SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XVIII.—No. 12. [NEW SERIES.] NEW YORK, MARCH 21, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Power Mortising Machines.

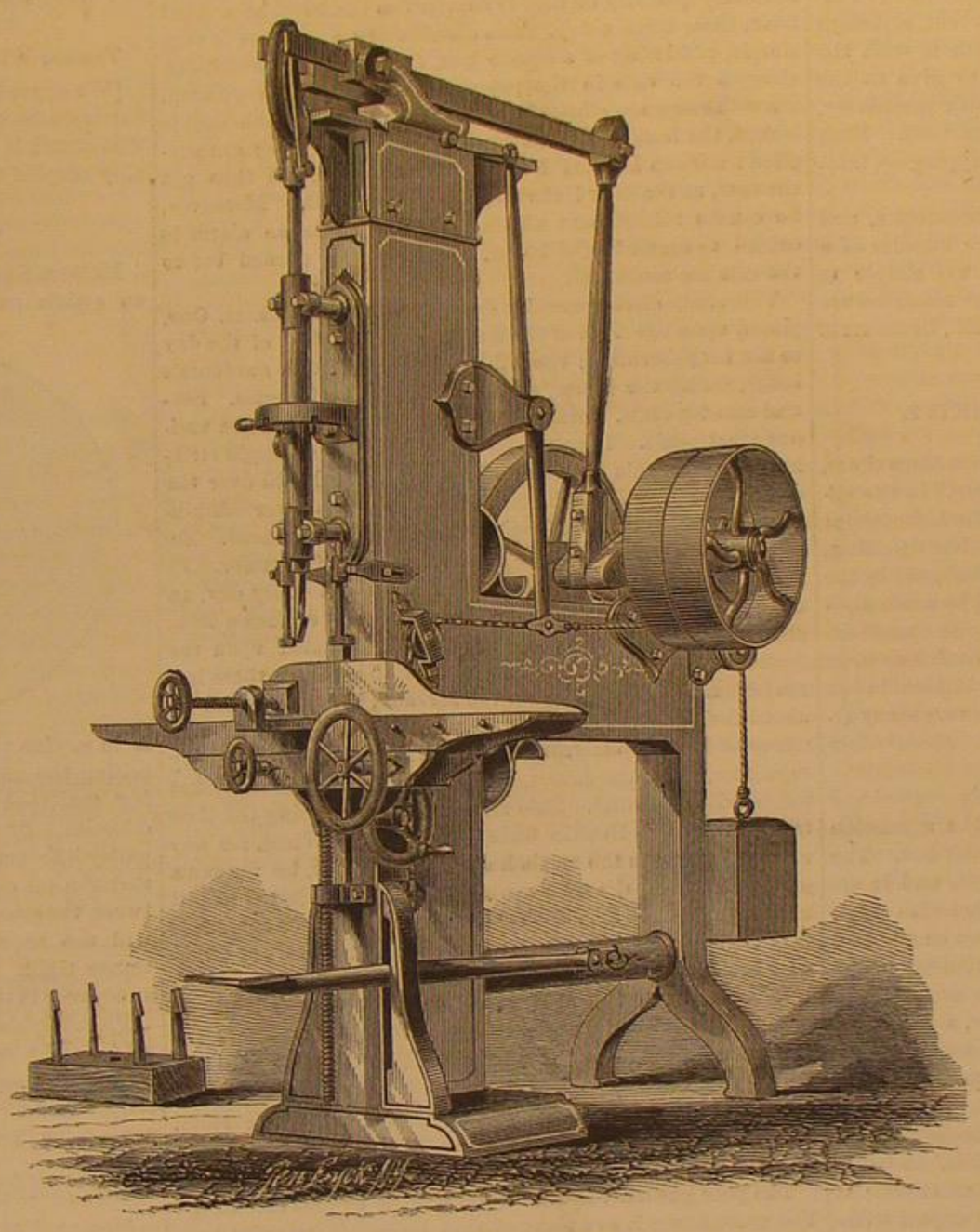
The engraving presents a perspective view of a power mortising machine which seems to possess some very decided advantages in portability, directness of action, compactness, and ease of handling. Beside, it can be placed, like a lathe or planer, on the floor of a shop, and is ready at once to receive a belt, requiring no bracing to keep it in place, as the machine—wholly of iron—has two supports, front and rear, as seen in the engraving.

While the machine is in operation the table, upon which the stuff is to be mortised, remains stationary, so far as its vertical movement is concerned, its only motion being a lateral one, governed by a hand wheel which passes the material gradually under the vibrating chisel.

The movable fulcrum at the top of the machine, sliding on planed ways, is actuated by the foot lever, so that when the foot is raised from the lever, a weight or other device, by a chain connection, brings the fulcrum forward and makes it a dead center of the crank pitman, or a pivot on which the lever plays, so that no motion is imparted to the vertical chisel bar, although the machine may be running and the crank turning. To start the chisel the foot is pressed upon the treadle throwing the sliding fulcrum back until the requisite length of stroke is obtained. Thus the depth of cut in the timber is entirely under the control of the operator. A screw with platen on one end and a hand wheel at the other secures the stuff in place, while another hand wheel will feed it across under the chisel. The upper portion of the carriage can be brought forward or back by another hand wheel, and the whole carriage or platen can be raised by a similar device. All these appliances are directly in front of the operator and under his immediate notice, so that they can be operated by his hand without the slightest change of his position.

The advantages of a movement such as is shown in this machine are, that great power is obtained, and the operator is relieved from the severe jar experienced when operating machines where the stuff is brought up to the chisel by a rising table. Soon as the mortise is finished the operator raises his foot from the treadle, the sliding fulcrum returns to the front of the machine, and the motion of the chisel instantly ceases, thus avoiding all danger from the chisel while changing the stuff.

Manufactured by Witherby, Rugg, & Richardson, 24 Central street, Worcester, Mass., to whom all orders should be addressed.



BARTLETT'S PATENT POWER MORTISER.

Improvement in Plow Clevis.

The object of this device is to afford a ready means of adjusting the pitch of a plow so that the depth of the furrow may be easily regulated and governed, as desired, by means of a vertical oscillating clevis attached by a pivot to the forward end of the plow beam.

Fig. 1 shows a plow with the adjustable clevis attached. Fig. 2, shows more clearly the construction and operation of the device. The clevis, A, is of U-shape, having one arm about one time longer than the other, the long arm having a segmental T-head, B, perforated with a series of united holes. The clevis is pivoted to the beam by a bolt passing througth the beam and both arms of the clevis. The adjusting bolt C, having a handle at one end to be used as a wrench, is threaded at the other, and engages with a nut sunk into the plow beam. That portion of the bolt directly under its handle fits accurately the holes in the segment, holding the device firmly. In Fig. 2 the full and dotted lines taken together represent the form of the clevis and its positions. It may be made either of wrought or malleable cast iron, and can be used on all sizes and description of plows, while the cost is no more than that of any other clevis.

Patented by Jacob Newhart, Oct. 29, 1867. All communications should be addressed to Newhart & Co., Terre Haute, Ind.

Fig. 1.

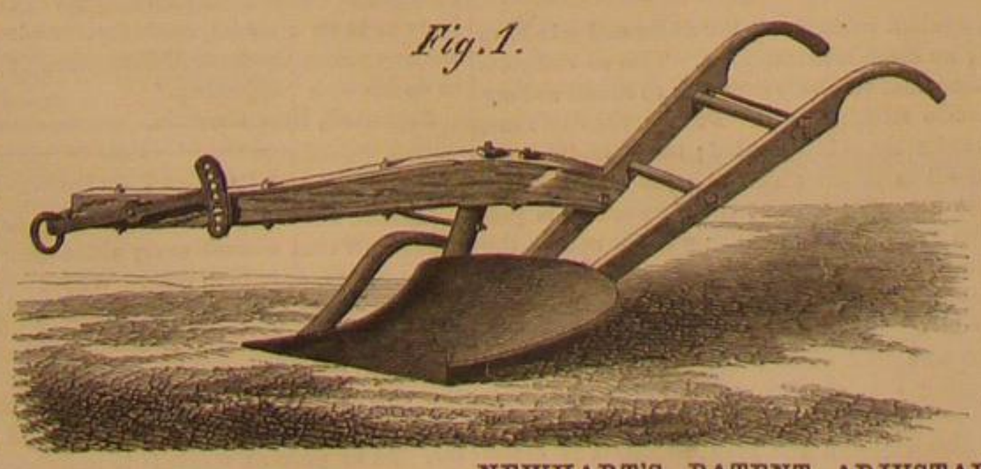
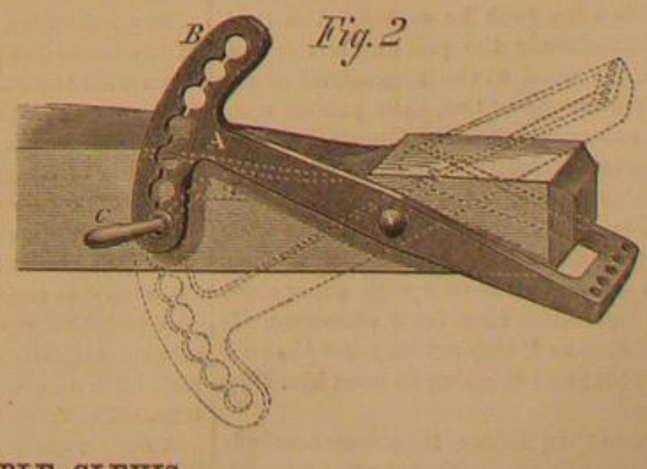


Fig. 2



NEWHART'S PATENT ADJUSTABLE CLEVIS.

How Kid Gloves are Made.

From an interesting article in *Harper's Magazine*, describing the process of manufacturing kid gloves, employed in the large European establishments, we make the following extracts, believing that the information will be acceptable to our readers:

"The skins of the young kid, after being roughly dried in the sun and air, are sold to peddlers who go about from place to place gathering them, in order that the latter may in turn sell them to dealers in the principal towns adjacent to the mountain ranges. These peddlers commence this work in Italy as early as March in each year, and proceed northward as far almost as the Baltic, as the season advances and the young kids reach their required maturity. The most important point for obtaining skins in Italy is Naples. Leipsic, in Germany, is also one of the considerable markets. The extent of the trade may be inferred from the fact that a single manufacturer of gloves in Paris makes about 600,000 pairs annually. He leaves no market in Europe unexplored to obtain the best material for the manufacture of gloves. The price of skins—such is the growing demand—has advanced nearly 50 per cent in the last five or six years.

"The process of cleansing the inner portion of the skin from fleshy impurities, of reducing the thickness when necessary by paring or scraping, and of removing the hair after it has been soaked in a solution of lime and water, or otherwise prepared, is very much the same as with other light skins. After expelling the lime, which has already performed its service, the skin is converted into soft leather for gloves by subjecting it to a solution chiefly of alum and salt. The skins, immersed in this emulsion, are trampled upon with bare feet until they become thoroughly impregnated with the liquid. They are dried, and also rubbed and stretched to make them smooth and supple, and portions are bleached—the object of these several processes being to render them incapable of the decomposition to which they are liable in their natural state, and to make the leather soft, pliable, and partially impervious to water

"Some of the manufacturers in France perform this work, as well as that of dyeing, in their own establishments, so as to be certain to command a large trade, but others buy the skins already prepared.

"For the purpose of coloring, the liquid dye is made in a kind of tub, attached to which is a sloping rest composed of wood, on which the leather—for such it has become—is fastened so as to permit the ready application of the dye to its outer surface by smearing, which is done by the hand, with the aid of a brush. If it were immersed, the inner portion of the glove would receive the dye as well as the outer, and stain the hand. The best leather is that dyed black, or of some other dark color, as only those skins are used for these colors which are free from imperfections on the surface. The dye does not penetrate beyond the mere exterior, and such imperfections as become visible when the glove is stretched—in the nature of a slight opening—are more obvious when the color is dark, and hence skins of poorer texture are used for white kids, which are known to be more flexible than others. The number of shades communicated in dyeing these leathers is about two hundred, gloves of any one of which will be furnished to a large customer who sends his orders in advance of their manufacture. Nearly all the diversity in the colors of flowers and plumage of which we know is presented, to afford gratification to the sense of pleasure occasioned to the wearer by their appropriation and display.

"Large dealers in gloves usually keep on hand a book of sample colors, in which small pieces of colored leather are arranged in the order in which the respective shades vary, each being numbered so as to correspond with a like book retained by the manufacturer, to which reference is made in giving and filling orders.

"The leather, thus tanned and dyed, is cut up into small rectangular pieces, and then stretched to the length and width of the proposed glove—the process being accomplished by holding each extremity of it in the hand and straining the piece gradually over a metallic edging fashioned for the purpose. A small metallic plate, furnished with sharp points arranged according to the shape of the hand, is then pressed on the leather, so that the latter may be cut into the shape and size which the points indicate. The person who does this—or some other if the business is on a large scale—follows with his scissors the slight indentations in the leather, which show the line for each finger and the position of the thumb. Others are engaged in cutting out thumbs, and still others in fashioning the gores, portions of which are cut out of the small pieces which remain when the chief parts of the glove are formed. There are ten different sizes for ladies' gloves—5½, 6, 6¼, 6½, 6¾, 7, 7¼, 7½, 7¾, and 8; thirteen for gentleman—7½, 7¾, 8, 8¼, 8½, 8¾, 9, 9¼, 9½, 9¾, 10, 10¼, and 11; and seven for misses—5, 5¼, 5½, 5¾, 6, 6¼,

and 6½. The numbers in each class indicate a different size, those of gentlemen being longer in the fingers and higher in the wrists than are those of ladies of like numbers; though they are alike in width, and the misses' gloves are narrower than either. Each of these sizes is cut in the manner above mentioned by the points of a corresponding plate. Great care is exercised in securing uniformity of shade and texture in the various parts of a pair of gloves, although close scrutiny sometimes shows the wearer a slight difference.

"The gloves being cut, and all the parts supplied except the button or other fastening, or some ornament, they are tied together in bundles of a dozen each, and distributed over Paris and adjacent convenient towns for the purpose of being sewed. The families that do the sewing have scarcely any other industry, except that which appertains to their own households, or, if in the country, to their rural establishments, and occupy the intervals when not otherwise employed in these duties in sewing gloves. The amount paid for each pair—which is only about ten cents—would scarcely maintain those who devoted themselves exclusively to the work. The sewing is generally done by hand, but the parts to be united are held in a metallic clamp, the edges of which are regularly notched as a guide for the needle; and so accustomed do the women become to their work that, although the notch is very slight, they are able to reach it with the point of the needle with such accuracy as to give to the stitch the appearance of having been made with machinery, and this without keeping the eyes upon the work. Each stitch is now held with a knot to prevent ripping—a fault until recently common to gloves."

The addition of buttons, fastenings, and ornaments, and the final collection of the finished gloves into bundles of a dozen each, ready for market, are processes too simple to need special mention. For a description of the manufacture of American kid gloves, see page 242, Vol. XI., Scientific American.

CURIOUS APPLICATIONS OF ELECTRICITY.

Robert Houdin, the greatest *prestidigitateur* of modern times, lives in a charming mansion called the "Priory," in the village of Saint Gervais, upon the right bank of the Loire, about one and a half miles from the city of Blois. His dwelling, with the spacious grounds surrounding it, are believed by the common people of the vicinity to be controlled by some mysterious agent; and in their eyes the owner has an almost supernatural reputation. This impression has doubtless been produced, in no small measure, by the fact that M. Houdin has made extensive use of electricity to accomplish very many remarkable, and at the same time useful results. Some of these are exceedingly ingenious.

The main entrance to the Priory is a carriage-way closed by a gate. Upon the left of this is a door for the admission of visitors on foot; on the right is placed a letter-box. The mansion is situated a quarter of a mile distant, and is approached by a broad and winding road, well shaded with trees.

The visitor presenting himself before the door on the left, sees a gilt plate bearing the name of Robert Houdin, below which is a small gilt knocker. He raises this according to his fancy, but no matter how feeble the blow, a delicately tuned chime of bells, sounding through the mansion, announces his presence. When the attendant touches a button placed in the hall, the chime ceases, the bolt at the entrance is thrown back, the name of Robert Houdin disappears from the door, and in its place appears the word "entrez," in white enamel. The visitor pushes open the door and enters; it closes with a spring behind him, and he cannot depart without permission.

This door in opening sounds two distinct chimes, which are repeated in the inverse order in closing. Four distinct sounds, then, separated by equal intervals, are produced. In this way a single visitor is announced. If many come together, as each holds the door open for the next, the interval between the first two and the last two strokes indicates with great accuracy, especially to a practiced ear, the number who have entered; and the preparation for their reception is made accordingly. A resident of the place is readily distinguished; for, knowing in advance what is to occur, he knocks, and at the instant when the bolt slips back he enters. The equidistant strokes follow immediately the pressing of the button. But a new visitor, surprised at the appearance of the word "entrez," hesitates a second or two, then presses open the door gradually, and enters slowly. The four strokes, now separated by a short interval, succeed the pressing of the button by quite an appreciable time, and the host makes ready to receive a stranger. The traveling beggar, fearful of committing some indiscretion, raises timidly the knocker; he hesitates to enter, and when he does, it is only with great slowness and caution. This the chimes unerringly announce. It seems to persons at the house as if they actually saw the poor mendicant pass the entrance; and in going to meet him they are never mistaken.

When a carriage arrives at the Priory, the driver descends from his box, enters the door by the method now described, and is directed to the key of the gate by a suitable inscription. He unlocks the gate, and swings open its two parts; the movement is announced at the house, and on a table in the hall, bearing the words, "The gate is ——" appears the word "open" or "closed," according to the fact.

The letter box, too, has an electric communication with the house. The carrier, previously instructed, drops in first all the printed matter together; then he adds the letters, one by one. Each addition sounds the chime; and the owner, even if he has not yet risen, is apprised of the character of his dispatches.

To avoid sending letters to the village, they are written in the evening; and a commutator is so arranged that when the carrier drops the mail into the box the next morning, the electricity, in place of sounding the chime in the house, sounds one over his head. Thus warned, he comes up to the house to leave what he has brought, and to take away the letters ready for mailing.

"My electric doorkeeper then (says Houdin) leaves me nothing to be desired. His service is most exact; his fidelity is thoroughly proven; his discretion is unequalled; and as to his salary, I doubt the possibility of obtaining an equal service for a smaller remuneration."

M. Houdin possesses a young mare, whom he has named Fanchette. To this animal he is much attached, and cares for her with the greatest assiduity. A former hostler, who was an active and intelligent man, had become devoted to the art so successfully practiced by his employer in previous years. His knowledge, however, was confined to a single trick, but this he executed with rare ability. This trick consisted in changing the oats of his master into five-franc pieces. To prevent this peculation, the stable, distant from the house seven or eight rods, is connected with it by electricity; so that by means of a clock fixed in the study, the necessary quantity of food is supplied to the horse at a fixed hour, three times a day. The distributing apparatus is very simple, consisting of a square box, funnel-shaped, which discharges the oats in the proportions previously regulated. Since the oats are allowed to fall only when the stable door is locked, the hostler cannot remove them after they are supplied; nor can he shut himself in the stable, and thus get the oats, as the door locks only upon the outside. Moreover, he cannot reënter and abstract them, because an alarm is caused to sound in the house, if the door be opened before the oats are consumed.

This study clock transmits the time to two dial-plates. One, placed upon the front of the house, gives the hour of the day to the neighborhood; the other, fastened to the gardener's lodge, facing the house, gives the time to its inmates. Several smaller dials, operated similarly, are placed in the various apartments. They all, however, have but a single striking part, but this is powerful enough to be heard over the entire village. Upon the top of the house is a tower containing a bell on which the hours of meals are announced. Below this is a train of wheel-work to raise the hammer. To avoid the necessity of winding up the weight every day, an automtic arrangement is employed, which utilizes a force ordinarily lost. Between the kitchen, situated upon the ground floor, and the clock work in the garret, there is a contrivance so arranged that the servants in going to and fro about their work, wind up the weight without being conscious of it. An electric current set in motion by the study regulator, raises the detent, and permits the number of strokes indicated by the dial. This manner of distributing the time from the study, Houdin finds very useful. When, for any reason, he wishes the meals hurried or retarded, he presses a secret key, and the time upon all the dials is altered to suit his convenience. The cook finds often that the time passes very rapidly; while a quarter of an hour or more, not otherwise attainable, is gained by M. Houdin.

Every morning this clock sends, at different hours, electric impulses to awaken three persons, the first of whom is the gardener. But, in addition, the apparatus forces them to rise, by continuing to sound until the circuit is broken by moving a small key placed at the further end of the room. To do this, the sleeper must rise, and then the object sought is accomplished.

The poor gardener is almost tormented by this electricity. The greenhouse is so arranged that he cannot raise its temperature above 10° C. (50° F.), or let it fall below 30° C. (37° F.) without a record in the study. The next morning Houdin says to him, "Jean, you had too much heat last night; you will scorch my geraniums;" or, "Jean, you are in danger of freezing my orange trees; the thermometer descended to three degrees below zero (27° F.) last night." Jean scratches his head and says nothing, but he evidently regards Houdin as a sorcerer.

A similar thermo-electric apparatus placed in the woodhouse, gives warning of the first beginning of an incendiary fire.

As a protection against robbers, all the doors and windows of the house have an electric attachment. This so connects them with the chime that the bells continue to sound as long as the door or window remains open. During the day time, the electric communication is interrupted; but at midnight—the hour of crime—it is reëstablished by the study clock. When the owner is absent, however, the connection is permanent. Then the opening of a door or window causes the great bell to sound like a tocsin. Every body is aroused, and the robber is easily captured.

A pistol-gallery is upon the grounds, and Houdin often amuses himself in shooting. But in place of the ordinary method of announcing a successful shot, a crown of laurels is caused to appear suddenly above the head of the marksman.

A deep road passes through the park, which it is sometimes necessary to cross. On reaching it, no bridge is to be seen; but upon the edge of the ravine, a little car appears, upon which the person desiring to cross places himself. No sooner is he seated than he is rapidly transported to the opposite bank. As he steps out, the car returns again to the other side. This being a double-acting arrangement, the same aerial method is made use of in returning.

"I finish here my description," says Houdin. "Ought I not to reserve some few and unexpected details for the visitor who comes to raise the mysterious knocker, below which, it will be remembered, is engraved the name of Robert Houdin?"—*College Courant (Yale)*

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Solder Drops.

Messrs. Editors:—In looking over some back numbers of the Scientific American, I noticed a patent plate or mold for casting "solder drops," and it occurs to me that a process used by me for accomplishing the same result might be of use to many of your readers.

I am a practical tinsmith, and have never yet met with any one who was in possession of the secret, except the person who taught me, and it has always been a source of wonder to all who have witnessed the process. It consists simply in pouring the melted solder into cold water, and the whole secret is in pouring it at as low a heat as possible and have the metal run. Pour a steady stream about one-eighth inch in diameter, holding the lip of the melting cup about two or three inches from the water.

Inclosed with this I send samples of the "drops," which you will see are of the most convenient shape possible for tinsmiths' use.

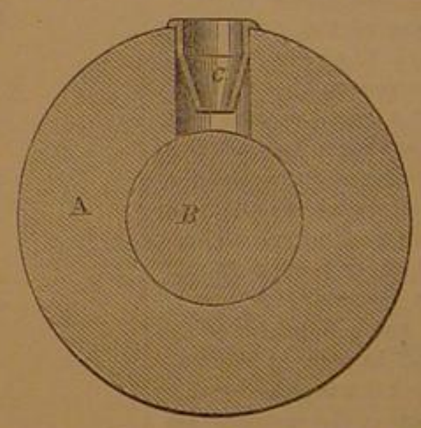
N. F. Blackman.

Tomah, Wis.

[We append a sketch of one of the "drops," of which our correspondent has sent a number, uniform in size and shape. The sketch is of full size, and the form appears to be admirably adapted to several varieties of tinman's work.—Eds.

Waste of Oil--Loose Pulleys.

Messrs. Editors:—In your paper of the 8th of February is an article on the waste of oil in shops and manufactories, which is of more value than the price of your journal. Therefore I desire to contribute something upon the same subject which may be of some use to a portion of your readers. One great source of waste of oil in shops and factories is to be found in the loose pulleys. The oil holes are left open, and when the machinery is in motion the oil is thrown out, saturating the belts and soiling the machines. This can easily be prevented by having conical-shaped tubes, made of sheet metal fitted in the oil holes. By the annexed diagram, which is a section of a pulley hub cut through the oil hole and tube, it will be seen that the oil cannot run out, but will lodge in the space between the sides of the hole and tube, and of course the pulley will not require oiling so often. The tube must fit the entrance tight. No plug is needed, and all further waste and annoyance is ended.



Samuel Brown.

Philadelphia, Pa.

[A is the section of the pulley hub, B the shaft, C the sheet metal tube inserted in the oil hole. The device is so simple that no mechanic can fail to understand it, and it appears to be just what is needed.—Eds.

Self-adjusting Telegraph Magnet an Impossibility.

Messrs. Editors:—Seldom or never does the manipulating key break the *whole* of the electric current on a line of telegraph, frequently but a small portion of it; hence, communication is effected by a variation in the strength of current. But variations arise from other causes, and these changes are sometimes greater than those produced by the act of sending messages. Therefore, a self-adjusting magnet must be one that will obey changes of current, no matter how slight, when made by the operator, but will refuse to act from accidental changes, however great; in other words, it must have the power of discriminating between causes of variations in strength of current. As no magnet can do this, a self-adjusting one is an utter impossibility. As long as any thing but the key varies the force of the current, the operator will have to do his own "adjusting." S.

Aspinwall, New Granada.

Improvement in Hand Printing Presses Wanted.

Messrs. Editors:—I notice every week, in the Scientific American that almost every third patent is a washing machine, churn, or animal trap. Why do not the ingenious men of our country turn their attention to the printing office, and the wants of printers. Hundreds of patent *steam presses* (printing) are made each year, but where there is one office that can afford one of these machines there are twenty that cannot. The hand press has never been changed for the better. As at present made, it is too clumsy, and the old-fashioned tympan is constantly becoming slack and wearing out, and then comes the laborious re-covering. There is a nice fortune awaiting the man who will improve upon the hand printing press, and give country printers a machine they can afford to buy. The machine presses for newspapers, as now constructed, cost more (each) than four fifths of the country offices are worth. Won't you call the attention of inventors to this need, and if you succeed in awaking a slumbering genius, you will receive the thanks, I am sure, of all country printers, and you know they are no small class in the United States. W. A. Gabe.

Bloomington, Ind.

Steam Expansion---The Vacuum

MESSRS. EDITORS:—On page 52, No. 4, Vol. XVIII., I notice an article entitled "Steam Expansion" in which the writer labors under a great mistake; for his statement that "any good engine working steam to a quarter of stroke, cutting off and expanding to near half stroke, will form a vacuum on the steam side of the piston the remainder of the stroke," is not in conformity with practice.

The experiments of M. Regnault upon this subject have been very elaborate and very carefully conducted, and the result of his investigations shows that the temperature of steam does not increase as fast as the pressure does and that the sum of the latent and sensible heats do not form a constant quantity. Steam of 14·7 pounds pressure to the square inch has a temperature of 212°, while in steam of 75 pounds pressure the sensible heat is 304° and the latent heat 901. Expand this 75 pounds of steam to double its bulk, which would bring its pressure down to 37½ pounds, and its sensible heat to 264° instead of 152, while its latent heat would be 928°. From this it will be seen that the sensible heat increases slightly with the pressure while the latent decreases for in steam of 100 pounds the sensible heat is 327·8° and latent heat 886·1°, total 1213·9°; expand this to 15 pounds and the sensible heat will be 213·1°, the latent 965·8°, total 1178·9°, which makes a difference of 35°.

Bourne states that if steam of 100 pounds be expanded down to 15 pounds, it will have 35 degrees of heat over that which is required to maintain the vaporous state, or, in other words, it will be surcharged with heat, but I think differently. Your correspondent makes the remark that a small percentage of air mixed with steam in a high pressure engine helps its expansion. I do not think it would be any advantage to do so for the power that would be required to move machinery to do this, would be more than the benefit gained therefrom.

F. A. WISWELL.

Lenoxville, Province of Quebec.

Latent and Sensible Heat.

MESSRS. EDITORS:—Will you or any of your correspondents inform me whether any of the latent heat of steam is converted into motion in passing through the steam engine? If sensible heat alone is converted into motion it is evident that the greater the pressure and consequently the sensible heat, the greater will be the return of power from a given quantity of steam. The sum of the latent and sensible heat of steam is always the same—1212° F. Steam under a pressure of 100 lbs. to the inch has a sensible heat of 332° or 365° of the entire heat contained in the steam. If this alone is available, may not this be the reason for the present imperfection of steam machinery? D. B. T.

Bellefontaine, Ohio.

[Steam loses heat precisely in proportion to the amount of force it gives out. The heat is converted into ordinary motion. Heat is force. If the sum of latent and sensible heat of steam be a constant quantity, then a loss of sensible heat without condensation to water requires an increase of latent heat.—EDS.

Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., F.R.S.

Lecture V.

You know that towards the end of the last lecture I failed in the experiment of freezing water in a red hot crucible by means of carbonic acid snow. As I do not like failures in experiments I will try to make that good. I have here some of this beautiful carbonic acid snow, which I will now put in this red-hot crucible. I will pour upon that a quantity of ether, and then I bring down into the middle of the mixture this hollow brass ball containing water. The ether is now boiling. I will put in some more of this carbonic acid snow. It burns my hand—it is so enormously cold. This ball is very cold, and I have no doubt that already there is ice in it. The quantities of the substances are much smaller than I have been accustomed to work with, but I dare say we shall succeed notwithstanding all our difficulties. [After a short interval the water was found to be frozen.] There! look at that. The water in this spheroid is converted into ice, even in this red hot crucible!

I have here some mercury, and I will pour some of it into this basin. I dare say we shall be able to solidify this mercury by means of this beautiful carbonic acid snow. Now observe here what I think you have never seen before. You know the liquid metal mercury. You have it here made solid—frozen by the cold acid. This requires a far greater cold than will freeze water. I might beat this substance on an anvil or cut it with a knife. It becomes liquid again in a moment. If I hold this solid frozen mercury in a vessel of water, the mercury will become liquid and fall, and each little drop of mercury which falls will produce a stalactite of ice. See, the frozen mercury is being melted by that water. This is really cold water, but it is hot to the frozen mercury, and a mass of ice is produced round about the mercury which has been cold enough to do that.

We have now to pass on to another and very different portion of our subject. I have endeavoured to give you a kind of image, more or less perfect, of this thing that we call heat. I have endeavored to give you a picture as it were, which your minds should realize.

If you take a hot body and place it in the air, you find that it gradually cools. If it be red hot the glow first of all sinks, and by and by you see nothing of it. The thing gets cooler and cooler, and at the end becomes as cool as the surrounding air. Now this heat, in the first instance, was a motion of the particles of the hot body. When the body cools it is simply giving up its motion. Now to what does it give up its motion when you place it in the air? Well you might say, to the air. True: and when I held the heated piece of iron in front of the screen you saw the hot particles of air streaming up into the air above; so no doubt the motion which the hot body gives up is given up to the air. But if you put the hot body in the middle of a place where air did not exist it would still cool. Now, I want you to exercise your imagination as to the manner in which this motion is disposed of, lost, or given out when a body cools. I believe most of you know how it is that sound travels through the air, at least, how it is that the sound of my voice propagates itself through the air and makes every word I say audible, I trust, to you all. I have often looked into persons' throats when they were speaking, and observed cords or tendons there which are thrown into a state of vibration when we speak or sing. They cause the air to shiver, and those tremors are propagated through it just as motion is propagated by ripples over the surface of water when a stone is thrown into it. So if I draw this violin bow across this tuning fork, you have this beautiful sound produced, I can actually see the fork vibrating being thus near it, and you can hear it tapping against this card. The whole function of a tuning fork is to throw the air into tremors, and these tremors communicated to the air, are the cause of sound. The tuning fork communicates its motion to the mass of air which surrounds it. The vibrations of this tuning fork gradually become less intense, and the sound which it makes gets lower. Now, that is exactly analogous to the cooling of a hot body. It communicates its motion to what is called the "ether," by means of which bodies which are hot communicate their motion to the universe around. You all hear my voice. The human ear is one of the most wonderful organisms in the universe. I often think the human ear is still more wonderful than the human eye. It is by virtue of this wonderful organ that you hear with perfect distinctness every word I am uttering; but it does not tell that this communication of motion is going on. I want to show you something that will. Instead of the ear I will take a flame, which I dare say will give me a very good result. Perhaps one of the boys will chirrup to that flame. Every vibration produced by the lips by the act of chirruping is communicated to that flame, and makes it dance in that peculiar way. The action of this flame is an illustration of the motion in the air produced by sound. This action of flames was discovered by professor Leconte, in the United States: and it has been worked at in this country by Mr. Barret and myself. Something passes through the air and knocks the flame down when you chirrup. The vibrations communicated to the air make the flame behave in this peculiar way.

We now come to consider the cooling of a body. I say that the act of cooling must be figured in a similar way to the action of a body producing sound. The cooling body is communicating its motion, not to the air, but to this wonderful thing called the ether. The radiation passing through the air might be called the radiation of sound: but when motion is communicated to this wonderful ether it is called the radiation of heat. To illustrate this we must employ this beautiful instrument with which you are already acquainted—the thermo-electric pile. I shall now unite the ends of these wires with this pile, and we shall observe by means of our magnetic needle whether the pile is heated or chilled. I wish I could have a warm cheek here, for every one of you here present is a radiating body, not luminous but radiating. [The lecturer then selected a boy from the audience, and led him to the lecture table.] I want to make my young friend here my radiating body. I will first chill the pile by turning it to the cool side of the room, and then bring the needle to rest by means of this magnet. The pile itself is now a radiating body, and hence you see the needle coming down. I will now try and extract heat from the cheek of my excellent friend here. He does not touch the pile. I will depend purely on the radiation of heat from his cheek, and I will venture to say that if his cheek is not chilled by the very cold weather, the needle will move up through an arc of 90°. Observe, now, the needle goes up in virtue of the heat extracted from his cheek. We will now direct the face of the pile against this comparatively polar region of the room, and allow it to waste its heat once more. Now the heat which has produced this effect on the pile is the radiant heat which I want to examine during the rest of the lecture.

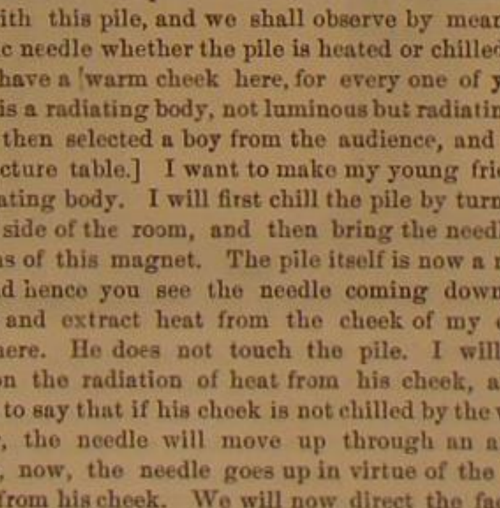


Fig. 1.

I want to show you that various bodies possess the power of emitting this radiant heat in very different degrees. My friend's cheek was an admirable radiator of heat. There are various other bodies, however, much less admirable as radiators. To show this fact, I will take this cube. (Fig. 1). It is covered on three sides with velvet. One side has white velvet, one has scarlet velvet, and the other has black velvet, and this fourth side is a naked face of metal. I should like to make clear to you that these four sides of this cube possess the power of radiating heat in very different degrees; and for the purpose of showing you this I will fill the cube with boiling water. The sides of the cube will become equally heated by the hot water poured into the cube, and then I will allow them in succession to radiate against our thermo-electric pile. I dare say you will then see the distinction. I first bring the needle to zero by turning the face of the pile away from the audience; and now I place the cube of hot water on this little stand near the pile. I think you will agree with me that the outside of the metal side of the cube must be hotter than the velvet. You could feel this difference by placing your hand upon them. But still, I think the velvet will be able to produce a greater effect upon the pile than the metal surface. The metal side, you see, does not produce much effect upon the pile. Now I turn the velvet to the face of the pile, and you see that the needle goes up beyond the position it occupied when the metal side was there. I now turn the metal side back again, and the needle will go down. Now you see it going down; and when it has gone down a little more, I will turn the black velvet surface toward it, and you will see that the needle will go up again. Thus you see that the heat radiating from this velvet surface is much greater than the heat radiating from the metal; and we have from this fact a beautiful consequence which many boys would not think would occur. The consequence is this. If we filled with boiling water these two vessels, one of which is covered with a thick coating of flannel, and the other of which has naked sides of metal, and allowed them to rest here until the end of the lecture, and then put a thermometer in each to find out the temperature of the water, which vessel do you think would contain the coolest water?

Boys of the Audience: The metal one.

The Lecturer: You have not philosophized correctly upon the experiment I made with the cube. Your conclusion is the most natural one, but you saw that the quantity of heat sent away from the covered surface of the cube was greater than the quantity sent away from the uncovered surface. In the same way the quantity of heat from the radiating vessel coated with flannel would be greater than that radiating from the uncovered metal vessel, and therefore at the end of the lecture the water in the covered vessel would be three or four degrees cooler than the water in the other. In order that this difference should exist in favor of the covered vessel, it must be covered very closely; that it to say, the heat must communicate itself very freely from the surface of the metal to the flannel covering. If it were not covered closely the result would be different and the heat would be preserved. This is the reason why ladies who wish to keep their teapots warm, put over them a kind of nightcap, which they call a "cozey." This cozey must, however, be loose about the teapot. If it were to fit very closely it would do more harm than good. However, if it does not fit tightly the heat radiates against the cozey, and the cozey prevents it from being radiated into space.

I have said that we find very great differences among substances in their power of radiating heat. Some are good radiators; some are bad radiators. The metals are all bad radiators. I now want to make plain to you another fact which goes hand in hand with this radiation. I think you will understand the experiment by which I want to illustrate this point. Here you see I have a metal surface which is a bad radiator. If that metal surface formed the side of a vessel containing hot water, it would radiate far less heat away than this surface which is coated with lamp black. A vessel coated as this surface is would cool the hot water in it far more rapidly than a vessel composed of naked tin. Now, observe that bodies have also different powers of absorbing or drinking in radiant heat, and as a universal rule the body that is a good radiator is a good absorber. Both actions are perfectly reciprocal the one to the other. I want to make this evident to you by means of a device; for in working in physical science we have incessantly to address questions, as it were, to nature, and we do that by means of experimental devices. And now I am going, in your presence, to ask nature the question which of these two surfaces absorbs and takes up the heat most speedily, most rapidly, and most effectually, if both be presented to a hot body—which of them, in fact, is the best absorber. The device that I want to employ in this experiment will be evident to you after a little attention on your part. Nothing is learned or nothing is understood without an act of attention on the part of the student; and if you do not think of these lectures afterwards, and read about the subject afterward—if you do not dwell upon what we say here, and work at the subject, and reflect upon it, these lectures will pass away from your memories, and make very little impression. In fact, these lectures are very little good except for the purpose of stirring you up, and giving you, as it were, the first taste of science. I really do not care much about lectures. I would rather have ten or a dozen boys working away with me in a room than be preaching to them as I am doing now. However, there is good to be done in this way if you will only think about the subject, and bring your own minds to bear upon it afterward.

FUSION OF GLASS.—Herr C. Sching has shown, by the application of the thermo-electric pyrometer, that the temperature of a glass furnace in operation is only from 1,100° to 1,250° C. Crystal glass becomes completely liquid at 929° C., and is worked at 833°. A Bohemian glass tube softens at 769° and becomes liquid at 1,052° C. Pure limestone loses its carbonic acid by heating for several hours at 617° to 675° C. The gas can be driven off more rapidly by increasing the temperature.

Why Men Like to Drink.

[The following article from the pen of Horace Greeley we copy from the *Herald of Health*, a journal which contains more sensible articles on subjects of a practical moral bearing, than are to be found in any other monthly that comes to our sanctum.]

The Greek root of the word intoxicate means poison. Whoever says a man is intoxicated, says he is poisoned. And it is true. Give a part of a glass of ordinary spirits to a child three or four years old, and the child is in twenty minutes in a congestion fit, and probably dies. It operates precisely like strychnine, arsenic, or any other deadly drug. Commence by giving a child a thimbleful at a time, and gradually increase the amount, and you may indurate him so that he will swallow as much at a time as would kill him at first. You may begin with any other poison, and do the same thing. Our physical framework is constructed with reference to this, to enable it to stand a large amount of any deadly substance. There is nothing peculiar in this action of alcohol. There is nothing in this but the universal law that all poisons destroy the susceptibility of the human frame.

Why does a man like to drink liquor? Not because it has a good taste, but because it exhilarates his nervous system. The man takes his first glass of liquor. It goes to his stomach. Now, there is not a single human stomach, nor that of any animal ever created on this earth, that ever did or can digest a drop of alcohol. The moment it falls into the stomach every vital organ recognizes the presence of a deadly enemy. It is precisely as if a lion were thrown into a cage of tigers, and every tiger were to recognize the lion as his deadly enemy. The stomach cannot digest it, and it cannot remain. All the organs assist in throwing it off, and that great struggle of every vital organ to rid the stomach of this poison is the very thing which the perverted senses recognize as *exhilaration!* If a man, standing on the moon, could have a telescope of sufficient power to enable him to view objects on the earth, and could have looked upon us during the late civil war, and have seen, dimly through the glass, the movements of immense bodies of men, he would have said, "This nation has an immense population; there is a tremendous outpouring of the people; this nation is in a state of extraordinary prosperity." Precisely so the man's sensorial, the point where the nerves of sense concentrate, recognizes, in this desperate effort of the vital organs to get rid of an enemy, a sense of strength and exhilaration in place of the languor and feebleness he felt just before. But in a little while, when nature has, by all her efforts, disposed of this poison, the man sinks down to his former condition, and a great deal below it. Nature has made her superior struggle; she has got rid of the poison; but she has tired herself in the effort. The next time Nature makes the same struggle, but she has not the same strength. The second glass does not make the man feel so good. The more a man drinks, the more he has to drink to attain a certain condition. He has to take more and more. Nature turns constantly to rid herself of it, but by and by becomes tired out and gives it up. There are men who are not very perceptibly affected by liquor. It does not make them drunk. It does not hurt them, they say. But it does hurt them. I never knew a man who drank a good deal without becoming intoxicated, whom liquor did not kill fast. And for physiological reasons. If a man will take poison, it is better to get rid of it than to keep it in the system. Drunkenness is one of God's infinite mercies, sent to help poor, mistaken, human beings to get rid of the consequences of their iniquity.

What we should do depends largely upon what we are able to do. It is not easy to fly in the face of public opinion. Laws will, after all, be mainly a reflection of the moral condition of the people. They will always be a little better, but not much better. If you should say that no one in the country should do a bad thing, it would be useless, because human nature, in the development to which we have reached, would not sustain such a law. Public sentiment is advancing. It does not allow men to make a parade of vices which were once tolerated. The time will come when men will not be licensed to sell alcoholic liquors, when grogshops will be where gambling-houses are now, out of sight.

Improved Process of Bleaching Cloth, Yarn, etc.

By Wheaton Luther, of Niagara Falls, N. Y., recently patented:

"First boil the article in common lime water, whose strength is from two to four degrees, an hour or hour and a half, depending principally upon the size of the piece. It may be soaked in cold lime water instead of boiling, but moderate boiling hastens the process, while severe boiling may damage the article. Next rinse the article thoroughly, for five minutes or more, in clean water, cold or hot, and immediately immerse in a dilute acid, muriatic or sulphuric, although I greatly prefer the latter, whose strength is about one degree, until it thoroughly permeates the article—say about half an hour. Then remove it, and without rinsing—and even squeezing is unnecessary—immediately, while it is thoroughly saturated with acid, immerse it in the bleaching liquid, chloride of lime or hyperchloride of magnesia, whose strength is about two or three degrees, and the bleaching will proceed very rapidly. In ordinary cases it will take from fifteen to thirty minutes to bleach thoroughly. The article is then removed, and without rinsing is immediately immersed in the dilute acid before mentioned for a few minutes, say five or ten, and the process is completed, and the article is thoroughly washed and rinsed.

"Having explained the process I will now proceed to explain the chemical action, so far as to enable others skilled in the art to understand that the process is a rational one. Boiling in lime is not new, but by treating it in acid according to my process, it is unnecessary to keep it in as long as by other known processes. After boiling, the lime is thoroughly washed or rinsed out, and this is the only washing or rinsing that is necessary during the whole process. The lime is supposed to start the color, and the acid continues the process. One of the essential features of this process is immersing the article in the bleaching liquid while it is thoroughly saturated with the sulphuric or other acid, thus causing the chlorine to be set free the instant that it comes in contact with the article bleached, whereas by other known processes the chloride of lime remains in contact with the article several hours, and rots or weakens it. It is better to have an excess than a deficiency of the acid, for it will set free the chlorine and prevent its preying upon the fiber; hence squeezing out the acid before the article is put in the bleaching liquid is unnecessary, and might prove detrimental. The acid used in my process is so dilute that it tends to strengthen the fiber, and it remains in contact with the bleaching powder so short a time that it comes out of the process as strong as it went in. The last immersion in the acid is to set free the chlorine, should any remain in the article after it has been removed from the bleaching powder. If the acid be sufficiently weak, the last immersion may be prolonged to a quarter or half an hour, without detriment to the process. By the process herein described I am able to bleach thoroughly in three or four hours."

Dittenhaver's Adjustable Clothes Line Post.

The improvement exhibited in the engravings is intended to prevent the overreaching frequently necessary in hanging out clothes, which is so detrimental to the health of woman, and to afford a ready means of stretching or taking in the line, and appears to be well adapted to both these purposes.

Fig. 1 is a perspective view of the contrivance, and Fig. 2 a central vertical section. A is a post or beam set firmly into the ground or otherwise secured to an immovable base, and

Fig. 1

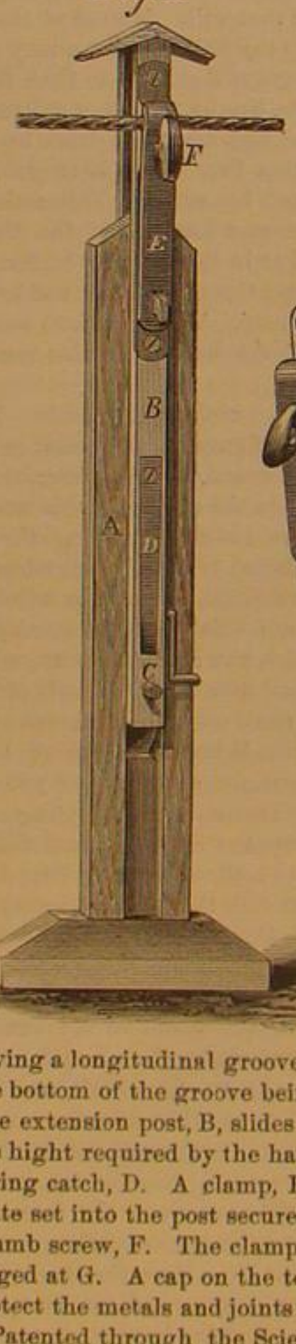
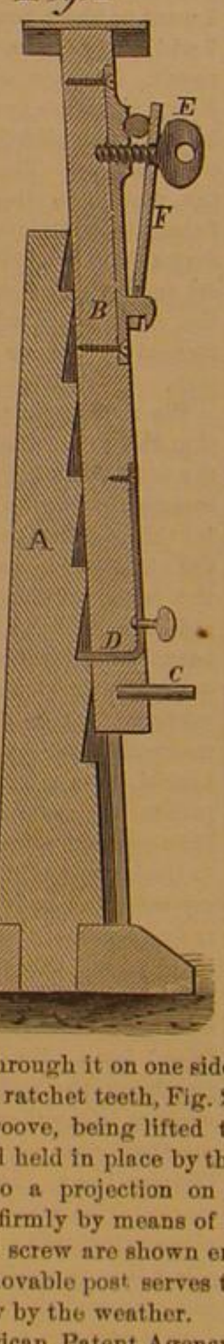


Fig. 2



having a longitudinal groove running through it on one side the bottom of the groove being cut into ratchet teeth, Fig. 2. The extension post, B, slides in this groove, being lifted to the hight required by the handle, C, and held in place by the spring catch, D. A clamp, E, hinged to a projection on a plate set into the post secures the line firmly by means of a thumb screw, F. The clamp, plate, and screw are shown enlarged at G. A cap on the top of the movable post serves to protect the metals and joints from injury by the weather.

Patented through the Scientific American Patent Agency, January 7, 1868, by George Dittenhaver, who may be addressed at Napoleon, Ohio.

Test your Kerosene.

In view of the many lamp explosions resulting almost invariably from the use of bad kerosene we urge upon the heads of families the importance of testing their oil before use in the lamp. This may be readily done by any man, woman, or child, by means of a thermometer, a little warm water and a tablespoonful of the oil. Fill the cup with warm water, the temperature of which is to be brought to 110° Fah. Pour the oil on the water; apply flame to the floating oil by match or otherwise. If the oil is unsafe it will take fire, and its use in the lamp is dangerous, *for it is liable to explode.* But if the oil is safe and good it will not take fire.

All persons who sell kerosene that will not stand the fire test at 110° are liable to prosecution.

During the germination of seeds and the growth of plants negative electricity is generated and becomes free in the air Pouillet has estimated that a surface of 100 square yards covered with vegetation, disengages in a day more electricity than is required to charge the most powerful Leyden battery,

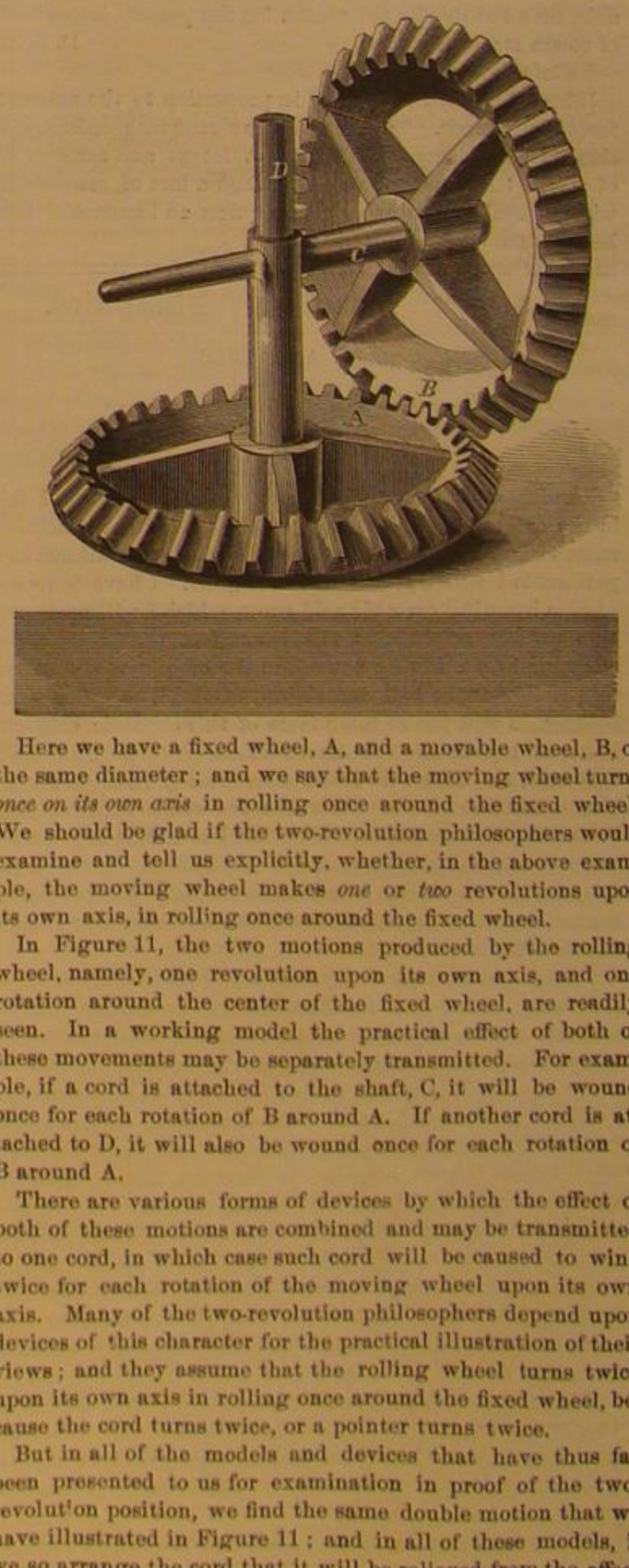
Turning a Movable Wheel Around a Fixed Wheel.

"How many revolutions on its own axis will a movable wheel make in rolling once around a fixed wheel of the same diameter?"

This discussion continues with unabated interest, and we are in the receipt, from all parts of the country, of communications upon the subject, some of which are of an exceedingly curious nature. One of our enterprising correspondents brings the matter to a very practical focus. He is connected with the Secombe Manufacturing Co., on Broadway, makers of Holt's patent Marking Wheel. This is a very ingenious and effective contrivance for printing business cards upon all sorts of surfaces, plane or curved. It consists of a handle carrying a printing wheel, around which a plate of flexible printing types is secured, and whenever the wheel rolls over a given surface a print is made. One of the common uses for which this instrument is now employed all over the country is to stamp the curved surfaces of pails, firkins, cylinders, bottles, fixed wheels, etc., and in many cases the fixed wheel or cylinder is of precisely the same diameter as the rolling printing wheel. Our correspondent assumes that this wheel turns only once on its own axis in rolling once around a fixed wheel of the same diameter; he extends a cordial invitation to all the two-revolutionists to visit his place of business and try the thing for themselves; to all who can show that the wheel makes two revolutions he offers to present one of the printing instruments valued at $10. This is practical, and is, moreover, a *bona-fide* offer. We trust that "L. M.," W. E. H., Prof. Hepburn, Prof. Vander Weyde, Prof. Jackson, the *Newburyport Herald*, Capt. Goodwin, A. W. B., and all the geometrical, astronomical, mathematical, mechanical, and all other two-revolution philosophers will call on our correspondent, demonstrate their theory and carry away the proffered prizes. Hundreds of the rolling wheels are there waiting for them, with any quantity of fixed wheels upon which to try the experiment. In the meantime we publish the letter of our correspondent with diagram of the instrument; together with sundry other letters and illustrations of the general subject.

We have heretofore stated that in the rolling of the wheel around the fixed wheel, a compound motion was produced, and that the rolling wheel turned once on its own axis, and once around the center of the fixed wheel. We give an illustration:

Fig. 11.



Here we have a fixed wheel, A, and a movable wheel, B, of the same diameter; and we say that the moving wheel turns *once on its own axis* in rolling once around the fixed wheel. We should be glad if the two-revolution philosophers would examine and tell us explicitly, whether, in the above example, the moving wheel makes *one* or *two* revolutions upon its own axis, in rolling once around the fixed wheel.

In Figure 11, the two motions produced by the rolling wheel, namely, one revolution upon its own axis, and one rotation around the center of the fixed wheel, are readily seen. In a working model the practical effect of both of these movements may be separately transmitted. For example, if a cord is attached to the shaft, C, it will be wound once for each rotation of B around A. If another cord is attached to D, it will also be wound once for each rotation of B around A.

There are various forms of devices by which the effect of both of these motions are combined and may be transmitted to one cord, in which case such cord will be caused to wind twice for each rotation of the moving wheel upon its own axis. Many of the two-revolution philosophers depend upon devices of this character for the practical illustration of their views; and they assume that the rolling wheel turns twice upon its own axis in rolling once around the fixed wheel, because the cord turns twice, or a pointer turns twice.

But in all of the models and devices that have thus far been presented to us for examination in proof of the two-revolution position, we find the same double motion that we have illustrated in Figure 11; and in all of these models, if we so arrange the cord that it will be relieved from the effect of the central motion, then only the actual rotation of the movable wheel upon its own axis is transmitted, and the

cord will be wound but once for each rotation of the moving wheel around the fixed wheel.

Our friend L. M. whose original diagram gave impetus to the discussion, appears again as follows:—

MESSRS. EDITORS:—In the progress of this discussion it is increasingly manifest that the variance in the views of your correspondents arises, mainly, from the variant meanings we attach to one or more words and phrases. Under this impression I recently addressed to certain friends of mine a simple but very pertinent question, to which, aside from their characteristic courtesy, they failed to respond. I must, therefore, without their coveted aid, offer you some notions of my own.

I would ask of all who take an interest in the question to concur with me in simplifying it, by confining our attention to those points alone that are essential to a competent understanding and correct solution of it. This will exclude all side issues that would confuse or mislead.

The question is a simple one:—"How many revolutions on its own axis will a wheel make in rolling once around a fixed wheel of the same size?"

The machinery thus indicated consists of two wheels of same size, one of them fixed and the other free, the fixed wheel and all the movements of the other being restricted to one and the same plane. *This is all.* And we must refuse the introduction of lines, pins, axles, or anything else. They are not needed.

A. The axis, contemplated by the question, is located in the center of the wheel, and is a geometric or imaginary line, having length, without breadth or thickness. Therefore, to speak of a revolution of the axis itself is absurd.

B. A "revolution on its own axis" means such a movement of a rolling wheel as causes a right line drawn through its center to point successively to every surrounding point in the plane of motion, and every particle of its mass to pass once on every side of its axis, no matter to what extent or in what direction the axis itself may move.

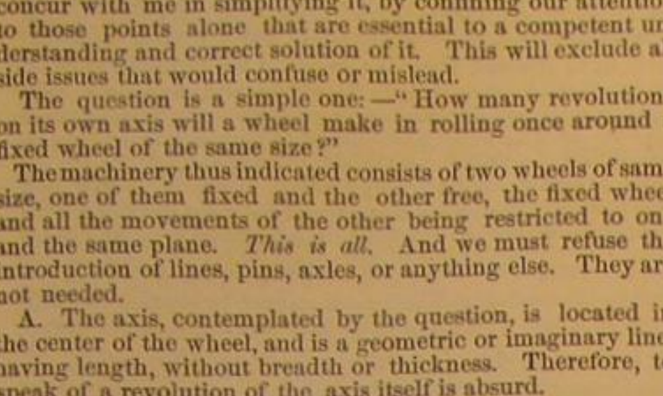
C. The distance traveled by a wheel is determined by, and is equivalent to, the length of the path of its axis, whether curved or rectilinear.

D. Roll a wheel over a right line of the length of its own circumference, and the path of its axis will be of the same length; but less if the line rolled over be concave, and greater if the line rolled over be convex, the extent of these differences being governed by the elements of the respective curves.

E. Divide the length of the path of the axis of a rolling wheel by the length of its circumference, and the quotient will be the number of revolutions made by the wheel around its own axis.

EXAMPLES.—Take a wheel one inch in diameter—its circumference three inches:

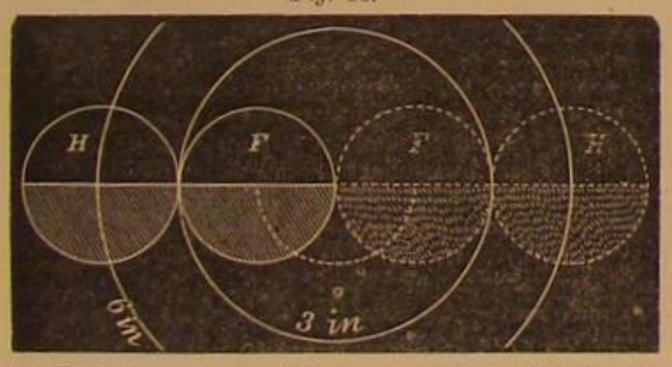
Fig. 12.



G. Roll it 3 inches over a right line, and the path of the axis will be 3 inches. Then 3 divided by 3 equals 1 revolution on its axis.

F. Roll it 3 inches over the concave surface of a curve of 2 inches diameter, and the path of the wheel's axis will be 1½ inches. Then 1½ divided by 3, equals ½ a revolution on its own axis. [It would thus make one entire revolution on its own axis, if the curve were a complete circle.—EDS.]

Fig. 13.



H. Roll it once around the convex surface of a wheel of same size, and the path of its axis will measure 6 inches. Then 6 divided by 3, equals 2 revolutions around its own axis.

This last example, I contend, furnishes the correct answer to the question at issue.

The foregoing paragraphs, marked A to E, are submitted merely as postulates. Should they be accepted as truths (and I have no doubt of their being such), the conclusive force of their application, in the examples F, G, and H, seems to me irresistible. I will gratefully welcome a frank exposition of anything erroneous in them, and will as frankly acknowledge it, if I cannot show the objection to be groundless. But I must be allowed to deprecate a naked assertion of dissent, unaccompanied by an explanatory why or wherefore.

L. M.

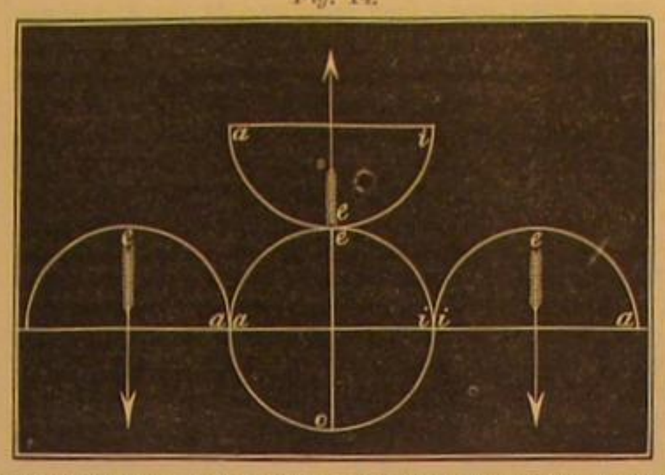
Germantown, Phila.

If we were to assent to L. M.'s list of postulates, we fear that some of the other two-revolution philosophers will want us to adopt the differential and integral calculus, together with the seven books of Euclid, as a preliminary basis for the settlement of the question. Indeed one correspondent has already sent us an algebraical calculation, full of the cube and square root signs, which, if published, would fill a page of our paper, the resulting answer being "two." It is too late for any change in the terms of the question. If we understand the practical effect of L. M.'s reasoning, he makes out that, in a case where a given point can be reached by four routes,—for example, a direct straight road, down a valley, over a hill, or around a hill, the actual length of the path being the same in all, a farmer will gain half the number of revolutions of his wagon wheels by taking the valley road in preference to the straight road; but if he goes over or around the hill, his wheels will make twice as many revolutions as on the straight road.

In Fig. 13 it will be observed that the paths upon which the wheels, F H, roll are of the same length, the wheels start together, roll together, reach the opposite position together, maintain the same relative position throughout their circuit, and complete the movement around the fixed wheel together. It is obvious that both wheels have done exactly the same duty and made the same number of turns upon their own axes. But according to the calculations of L. M. the wheel, F, has turned only once on its axis while the wheel, H, has turned twice. L. M. will need to give further explanation.

MESSRS. EDITORS:—Feeling much interested in the argument going on about the wheels, and yet thinking that you are on the right side of the question, I should like to ask your correspondent, L. M., how he would answer this inquiry: Suppose that he takes off one half of his left wheel

Fig. 14.



leaving the arrow where it is, then roll it up to point, *e*, of his standing wheel, then from there down to the right side of it. Well, according to his idea, the arrow being in the same position on the right as it was on the left, the wheel would have made one full revolution around its axis. But I ask how can it be so, there being only one half of a wheel? It seems to me that it is only half a revolution. P. JEANNE.

Brooklyn, N. Y.

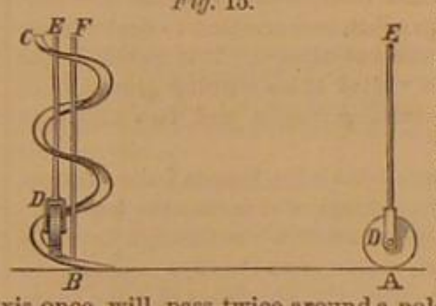
MESSRS. EDITORS:—The movable wheel question still being the subject of discussion with all classes in this vicinity, I would like your decision, with an explanation, that may create satisfaction, which the correspondence you have printed has failed to do. J. B. A.

Riverpoint, R. I.

Ans. Let patience have her perfect work.

MESSRS. EDITORS:—1st. A wheel while turning once on its own axis may make a variety of other movements. 2d. As regards a straight and a circular path, a wheel will make the same number of rotations on its own axis, whether the path on which it rolls be curved or straight, both paths being of the same length. Illustration: A B, straight path; B C, curved path of same length. D, moving wheel, E, vertical shaft rising from the axle of D. Now, one rotation of the wheel, D, will carry A to B, and another rotation will carry the wheel up the spiral path to C. In making this ascent the wheel, D, will turn on its own axis once, will pass twice around a pole, F, and will also impart a perpendicular motion to shaft, E, equal to the rise of the spiral path. The right answer to your question is, *one* revolution on its own axis; the wheel also makes other motions. DUNCAN.

Fig. 15.



Brooklyn, N. Y.

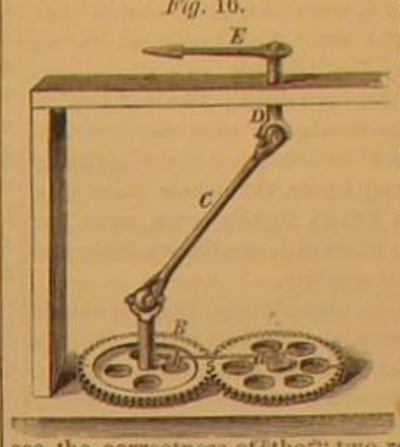
Both of the following letters refer to the same diagram, Fig. 16.

MESSRS. EDITORS:—Having been a reader of your valuable paper for more than fourteen years, and having seldom, if ever, before found its judgment at fault, I must confess that I do think that the answer to L. M., Vol. XVIII., is incorrect. To explain myself I send you a sketch which I hope will enable you to see it in quite a different light. I have a stationary wheel, a movable wheel, and a shaft with universal joints with pointer at top of the frame. Now if I take and revolve the wheel, B, once around A, we will have two revolutions of the pointer. Therefore B has made two revolutions on its own axis. J. G. BAKER.

Philadelphia, Pa.

The pointer makes two revolutions, but not for the reason stated. See answer to next letter.

Fig. 16.



MESSRS. EDITORS:—The movable wheel question being unsettled, or rather, there are those who pretend that a movable wheel will revolve on its own axis twice in going round a fixed wheel of the same size, I submit the following proposition:

I have my office in the establishment of THE SECOMBE MANUFACTURING CO., 264 Broadway (2d floor), who manufacture *Holt's Patent Marking Wheel*, a practical and veritable article used by thousands in this city, a drawing of which I herewith inclose. (See Fig. 17.)

A is a "movable wheel," and whenever it is rolled on any surface, "it revolves on its own axis," and prints, wherever its type surface touches (having an inking roller in front). Now my proposition is this: I will present gratis, to any one of your correspondents, "or any other man," one of the marking wheels, with the party's business card affixed to the wheel (worth $10), who can make this "movable wheel" "turn on its own axis twice," printing twice, in going once round a cylinder of the same size. Any body can try it, by taking the instrument by the handle, and setting up a post, or old ink bottle of the same size. If it prints twice in going round the fixed article, and then those who advocate the one revolution are beaten, the dualists winning, I present the marking wheel to the party demonstrating the fact. But if it will print only once in going round (and it will print every time "it revolves on its own axis"), then the "ones" have gained the day. I will let you know how many make application. C. C. MOORE.

264 Broadway, New York, March 5, 1868.

Referring to Fig. 16, we may observe that such a machine will not operate at all, unless an attachment or carrier be supplied to carry the moving wheel and keep it in gear with the fixed wheel. Such a carrier may be readily applied, and we will suppose that it has been done, and that the thing is in working order. The pointer, E, and its shaft, will unquestionably make two revolutions for each rotation of the movable wheel around the fixed wheel. The movable wheel will be conveyed by the carrier once around the axis of the carrier, which is at the center of the fixed wheel. The movable wheel will also turn once upon its own axis, in consequence of contact with the fixed wheel. This single rotation of the movable wheel, B, upon its own axis, may be readily shown by stretching a cord, *b*, from its shaft to *a*, the center of the the fixed wheel. The cord winds once for each rotation of the wheel, B, around A. The compound nature of the movements of wheel, B, is further explained in connection with Fig. 11.

MESSRS. EDITORS:—The movable wheel question being unsettled, or rather, there are those who pretend that a movable wheel will revolve on its own axis twice in going round a fixed wheel of the same size, I submit the following proposition:

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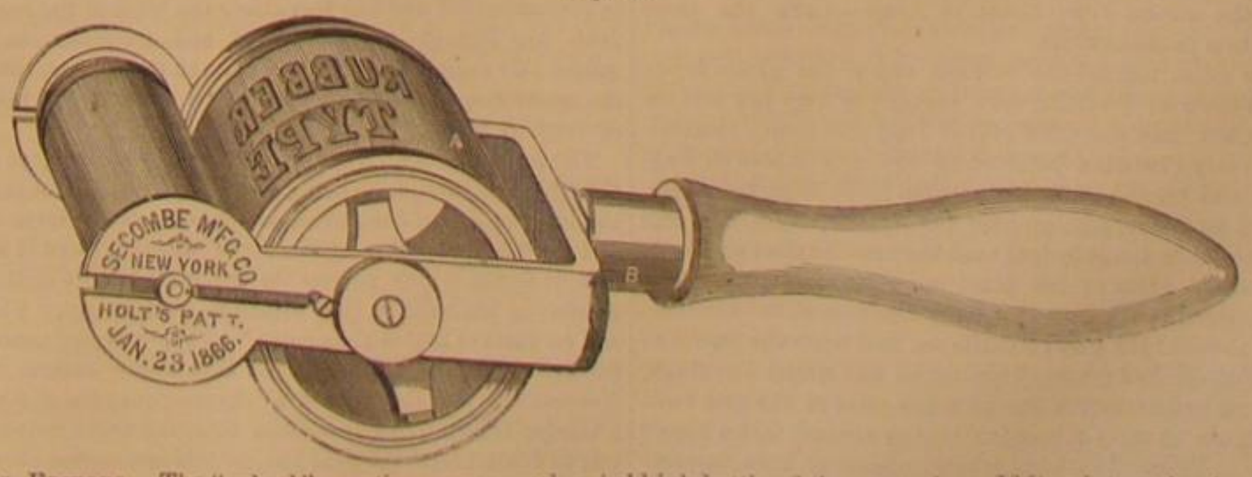
264 Broadway, New York, March 5, 1868.

Fig. 17.



MESSRS. EDITORS:—The "wheel" question seems such a very plain one, that it frets me to see sensible men differ upon it.

If you will allow me to make a brief, clear, "scientific" restatement and elucidation of the subject, it may luckily tend to a settlement. I have been, all my life, accustomed to mathematical, astronomical, and mechanical investigations, involving questions of a similar character, and have read the remarks of your correspondents and your own, observing and understanding clearly the several positions and arguments advanced. What I have to say, therefore, is not from a one sided view, hastily formed, but from a full understanding and familiarity with the matter in all its bearings. All the diagrams have indicated that the movable wheel is to be considered as rolling around the fixed wheel in the same plane with it, and so it appears to be understood by you and others. One word in regard to what is meant by the term "revolving on its own axis."

I understand it, in the "scientific" sense, to mean that it revolves around its own center, no matter whether the wheel has a fixed or a loose axis to revolve on.

With this explanation of terms, permit me to re-state the proposition:

"If a movable wheel be rolled around a fixed wheel of equal diameter, in the same plane, it (the movable wheel) will make two revolutions around its own axis every time it rolls once around the fixed wheel."

One of these is caused by the passage around the fixed wheel, the other by the rolling in contact with it. In stating this we do not mean imaginary revolutions, we mean real, positive, *bona fide* revolutions, that can be communicated to a line of shafting or any other machinery, and demonstrated beyond controversy by the stubborn fact. We can scarcely imagine how to prove it any more clearly on paper than some of your correspondents have already done; yet many still appear to doubt it, yourselves among the number. You we can readily excuse, when we remember the arduous duties of a publisher, and how little leisure they can have for abstract questions. We are however very anxious that you should stand correct on all questions; and this anxiety has led us to have made, and sent herewith, a little apparatus that, we think, will enable you to see the correctness of the "two-revolution" position. The apparatus explains itself.

To make the position still clearer, I present the annexed diagram, representing the fixed wheel, A, movable wheel, B, with a projecting axle fast to it, and revolving with it; C, bar, with two universal joints or couplings, allowing the revolutions of the wheel, B, to be communicated to the shaft, D, hung in a line with the axis of the fixed wheel. Now, "the proof of the pudding will be found in the eating," and you may stake the public debt of the United States that, for every time the wheel, B, rolls once around the wheel, A, the shafting, D, and pointer, E, will revolve twice.

Wilmington, Del. JOHN G. JACKSON.

own axis twice, the moon must so revolve monthly, the ball on the church spire and the pebbles on the beach, daily. If you swing a cat around your head, would his head, eyes, and vertebræ each revolve on its own axis, and around each other, severally and collectively? Would he die at the ninth turn? The hero of how many revolutions? H. Bluffer.

La Salle.

EDITORIAL CORRESPONDENCE.

Sorrento—Amalfi—Pestum—An Excursion to Pozzuoli—Solfatara—Ruins of Temples and Villas—Puetoli of St. Paul—Lake Avernus and the Sibyl's Cave—Virgil's Tomb—The Miracle of St. Januarius

Naples, Feb. 12, 1868.

At Sorrento a beautiful spot nineteen miles south-east from Naples, across the bay, we sat within the gardens of the "Tramontano" under the shadow of orange and lemon trees, loaded with their luscious fruits, listening to the songs of birds, and inhaling the fragrance of the flowers and though mid-winter the air was soft and spring-like. Certainly a fitting spot for the abode of Tasso, whose dwelling stands upon the high bluff bordering the sea. The house where we stayed was built by a wealthy English lady, as a winter residence for herself and twenty-four pet dogs. The old tenants have gone the way of all the earth, and now the house is used for a hotel. The grounds enclosing a deserted nunnery with its beautiful gardens and baths, the whole forming a lovely retreat when leisure hangs lightly even upon the hands of a New Yorker, who when at home knows little else than incessant toil and mental activity.

The situation of Sorrento is exceedingly fine. It stands upon a flat semi-circular plateau, sheltered by bold mountain peaks, and fronting the island of Capri, with its blue grotto, the bay and city of Naples, together with views of blazing Vesuvius and the volcanic ranges that run along the coast. This view is indeed wonderful, and especially so upon a clear night, when the whole coast is illuminated by volcanic fires, and the glimmer of thousands of lights. The elder Pliny lived at Stabie, now Castellamaro, near Sorrento, and perished by suffocation at the time of the destruction of Pompeii. Across the woods, over the rocks and mountains, upon another gulf, is what remains of the old city of Amalfi, now reduced to a poor fishing village, but it was the Athens of the Middle Ages, and the seat of a vigorous republic, whose merchants first obtained admittance to Mahometan countries. Upon the rock above Amalfi were found the famous Laws of Justinian, which were captured and carried off by the Pisans, afterward taken by the Florentines, and now kept in the Laurentian Library at Florence, as one of the precious books of the world.

This same old city of Amalfi claims the invention of the compass, and also to have furnished a code of maritime laws that for four centuries were adopted throughout Europe. Still further on is the site of ancient Pestum, whose origin is still a mystery that continues to puzzle the brain of scholars—whether Phenician, Etruscan, Greek, or Sybarite, it is all the same, as there are evidences to support either choice. There are no traces of a city, all vestiges of houses having long since been swept away, but the imposing wrecks of temples and other broken edifices are sufficient to attest its ancient magnificence.

Westward from Naples are the remains of cities and many grand structures of the Romans, who cemented brick and marble together in solid piles, which, though at the time of their construction seemed fitted to stand almost amid the wreck of matter and the crash of worlds, are now but a mere mass of material overhung with ivy and covered by the accumulated dust of centuries.

I cannot conceive of an excursion of one day which combines more real interest and pleasure than to ride out of Naples, passing through the grotto, or tunnel, cut through the tufa rock, 2,500 feet fong and nearly 70 feet high. Above the entrance overlooking the city stands the humble tomb of Virgil, whose verses have converted this whole region into classic ground. The tunnel is brilliantly lighted day and night, and in the center a chapel dedicated to the Virgin has been hewn in the rock, and is never passed by devotees without some sign or expression of devotion.

The tunnel is thronged by pedestrians and vehicles of all shapes and sizes, and clouds of dust, the cracking of whips the rumbling of wheels, and the light of hundreds of gas jets, together with flocks of milch goats which are driven about the streets from house to house—make the place seem like a pandemonium.

A few miles beyond the western end of the grotto is the ancient town of Pozzuoli, now reduced to very low circumstances, but once the chief port of Italy and deeply interesting to every Christian believer, as the spot where St. Paul landed and tarried with the brethren seven days, before setting out for Rome, passing over the Appian way which still continues to be the principal road between Naples and Rome. The ancient name of the place was Puteoli, and the narrative is given in the 28th chapter of the Acts of the Apostles. At the moment the great Apostle set foot upon the shores of Italy, Puteoli had commodious docks and grand dwellings, now gone to destruction, except a few piles of the pier built by Caligula to carry a wooden bridge several miles across the bay to Baiæ. There are several objects of rare interest in and about Pozzuoli which are worthy of attention. Here are to be seen the remains of the magnificent temple of Jupiter Serapis, with its giant marble columns cut from a single piece, the altar of sacrifice, and the solid foundations now standing ten inches in water, the lower portions being covered with small marine shells, which show that since the building of the temple some change has taken place either in the land or sea, as it is not probable that the builders of the ancient Serapis would have submerged the fine marble pavement of the structure under water. This whole country, however, stands upon a volcano, and it need not surprise any one to hear of the destruction of Naples or any of the other places in its vicinity. I do not wonder that the ancients, dwelling in this region, without the light of Christian revelation, held the supersitious notion that the veritable hell was below them, and the entrance to it not far off.

Just above the town, within easy walking distance, you pass into and across the shell of the crater of Solfatara. It is now private property, and a small fee is exacted from visitors. Think or owning a volcano, and keeping it on hand for exhibition! However, it is now comparatively harmless, and furnishes a large quantity of sulphur, which is an article of extensive export from Naples. At one time, before Vesuvius succeeded to the business, Solfatara was an active volcano, its crater being larger than Vesuvius. At the time of our visit small smoke jets were issuing through fissures in the shell, and a large volume of sulphurous smoke was puffing from the opening of the huge mouth. The guide, by means of a long rake, pulled out masses of hot sulphur. Crude alum and yellow ochre are also found in considerable abundance along the sloping sides of the crater, while a stone thrown upon the crust reveals the existence of a cavern below, which always excites a curiosity to pierce through it, to discover what is going on beneath. Upon the crest of the hill above Pozzuoli are the well-preserved walls of a Roman amphitheater, with its vast subterranean chambers, large enough to seat forty thousand spectators, and next to the Coliseum the most remarkable structure of the kind in Italy.

Still further up the bay are the remains of Baiæ and Cumæ, which in the days of Roman glory were the resorts of the great men of the Empire, who came hither to enjoy the luxury of sea and sulphur baths. Cesar, Cicero, Nero, Hortensius, Severus, Pompey, and other notable men, had their elegant villas perched above the coast, and the ruins of grand old heathen temples to Jupiter, Venus, and Mars, still stand as silent memorials of the great dead. Nero's thermal baths still exist as perfect as when this monster of human pride and wickedness first caused them to be made. They consist of excavations made in the perpendicular face of a large rock, and are reached by a flight of steps. Upon leaving the outer chambers, galleries are run into the mountain, through which issues the steam from a running stream of sulphur water, hot enough to boil an egg. We were invited to enter this infernal region, and following a boy bearing a torch, and divested of all clothing except a pair of brown linen trousers about the color of his skin, we essayed the journey, but found it necessary to crawl along on all-fours, in order to breath the cooler under strata of air. Here we saw the egg boiled, and upon emerging were drenched in a profuse perspiration, and the boy looked as if he had been soused in a tub of water. Few are able to stand the effort, and are glad to beat a hasty retreat before reaching the hot stream. It is recorded that when the profligate Nero visited these burning grottos, "his train consisted of a thousand carriages and two thousand mules shod with silver."

A little way over the mountains is the famous Lake Avernus, and the cave of the Sibyl, through which runs the legendary Styx. The cave is a long excavation cut through the tufa rock several hundred feet, and to cross the Styx it is necessary to mount pick-a-back upon the shoulders of some rough looking fellows, resembling coal heavers, who are always in attendance to undertake the job for a small fee. We performed this trip, and felt ourselves well repaid for the experiment by its novelty and grotesque character. If the person who attempts the journey happens to weigh a little above the average of our humanity, the guide very politely suggests a trifle more for the extra load. But what adds to the novelty of the trip is to see fashionable ladies cheerfully crawling upon the backs of these guides, and sharing the perils of the voyage across the Styx, to gratify their commendable love for the curious.

The Styx is a dirty pool of warm water, that finds its way into the mountain from Lake Avernus, and becomes tepid, so that long-legged people often get their extremities saturated, unconscious of the fact until they get into day light. The Grotto del Cane is also to be seen, and dogs will be smothered in the noxious gas emitted, if fools enough can be found to pay for the expenses of the sacrifice of a scurvy pup. Another curious feature of this day's excursion is the neatly-rounded, conical-shaped Monte Nuovo, one and a half miles in circumference and 440 feet above the level of the sea. The peak was formed by earthquakes, and eruptions that convulsed this region during three days, in September, 1538. At the same time a portion of the earth sank down, and was covered by water.

The inhabitants of Naples nourish the superstitious belief that they are saved from being overflown by Vesuvius through the intercession of Januarius, patron saint of the city. Upon a stone bridge leading towards the volcano, there is a good marble figure which represents the saint in the attitude of extending his hand in that direction, as if to say, "Thus far and no further mayst thou come." The name and memory of St. Januarius are held in most affectionate esteem by all Neapolitans, and the Cathedral church dedicated to him has a tawdry interior. It is related that the saint was cruelly put to death about the year 300, on which occasion a devoted woman, whose name was lost in the confusion of subsequent events, contrived to sponge up some blood and a bit of straw where the martyrdom took place.

These relics were piously preserved in two vials for several centuries, then it was discovered in some way that the blood, a hard, dry substance, was the subject of a miracle twice a year, and even oftener if occasion required when after suitable prayer and devout ceremonials, liquefaction takes place, the dry clot resuming its original liquid condition. It is said that the people of Naples become very much alarmed, and the lower classes are even dangerous, if for any reason the miracle is suspended. A Paris paper printed the statement that at the time of the French occupation of Naples in 1859 the custodian of the revered relics gave out the opinion that liquefaction would not take place owing to the presence of foreign enemies. The narrative asserts that the French troops were in danger of assassination, whereupon the Commanding General went personally and demanded that the miracle should operate within fifteen minutes or he would shoot the whole of them. The order was obeyed, liquefaction took place, the church bells rang forth the joyful news, and all became tranquil. The miracle transpires in May and September of each year, when all business is suspended, and the proceedings are watched with absorbing interest. Some writers upon this subject have insisted that the belief in the miraculous blood of St. Januarius was perfectly harmless and, moreover, that it operates as a conservative of the public peace.

The people of Naples live out of doors and no other city in Europe presents such a living throng upon its streets and public places. The street corners and by-lanes are filled with stalls, where fruits and lemonade are sold, and small money changers carry on their traffic, women being generally engaged in the business. The people cannot be blamed for staying out of doors, for as a general rule their houses are dingy, dirty looking abodes of wretched misery and discomfort.

The lower classes, generally uneducated, are unable to read and write, therefore the office of professional *Scrivani* still exists in Naples, and they are permitted to occupy tables under an arcade near the royal palace. They write and read letters, and draw up papers for those who cannot do it for themselves. It is a curious sight to see one of these old scriveners with spectacles astride his nose engaged in penning down the secret wishes and prayers of the humble people with a confidence as sacred as that imposed upon the family physician.

Naples and its environs are full of interest, but in the brief space of a letter I am only able to glance at some of the leading attractions, such as present themselves upon every hand, therefore without other details of a ten days' visit, I leave this strange spot and return to Rome. S H. W.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

A gold mine in the deep valley of the Alps, near Salzberg, is the highest in Europe now worked. There are two tunnels near the mines which are entirely surrounded by glacier ice, and the miners of this region undergo great hardships from exposure and avalanches.

It appears from the gold-mining records of the colony of Victoria, that twelve selected mines, with an aggregate paid-up capital of $726,910, have paid as profits in the short period of from seven months to five years, no less a sum than $9,394,535. The history of mining, says the *Mechanics' Magazine*, has never before shown such extraordinary results.

The railways of France, during the past seven years, have killed 297 persons. The companies, in their own defence, assert that of this number, 169 perished through their own imprudence. During the same space of time, 4,515 travelers were seriously injured; 47 by their own fault. In the year 1866, of nearly 250,000,000 passengers, 31 were killed and 540 injured.

Mr. Hewitt, of this city, one of the late Exposition Commissioners, has shown that in the number of days' labor it costs, iron can be produced cheaper in America than in France, Belgium, or England. In Pennsylvania, pig iron can be made at a cost of $24 per tun, representing, at present wages, thirteen days' labor. A tun of bar iron represents the labor of twenty-nine days. In France, a tun of bar iron costs fifty-eight days' labor, and a tun of pig costs twenty-six days' labor, or just twice as much as in this country. The rate of wages and cost of iron per tun, estimated in days' work in Belgium, are midway between the rates in England and France, wages being higher in Great Britain than in Belgium, and higher in Belgium than in France.

The highest average cost per mile for the construction of any of the leading American railways, was $145,630 for the Atlantic and Great Western railroad. The Erie line cost $105,680 per mile. For 4,294 miles of track, belonging to eight of our longest roads, the average cost of construction was $66,747 per mile. The English pay much more for their roads than is the case with us. For 8,611 miles belonging to twelve British lines, the cost averaged $196,225 in gold, but some of the shorter roads cost a far greater sum than this. The North London, eleven miles in length, was constructed for the enormous sum of $1,351,000 in gold per mile.

Notwithstanding the dull times, South Carolina is reconstructing and adding to the number of her cotton mills. We have accounts of new establishments being erected and old ones being enlarged. The total number of spindles now running in the State is 32,000, but the mills running them are all confined to three districts where very little cotton is grown.

It is reported that a silver mine discovered in Prince William, Canada, is capable of producing silver valued at $10,000 a day, and further, that the antimony in it will pay all the expense of working. The metalliferous tract covers a thousand acres, and one happy—or otherwise—mortal owns the whole of it, and believes himself to be the richest man on the continent.

Mr. Delmar, Director of the Bureau of Statistics, furnishes the following compilation of the decennial relation between domestic exports and railway mileage: Decade ending 1837, to one mile of railway, $2,245,000 of exports; decade ending 1847, $32,000 of exports to one mile of railway; decade ending 1857, $16,000 of exports to one mile of railway; decade ending 1867, a little short of $9,000 of exports to one mile of railway.

In St. Louis the total amount of manufactured products for 1867 is valued at $41,625,457. The number of skilled laborers engaged in manufacturing, 9,532; and the value of their services, $7,617,904. The thirty-five flour mills of the city contributed about one seventh of the value mentioned above employed 413 hands, and paid them $387,000 for their labor.

We see it stated that a machine for making pins has recently been completed by a firm in Hartford, Conn., by which between eighty and ninety millions of pins can be made in a day of ten hours, or, to vary the mode of statement, a single machine every minute will supply the world with 144,000 and every second with 2,400 of these small but indispensable conveniences.

According to the Helena *Gazette*, placer mining, the coming season, will be more extensively prosecuted in that section of Montana than ever before Large ditches have been dug, some of which have cost $100,000 each, and the supply of water will be unfailing. It is a reasonable estimate that $1,000,000 were expended last year for operations for this year, and everything predicts a large production of gold and good times generally.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Trunk Caster.—Lewis Horton and Josiah A. McGaw, Manchester, N. H This invention relates to an improvement in the construction and arrangement of casters for trunks and other similar articles, and consists in a corrugated caster roller hung in a frame that is swivelled on a pivot rigidly fastened to a plate that is attached by nails or screws to the bottom of trunk or other article.

CENTER PLATE FOR CARS.—Geo. W. Bennett, White Haven, Pa.—The object of this invention is to provide a center plate which will prevent the trucks from shearing off of the road in turning a short curve and thereby dispense with safety chains.

CORN HARVESTER.—Elihu Boswell, Highland, Ohio.—This is an improved machine which being driven between the rows of standing corn gathers and cuts the corn on either side and at the proper intervals deposits it between the rows in shocks ready for binding.

CASE FOR WATER WHEELS.—N. F. Barnham, York, Pa.—In this invention curved shutes or water passages of peculiar form are arranged around a circular case and used in connection with a system of gates so constructed and operating with the shutes as to direct the water upon the wheel in such a manner that its whole force is utilized.

RAILROAD SPIKE EXTRACTOR AND JACK.—Joseph Douglass, McConnellstown, Pa.—This invention is a simple, compact and powerful device for extracting spikes from timber, combined with an apparatus which renders the instrument useful for raising ties, rails and other heavy articles from the ground.

FIRE-ARM.—George Holman, Waterville, N. Y.—This invention relates to an improvement in fire-arms of that class which are provided with a revolving many-chambered cylinder. The invention has for its object the combining, in one piece or weapon, of a rifle and smooth bore in such a manner that either may be used at the will of the hunter or sportsman. Also the rotating of the cylinder from the hammer by a means simple and efficient and less liable to get out of repair than the mechanism usually employed for such purpose, and also in a novel arrangement of the cylinder method of securing it in its frame, whereby it is firmly held in position and permitted to rotate under the movement of the hammer with but little friction and consequently without subjecting the actuating parts to any unnecessary or undue wear and tear.

CAR REPLACER.—Charles Hurst, New York city.—This invention relates to a new device for placing cars on tracks and for raising the same over those laying across the track, and is particularly adaptable to horse railroad cars.

FURNACE FOR DECARBONIZING IRON FOR THE PRODUCTION OF STEEL.—Alois Thoma, New York city.—This invention relates to a new process of converting ordinary white iron or any other suitable kind of iron into steel of such quality that it may be used for cutting tools and for all purposes for which the best quality of steel is required.

REFLECTOR.—J. A. J. Logan, Moline, Ill.—This invention relates to an improvement in hand lanterns, railroad lights, lamps, etc. and it consists in orming a concave metallic or glass plate on disk with a shoulder and shank attached thereto, whereby it is adapted to the purposes named, and made removable at pleasure.

LIQUID COOLER.—Robert Morton, Stockton-on-Tees, England.—This invention relates to certain improvements in that class of refrigerators in which flattened or other shaped tubs are used for the purpose of cooling worts or other liquids or fluids, the liquid to be cooled being passed through the chamber between said tubes in one direction while the cooling liquid passes through the tubes in the opposite direction.

DEVICE FOR CUTTING DRAWERS.—Lyman Bennett, Amsterdam, N. Y.—This invention relates to a method of cutting the fronts and bands of drawers, and it consists in an arrangement of adjustable guides for the cutting knife, and clamp or press bar in connection therewith, for holding the cloth, the whole being arranged upon a table for the purpose assigned.

HEMP DROPPING ATTACHMENT TO REAPERS.—R. C. Wrenn, Waverly, Mo. The object of this invention is to remove the cut hemp as the reaper moves forward, out of the way of the machine and the horses, for the passage of the reaper on the next round, and thus prevent the tangling of the hemp stalks.

STOVE ATTACHMENT.—B. J. Watson, Troy, Wis.—This invention relates to a method of constructing and arranging the flues of parlor and box stoves, whereby a greater radiating surface for heat is presented within a smaller compass.

LAMPS.—S. K. Ayers, Delton, Wis.—This invention relates to an improvement in lamps for burning kerosene and other hydro-carbon oils, which are explosive when the oil becomes heated and vaporizes, and consists in making a vent hole in the base of the burner of a lamp, provided with an adjustable valve to close when the lamp is not in use, for the purpose of preventing the evaporation of the oil.

UPSETTING AND PUNCHING MACHINE.—Samuel E. Lockwood, New York city.—The object of this invention is to forward a machine which shall enable blacksmiths and others to upset wagon tires, or bars of iron or steel, punch holes in the same, or in other plates of metal, and also to gum saws.

BILLIARD CUE CLEANER AND TRIMMER.—Hypolite Pernot, New York city.—This invention relates to a new article of manufacture for cleaning and trimming the ends of billiard cues, and consists in the use of a concave or flat circular, or other shaped plate, made of steel or other hard material, and set in a suitable case, in which a recess or hole is made, to allow the end of the cue to reach the plate. The face of the steel or metal plate is roughened, similar to the face of a file, and thus, by bringing the end of the cue in contact with the face of the plate, the cue may be cleaned and trimmed so as to receive a new clean playing surface.

FASTENING FOR TRAVELING BAGS.—Wm. Wakenshaw, Newark, N. J.—This invention relates to an improved fastening for the sides or ends of traveling bags, and it consits of a hook-shaped jaw pivoted to each end of the bag, or to the sides of one part of the frame of the bag, and so constructed and arranged that by depressing or shoving down the jaws they will clamp both parts of the frame at each side thereof, and hold the same firmly in contact, or in a closed state.

HEMMER ATTACHMENT FOR SEWING MACHINE.—W. H. Thomas, Galveston, Ind.—This invention relates to a hemmer for sewing machines, and it consists in a novel construction of the same, whereby a hem may be turned or folded underneath the fabric, and without the necessity of previously folding and holding the hem or fabric during the process of stiching, the fabric being folded and retained in a folded state by the hemmer, as the former is drawn through the latter under the feed motion of the sewing machine, and the same is being stitched.

EXTENSION LADDER.—Benj. Pine, New York city.—This invention relates to an extension ladder, designed for general purposes, and consists in having the ladder constructed of two sections or lengths, one of which is fitted in guides attached to the other, so that it may slide freely up or down, and having the sliding section or length connected to one or more endless chains, which are applied to the stationary length; all being arranged in such a masener that by turning a crank the endless chains will be moved, and with them the sliding section or length, and the latter extended or drawn in, as required.

CAR COUPLING.—Silas O. Rogers, Stanfordville, N. Y.—This invention has for its object to furnish a safe, convenient, and reliable car coupling, which shall be self coupling and at the same time simple in construction and not liable to get out of order.

POTATO DIGGER.—Wm. H. Chamberlin, Medina, N. Y.—This invention has for its object to furnish an improved potato digger, simple in construction, easily adjusted, and effective in operation.

MOLD FOR ARTIFICIAL TEETH.—A. A. Knowlton, St. Albans, Vt.—This invention has for its object to furnish an improved mold for forming artificial teeth, which shall be simple in construction, effective and convenient in operation, and which will obviate the difficulties heretofore attending the molding of artificial teeth.

AXLES FOR VEHICLES.—J. A. Williams, Elizabeth, Ill.—This invention relates to improvements in axles, and consists in the several devices perfecting the same.

TIRE HEATER.—C. E. Pierce, St. Charles, Ill.—This invention has for its object to improve the construction of tire-heating apparatus, so as to lessen the cost of construction and use, and to increase the convenience of its use and the efficiency of its operation.

GANG PLOW.—George Steinegger, Highland, Ill.—This invention consists in the arrangement of certain parts of a gang plow, so as to accomplish more perfectly the work of plowing.

PLOW WHEEL.—E. S. Rice, Paw Paw, Mich.—This invention has for its object to improve the construction of plow wheels, so as to keep the dirt from working in and wearing or clogging the wheel.

APPARATUS FOR CONDENSING AIR.—Halsey Moore, Bangall, N. Y.—This invention has for its object to furnish an improved apparatus for condensing air for use in driving an air engine.

CHURN DASHER.—Robert Crawford, Mercer, Pa.—This invention consists in attaching an air vessel to and underneath the dasher disk of a churn, together with other devices perfecting the whole.

SLED LOCK OR BRAKE.—John Cassidy, Montezuma, Iowa.—This invention refers to the locking of sleds or sleighs when descending hills or declivities. It consists of two angular locking irons, which are raised or lowered by a lever.

NAIL DRAWER AND HAMMER.—Thomas Comstock, Harrodsburgh, Ky.—This invention is a nail-drawing device, having other implements combined in the same tool.

SHEEP RACK.—Jacob Taylor, Beloit, Ohio.—This invention has for its object to furnish an improved sheep rack, cheap, strong, durable, simple and convenient in construction, and which can be used for all the purposes of sheep feeding.

HAY GATHERER AND GLEANER.—John Eliot, Vermillion, Ill.—This invention has or its object to furnish an improved machine, simple in construction, easily operated, and effective in operation, by means of which hay may be gathered and grain fields gleaned quickly and thoroughly.

COMPOSITION FOR CASTS AND FANCY ARTICLES.—Michael Schall, New York city.—This invention consists in forming a composition for making casts for toys and fancy articles.

SPRING BALANCE FOR SAFETY VALVE LEVERS.—James Ayres, Paterson, N. J.—This invention has for its object to furnish an improved spring balance for adjustably and safely securing the safety valve levers of steam boilers, which shall be simple in construction and easily adjusted to hold the valve closed until the pressure has reached any desired point.

BRAKE BLOCK LINING.—Gardner Drake, Farmington, Me.—This invention relates to a new method of constructing the lining of the blocks of car or wagon brakes, and attaching the same to said blocks, whereby the brakes of cars, wagons, etc., are rendered more durable, are less liable to injure the wheels, and whereby the wheels are kept free from snow or mud.

WATER WHEEL.—N. Rose and E. W. Wright, Milford, N. Y.—This invention relates to an improvement in water wheels which rotate or work in a horizontal plane, and which are acted upon both by the direct and reacting power of the water. The invention consists in the employment of adjustable buckets so arranged and applied that water may be discharged from the wheel, in greater or less quantities according to the power required, and the amount of water used be in proportion to the amount of power given out by the wheel.

WATER WHEEL.—M. D. Grow, Fort Dodge, Iowa.—This invention relates to an improved turbine water wheel, and it consists of a wheel having a bell-shaped form or body, and carrying spiral-shaped buckets on the outside of its mouth, surmounted by a guide band which guides the water to the buckets beneath the flume from the shute, set in said flume, in which the wheel is concentrally disposed.

ICE PLANER.—Samuel Lewis, Brooklyn, N. Y.—The object of this improvement is to obviate the many and serious difficulties in the treatment of the surface of ice, which have heretofore been experienced by those having charge of skating ponds, or engaged in the business of cutting ice for the market.

MACHINE FOR BORING POSTS.—B. F. Mohr, Mifflinburg, Pa.—This invention relates to a machine for boring posts, and consists in a frame having an adjustable bar on which is mounted an augur turned by any motor.

PAPER COLLAR AND CRAVAT.—George F. Perkins, New York city.—This invention relates to a combined paper collar and cravat, the cravat being formed on the collar, both being cut from one piece of paper.

ANIMAL TRAP.—John M. Dearborn, Boston, Mass.—This invention has for its object to furnish a simple, cheap, and effective trap for catching rats and other animals.

SLAT MATTING.—William Barton, Troy, N. Y.—This invention consists in connecting a series of parallel slats, with the intervening buttons, by which they are held the required distances apart, by means of ropes or other flexible material.

FURNACE DOOR.—Joseph L. Reilly, Chester, Pa.—This invention relates to a new furnace door for marine boilers, and its object is to facilitate the firing of the furnace, while the vessel labors in a heavy sea. The invention consists in the use of a latch, which is pivoted to the door, and which, when the door is opened, springs into a catch, that is provided on the furnace, so that the door will remain open as long as required.

HAND SPINNING MACHINE.—Anthony W. Silvis, Birmingham, Iowa.—This invention relates to an improvement in the construction of a machine for spinning a number of threads at once by hand power, and consists in a frame on which is mounted a carriage with feed rollers to traverse back and forth to and from a series of spindles arranged across the front end of the frame.

RAILROAD CAR WHEEL.—G. Dock, Wiconisco, Pa.—This invention relates to an improvement in railroad car or truck wheels for mining purposes, and consists in a device in the hub of the wheel for the purpose of preventing the loss of oil from a recess which holds the oil, in order to keep the axle constantly lubricated.

CANE CLEANER.—Samuel Bean, Syracuse, Ohio.—This invention relates to an improved cane cleaner, and consists of a frame clamped to the mill. An iron plate, or stripper, having a hole in its center, is pivoted vertically in the frame. Two crescent-shaped steel plates are constructed in the center of this plate, and two other crescent-shaped steel plates set crosswise up the former, the whole of them held in place by pins and pressed together by springs, and forming a hole through which the cane passes to the mill. A knife is disposed near the top, or in any other convenient position upon the frame on which the cane is passed, to cut off the top before putting it through the hole formed by the crescent-shaped steel plates.

SAFETY ATTACHMENT TO RAILROAD CARS.—George W. Brady, New York city.—This invention relates to a new arrangement for preventing accidents on railroad cars, and consists in the use of a shield arranged around the wheels in such a manner that by the same any obstruction on the track will be pushed off, so that the wheels of the car cannot pass over and injure persons that may be laying or falling upon the track.

SNOW CLEANER.—Samuel Lewis, Brooklyn, N. Y.—This invention relates to a device to be used for the removal of snow and cut ice from the surface of ice lakes and skating ponds. The invention consists in a peculiar construction of the machine, whereby the snow or cut ice, as the machine is drawn along, is scraped up, and by a very simple manipulation on the part of the device, deposited in piles on the banks or sides of the lake or pond.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

F. R., of N. Y.—"Will you give me some information in regard to the manufacture of white gunpowder and where it can be obtained?" It is made of chlorate of potash, ferro-cyanide of potassium—commonly known as prussiate of potash—and sugar. The proportions we cannot state. It is used generally for firing cannon by friction, its chief danger being the readiness by which it may be exploded by friction

E. R., of Mich., asks if there would be "any difference in the pressure of steam on two slide valves of a steam engine, one with ports under it and the other without." If the valves fitted their seats and the atmosphere reached the under side of the ported valve there would be on that the atmospheric pressure of fifteen pounds to the square inch to offset the steam pressure on that valve, and not on the other; but we never heard of a steam engine valve without a port under it.

C. A. W., of Pa.—"What shall I cover my boiler with to confine the heat so as not to be uncomfortable to the men at work close by it?" If your boiler is not incased in masonry we recommend hair felting covered with wooden lagging.

J. M. K., of Conn.—"Will lead sink in water ten miles deep?" We have never been so low. Go down and see for yourself.

J. F. G. of Ohio.—"How is canvas prepared for painting on?" The canvas is stretched, sized with glue, and then coated with white lead, which when dry is rubbed down with pumice stone, when another coat of paint is applied and the canvas is ready for colors.

T. D. R., of Canada.—"What is the use and botanical source of spruce gum?" As its name denotes it is an exudation of the spruce tree, and it is used by school girls and boys as a juvenile substitute for tobacco. See an article on the subject in a previous issue of this paper.

S. N. T., of Md., desires a composition to resist the acids in an electro-plating bath to preserve those portions on which no deposit is required. Perhaps the engraver's etching ground will answer the purpose. It may be made of 2 oz. white wax, ½ oz. burgundy pitch, ½ oz black pitch and 2 oz. asphaltum, all but the asphaltum melted over a fire the latter ingredient added in the form of a fine powder, gradually Spirits of turpentine is the solvent to reduce the composition to the requisite consistency.

C. S. S., of Ill.—There is no way known to us to clean a kerosene oil barrel so as to fit it for other uses, as for pickling pork, etc. The penetrating quality of kerosene baffles any ordinary means of removal.

A. F. T., of Wis.—"How can paper be prepared to make pencil marks indelible?" We wish we knew.

J. P. A., of Ohio.—Your friend who has the "self mover" has got either a fortune or an elephant; probably the latter. When perpetual motion seizes a man quinine will not help his case.

J. E. B. N., of Ala., has found a place, by means of a letter, where $9,000 of specie and plate was buried during the war, but as the locality cannot be exactly determined within fifty yards, he desires the interposition of the "divining rod." The best implements for the case are pick, shovel, and muscle.

T. F. W., of N. Y.—"Why will common salt liquefy iron when it clogs in coming from the blast furnace?" We suppose for the simple reason that it, like some other salts, is a flux.

J. E. S., of Ark.—There is no difficulty in running a rubber belt in water. The rubber is water proof, is it not?

C. E. P., of Vt.—Ornamental brass work is cleaned by almost any acid; even vinegar will do it. Its brightness is preserved by any simple transparent varnish.

S. C. T., of N. J.—"Are kerosene lamp explosions caused by inflammable gas or does the liquid itself reach it, and in either case will the explosion occur by heat alone?" The mixture of the vapor of oil and atmospheric air is explosive; not the liquid oil. We doubt the explosion of this vapor without contact with fire.

E. A. B., of Mass.—"What are the benefits of using salt in kerosene lamps?" Salt has probably no effect. If it could be dissolved in the oil it would give a ghastly, yellowish tint to the light. We doubt its utility.

F. S. B., of Mass.—"What proportion of water should be used in mixing plaster of paris so that no shrinkage results in setting?" The material of commerce is so varying in its quality that only actual trial can determine.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Mill-stone Dressing and Glaziers' Diamonds. Also, for all Mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

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For sample of a neat little Self-lighting Pocket Repeating Cigar Lighter, with wholesale price, send 65c. to L. F. Standish, Springfield, Mass

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Makers of Machines for getting out hhd. and pipe Staves, will send circulars to Butts & Brother, Georgia Land Agency, Macon, Ga.

Water-proof Paper—Manufacturers of—please send address or circulars to Hoeckley & Hall, 448 York avenue, Philadelphia, Pa.

Wholesale and Retail Agents wanted for Hyslops & Phillips' Patent Combination Stove Lifter and Dish Tongs. 100 per cent profit. T R. Bearse, Taunton, Mass.

Patentees of brick machines send circular to W. D. Wesson, Springfield, Mo.

Wood-shaving Boxes—Manufacturers of—please address or send circulars to Hoeckley & Hall 448 York avenue, Philadelphia, Pa.

Patentees or others wishing to have light articles made from steel or wrought iron, address S. H. Jennings, Deep River, Conn.

A Fortune may be realized by purchasing the right, and Manufacturing the Book Clamp of Miller & Watson, advertised on the last page of this paper. The patent was taken by Munn & Co., and the article has been examined and approved by the editors of this paper. A descriptive circular will be sent on application to the advertisers. See last page.

Winans' Anti-incrustation Powder, (11 Wall st., N. Y.,) reliable and uninjurious in preventing scale in Boilers. 12 years in use.

Manufacturers of Steel Castings please address Cumming Bros., Oil City, Pa.

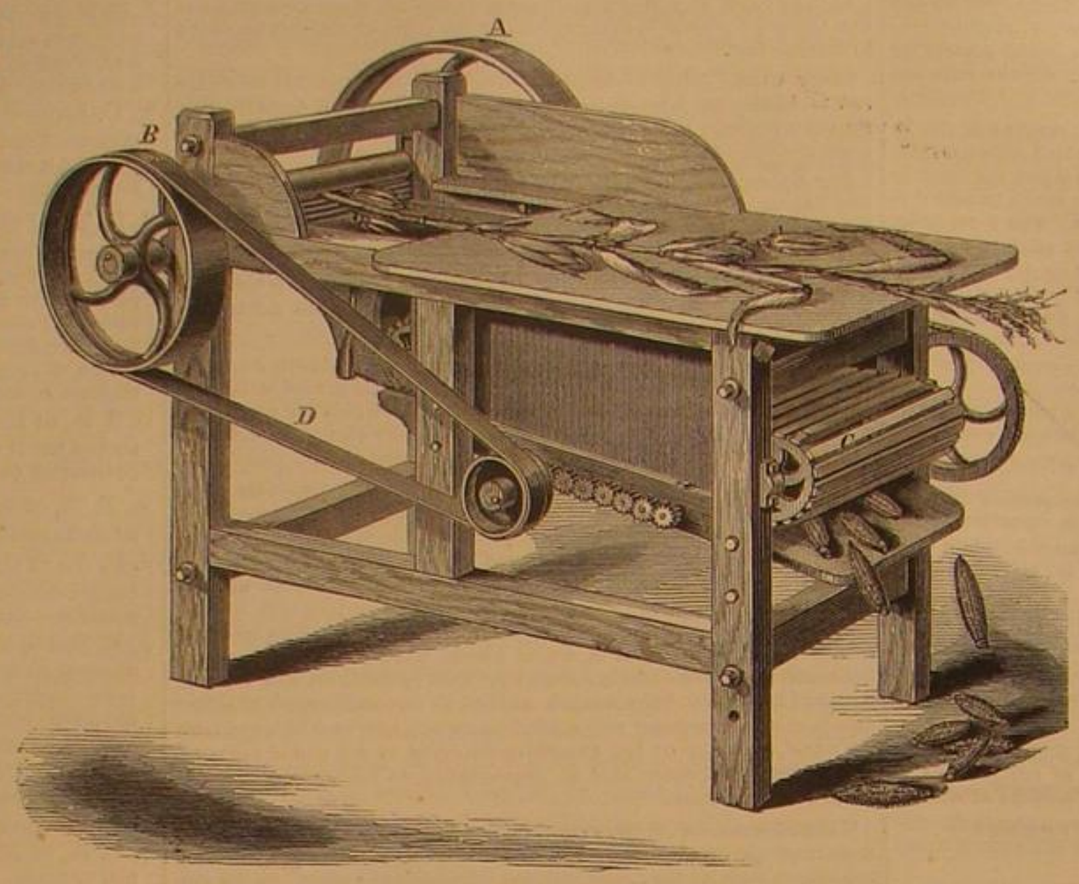
Olmsted's Patent Oilers are the Best. Sold everywhere.

Improvement in Machinery for Husking Corn.

Machinery for husking corn has been attempted for years, but the various devices prove to have been more or less imperfect. Some of them only partially husk the ear, some partially shell the corn from the cob, and others waste the husk, now become a valuable commodity, not only for filling beds, mattresses,and cushions, but for manufacturing into paper, cloth, and other fibrous substances.

The machine shown in the engraving is intended to obviate these difficulties. It may be run by hand or power, the hand machine having a capacity of twenty-five bushels per hour, and the power machine of from forty to sixty bushels. The machine is simple in construction and requires but little power to drive it. Power is applied to the wheel, A, on the axis of a fluted iron roller, called the picker, which carries, on the other end of its axis, a pulley, B. Over the picker is a smooth wooden roller, the object of the two being to pick the ears from the stalk. From the picker they fall into a hopper, which has communicated to it a rapid vibratory motion, which, together with its inclined bottom, compels the ears, in their passage, to present themselves to the next operation sidewise, and not endwise. The ears are now carried forward to the husking rollers by means of an endless apron, C, made of wooden slats. The next operation, which is the husking proper, is performed by means of a series of rollers driven by the belt, D, and connected by gears. The boxes for the journals of these rollers, lying in a groove, are divided by elastic cushions which allow for the passage of husks of varying thickness, or pieces of stalk, or other substance that may accidentally be drawn in. The apron, during the process of husking, which is but momentary, rotates the ears on the husking rollers. By this means the husks are cleanly stripped off and the ears carried away by the apron and delivered, as seen in the engraving. The stalks are fed to the picker from the table or top of the machine. The picking device, like the husking rollers, has yielding bearings of rubber or other elastic material, which allow stalks of varying sizes to pass, but compel the ear to drop into the vibrating hopper. The stalks are delivered lengthwise in front of the machine ready for bundling—the bright, clean husks by themselves underneath it, and the husked ears in the rear, as shown. Patented July 2d, 1867.

All communications should be addressed to the National Corn Husker Co., 164 Duane st., New York city.



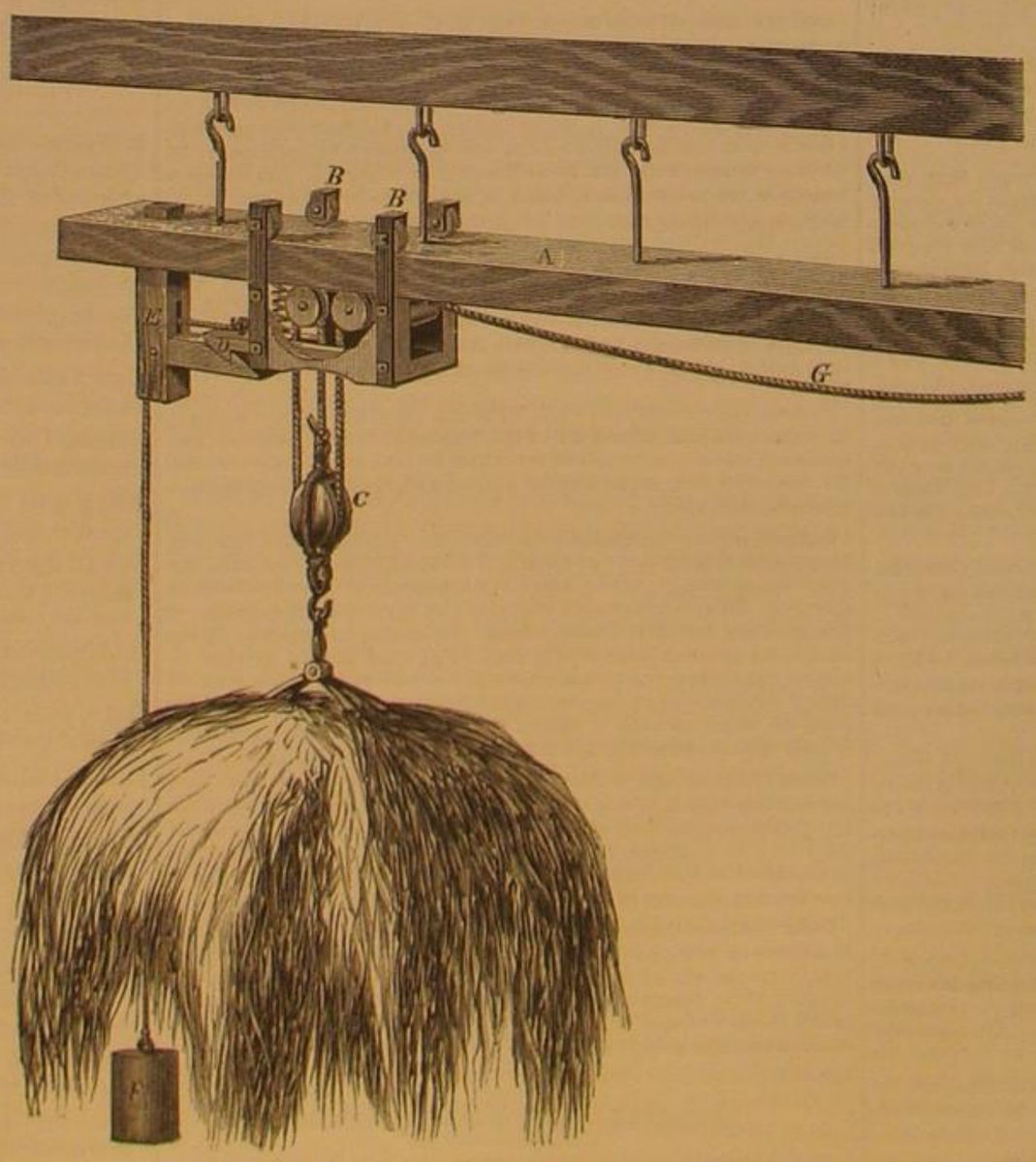
THE NATIONAL CORN-HUSKING MACHINE.

Improved Device for Elevating and Depositing Hay.

The intention of the invention herewith illustrated is to furnish a handy and effective device for elevating hay from the wagon and depositing it upon the bay, mow, or stack, at any point desired.

A represents the way, suspended to the rafters or string pieces of the barn, and supporting a carriage which traverses the way by means of straps and rollers, B. Within the carriage are two grooved rollers, or sheaves, over which and the sheave of the pendant block, C, a hoisting rope is rove, as in the ordinary fall or tackle. The block is provided with a hook to receive the eye of a hay fork. The bottom of the carriage is a pivoted latch, D, to which is attached a line passing over a pulley in the projection, E, and sustaining a weight, F, which has a tendency to draw the carriage toward the bar, E, so that the notch in the bottom, D, will engage with a corresponding one in the horizontal arm of E, and the fork and carriage be held in position while the former is being elevated; otherwise, the pull of the draft rope, G, would move the carriage on the way while the hay was being raised. As, however, the fork reaches its highest point, the block, C, elevates the latch, D, freeing the carriage, when it runs along the way until it arrives at the spot desired, when the fork is tripped, the load discharged, and the horse backed, permitting the weight, F, to return the carriage to place. The process is indefinitely repeated until the hay is all deposited.

Letters patent were secured through the Scientific American Patent Agency, January 7, 1868, by Harvey and Luther M. McCown, either of whom may be addressed for information regarding the sale of rights, etc., at Enon Valley, Lawrence county, Pa.



McCOWN'S PATENT HAY ELEVATOR.

The Coloring of Brass.

Although no alloy presents a more agreeable appearance to the eye than brass when it is in a high state of polish, yet the facility with which it tarnishes has rendered it necessary to color or bronze it, especially in those instances where its use exposes it to the liability of being frequently handled. Many of our readers no doubt remember the time when all scientific instruments, such as theodolites, levels, sextants, and numerous others of a smaller character used in the drawing office, were all manufactured *bright*, as it is termed. At present the best makers universally bronze instruments of the former class, and though they have not absolutely renounced the manufacture in brass of those belonging to the latter, yet they invariably recommend, and justly, those made of white metal. The reason that it was not until comparatively recently that brass was colored or lackered, is probably because it takes a layer of color very badly, and without certain precautions when a coating is laid on, the least shock will suffice to cause it to scale off. Some interesting details have lately been published respecting this very practical subject in a German cotemporary, illustrating the methods employed in obtaining a color of any required tint.

An orange tint, inclining to gold, is produced by first polishing the brass and then plunging it for a few seconds into a neutral solution of crystalized acetate of copper, care being taken that the solution is completely destitute of all free acid and possesses a warm temperature. Dipped into a bath of copper, the resulting tint is a grayish green, while a beautiful violet is obtained by immersing it for a single instant in a solution of chloride of antimony and rubbing it with a stick covered with cotton. The temperature of the brass at the time the operation is in progress had a great influence upon the beauty and delicacy of the tint; in the last instance it should be heated to a degree so as just to be tolerable to the touch. A moire appearance vastly superior to that usually seen is produced by boiling the object in a solution of sulphate of copper. According to the proportions observed between the zinc and the copper in the composition of the alloy, so will the tints obtained vary. In many instances it requires the employment of a slight degree of friction, with a resinous or waxy varnish, to bring out the wavy appearance characteristic of moire, which is also singularly enhanced by dropping a few iron nails into the bath. There are two methods of procuring a black lacker upon the surface of brass. The one, which is that usually employed for optical and scientific instruments, consists in first polishing the object with tripoli, then washing it with a mixture composed of one part of nitrate of tin and two parts of chloride of gold, and after allowing this wash to remain for nearly a quarter of an hour, wiping it off with a linen cloth. An excess of acid increases the intensity of the tint. In the other method, copper turnings are dissolved in nitric acid until the acid is saturated; the objects are immersed in the solution cleaned, and subsequently heated moderately over a charcoal fire. This process must be repeated in the order to produce a black color, as the first trial only gives a deep green, and the finishing touch is to polish with olive oil. Much pains is taken abroad to give brass objects "an English look." For which purpose they are first heated to redness, and then dipped in a weak solution of sulphuric acid. Afterward they are immersed in dilute nitric acid, thoroughly washed in water, and dried in saw dust. To effect a uniformity in the color, they are plunged into a bath consisting of two parts of nitric acid and one part of rain water, where they are suffered to remain for several minutes. Should the color not be free from spots and patches, the operations must be repeated until the desired effect is produced.—*The Engineer.*

Cause of Lamp Explosions.

The Boston *Journal of Chemistry*, in an article on the chemistry of kerosene, speaks as follows. As an explanation of the causes of lamp explosions, it is worth studying, that these accidents may be avoided:

As has been stated, kerosene is not explosive. A lighted taper may be thrust int it, or flame applied in any way, and it does not explode. On the contrary it extinguishes flame, if experimented with at the usual temperatures of our rooms. Kerosene accidents occur from two causes: First, imperfect manufacture of the article; second, adulterations. An imperfectly manufactured oil is that which results when the distillation has been carried on at too low temperature, and a portion of the naphtha remains in it. Adulterations are largely made by unprincipled dealers, who add 20 to 30 per cent of naphtha after it leaves the manufacturer's hands. The light naphthas which have been spoken of, as known in commerce under the names of benzine, benzoline, gasoline, etc., are very volatile, inflammable, and dangerous. They, however, in themselves, are not explosive; neither are they capable of furnishing any *gas*, when placed in lamps, which is explosive. Accidents of this nature are due entirely to the facility with which *vapor* is produced from them at low temperatures. But, the vapor by itself is not explosive; to render it so, *it must be mixed with air*. A lamp may be filled with bad kerosene, or with the vapor even, and in no possible way can it detonate, or explode, unless atmospheric air has somehow got mixed with vapor. A lamp, therefore, full, or nearly full, of the liquid, is safe; and also one full of pure warm vapor is safe. Explosions generally occur when the lamp is first lighted, without being filled, and late in the evening, when the fluid is nearly exhausted. The reason of this will readily be seen. In using imperfect or adulterated kerosene, the space above the line of oil is always filled with vapor; and so long as it is warm, and rising freely, no air can reach it, and it is safe. At bed-time when the family retire, the light is extinguished; the lamp cools, a portion of the vapor is condensed; this creates a partial vacuum in the space, which is instantly filled with air. The mixture is now more or less explosive; and when, upon the next evening, the lamp is lighted without replenishing with oil, as is often done, an explosion is liable to take place. Late in the evening, when the oil is nearly consumed, and the space above filled with vapor, the lamp cannot explode so long as it remains at rest upon the table. But take it in hand, agitate it, carry it into a cool room, the vapor is cooled, air passes in, and the vapor becomes explosive. A case of lamp explosion came to the writer's knowledge a few years since, which was occasioned by taking a lamp from the table to answer a ring of the door-bell. The cool outside air which impinged upon the lamp in the hands of the lady, rapidly condensed the vapor, air passed in, explosion occurred, which resulted fatally. If the lamp had been full of fluid, this accident could not have occurred. Before carrying it to the door, flame might have been thrust into the lamp with safety; the vapor would have ignited, but no explosion would have taken place.

In investigating the electricity of steam, Faraday found that dry steam gave no excitement, and that the electricity resulted from the friction of the vesicles of water against the sides of the orifice.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ "The New York News Company," 8 Spruce street.

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VOL. XVIII., No. 12....[NEW SERIES.]..*Twenty-third Year.*

NEW YORK, SATURDAY, MARCH 21, 1868.

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PRACTICAL INFORMATION FOR MECHANICS.

The lecturer on chemistry would find his desk and text books alone very insufficient appliances for conveying the information designed. He must have his laboratory, or such portion of it as he requires, to illustrate that branch of his subject upon which he desires to speak. And his text must be made plain and palpable by means of experiments, conducted before his audience. It is so in medical lectures, and in other branches of human knowledge; and being so, why cannot the benefits of a union of theory with practice be extended to that highest and most valuable branch of arts—mechanics.

It is a notable fact, that lectures generally, which profess to give theoretical information to practical mechanics, and those desirous of learning the business, are so abstruse, perhaps pedantic, and so entirely theoretical, that the hearer goes away with the idea of a load, which is merely a load, not valuable or available. Perhaps some of this is due to the fact that many of these self-called teachers have no practical knowledge of any branch of mechanics, and therefore cannot be expected to afford the information which they do not possess. But another difficulty is, that their teachings, instead of being addressed to those who need them most, are intended for persons who have, at least, mastered the rudiments of their business, and generally to those who have advanced (or retrograded) from the mere art or practice of mechanics to its theoretical formulæ.

There would seem to be no adequate reason why our young mechanics, and others whose proclivities are toward that valuable branch of useful knowledge, should be debarred from the privileges accorded to chemical and surgical students, and we believe that one or more courses of lectures annually, on mechanics, illustrated by practical experiments, in New York city, would be not only well patronized, but also of great benefit. Of course, it could not be expected that a complete foundery, forge, machine shop, sash and blind establishment, and sawing and planing mill could be run occasionally, merely to illustrate mechanical lectures; but such machinery and appliances as are calculated to exhibit the proper method of working materials employed in the arts could be readily and cheaply obtained and put in operation. It is not enough to say that the knowledge thus designed to be imparted should be sought only in the shop. To this, hundreds who would like to learn the business, are debarred access, and also many who would like to understand the *modus operandi* of mechanical operations without spending years in actual practice of the work.

A small forge, two or three diminutive lathes, for drilling, turning, and screw cutting, a planer for iron, and one for wood, with a circular saw, etc., would serve to illustrate the different qualities of different metals, and of different woods, with the peculiar appliances and tools necessary to meet these varying qualities. And this is the sort of knowledge our young men need; they want to see the process which they have heard described. They wish to understand the reason why brass cannot be worked in the same way and by the same tools as iron. It is not enough to tell them that brass is softer than iron, etc. They also wish to know why a tool which cuts lignumvitæ, one of the hardest woods known, will not cut white pine, one of the softest. And a hundred-and-one other wants of knowledge will remain unsupplied until theoretical and practical information for mechanics is combined.

We believe that here is a field opened for culture which has long laid untilled. We believe that a taste for a practice of the mechanical arts can be in no way so readily cultivated and the advancement of the useful branches of science, as practically applied, so easily and rapidly secured.

We commend these suggestions to the consideration of such public spirited and large minded men as Peter Cooper, and others of his "ilk," in other cities. Let the experiment be tried and it will be found that hundreds now prevented from securing a useful education will avail themselves of such means as we have here suggested.

IMPROVEMENT IN THE MANUFACTURE OF MACHINISTS' TOOLS.

We believe this was the first journal, at least in this country, that advocated the manufacture of machinists' hand tools as a specialty. When we were serving our novitiate at the machinist's business, and long after, it was compulsory that every workman should make his own inside and outside callipers, straight edges, squares, rules, hammers etc; and to finish his drills, turning tools, planing chisels, and many other appliances used in his work. He must also contrive temporary chucks for boring and turning, and make his drill holders or chucks. Many of these tools were considered by their makers their masterpieces, and were often marvels of skilled and patient labor. In accuracy, facility of handling, and beauty, many of them compare favorably with the machine made, standard articles. The machinist who could show a kit of highly finished tools, made by his own hands, had reason to be somewhat proud, and frequently the exhibition of these products of his skill secured him the confidence of his employer and the respect of his fellows. Even to this day we confess to the weakness of admiring the machinist who possesses these evidences of his interest in his business. It is an admirable trait in the character of the mechanic that he loves to possess and to use good, and even elegant tools. The sloven who cares nothing about the appearance of his tools so they serve his purpose never so clumsily, not seldom is satisfied with turning out an imperfect job so long as it will "go." This slovenliness and carelessness bring discredit on mechanics and induce a want of confidence in their work.

Still, we would not advise the waste of time and expenditure of labor by the workman on the manufacture of his own tools, when for a fraction of the value of that time and labor he can purchase accurate and handy instruments which can be relied on. To this, however, we make one exception. Never yet have we seen a sale hand hammer that suited the hand either in shape, balance, or "hang." Probably no tool used by machinists is subjected to a greater number of whims, some of which may be merely fanciful, but many of which are based on common sense. Working with a strange hammer, the mechanic almost invariably will make foul blows and produce imperfect work.

But the twist drills, machine made, which have worked their way into favor against prejudice and factious opposition are proof of the advantages of standard tools. We have now gages, rules, circular, iron-cutting saws, squares, turning tools, etc., which for handiness, excellence of material, and accuracy are unsurpassed. They are made by machinery which is infallible in its operation, and by manufacturers who make them a specialty and base their reputation upon their perfection. These tools have been as great an aid to the progress made in machine building as any other one agency. But they have an advantage beyond this. They produce uniformity of work, uniformity of measurements, uniformity of construction throughout the country, rendering repairs more easy and replacement of parts less difficult. It is an evidence of advancement that our mechanics appreciate these decided improvements. There is no shop of any note in the country but has the standard tools, the manufacturer's stamp on which is ample guarantee of their reliability and accuracy.

FISH AS FOOD---ITS RELATIVE VALUE.

The subject of the cultivation of fish—the re-stocking of ponds and streams with varieties which have become scarce and nearly extinct, and the value of fish for food—has been elaborately treated and generally discussed in the journals of the day. It is a subject of very great importance, and those public spirited men who have engaged in the work of reproducing valuable varieties of fish deserve much credit for their endeavors.

Still, we think one argument upon which they seem greatly to rely is scarcely so strong and convincing as the importance they attach to it would imply. That is the cheapness of fish as compared with flesh. It is certain that some varieties of fish, in their season, are plentiful enough in the market to make them cheap; but it is equally certain that, compared with mutton, beef, and pork, they are anything but cheap. Despite the statistical tables of out economic wiseacres, who spend their time in calculating the amount of nutritious substance contained in a certain quantity of certain food, and how cheaply soul and body may be kept together, we have yet to see the proof that fish at the prices now asked for it, or at the imaginary prices which it is believed will follow its more plentiful supply, will ever usurp, to any great extent, the position which flesh meats occupy.

No peoples have a very strong *penchant* for fish as a "steady drink," and at the best it is regarded as a makeshift or temporary substitute for a kind of food for which the stomach craves and which, perhaps, the pocket cannot supply. Nobody who has tried it believes that two pounds of fish at twelve cents per pound are equal in life-giving qualities to one pound of beef at twenty-four cents per pound. A soup made, even from the bones of beef, mutton, pork, or fowls is more "staying" than any clam, oyster, or fish soup that can be concocted, saving the admixture in the latter of vegetables, bread, pork, etc. Fresh salmon costs twice as much as beef steak, not alone because it is scarce and difficult to obtain, but because it is nearly equal if not quite in its satisfying quality to beef. That scarcity of the fish has nothing to do with its market price is fully proved by the fact that, salted and smoked, it is as cheap as ordinary beef.

The true value of the movement of pisciculture, now so popular, consists simply in this: Keeping the price of fresh fish, as a variety of diet, within such bounds as will enable those whose means are circumscribed to make an occasional divergence from their daily *menu*. That it can ever supersede flesh for food is a vagary which, as relates to the people of this country, might as well be dismissed first as last.

THE NEW FRENCH GAS LIGHT.

Our foreign exchanges several weeks since, announced an improvement in gas lighting which had been discovered by two French chemists and was about being introduced into Paris. Great advantages on the score of brilliancy of illumination, and especially, on that of economy, were claimed for the new invention which, it was predicted, would soon complete an entire revolution in our present system of gas lighting. Beyond however, brief and unsatisfactory descriptions, which indicated that the apparatus embraced some modifications of the Drummond light but failed to show the distinguishing peculiarity, the first intelligible account we have met with, is just at hand.

The ignition of the gas formed by the union of oxygen and hydrogen or ordinary illuminating gas, is the principal secret of the process, and any novelty the apparatus may possess is the manner in which oxygen is cheaply procured from the manganate of soda. A reverberatory furnace heats seven retorts having each a capacity for 231 pounds of this substance. Superheated steam, having a temperature of 842° Fah., is admitted into these retorts from a connecting steam boiler. Thus brought in contact with the steam, the maganate of soda becomes decomposed and its oxygen being freed, is swept off by the steam into a condenser. This latter vessel is filled with wet coke which condenses the watery vapors, and permits the oxygen to pass to the gas holder, ready for use. Remaining in the retort are left the manganese and soda; these are recombined as the manganese takes up fresh oxygen from a current of cold air which is forced into the retort by a powerful blower driven by a steam engine. The same process being renewed indefinitely, a steady supply of oxygen may be obtained. By means of separate pipes, oxygen, and hydrogen from the ordinary gas mains, are led to the burner, when they are lighted and the flame being directed against a piece of magnesia, an intense light results.

Our authority states that the French Emperor, wishing to satisfy himself personally of the truth of the facts regarding this new light stated by the Parisian journals, summoned the inventors to the Tuilleries, and during two evenings the apartments of the Imperial Palace were brilliantly lighted by their apparatus.

In regard to the cost of this oxy-hydrogen light, the French papers assert that the oxygen can be made for less than forty cents per thousand cubic feet, and that three cubic meters—106 cubic feet—of coal gas, and four cubic meters—141 cubic feet—of oxygen, costing about $1,69, according to photometric tests, give as much light as 180 cubic meters—6,357 cubic feet—of coal gas having a value of about eleven dollars, or, as they claim, for equal quantities of light a saving is made of $8,60, and allowing for the necessary imperfections of newly devised apparatus, the securing of three or even four times the economic advantage at less than one half the outlay, is believed to be possible.

In commenting upon this French project, the *Mechanics' Magazine* takes a somewhat different view regarding the economical value of the new improvement, and believes that the bright anticipations of the Parisian Company will never be realized.

"The projectors of the scheme intend employing the oxygen in the proportion of about a fourth of the coal gas, so as to increase the intensity of the illuminating power nearly eight times. First, can this result be accomplished? Secondly, if it can, will it be more economical than the present system? Taking the relative values of coal gas and pure oxygen as 1 to 7, it is evident that in order that the price should remain the same, the quantity of gas consumed by the proposed plan should only be one-seventh of that burned at present. But the quantity of light developed by a burner is proportional to the area of the flame for a given intensity. If oxygen be the illuminating agent, the intensity will be greater than that of the same quantity of coal gas consumed in a given time; but since the combustion of the former will be more energetic, the area of the flame will undergo a corresponding diminution, which may be estimated at one fourth. As the quantity of gas is reduced to a seventh, the actual flame is, therefore, represented by a twenty-eighth and, consequently, instead of an illuminating power of seven times the intensity of coal gas, one of twenty-eight times is required to maintain an identity in the cost. Unless the manufacture of pure oxygen can be reduced to a price less than 1s. per cube yard, which is certainly assuming a condition of affairs for which there is no warrant, it is scarcely possible that the new project will be found to succeed.

"Conceding that both in quantity and quality the oxygen can be produced and stored in suitable reservoirs, the next step is to convey it to its destination, and this involves a task of no ordinary magnitude. Owing to the tremendous explosive powers of the two gases when mixed, and ignited without due precaution, the oxygen and the coal gas could not be conveyed in the same pipes. The former must, therefore, have a special service of its own, and also one in every respect superior to that given to its neighbor. Coal gas is so readily manufactured, that, comparatively, its value is not very high, and companies are quite satisfied to regard with indifference

the enormous loss that occurs through leakage and bad manipulation of the pipes. It has been alleged that so much as 50 per cent of all the gas made in London is lost in one way or another. When, however, it becomes a question of transporting a substance which under the same volume possesses a much higher value than coal gas, the service pipes must be laid in a better manner, and the whole system attended to with a commensurate degree and precaution. In addition to entailing a new set of pipes, all the present burners would be useless under the proposed system, and it would be necessary to replace them with others adapted for the employment of a solid instead of a hollow flame.

"With respect to a city similar to Paris, there are many additional disadvantages which a company of this description has to contend against which are unknown to ourselves. Our streets are common property, and any one who owns a few yards of piping may prove his title to "a right of way" by ripping up the road, obstructing the traffic, and causing a local nuisance for almost any length of time. There is not a single main thoroughfare in London that is not disembowelled at least once every three months. Matters are otherwise managed on the other side of the Channel, and in connection with our subject it may be remarked that the ground is already occupied by an existing company whose interests would be carefully protected. There is another feature presenting itself worthy of consideration. The City of Paris levies a duty upon every cube yard of gas consumed. If, therefore, the employment of pure oxygen will reduce the annual consumption of that article to one seventh of the original quantity, there is no question but that in order to preserve the total amount of the rate unaltered, seven times the duty will be levied off the oxygen which has caused the decrease."

Editorial Summary.

Porosity of Iron.—The porosity of cast iron is a well-known fact. Many years ago, Mr. Perkins forced water through thick plates of it; hence it is not astonishing that gases pass with ease. A few years ago, a physician at Chambery was struck with the circumstance that an epidemic of fever occurred in Savoy every winter; and he fancied that he had traced the cause to the use in the cottages of cast-iron stoves, which allowed the gases of combustion to pass into the atmosphere of the rooms. The subject has been investigated by MM. Deville and Troost, and they find, by a very carefully conducted experiment, that hydrogen, carbonic acid, and carbonic oxide, do actually pass through the walls of a cast-iron stove, at a dull as well as a bright red heat. The fact is worth knowing here, for such stoves are often used in this country, and most frequently in ill-ventilated apartments. The amount of gases which pass is certainly not large, but carbonic oxide is an exceedingly poisonous agent, and most of the discomfort experienced in rooms heated by these stoves is no doubt attributable to that gas. The subject deserves the attention of manufacturers, who might possibly devise a tile or clay-lined stove that would diminish the inconvenience we mention, and at the same economize fuel.

Electric Light.—In Holmes's magneto-electric machine each revolution developes sixteen currents in opposite directions; hence the light it produces must be discontinuous, being extinguished and relighted sixteen times in the course of each revolution. As the machine makes 500 revolutions in a minute, the interval of time during which the current is cut off is excessively small; nevertheless, M. Jamin thought he could demonstrate the intermittence of the light. He failed to do this, but was able to recognize that the light of the luminous arc was less intense than that given off by the charcoal points, which he attributes to the interruption of the current. Properly speaking, he says we have in this lamp not the discontinuous electric light, but that of the carbon poles heated to intense whiteness, and giving a light nearly uniform. The light of the magneto-electric machine is, therefore, less blue and poorer in chemical rays than that from a lamp excited by a battery, and consequently better adapted for lighthouses.

American Invention Ahead.—The Director General of French Telegraphs, desiring further improvements in the telegraphic material in use in that country, some time ago appointed a commission specially charged with the selection of the best kind of insulator for adaptation to the French telegraphs. Having completed their examination we learn that choice has been made of an insulator invented by Mr. David Brooks, of Philadelphia. This insulator consists of an iron hook, for holding the wire, cemented in an elongated glass vase, the latter being cemented in a hollow cast cylinder. All parts of the apparatus susceptible of absorbing paraffine, are saturated with that substance which is now known to stand first among insulating bodies. The French Government has sent to the inventor a delicate differential galvanometer of 40,000 involutions, to test the insulators he is engaged in making for their telegraph lines, and specimens of all the insulators from every part of Europe offered in competition before the Commision.

The Waters of Affliction.—The men and animals of the Abysinian expedition now stationed at Annesley Bay, require a daily supply of 40,000 gallons of water. This entire amount must be distilled before it is potable, and this process is at an actual expense of fifty cents per gallon. British taxpayers therefore pay $20,000 per day, or at the rate of between seven and eight million dollars a year for this one item of expense of the expedition; in contemplating which the *Pall Mall Gazette* is forced to call these the "waters of affliction."

Concerning Birds.—In *The Naturalist*, Mr. Wallace has published a very interesting paper on the "Relation between Sexual Differences of Color and Nidification in Birds." In some few species of birds the females can boast of a plumage more beautiful and brilliant than that of the male. In cases where the female has this conspicuous appearance, the nest always conceals, her, but in cases where the female is of a dull color, the nest exposes a considerable portion of the sitting bird. When the male bird is less brilliant than his mate, it is found that he performs the duties of incubation. There seems, then, to be a connection between the color of the different sexes of birds and the sitting over the eggs. Mr. Wallace considered that Darwin's principle of natural selection most aptly explained this connection of color and nests.

Fauna of California.—At the last meeting of the Academy of Sciences at San Francisco, Dr. Cooper read a paper on the above subject giving notes of animal species recently determined to exist on that coast. Among these, he enumerated one sea elephant as large as a walrus, two species of seals, and three of sea lions. There are sixteen species of bats in California, two of which are very large and curious. Among rodents, a link has been found between the rat and rabbit. Of birds, quite a large number of species have been added, among which we note a black hawk, the first found in the United States; the European widgeon duck, a straggler from Asia; the short-tailed Albatross; the frigate Pelican, which is rarely found north of the tropics, and a large and entirely white gull of a species never but once before found in this country. Several of these additions to the fauna of the State, werefi rst identified and described by Mr. Cooper.

An Unparalleled Telegraphic Feat.—On Saturday the 1st inst. the telegraph operator in San Francisco held communications with the office at Heart's Content, N.F., the terminus of the Atlantic cable. After exchanging the usual complimentary messages, the circuit was still further extended the trifling distance of 2,000 miles, and a telegram was started from Valencia at 7:20 A. M., passing through New York at 2:35 A. M., and being received in San Francisco at 11:21 on the previous evening. Allowing for the differences of time, the actual time occupied in traversing this entire stretch of 14,000 miles, was only two minutes. Subsequently the operator at San Francisco transmitted an eighty-word message to Heart's Content direct in three minutes; it was repeated back by the operator at the latter office in two minutes fifty seconds.

Scientific Explorations in South America.—About seven months ago we informed our readers of a scientific expedition that was about starting from Williams College for the purpose of making explorations in South America. We have now intelligence of the safe return of the company, after an absence as above stated. The party traveled in two divisions. One section started from Guayaquil upon the western coast, crossed the Eastern Cordillera of the Andes, penetrated to the river Napo, and thence by canal to steam navigation on the Amazon. The other started from Caracas upon the coast of Venezuela, struck inland to the Orinoco, and down the Rio Negro to the Amazon, traveling a distance of 2,500 miles by canoe. Much valuable information respecting the country passed through, and very extensive collections in the various departments of natural history, are the results of the expeditions.

Feline Fanciers will be gratified to learn that Prof. Glover has added to his museum in the Department of Agriculture, a genuine Grimalkin imported from Angora, Asia Minor. The cats of this region are said to be one of the best of the species, being very domestic in habit and expert mousers. They resemble somewhat, the famous Angora goats, in having long and silky white hair and quite a lengthy and heavy tail. Enormous prices have been paid for this breed to be placed in museums of natural history, and by the nobility of Europe as pets. The particular puss now under notice, is one of three imported by Hon. Israel S. Diehl, with a view to try the experiment of domesticating them in this country.

Beware of Benzine.—From the facility with which it removes grease spots from fabrics, this substance has come to be regarded almost as a household indispensable. But few persons, however, realize the explosive character of benzine or the dangers attending the careless handling of the liquid. Being one of the most volatile and inflammable products resulted from the distillation of petroleum, it vaporizes with great rapidity, so that the contents of a four-ounce vial, if overturned, would render the air of a moderate sized room highly explosive. The greatest care should be exercised in handling this substance, in proximity to fire, and it is important to remember that the vapor escaping from an uncorked bottle will cause a flame to leap over a space of several feet.

Petroleum Champagne.—By long continued distillation at a low temperature, petroleum is made to yield a kind of hair oil which, when properly scented, is said to serve the purpose of a capillary lubricator in a very satisfactory manner. Two other products obtained under these conditions are a liniment, recommended in certain quarters for its healing virtues, and a species of castor oil, stated to possess equal medicinal value as the great original cathartic itself. These products we have seen, but the transformation of petroleum into champagne is something we have not seen, yet an Eastern paper assures us that it is done, and that from the fiery benzoles a sparkling, foaming champagne can be produced, capable of delighting the eye, tickling the palate, and gladdening the heart, and, it may be added, killing the body.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING MARCH 3, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

74,970.—Furnace for Heating Bolt Blanks.—Abram Alexander (assignor to Alexander Bolt Manufacturing Company), Pittsburg, Pa.

I claim, 1st, The bolt blanks heating furnace herein described composed of a combination of a certain number of hollow castings or boxes forming the sides of the said furnace.

2d, The side, A, having two or more rows of holes, R R R etc., and shelves I I' etc., arranged and used for the purpose set forth.

3d, Circulating water through the hollow sides of a furnace for heating bolt blanks for the purpose of dispensing with the fire-brick lining therein.

4th, In combination with the hollow cast sides or hollow made sides the pipes, Q K K L L and M, arranged substantially in the manner and for the purpose specified.

5th, In furnaces for heating bolt blanks the apron, V, in combination with one or two of the sides of the furnace, for the purpose set forth.

74,971.—Cards for Artificial Teeth.—A. Merritt Asay, Philadelphia, Pa. Antedated February 20, 1868.

I claim, 1st, The cards or slips for holding artificial teeth with the wax only on one side, substantially as above described.

2d, Printing the manufacturer's name or trade mark on one side of the slip and coating the opposite side of the same with beeswax, or an equivalent material, substantially as described and for the purposes specified.

3d, The process of preparing the sheets out of which the cards or slips are formed to receive the coating of wax on their outer surfaces, substantially as described.

74,972.—Lamp.—S. K. Ayers, Delton, Wis.

I claim a vent hole, c, in the base of a lamp burner combined with a valve, d, arranged and operating as and for the purpose described.

74,973.—Spring Balance for Safety Valves.—James Ayres, Paterson, N. J.

I claim the spring balance formed by the combination of the box or frame, A, rod, B, having a head, b, formed upon its inner end, springs, C, long hand nut, E, and rod, F, with each other, substantially as herein set forth.

74,974.—Curry Comb.—John H. Barringer, Jr., Hillsboro, Ill.

I claim, 1st, The teeth cylinders, C, the side pieces, B, and the handle, A, when combined and arranged as described and for the purpose set forth.

2d, The cylinders, C, when provided with two or more sets of teeth, c, substantially as described and shown.

74,975.—Slat Matting.—William Barton, Troy, N. Y.

I claim connecting the slats and buttons which form a slat mat by means of ropes or other flexible material which passes through the slats and buttons, substantially as and for the purpose herein shown and described.

74,976.—Cane Cleaner.—Samuel Bean, Syracuse, Ohio.

I claim the plates, C C', and springs, D D', in combination with the pivoted plate, B, and frame, A, all constructed, arranged and operating substantially as and for the purpose set forth.

74,977.—Device for Cutting out Bands and Fronts of Drawers.—Lyman Bennet, Amsterdam, N. Y.

I claim the arrangement upon the table, A, of the guides, B D and F, press bar, C, and knife guide, E, as herein described for the purpose specified.

74,978.—Mode of Fitting Clothing.—Randall Bisbee, Boston, Mass.

I claim as an improvement in the mode of manufacturing or fitting clothing or other covering for the foot and other portions of the human figure the employment of an inelastic but flexible mold made perfect in form constructed with yielding opening or apertures and provided with a device for indicating the shape or form of such openings, substantially as herein shown and described.

Also as a means of indicating and noting the size and shape of the apertures in the mold, the pointers, or their equivalents, essentially as herein shown and described.

Also the construction of the sole of the mold for the foot as divided in its center and provided with a suitable means of confining it in position, substantially as before set forth and explained.

74,979.—Mechanical Movement.—Marcus Bockman Brooklyn, N. Y.

I claim the frame, A A and B B, with the levers, C C, with their arms, D D, and rollers, J J, and the segment, E, and connecting bars, F F, constructed, arranged and operating substantially as and for the purpose set forth.

74,980.—Safety Attachment to Railroad Cars.—George W. Brady, New York city.

I claim, 1st, The shields, G, when connected with slides, H, which are fitted upon tapering dove-tail or other tenons, a a, formed on the ends of the yoke, J, which rest upon the axle boxes of railroad cars, substantially as herein shown and described.

2d, The above in combination with the springs, I I, arranged as and for the purpose set forth.

3d, The yoke, J, resting upon and fitting around the axle box and extending down the side of the pedestal the said yoke having a dove-tail tenon on each end to which the metallic slide connected with the shield frame is attached.

74,981.—Corn Sheller.—Jacob Brinkerhoff, Auburn, N. Y.

I claim the series of regulators or pressure blocks each with its independent spiral spring, combined and arranged substantially as and for the purpose herein set forth.

74,982.—Planer Chuck.—Rufus N. Bruce (assignor to himself and Amos Case), Springfield, Mass.

I claim a planer chuck in which the bottom plate, A, of the vise, is hinged at one side to the bottom plate, B, of the chuck, between two projecting guides, K and K, and operated at the other side by an elevating device, consisting of a screw, F, and loose nut, E, the parts being combined and arranged together substantially in the manner described.

74,983.—Harvester Rake.—Robert Bryson, Schenectady, N. Y.

I claim, 1st, The laterally sliding segment, I, applied to the plate or track bed, H, by means of a slot and guide, or slots and guides, substantially as and for the purpose described.

2d, The rod, K', and guide, n, upon the draft frame, A, in combination with lever, K, and sliding segment track, I, substantially as and for the purpose described.

3d, The combination of the sliding segment, I, and its lever and connecting rods for operating it, with the track bed, H, fixed cam, H2, and a series of revolving rakes and reels, substantially as described.

4th, The combination of a sliding elevating segment track, I, with rake and reel arms, which revolve around an axis, and with anti-friction wheels, e e, applied upon said arms at different distances from their respective axes of motion, substantially as and for the purposes described.

5th, A gimbal-jointed rod, S, which is allowed to slide freely through the clutch hub, h, and which carries upon it a sliding clutch, r, in combination with spur wheels, f3 f2, longitudinal shaft, g, and spur wheels, f f1, arranged to operate substantially as described.

6th, The sliding rod, S, and its gimbal or universal joint, T1, in combination with a clutching device, r h, a rotating bearing, p, and a driver, h', substantially as and for the purpose herein described.

7th, The arrangement of the rod, K', and the slide rod, S, with its clutch, upon the draft frame of a front-cut machine, and in front of the driver, all in such relation to the driver's seat that the driver can conveniently stop or start the rakes and reels, and also cause any one of them to operate either as a rake or reel at pleasure, substantially as described.

74,984.—Double Hoes.—A. Burchard, New Brenton, Ill.

I claim making them adjustable so that the blades may be set near together or further apart, as desired.

I also claim, as a means of adjusting double hoes, a cleft or forked handle provided with a screw or other device, for adjusting the separation, substantially as described.

74,985.—Apparatus for Dyeing Piece Goods.—Henry Burrows, Lowell, Mass.

I claim the combination as well as the arrangement of the series of guides, I, and either bars or rollers, K, with the reservoir, its drum, B, and roller, H the whole being to operate together as described, with a piece of cloth applied to them, in manner as set forth.

I also claim the arrangement and combination of the guide arm, L, with the system of guides, I, bars or rollers, K, drum, B, roller, H, and reservoir, A.

I also claim the combination and arrangement of the pressure roller, O, and forked arm, N, or the same and the post, M, with the reservoir, its drum, rollers, and guides, arranged as set forth.

I also claim the combination and arrangement of the roller, F, with the reservoir, A, the drum, B, the roller, H, and the system of guides, I or I and K, applied to the said reservoir, and arranged with the drum, B, and roller H, substantially as specified.

74,986.—Mowing Machine.—Geo. E Burt, Harvard, Mass.

I claim, 1st, The seat, T, supported by mechanism constructed and arranged in such a manner that the weight of the operator shall act to lift the cutter bar, substantially as described, for the purpose set forth.

2d, The foot lever, r, when constructed with mechanism so arranged that, when operated upon, it shall act, in conjunction with the operator's weight

in the seat to elevate the cutter bar, substantially as described and set forth.

3d, The segment, s, the gear, v, the lever, r, in combination with the segment, H, and elevating chain, c, substantially as described for the purpose set forth.

4th, The hanging boxes, C C, the lever, D, and pivot, d, in combination with the seat, t, constructed and arranged substantially as described for the purpose set forth.

5th, The combination of the periphery rolls, f f f, the rings, J J, the revolving rim, I, and the stationary hollow ring, K, with the frame, A, constructed and arranged substantially as described for the purposes set forth.

74,987.—RAKE.—John H. Butler, Scottsville, Ky.

I claim the circular and rotary construction of the machine above described, connected with a handle, as above described, and having teeth inserted in the usual manner in the circular frame, and by means of iron hooks and staples, above described, preventing the rotary motion of the machine, at pleasure, and thereby converting it into a common rake.

74,988.—LANTERN.—John Caldwell, Providence, R. I.

I claim the combination of a lantern frame, e e' d, constructed as described, with a lamp, a, and chimney, c, in such a manner that the frame may be readily fitted to the lamp, and the chimney will form the glass of the lantern, substantially as set forth.

74,989.—SLED BRAKE.—John Cassidy, Montezuma, Iowa.

I claim, 1st, The double-locking irons, B B, bent or otherwise, forming one continuous bar, all substantially as shown and described, in combination with a sled or sleigh, for the purpose of retarding the progress of the latter, all as set forth.

2d, The lifting bar, e, substantially as shown and described, in combination with the locking irons, B B, and lever, b, all as and for the purpose set forth.

3d, The frame, n, substantially as shown and described, in combination with the roller, l, locking irons, B B, and lifting bar, e, or the equivalent thereof, all as and for the purpose set forth.

4th, The roller, l, substantially as shown and described, in combination with the locking irons, B B, and frame, n, all as and for the purpose set forth.

74,990.—PLAITER FOR SEWING MACHINE.—Hugh Cawl, Douglass Corning and James W. Wheeler, Troy, N. Y.

We claim the plates, A, B and C, and the gage, D, for the purpose of guiding the cloth as it passes through the plaiter, and regulating the width of the first plait, in combination with the additional blade or gage, E, substantially in the manner and for the purposes herein described and set forth.

74,991.—POTATO DIGGER.—W. H. Chamberlin, Medina, N. Y.

I claim, 1st, the wheels, G, formed with three curved prongs, g', and removably arranged upon the shaft, F, substantially in the manner herein shown and described and for the purposes set forth.

2d, The combination of the pronged wheels, G, shaft, F, frame, B, gear-wheels, E and D, axle, A, drive-wheels, C, and tongue, t, with each other, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the tongue, I, seats, K, bars, L J, lever, M, and catch, N, with the frame, B, and axle, A, all constructed, arranged and operating substantially as herein set forth for the purpose specified.

74,992.—IMPLEMENT.—T. C. Comstock, Harrodsburg, Ky.

I claim, 1st, The nail drawer and hammer, constructed as described, its handle, B, provided with the beak, E, and fulcrum nose, D, forming the wrench, W, and also provided with the vertical opening, H, for the passage of the nail being drawn, and the handle, A, having the sharpened vertical jaw, F, all arranged as described, for the purpose specified.

2d, The nail drawer and hammer, when provided with the beak, D, jaws, E F, opening, H, hammer, C, screw driver, G, and tack drawer, i, all constructed and arranged as herein shown and described.

74,993.—ADJUSTABLE SEAT.—Isaac Cook, St. Louis, Mo., assignor to himself and Franklin Manufacturing Company, assignors to Isaac Cook and George P. Herthel, Jr.

I claim the seat board, A, in combination with the lever, B, the trunnion, m, supported in a rubber-cushed mortise of the stand, C, the shoulder, E, its rubber facing, n, and the check stud, F, with its rubber facing, all acting to produce a noiselessly-moving seat, substantially as set forth.

74,994.—SELF-LOADING BATTERY GUN.—T. J. Granmer, Vallecita, Cal.

I claim, 1st, The sash or frame, R, provided with lugs for moving the slides, S S, and constructed substantially as described, and for the purposes herein set forth.

2d, The rock shaft and frame, Q, provided with teeth that move the sash or frame, R, substantially as and for the purposes herein shown and described.

3d, The construction of the lock for firing the volleys, consisting of the sliding bar, J, and dog, L, with the lug, a, hammer, M, and spring, F2, substantially as herein shown and described.

4th, The device by which the caps are placed upon the nipples, consisting of a combination of the spring, E2, dog, o, and lugs with the sliding bar, S, substantially as herein shown and described.

5th, The combination of the hopper, O2, with the tubes, p, and plates, t, lugs, g, and sash, R, operating substantially as and for the purposes herein shown and described.

6th, The construction and arrangement of the wall, S', in each powder chamber, adjusted laterally by means of the set screws to regulate the charge of powder, substantially as and for the purpose specified.

74,995.—CHURN DASHER.—Robert Crawford, Mercer, Pa.

I claim, 1st, The air vessel, D, of any suitable shape, for the purpose of displacing the cream and permitting the same to pour into the said vessel, D, and operating substantially as shown and described, and for the purpose specified.

2d, The valve, g, of any suitable form, in combination with an air vessel, thereby commingling with the air in the vessel, substantially as shown and described, and for the purpose specified.

3d, The concave radial wings, a, in combination with an air vessel, D, substantially as and for the purpose shown and described.

74,996.—PROCESS OF TREATING PAPER FOR VARIOUS PURPOSES.—Charles F. Crehore, Newton Lower Falls, Mass.

I claim the treatment, substantially as before described, of the different fabrication of paper, by combining the same with sulphur, or any combination with or equivalent to sulphur, for the purpose of producing the material or effects before explained.

74,997.—FLOATING THERMOMETER.—David B. Day, New York city.

I claim, 1st, The float, A, bent thermometer tube, B, and adjustable ballast weight, D, constructed and combined substantially as and for the purpose herein set forth.

2d, A thermometer for measuring the temperature of liquids, so constructed as to be suspended therein by means of a float making a part of the instrument, substantially in the manner and for the purpose set forth.

74,998.—ANIMAL TRAP.—John M. Dearborn, Boston, Mass.

I claim the combination of the side boards or plates, F, glass end plates, G, covering plates, H, gauze or fine grating, I, pivoted or hinged drop door or doors, B, arms, C, coiled springs, D, and arms, E, with each other and with the cover, A, substantially as herein shown and described and for the purpose set forth.

74,999.—CAR WHEEL.—Gilliard Dock, Wiconisco, Pa.

I claim the perforated projection, c, in combination with the recess, a, in the hub, A, of a car wheel, constructed an operating substantially as and for the purpose herein described.

75,000.—DENTISTS' FLASK.—George E. Donham, East Abington, Mass.

I claim in combination with the parts of a dentists' flask, and means for securing said parts together, means for allowing the parts to yield while retaining pressure on the contents of the flask, substantially as described.

Also the clamp when made so as to yield, and arranged to be used with means for securing together the parts of a dentist's flask.

75,001.—CAR BRAKE SHOE.—Gardner Drake, Farmington, Me.

I claim, 1st, The combination of the brake shoe, A, having the slot, a, and the beveled end, C, as herein described, for the purpose specified.

2d, The combination of the slotted shoe, A, with the pins, a1, bolt, a2, and block, B, as herein described, for the purpose specified.

75,002.—STRAINER FOR FLUIDS.—Wm. Dunn, Argosville, N. Y.

I claim the arrangement of a strainer within a vessel, such strainer having a wire gauze or screen in its wall, and attachments for the purpose of connecting it to one side of the vessel, substantially as and for the purpose described.

75,003.—METHOD OF EXCAVATING UNDER WATER.—Alfred Duvall, Baltimore, Md. Antedated Feb. 28, 1868.

I claim, 1st, the receiving box, C, forming a horizontal portion of the pipe leading from the excavator to the pump, constructed with doors to give access to its interior, and submerged in water, or otherwise made air tight, substantially as set forth.

2d, The combination of the pump, A, receiving box, C, and screen, E, pipe, F G, and vertically working excavator, K, substantially as and for the purpose set forth.

3d, The combination of the receiving inlet, I, and excavator, K, respectively constructed and arranged to operate substantially as set forth.

4th, The combination of the excavator, K, vertical shaft, J, and stationary cylinder, L, with revolving piston, for supporting the shaft, substantially as set forth.

5th, The arrangement of the hull of the boat with a partition, V, valve, T, and pump, M, for regulating the depth of the excavator, either when at work or for the purpose of adjusting the shaft, substantially as set forth.

75,004.—MODE OF EXCAVATING UNDER WATER.—Alfred Duvall, Baltimore, Md. Antedated Feb. 28, 1868.

I claim, 1st, The combination of the pump, A, receiving box, B, valve F, tubes, E, and pipes, I, the latter two being connected by a universal joint, H, substantially as set forth.

2d, The combination and arrangement of the stationary tubes, E, horizontally and vertically movable pipes, I, cord, J, and windlass, K, substantially as set forth.

3d, The combination and arrangement of the pipes, I and E, receiving box, B, screen, C, pump, A, and trough or series of troughs, P, substantially as and for the purpose set forth.

4th, The receiving box, B, with the adjustable valve, F, and screen, C, and external water box, D, constructed and arranged substantially as set forth.

75,005.—SEEDING MACHINE.—Andrew R. Eggleston and Charles F. Swain, Milwaukee, Wis.

We claim, 1st, The combination with the rotating feed cups, of the overlapping stationary sockets or shields, substantially as set forth, for the purpose described.

2d, The combination of the feed cups, the gage plate, and the shut-off slide, substantially as set forth.

3d, The combination of the windlass, the hand lever, and drag bars, with lifting chains, arranged as described, whereby the plows are lifted by the backward movement of the lever, as set forth.

75,006.—HORSE RAKE.—John Eliot, Vermillion, Ill.

I claim the hay gatherer when provided with teeth, B, having the rearward extensions, to the under side of which and the head, A, the runners, C, are secured, as herein shown and described.

75,007.—TWEER.—Benjamin Fish, Mechanicsburg, Pa.

I claim the improved tweer herein described, constructed and arranged substantially as set forth.

75,008.—BAG TIE.—L. H. Gano, Milwaukee, Wis. Antedated Oct. 18, 1867.

I claim the lever, a, provided with its tooth, c, in combination with the elastic link, b, the spurs, d d, and the links, b' b'', arranged and operating substantially as described.

75,009.—WATER WHEEL.—M. D. Grow, Fort Dodge, Iowa.

I claim the bell-shaped wheel, A, provided with the spiral buckets, S L, and having its upper edge and guide band, E, arranged in relation to the annular chute plates, B B', substantially as herein shown and described.

75,010.—APPARATUS FOR VENTILATING WATER CLOSETS.—Frederick Hainsworth, Chicago, Ill.

I claim a water closet ventilator consisting of the case, D, pipe, B G, and valve, A, substantially as described.

75,011.—STEAM BLOWER.—Jonathan Hainsworth, Chicago, Ill. Antedated Feb. 24, 1868.

I claim, 1st, The arrangement of the vertical shaft, G, and steam cup, D, as and for the purposes set forth.

2d, The arrangement of the vertical hollow center, I, and shaft, G, as and for the purposes specified.

3d, The combination of the cup, D, steam duct, C, and center, B, as and for the purposes set forth.

75,012.—TRAVELER FOR FURLING SAILS.—George Hart, New Bedford, Mass.

I claim a traveler with friction rolls running in a guide, for hauling in and out square sails, as herein set forth and described.

75,013.—RAILROAD GATE.—Andrew Hartman, Canton, Ohio. Feb. 22, 1868.

I claim, 1st, The combination of the rods, F H J, box, G, spring, q, slide, I, and, nut, n, the several parts being arranged in the manner and for the purpose herein specified.

2d, The combination of the lever, A, and the springs, d and x, the several parts being arranged as and for the purpose herein set forth.

3d, The combination of the gates, o o', rods, K l, and arms, l l k, spring, s, and box, m, the several parts being arranged in the manner and for the purpose specified.

4th, The peculiar arrangement of the irons, t t', levers, r r' catches, L L', slotted irons, v v', rods, u u', and stops, h h', the several parts being used as and for the purpose herein specified.

5th, The peculiar arrangement and combination of the gates, levers, rock shafts, rods, springs, boxes, slides, catches, and slotted irons, as herein shown, the whole forming a self-operating apparatus, in the manner and for the purpose herein specified.

75,014.—BOTTLE.—Gibbons G. Hickman, Coatesville, Pa.

I claim the conical tube, D, projecting obliquely downward and inward from the side of the bottle, A, to a point very near the bottom thereof, as and for the purposes shown and described.

75,015.—HYDRAULIC PRESS.—Chas. W. Holbrook (assignor to himself, Wm. Boardman, and Charles G. Bayley), New York city.

I claim the combination and arrangement of the movable platen, C C, rods, K K K K, toggle joints, H H H, and arms, E E E, with the central cylinder motor, all substantially as described.

75,016.—REVOLVING FIRE-ARM.—George Holman, Waterville, N. Y.

I claim, 1st, The plugs, E E', in the ends of the central hole, a, of cylinder D, in combination with the rod, F, on which said cylinder is fitted, all arranged substantially as and for the purpose set forth.

2d, The providing of the cylinder, D, with alternate rifled and smooth bores, e f, smaller in diameter than the bore of barrel, C, substantially as and for the purpose specified.

3d, The attaching of the spring, I, which operates the stop lever, J, to the front side of the hammer, H, for the purpose of insuring strength and durability.

75,017.—TRUNK CASTER.—Lewis Horton and Josiah A. McGaw, Manchester, N. H.

We claim the trunk caster consisting of the plate, a, to which the plate, b, is hung by the pin, c, said plate bearing between the two arms, e, the corrugated roller, d, all constructed as described; whereby the plate, a, is secured in place without the pin, c, entering the bottom of the trunk, and the plate, b, allowed to revolve in contact with the plate, a, without leverage, as herein shown and described.

75,018.—DUST RING FOR WATCHES.—Edward Howard, Boston, Mass.

I claim the method of attaching the dust ring, a, to the lower or dial plate of a watch movement, by means of a bevel or snap edge on said plate, engaging with a corresponding edge in the dust ring, substantially as and for the purpose set forth.

75,019.—SHOT CARTRIDGE.—Wm. O. Howard, New York city. Antedated Feb. 22, 1868.

I claim the combination with the fibrous elastic covering, A, and shot, B, of a coating of adamantine, stearine, or equivalent substance, substantially as and for the purpose specified.

75,020.—CAR REPLACER.—Charles Hurst, New York city.

I claim the sliding axles, D D', ratchet bars, F, axle, H, having pinions, e, screw shaft, I, arms, f h, and nuts, g, in combination with the flanged wheels E E', and car, A, whereby a vertical and lateral adjustment of the flanged wheels, E E', is obtained, substantially as herein shown and described, for the purpose specified.

75,021.—MACHINE FOR JOINTING STAVES.—Chas. B. Hutchinson, Auburn, N. Y.

I claim, 1st, The combination of the right and left hand screw, G, pivoted nuts, L L, and pivoted side pieces, E E, carrying saw arbors and saws, all constructed and arranged to operate to adjust the saws to different width of staves, substantially as described and for the purposes set forth.

2d, The combination of clamping levers, C c, with the carriage, B, when constructed and operating substantially as described.

75,022.—SLIDE FOR EXTENSION TABLES.—Nicholas Jenkins (assignor to himself, George Brown, and Charles F. Bliss), New York city. Antedated Feb. 20, 1868.

I claim, 1st, The circular form of the metal plate, N, when arranged relatively to the slides, A B, etc., and to the concentric fastening which secures it, substantially in the manner and for the purpose herein set forth.

2d, The stop, N, centrally arranged relatively to the slides, A B, etc., with the blocks, G, receiving the same, substantially in the manner and for the purpose herein set forth.

75,023.—FRICTION DRIVER.—John T. Jones (assignor to the Singer Manufacturing Company), New York city.

I claim the combination of the hub, friction clamp, two rocking cams, and two operating levers, arranged at the same side of the hub, substantially as before set forth.

Also the combination of the hub, friction clamp, two rocking cams, operating levers, and reciprocating driver, substantially as before set forth.

Also the comoination of the hub, friction clamp, two rocking cams, operating levers, reciprocating driver, transferrer, and gage, substantially as before set forth.

Also the combination of the hub, rocking cam, lever, reciprocating driver, transferrer, gage, and holding mechanism, substantially as before set forth.

75,024.—FRICTION DRIVER.—John T. Jones (assignor to the Singer Manufacturing Company), New York city.

I claim the combination of the hub, split ring, and cam, substantially as before set forth.

Also, the combination of the hub, split ring, cam, and operating lever, substantially as before set forth.

Also, the combination of the hub with two sets of split rings and cams, substantially as before set forth.

75,025.—BEDSTEAD FASTENING.—William Johnston, Appleton, Wis.

I claim the part, D, when made in two sections of segmental form, secured together by the single pin, P, in combination with the rings, R R, joined together and cast in one piece, and bearing upon one side the necks, s s, and catches, k, as herein described, for the purpose specified.

75,026.—CONSTRUCTION OF VEHICLES.—George P. Kimball, San Francisco, Cal.

I claim, 1st, The combination of the perch, A, and jack, P, with the bars, J J, and H H, substantially as described, and for the purposes set forth.

2d, The combination of the bar, D, plate, O, bolts, I I, braces, G, and perch, A, substantially as described, and for the purposes set forth.

3d, The combination of the screw plate, C, and nut, C, with eye-bolt, S, substantially as described and for the purposes set forth.

75,027.—MOLD FOR ARTIFICIAL TEETH.—Almas A. Knowlton, St. Albans, Vt.

I claim, 1st, Forming the back part of the mold in two pieces, B and C, the division line being located substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the screws, h, with the back part, C, of the mold, substantially as herein shown and described, and for the purposes set forth.

3d, Forming the holes for the platina pins in plain incisors and canines in the bevelled edge of the part, C, and at an angle of twenty degrees or thirty degrees with the plane of the position of said teeth when in the mouth, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the screws, d, with the parts, B C, and A, of the mold, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the pins, f, with the parts, B and C, of the mold, substantially as herein shown and described, and for the purpose set forth.

75,028.—SNOW-CLEARER.—Samuel Lewis, Brooklyn, N. Y.

I claim the combination of the tilting rear box, 6, frame, 1 2, brace, 8, windlass, 17, and lever, 18, all arranged and operating substantially as described, for the purpose specified.

75,029.—ICE-PLANING MACHINE.—Samuel Brooklyn, N. Y.

I claim, 1st, The adjustable knife, 7, in combination with a frame mounted on runners, 20 20, and all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

2d, The manner of attaching and bracing the knife, 1, of an ice planer, with its flat side downward, by the bolts, 2 2, braces, 3 3, taper washers, 5 5, and nuts, 4 4, substantially as described, and with the objects specified.

3d, The slots, b b, in the knife, 1, when in combination with bolts, 2 2, braces, 3 3, washers, 5 5, and nuts, 4 4, for the purpose explained.

4th, The vertical cutters, 9 9, formed, attached, and operating as described, and combined with the knife, 1, and its attachments, as shown.

5th, The runners, 11 11', when made reversible and adjustable as described, by means substantially as shown and combined with an adjustable knife and vertical cutters, all as specified and explained.

6th, The brake or elevator, 16, in combination with the chain, 17, and windlass, 14, applied and arranged to operate in the manner substantially as and for the purpose specified.

75,030.—BOSOM PAD.—H. W. Libbey, Cleveland, Ohio.

I claim, 1st, A breast form or pad, having a rigid base, A, and a flexible rubber front, provided with a valve at the nipple, and padded or stuffed, substantially as herein described.

2d, The valve, c, as arranged, in combination with the elastic covering, C, and nipple, F, for the purpose and in the manner substantially as set forth.

75,031.—BOSOM PAD.—H. W. Libbey, Cleveland, Ohio.

I claim, 1st, The diaphragm, A, membrane, B, and elastic covering, C, combined and arranged substantially as specified.

2d, The nipple, D, and valve, E, combined and arranged substantially as and for the purpose specified.

75,032.—COMPOUND PUNCHING AND UPSETTING APPARATUS.—Samuel E. Lockwood, Westbury, N. Y.

I claim the improved machine herein described, consisting of the stationary head block, C, sliding head block, D, connecting rod, F, eccentric, E, upon shaft, G, eccentric disk, H, with its lever, I, stationary blocks, J, and sliding block, J', having serrated projections, 11', toothed eccentric wheels, K', and punch, n, die block, O, and openings, r S, all constructed and arranged as described, for the purposes specified.

75,033.—REFLECTOR.—J. A. J. Logan, Moline, Ill.

I claim an improved article of manufacture, the concave metallic reflector A, made in one piece, with its shank, C, when said shank is formed with a shoulder, B, arranged as described.

75,034.—STEAM ENGINE CUT-OFF.—Henry O. Lothrop, Milford, Mass.

I claim the improved "cut-off" regulating mechanism herein described consisting of the auxiliary valves, K L, operated by the cams, c and d, applied to the shaft, e, and slides, i, the whole operating in combination with the main valve, D, and cylinder ports, B and E, to produce the results before set forth and explained.

75,035.—FRUIT GATHERER.—Virgil H. Lyon, Plainfield, Ill.

I claim, 1st, The head, A, fingers, C C C C, B B B B, in combination with sack, S, when formed, constructed, and arranged, in the manner herein described, and for the purpose set forth.

2d, The sectional rod, D, in combination with head, A, when constructed and arranged substantially in the manner as herein shown, and for the purpose set forth.

75,036.—CATAMENIAL SACK.—Charles Manheim (assignor to E. L. Perry), New York city.

I claim the catamenial sack, constructed as described, from one piece, in such a manner that the bags, B C D, are only formed when the sack is partially folded, as herein shown and described.

75,037.—WINDOW SHADE.—Charles G. Matchett, Greenville, Ohio.

I claim, 1st, The arrangement of gravitating catch, H, with the riband, F, upper roller, B, and bands, C C', for the purpose set forth.

2d, The arrangement of cord, I, tassel, J, and lower roller, E, for the purpose set forth.

3d, The combination of the two rollers, B E, bands, C C' F, catch, H, and cord, I, substantially as and for the purposes set forth.

75,038.—PRESS FOR PACKING SHRED TOBACCO.—David C. Mayo, Richmond, Va.

I claim the combination of the lever and counterpoise, d, and connecting rods, b1 b2, and slides, B B, cross head, E, plungers, e e, with filling tubes, f f, all arranged substantially as herein described.

75,039.—FURNACE FOR GENERATING STEAM.—David Neilson Melvin, Buffalo, N. Y.

I claim, 1st, Constructing a steam boiler of one or more inverted conical water tubes, B, each separate and independent of the others, substantially as set forth.

2d, The mode of sustaining the said tubes, B, in the metallic plates, E E, as herein described, to allow of their expansion and contraction.

3d, Constructing furnaces having inclined grates, with a bridge or partial diaphragm, K, at the center, for dividing the draft, in combination with the combustion chamber, D, and side escape flues, p p, substantially as and for the purpose set forth.

4th, The door, f provided with arm, h, and weight, g, and hinged so as to be self-operating and self-sustaining, substantially as specified.

5th, The arrangement of the tubes, B, heating chambers, C, and flues, p p, whereby the heat through the latter comes first in contact with the enlarged upper surfaces of the tubes, and is thence retarded as it descends, substantially in the manner and for the purpose set forth.

6th, The series of dampers, q q, in flue, G, in combination with the tubes B, heating chamber, C, apertures, p, and furnace, D, provided with a bridge K, arranged as described, for regulating and equalizing the draft among the said tubes, as specified.

75,040.—COMBINED BOOK COVER AND STAND.—William Milliken, Cambridge, Mass.

I claim, 1st, The combination of the covers, A A, and the adjustable frame or stand, B B, substantially as and for the purpose set forth.

2d, The adjustable bars or supports, E E, in combination with the adjustable frame, B B, and cover, A A, substantially as and for the purpose set forth.

75,041.—MACHINE FOR BORING POSTS.—B. F. Mohr, Mifflinburg, Pa.

I claim the combination of the levers, H J, and K, and M, with the pin, I, notch, h, and notches on the bar, L, of carriage, E, or its equivalent, all constructed and operating in manner substantially as above set forth and described.

75,042.—AIR-CONDENSING APPARATUS.—Halsey Moore (assignor to himself and Aaron W. Knapp), Bangall, N. Y.

I claim, 1st, The rock-shaft, D, with which the piston rods of the air pumps or condensers, A, are connected, operated by means of the sliding weights, G and H, moving back and forth upon the slotted arms, F, attached to said shaft, D, substantially as herein shown and described, and for the purpose set forth.

2d, The weights, G and H, moved back and forth upon the slotted arms, F from the working beam, P, by means of the connecting rods, I, levers, J connection rods, L, bent or elbow levers, M, and connecting rods, O, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the toothed segment, R, toothed segment, S, working beam, T, connecting rods, U, crank, V, and shaft, W, with each other and with the working beam, P, to impart motion to said beam, substantially as herein shown and described.

75,043.—COAL SIFTER.—Duncan Morrison, Portland, Me.

I claim the arrangement of the several devices hereinbefore described, in the manner set forth, and for the purposes specified.

75,044.—LIQUID COOLER.—Robert Morton, Stockton-on-Tees, Eng.

I claim the arrangement of a series of flat tubes, A, which are alternately provided with longitudinal ribs, c, and connected by corrugated strips, d substantially as and for the purpose described.

Also, the caps, C, in combination with the tubes, A, ribs, c, and connecting strips, d, constructed and operating substantially as and for the purposed scribed.

75,045.—COFFEE POT.—Joseph Nason, New York city.

I claim the employment of two cocks, communicating respectively with the upper and lower parts of the chamber of a duplex coffee urn, the several parts being constructed and arranged for joint operation, substantially as and for the purposes herein set forth.

75,046.—COOKING STOVE AND RANGE.—Benjamin Nott, Albany, N. Y.

I claim a base burning stove, so arranged and constructed as to admit the feeding and burning of the coal at the rear of the fire pot, in combination with lateral flues, surrounding ovens at the sides thereof, for the purposes making radiating fire surface at the front, or at C, for cooking purposes, in addition to the baking in the ovens, substantially as described.

Also, in combination with a base-burning stove, constructed as described the auxiliary supply openings, for the introduction of lighter fuels, substantially as and for the purpose described.

75,047.—COLLAR AND NECK-TIE COMBINED.—George F. Perkins, New York city.

I claim the reversible paper cravat, B, on the lower edge of one end of the collar, and cut in one and the same piece with the latter, adapted to be folded into said collar above the line, a, and its free end inserted in the opposite end of the collar, as herein shown and described.

75,048.—SHOE.—Charles Perley, New York city.

I claim, 1st, The padding, applied at f, within the rear portion of the shoe for the purposes and substantially as specified.

2d, The tongue, d, stiffened with a padding, that also equalizes the pressure of the lacing on the foot, substantially as set forth.

3d, The buttons or fastenings, along the tongue, d, between the flaps, g g, to hold said tongue properly in place as specified.

75,049.—BILLIARD-CUE TRIMMER.—Hypolite Pernot, New York city.

I claim, 1st, A billiard-cue trimmer, A, consisting of a roughened or toothed concave or flat plate, substantially as herein shown and described.

2d, A billiard-cue trimmer, consisting of two or more roughened plates, A' A', fitted into one handle, B', substantially as described, so that different kinds of cues may be trimmed by the same implement, as set forth.

75,050.—TIRE-HEATER.—C. E. Pierce, St. Charles, Ill.

I claim, 1st, Placing the tire box, B, upon the forge, A, and making it an integral part of the forge and chimney, substantially as herein shown and described, and for the purpose set forth.

2d, The arrangement of the shifting rollers, C E, in the annular tire box, B where by the smaller tire is hung upon the roller, C, in the upper part of the flue, and the larger tire rests upon and is operated by the roller, E, in the lower part of the flue, as herein described, for the purpose specified.

3d, The combination of the apron, H, with the lower part of the door, G or tire box, B substantially as herein shown and described, and for the purpose set forth.

75,051.—CONNECTING ROD.—E. S. Pierce, Hartford, Conn.

I claim, 1st, An improved connecting rod, constructed and operating substantially as herein set forth.

2d, The combination of the devices, C F G, and S, or their equivalents, substantially as specified.

75,052.—EXTENSION LADDER.—Benjamin Pine (assignor to Charles E. Hartshorn), New York city.

I claim an extension ladder, composed of two parts, A B, fitted together, and connected by endless chains, C C, all arranged to operate substantially in the manner as shown and described.

75,053.—FURNACE DOOR LATCH.—Jos. L. Reilly, Chester, Pa.

I claim, 1st, Providing a furnace door with a latch, B, which can be locked into a catch, D, for the purpose of holding the door open, substantially as herein shown and described.

2d, The bolt, B, of a furnace door, when arranged as described, so that serves to hold the door open and to keep it closed, substantially in the manner herein set forth.

75,054.—PLOW WHEEL.—E. S. Rice, Paw Paw, Mich.

I claim the combination of a removable collar, C, with the wheel, D, axle B, and standard, A, said collar being removably attached to the said standard, and passing around a flange formed upon the hub or axle of the wheel substantially as herein shown and described, and for the purpose set forth.

75,055.—CAR COUPLING.—Silas O. Rogers, Jr., Stanfordville, N. Y.

I claim the tumbler, C, constructed substantially in the form and manner herein shown and described, the slide bar, E, coiled spring, F, or equivalent and lever, G, in combination with each other and with the bumper-head, B substantially as and for the purpose herein set forth and described.

75,056.—WATER WHEEL.—Norman Rose, and E. W. Wright, Milford, N. Y.

We claim the buckets, e, at the central or main part of the wheel, D, in

combination with the adjustable buckets, f f, at the top and bottom of the same, substantially as and for the purpose specified.

75,057.—STEAM GENERATOR.—Sylvanus Sawyer, Fitchburg, Mass.

I claim the combination of the detached fire-box, the steam drums or chambers, and the main boiler, arranged substantially as described.

75,058.—COMPOSITION FOR FORMING CASTS AND FANCY ARTICLES.—Michael Schall, New York city.

I claim a composition formed of the ingredients herein named, for the purpose described.

75,059.—INJECTOR FOR FEEDING BOILERS.—William Sellers, Philadelphia, Pa.

I claim, 1st, The hole, c, in the end of the plug, which plug regulates the discharge of steam in the injector, substantially as herein set forth.

2d, The flange, d d, substantially as set forth.

3d, The discharging tube, K, constructed substantially as described.

4th, The arrangement of the waste orifice, W, substantially as specified.

75,060.—LATHE TOOL.—Thomas Shaw, Philadelphia, Pa.

I claim the combination of holder, a, with cutter bit, b, and wedge, c, in the manner and for the purpose described.

75,061.—TRUSS.—Jacob A. Sherman, New York city. Antedated Feb. 20, 1868.

I claim, 1st, Uniting the bars, a a, by a hinge, in combination with an adjustment applied between the lapping ends of such bars, substantially as and for the purposes specified.

2d, Applying the spring that carries the hernial pad, between the bar, a, and the person, and fitting the same to slide, at one end, on the said bar, a, substantially as set forth.

3d, The plates, m and n, attached together by a screw, and united, at the end of the plate, m, by a hinge, to the truss pad, and at the end of the plate, n, to the spring, l, so as to regulate the position of the hernial pad, as specified.

4th, The screw, t, in combination with the pad plate, o, and plates, m and n, as and for the purposes specified.

75,062.—LOOM.—Jacob Silbermann, and Gustav Unger (assignors to themselves and Jacob Heinemann), New York city.

We claim, 1st, A reed, supported in slides in the lay, in combination with mechanism, substantially as described, that gives and end movement to said reed each reciprocation of the lay, in order that the wider portion of the diverging reed may come into the warps where they stand wider apart near the heddles, for the purposes and as set forth.

2d, The cam, q, lever, p, link, n, and shaft, l, or its equivalent, in combination with the lay and diverging reed, fitted to slide in the lay, and operate in the manner and for the purposes set forth.

75,063.—HAND-SPINNING MACHINE.—Anthony W. Silvis (assignor to himself and Samuel B. Shott), Birmingham, Iowa.

I claim, 1st, The carriage, C, in combination with the feed-roll, D, guide rail, F, spool, E, catch, g, and pin, t', all operating as described, whereby, as the catch, g, strikes the pin, t', the feed roll, D, is dropped upon the wheel, a, of the carriage, and the guide rail, F, releases the roping to be fed to the spindles, as herein shown and described.

2d, The combination of the carriage, C, having the operating mechanism, the cord, m, sheave, n, rods, s, shaft, f, clutch pulley, p, levers, r r', and finger, q', as herein described for the purpose specified.

3d, The slide, y, connected with the drop, z, and operated by the carriage C, as and for the purpose specified.

75,064.—CHANDELIER.—Russell J. Skinner (assignor to J. W. Scott & Co.), Chicago, Ill.

I claim the hollow or solid extension rod, H, and the india-rubber or other elastic strap, straps or hose, G, placed inside or outside of the said rod, H, both combined, arranged and operating substantially as herein described and specified to be used for raising and lowering chandeliers, substantially as herein set forth.

75,065.—FUNNEL.—Thomas W. Slade, Manchester, Mass.

I claim the funnel, as made, with the body and ajutage in separate parts and provided with a bayonet connection to hold them in connection, as set forth.

Also, the arrangement and combination of the cross bar or rest, P, with a liquor funnel composed of a conical mouth piece and an ajutage or discharge nozzle.

75,066.—CLOTHES WRINGER.—H. E. Smith, New York city.

I claim the spring posts, A A', when provided with the adjusting screws, g g', in their legs, e e', combined with the rollers, B B', and the compensating gearing connecting them, arranged and operating substantially as and for the purpose herein described.

75,067.—COMPOSITION FOR ARTIFICIAL IVORY.—Alfred Starr (assignor to William M. Welling), New York city. Antedated February 24, 1868.

I claim the composition, made substantially as set forth, for forming an artificial ivory, as specified.

75,068.—PUNCHING MACHINE.—Charles Steinbach, Lima, Mich.

I claim a punch moved by a crank, which may be set at any desired angle, as herein specified and for the purposes set forth.

Also, the adjustable parallel rulers, substantially as herein specified.

75,069.—GANG PLOW.—George Steinegger, Highland, Ill.

I claim the swinging beams, B B', when lifted by the lever, b, and link, h, substantially as shown and described, in combination with the lateral braces, C, eye plates, i, and bolts, k, or their equivalent, all as and for the purpose set forth.

75,070.—HARVESTER.—W. H. Stevenson, Auburn, N. Y.

I claim, 1st, In a two-wheel double-hinged joint harvesting machine, the combination of the spur wheels, I H E, with a dished driving spur, D, which will allow of the arrangement of the pitman crank shaft, J, substantially as and for the purposes described.

2d, The arrangement of the wheels, D E H I, the wheel, E, being placed loosely on its shaft, F, constructed with a clutching face, f, and provided with a latching lever, G, substantially as described.

3d, The construction and arrangement of the adjustable shifter, holder, and guide, constructed in one piece, and made fast to the draft frame, by bolts passing through one or more slots, to enable the shifter to be moved back and forth to adjust its fork to the groove in the spur pinion, substantially as described.

4th, The arrangement of the adjusting lever, T, linked connection, L, and segment slide, S, working loosely in a guide box, k, which does not extend below the draft frame, in combination with the drag bar, P, all substantially in the manner shown and described.

75,071.—SLEIGH BELL.—George M. Strong, Boston, Mass.

I claim the riveted eye bolt, C, in combination with the tongue, T, bell, B, and strap, A, substantially as described and for the purpose set forth.

75,072.—CURTAIN FIXTURE.—Alvan Studley, Natick, Mass.

I claim a socketed head, l, jointed or hinged so as to be capable of being turned laterally against and be held in place by a spring, k.

Also, the window curtain roller end bearing, as composed of the cylindrically socketed head, l, the arm, G, the spring, k, and the carrier, H, arranged so as to be applied to the curtain roller and window frame, and to operate with respect to the roller, substantially as specified.

Also, the combination of the cylindrical case, E, having a bearing, r, at its outer end, with the roller, C, having a shoulder, x, for the inner end of the case to rest against, and a journal, g, to enter the bearing or socket, h, of the head, l.

Also, the combination of the cylindrical journal and roller with a pivoted or hinged socket, to move laterally, substantially as and for the purpose described.

75,073.—ASH PAN OF COOKING STOVE.—George W. Swett, Troy, N. Y.

I claim, 1st, The ash pan drawer, A, having the rear part thereof, extending under the fire chamber, so constructed as to receive the ashes or other matter falling from the combustion chamber while the front part of the top thereof is closed, and the whole arranged and combined in the manner substantially as herein described and set forth.

2d, The combination of the ash pan drawer, A, or its equivalent, with the fire chamber or chamber of combustion, B, and so arranged in the hearth of a stove as to form the air flues or chambers, f g i and j, in the manner and for the purposes substantially as herein described and set forth.

3d, Constructing the hearth of a stove with dampers and a flue or flues therein for the purpose of conducting atmospheric air from the room or place where the stove is used into the said ash pan drawer, A, and to the bottom of the said hearth, substantially as herein described and set forth.

75,074.—HAME FASTENER.—Alvah Sweetland (assignor to himself and Milton J. Palmer), Syracuse, N. Y.

I claim the lever, C, and slot, F, in the lever, and these parts in combination with each other and the slot of the strap, constructed and operating in the manner and for the purpose substantially as described.

75,075.—FISHING TACKLE.—D. C. Talbot, Holden, Mass.

I claim the arrangement of the weight, C, the loop, g, the spring, l, and the pin, j, in combination with a signal flag and staff and fishing pole, substantially as described and for the purposes set forth.

In combination with a fishing pole or tackle, the flag staff, B (with the weight, C), when attached to the pole and operated substantially as described, either with or without a reel.

75,076.—BASE FOR BALL PLAYERS.—Esau D. Taylor, Hornellsville, N. Y.

I claim the stake, A, pin socket, B, swivel cap, D, and cushion or sand bag, E, all in combination, to be used for the base or bounds for base ball players, substantially as and for the purposes herein set forth.

75,077.—SHEEP RACK.—Jacob Taylor, Beloit, Ohio.

I claim, 1st, The trough, C, open at one end, and consisting of the bottom, C, inclined boards, c', and perpendicular side pieces, in combination with the frame, A, and sliding racks, substantially as described, for the purpose set forth.

2d, The combination of the upright sliding side racks, D, with the frame, A, and slats, B, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the movable rack, E, with the frame, A, slats, B, and sliding racks, D, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the end board, e2, with the forward end of the rack, E, and with the trough, C, substantially as herein shown and described and for the purpose set forth.

75,078.—FURNACE FOR DECARBONIZING PIG IRON FOR THE PRODUCTION OF STEEL.—Alois Thoma (assignor to himself, S. Bromberg and A. W. Wilder), New York city.

I claim, 1st, The arrangement of the partitions, i i, in the channels, a, for more thoroughly heating and burning the gases on their passage to the decarbonizing chamber, as set forth.

2d, The perforated walls, D D, arranged between the ends of the channels, a, and the chamber, B, to allow the gases to gather in the chambers, K, thus created, and to be cooled therein, as set forth.

3d, Conducting the gases from the chamber, B, to a chamber, G, through which the pipes, H, are laid, in which air is conducted to the channels, a, to aid the combustion of the gases in said channels, so that, by means of the gas discharged from the furnace the air entering the same is heated, as set forth.

4th, The channels, a, partitions, i, air chambers, H, perforated walls, D, decarbonizing chamber, B, channels, o and p, chamber, G, and pipes, H, all arranged as described, in combination with each other, and all operating substantially as and for the purpose herein shown and described.

75,079.—HEMMER FOR SEWING MACHINE.—W. H. Thomas, Galveston, Ind.

I claim the deflector, dx, in combination with the guides, a b c, substantially as and for the purpose specified.

75,080.—SOCKET FOR CASTER.—Alexander C. Twining, New Haven, Conn.

I claim, 1st, The socket or stock, made with ridges edged, or nearly so, in planes acutely and equally inclined to the axis of the socket, as and for the purpose described.

2d, The valleys, along the ridge bases, for an increased prevention of splitting, as herein described.

75,081.—DYERS' VAT.—William Vine and William H. Jubb, Norwalk, Conn.

We claim the arrangement of the double vat, A and B, with hoisting attachments, in the manner substantially as herein set forth and for the purpose described.

75,082.—MACHINE FOR FINISHING CARD HANDLES.—Increase S. Waite, Hunbardston, Mass.

In a machine for tenoning card-board handles, I claim the rotary cutter head, with the curved concave flange, i, provided with the cutters, g and k, the cutter head, B, with the cutters, h, the rest, G, and guide, H, constructed and operating substantially as described.

75,083.—TRAVELING BAG.—William Wakenshaw (assignor to T. B. Peddle), Newark, N. J.

I claim the fastenings, D D, constructed of the form and applied to the bag in the manner substantially as shown and described.

75,084.—DRILL SHARPENER.—Elisha W. Walton, Drytown, assignor to Joseph H. Atkinson, San Francisco, Cal.

I claim the combination of the swage, frame, and die, in combination with a stirrup lever and an eccentric, for the purposes specified, all constructed and arranged substantially as described and shown.

75,085.—BEER FAUCET.—Frank J. Walz and Charles Steck, Hudson, N. J.

We claim the combination of the pump barrel, E, having side and end perforations, e and e', the plunger, F, and spring, K, arranged and operating in connection with the faucet, so as to commingle air with the liquor during its discharge, substantially as and for the purpose herein specified.

75,086.—SIGN FOR STREET LAMP.—William Powell Ware, New York city, assignor to himself and James J. De Barry, Brooklyn, N.Y.

I claim the transparent signs herein described, composed of perforated metal, A, and opaque material, B, combined and arranged so as to serve in the manner and for the purposes and advantages herein specified.

75,087.—HEAT RADIATING ATTACHMENT TO STOVES.—B. J. Watson, Troy, Wis.

I claim, 1st, A flue attachment for stoves, consisting of the chambers, G and H, and pipe, F, substantially as shown and described, and for the purposes set forth.

2d, The chambers, G and H, in combination with a stove, S, and pipe, F, and damper, a', substantially as shown and described and for the purposes set forth.

3d, The chamber, G, in combination with the pipe, A, and the chamber, H, in combination with the pipe, B, and damper, a', substantially as shown and described, and for the purposes set forth.

75,088.—PUMP.—J. R. Weisiger, Danville, Ky. Antedated February 28, 1868.

I claim, 1st, The construction and arrangement of the hollow shaft, I, having at its lower end the hollow head, J, provided with valve, M, the uprights, P, arms, Q, rack, O, and pinion, all operating as described, for the purpose specified.

2d, The arrangement of the radial plates, E, having valves, G, hollow head, J, having valves, M, hollow shaft, I, cylinder, A, uprights, P, rack, O, arms, Q, and pinion, as herein described, for the purpose specified.

75,089.—RATCHET HEAD AND LEVER.—T. A. Weston, Buffalo, N. Y.

I claim the ratchet lever head, when constructed with teeth, e e e e e, and pawls, c c c c, combined, arranged, and operating substantially as and for the purposes shown and described.

75,090.—RATCHET HEAD AND LEVER.—T. A. Weston, Buffalo, N. Y.

I claim, 1st, In a ratchet lever with a series of differential teeth and pawls, b c, as described, the construction and arrangement of parts as herein set forth, consisting of the feed screw, D, socket, I, the barrel, A, turning thereon, and operated by lever, B, the ratchet head, C, secured to the screw by the pin, d, and the washer, k, for retaining the springs in place, the whole operating in the manner and for the purpose specified.

2d, The jointed lever, B, in combination with the devices thus constructed, substantially as set forth.

75,091.—RATCHET BRACE.—T. A. Weston, Buffalo, N. Y.

I claim, 1st, The combination of two ratchet heads, D E, an intermediate pawl barrel, A, and the locking device, which may shift from one end to the other to engage and disengage the said heads, substantially as set forth.

2d, The combination of the shifting slide, I, and tightening screw, n, or equivalent, with the ratchet heads D E, and pawl barrel, A, substantially as herein set forth.

75,092.—RATCHET BRACE OR LEVER.—T. A. Weston, Buffalo, N. Y.

I claim the special construction and arrangement of the double ratchet head, B, with the end of the lever, forming a strap, a, resting centrally between the sets of ratchet teeth and the spring pawls, C C, on opposite sides, playing alternately in said teeth, the whole operating in the manner and for the purpose specified.

Also the special construction and arrangement of the pawls connecting with the one pivot, d, and formed hollow, and receiving the springs, g g, the whole operating in the manner and for the purpose set forth.

75,093.—RATCHET BRACE LEVER.—T. A. Weston, Buffalo, N. Y.

I claim the special arrangement of one sliding pawl, F, and one pivoted pawl, E, as described, when combined with a ratchet head, C, having an unequal number of teeth, with said pawls, the whole operating in the manner and for the purpose specified.

75,094.—GLOBE VALVE.—S. H. Whitaker, Cincinnati, Ohio.

I claim, 1st, The self-adjusting metallic valve seat, B, in combination with a conical valve, A, substantially as and for the purposes set forth.

2d, In combination with the aforesaid movable valve seat, B, applied and operated as described, the compressible packing ring, D, for the purpose set forth.

3d, The combination of the movable seat, B, and screw clamp, C, substantially as and for the purposes set forth.

75,095.—FRYING PAN.—R. C. Whitehouse, Boothbay, Me.

I claim the combination and arrangement of the two pans, a b, united by the hinge, c, and having the handles arranged as herein set forth, for the purposes described.

75,096.—BRICK KILN.—H. D. Whittemore, New York city.

I claim the railway cars, a a' a'', constructed in the form of a fire grate, and the artificial blast, B, pipes, c e e, with dampers, n, all in combination with the dampers, o o' o'', arranged with the vertical partition plates, m m m, all arranged and operating substantially as herein set forth.

75,097.—HOT AIR FURNACE.—Charles F. Whorf (assignor to himself and Charles M. Ellcard), St. Louis, Mo.

I claim, 1st, The distributing chamber, E, the water vessel, F, and the furnace, A A' B, when combined and arranged as described and set forth.

2d, In combination with the above, the series of pipes, B, the annular heating chamber, B', and the pipes, C and C', as and for the purpose set forth.

75,098.—CONSTRUCTION OF WALLS OF BUILDINGS.—Charles Williams, Vineland, N. J., assignor to himself and Isaac B. Ward, New York city.

I claim the arrangement of lattice framework, substantially as herein shown and described, in combination with concrete material, in the formation of walls, substantially as and for the purpose described.

75,099.—AXLE FOR VEHICLES.—J. A. Williams, Elizabeth, Ill.

I claim, 1st, The serrated extension, T, of the spindle, E, of an axle, in combination with a serrated rack, R, for holding the said spindle firmly to its place, substantially as and for the purpose shown and described.

2d, The longitudinal slots, substantially as described and for the purpose specified.

3d, The reversible character of the rack, R, substantially as described and for the purpose specified.

75,100.—OIL CUP.—N. Bangs Williams, Providence, R. I.

I claim the tapering compressing plug, a, in combination with a chamber, B, containing a fibrous absorbent, for the purposes specified.

75,101.—CIDER MILL.—J. D. Willoughby, Shippensburg, Pa. Antedated Feb. 20, 1868.

I claim the arrangement of the grinding rolls, B, relatively with one or more pairs of pressing rolls, C D, and the spouts for receiving and conveying separately the various qualities of juice produced, substantially as shown and described.

75,102.—SURFACE CONDENSER.—I. Shield Wilson and Horace See, Philadelphia, Pa., assignors to themselves and N. D. Thompson, Bordentown, N. J.

We claim, 1st, Removing the condensed steam, after it has passed through a surface condenser, and discharging it directly into the boiler of the feed pump, when arranged in connection with the air pump, in the manner and for the purpose set forth.

2d, The pumps, I and J, when arranged in respect to the surface condenser, E, substantially as described and for the purpose set forth.

75,103.—HEMP HARVESTER.—R. C. Wrenn, Waverly, Mo.

I claim in combination with a machine for cutting hemp, the curved apron, D, placed behind the cutter bar, constructed, arranged and operating substantially as described.

75,104.—HILLSIDE PLOW.—H. B. Abbott, Felicity, Ohio.

I claim the combination with the two bar shares, E E', connecting sheath, G, and double mold board, F, of the connecting bar, I, bracket, C, and locking bolt, J, the latter being shifted from one set of staples to another on the opposite sides of the plow beam, as and for the purpose explained.

75,105.—CARRIAGE HUB.—Seaman Allaire (assignor to himself, Robert Henry and E. Wright Vail), New York city.

I claim the solid metallic hub, A, provided with radial sleeves, b, and wooden spokes, B, when constructed and combined essentially as shown and described.

75,106.—CASTING ALUMINUM PLATES ON ARTIFICIAL TEETH.—Wm. Allender, New London, Conn.

I claim, 1st, In combination with the pouring of molten aluminum to form a base for artificial teeth, the so making and grinding off the blocks of teeth designed for the reception of molten aluminum as a base, as that the metal cannot seize or gripe, but slip upon the teeth or blocks, in contracting, and thus prevent the fracture of the metal, or of the teeth, or blocks of teeth, substantially as described.

2d, In combination with teeth or blocks of teeth, on which aluminum is to be cast for a base, the pointing of the pins or rivets, towards each other or towards the center of the block, or in the line of the greatest contraction, substantially as described.

3d, In combination with the molding of teeth or blocks of teeth, or preparing them to receive molten aluminum, which is to form their base, the protected space between them, to guard against the entrance of the metal, or other material, as described, so that the contractile force of the aluminum, in cooling, may draw them up together, or nearly so, substantially as described.

75,107.—GRIDIRON.—Wm. Andrews, Allegheny County, Md.

I claim bars, e e e, united as described, and forming an imperforated bottom, in combination with the rim, d, the basin, B, and the mouth, C, constructed substantially as and for the purpose set forth.

75,108.—TRUSS AND SUPPORTER.—G. W. Antisdale, Chagrin Falls, Ohio.

I claim the upright bar, E, horizontal bar, C, adjustable pad, G, and pad H, as arranged in combination with the frame, A, for the purpose and in the manner set forth.

75,109.—COWL.—Charles W. Atkeson, St. Louis, Mo.

I claim, 1st, The funnel head, A, when combined with the duct, B, the guide C, and the weather cock, C2, substantially as described and shown.

2d, The funnel head, A, when constructed by means of the two disks, a, and the vertical partition, a1, the whole combined and arranged as described and set forth.

75,110.—MANUFACTURE OF GLASS WARE.—James S. Atterbury and Thomas D. Atterbury, Pittsburg, Pa.

We claim, 1st, As a new article of manufacture, a pitcher, A B, produced by blowing a glass or other suitable material in a mold, and providing it with a metallic cover, substantially as described.

2d, The method herein described of perforating glass pitchers and securing the covers upon them, substantially as described.

75,111.—STREET SPRINKLER.—L. F. Bancroft, Worcester, Mass., assignor to himself and Andrew B. Yetter, New York city.

I claim, 1st, The combination of the side water guards, D D, with the sprinkler, A, substantially as and for the purposes set forth.

2d, The combination with the water guards, D D, of the bent levers, e e, arms, E E, and springs, h h, substantially as and for the purpose set forth.

75,112.—PUMP.—John S. Barden, Providence, R. I., assignor to Wm. M. Stone, Attleborough, Mass.

I claim the combination and arrangement of the internal annular nut, G, and its screw, e, with the nose head, B, connected with the base, A, by the series of rods, C C, such nut, G, serving to confine the glass barrel or tube, D, within the pump frame, as specified.

75,113.—DRYER.—David Barker, Northfleet, England.

I claim chambers for drying artificial fluid and other substances, subdivided into horizontal compartments, as hereinbefore described, by permanent or removable partitions, and provided with series of lateral apertures arranged along the lower part of each compartment for the escape and withdrawal of vapors therefrom, the whole being constructed and arranged substantially as herein set forth.

75,114.—WASHBOARD.—Jacob H. Beidler, Lincoln, Ill.

I claim the corrugated perforated face plate, C, in combination with the longitudinally-corrugated board, B, when used in a washboard, as and for the purpose set forth.

75,115.—CENTER PLATE FOR RAILROAD CARS.—George W. Bennett, White Haven, Pa.

I claim the combination of the rings, a a', having the recesses, c c, and projections, c' c', operating in connection with each other when used in a center plate for cars, substantially as and for the purposes specified.

75,116.—GATE.—Geo. W. Bishop, Stamford, Conn., assignor to John Labart, Cohocton, N. Y.

I claim the combination with a gate whose horizontal rails are pivoted in advance of each other, substantially as herein described, of a slotted top rail and pulley, all constructed, arranged and operating substantially as herein specified.

75,117.—ROTARY STEAM ENGINE.—J. S. Boicourt and T. H. Barnes, Boonesboro, Iowa.

We claim the arrangement of the sliding valves, E, and the springs, F, with reference to the pistons, D D, as herein set forth and described.

75,118.—BELL PULL.—Sterling Bonsall and Louis Hillebrand, Philadelphia, Pa.

We claim, 1st, The construction of a plate, B, with the opening, a, at the upper end, and boss, k, at the rear, the slot, b, at the lower end, with a pintle c, cast into and across the middle thereof, and with the screw hole, d, substantially as described for the purpose specified.

2d, The construction of a handle, C, with a forked end at the lower part, a tongue, E', at the inner side of the upper end, and a knob or projection, D, on the outer side of the upper end, substantially as described for the purpose specified.

3d, The combination of plate, B, and handle, C, with the bar, E, so fastened at f, as to make the slot, l, resting over the pintle, c, and restrained by the plate, B, act as a hinge, with the fulcrum inside of the perpendicular of the lever, substantially as described.

75,119.—CORN HARVESTER.—Elihu Boswell, Highland, Ohio.

I claim the sliding stop, composed of the rod, r, and spring, s, when these parts, constructed and operating together as explained, are used in combination with the revolving reels or tables, R' R', for the purpose of controlling their action, substantially as described.

75,120.—IRONING STAND AND CLOTHES DRYER.—B. S. Boydston, Richmond, Ind. Antedated Feb. 28, 1868.

I claim, 1st, The stand composed of bars, A A A' A', strips, a a, and clothes receptacle connected by means of the stay, a, set forth, and provided with the ironing board, B, in the manner and for the purposes described.

2d, The combination of the bars, d d, with their keepers, and the slats, f f f, with the stand, as described and for the purposes set forth.

75,121.—WATER WHEEL.—N. F. Burnham, York, Pa.

I claim the combination of the curved chutes, s s, when constructed with curved walls near the outer extremity, and straight slightly converging walls towards their inner extremity, in the manner described and shown, with the gate ring, R, surrounding said chute, and having the openings, r r, the whole device operating to receive the water in a direction toward the center of the wheel, and turn it by the concave wall until it is thrown in a compact mass against the buckets, tangentially to them, in the manner described.

75,122.—MACHINE FOR FULLING HAT BODIES.—Angelo Cattaneo, Newark, N. J.

I claim the side piece, h, to the box, f, fitted to swing on the hinge, l, in combination with the hammers, c c, the parts being arranged and operating substantially as and for the purposes set forth.

75,123.—POTATO DIGGER.—J. C. Clark, Elmira, N. Y.

I claim, 1st, the cutter, G, with arc-shaped knives, o, substantially as described.

2d, The cutter, G, sliding arms, F, and pivoted braces, E, combined and operating substantially as described.

3d, The hoes, J, provided with ridges, e, substantially as described.

4th, The hoes, J, sliding arms, I, and pivoted braces, H, combined and operating substantially as described.

5th, The sliding bearing, M, shaft, L, and eccentric, n, or equivalent, in combination with the shaker, O, substantially as and for the purpose described.

6th, The combination of the arm, c, eccentric, u, or equivalent, and reciprocating frame, N, substantially as and for the purposes set forth.

7th, The hinged blocks, k l, in combination with the sliding bearing, M, substantially as and for the purposes set forth.

8th, The combination of the cutter, G, hoes, J, and shaker, O, substantially as described.

75,124.—SPRING EQUALIZER FOR MILL SPINDLE.—T. L. Clark, Mount Vernon, Ohio.

I claim the oblong driver, F, with a short and long jaw, z x, at each end, within which are placed the boxes, C C, bevelled at their tops, and provided with rubber fillings, D D, and followers, E E, when used in combination with the spindle, A, and pinion, B, substantially as and for the purposes set forth.

75,125.—STEERING APPARATUS.—Geo. H. Colbert, Downsville, Md.

I claim the vertical shaft, d, provided with gear-wheel, c, and cross lever, i, arranged in combination with pinion, b, rudder, D, cords, g g, and pilot wheel, B, substantially as and for the purpose set forth and described.

75,126.—SHOE LACER.—O. H. Cooke, Morristown, Vt.

I claim the within-described lacer as an article of manufacture, consisting of a concavo-convex body, provided with the teeth, c c, and a shank which is curved and which has a convex head upon it, constructed and arranged as and for the purpose herein specified.

75,127.—CULTIVAVOR.—John Crowther, Oxford, Mich.

I claim raising and lowering the frame, A, by means of levers, D and H, and bars, C F and I, and shaft, J, substantially as herein specified.

75,128.—ROOFING FELT.—Francis Curtis, Newton, Mass.

I claim the new fabrication or compound material, above described, consisting of the combination of woolen or worsted rags with wood or wood fiber.

75,129.—WASHING MACHINE.—Geo. Custer (assignor to himself and Wm. Moore), Norristown, Pa.

I claim the box, C, its ribs or projections, f and f', in combination with the ribbed roller, B, and with the within-described device, or their equivalents for imparting a rotary motion in one direction to the box and in the other to the roller, substantially as and for the purpose specified.

75,130.—CARD BOARD FOR PRINTING.—A. R. Davis, East Cambridge, Mass.

I claim subjecting the sheets of wood to severe pressure, by rollers or otherwise, to reduce the thickness of the wood, and to condense and unite the fibers, and thus prevent the card or card board thus made from twisting warping, and breaking, substantially as specified.

75,131.—MACHINE FOR REDUCING AND POINTING WIRE.—T. B. De Forest, Birmingham, Conn.

I claim, 1st, The combination of the two jaws, G and G', with the revolving shaft, D, when constructed and arranged so as to receive from the said shaft a rotory motion, and further combined with the cam, J, and shaft, H, so that the said jaws receive therefrom a vibratory movement, and when both the jaws are movable, or the one fixed and the other movable, substantially as herein set forth.

2d, The hollow shaft, D, carrying the vibrating jaws, G, having combined therewith a head, I, and cam, J, with its stirrup connection, so as to operate in the manner herein described.

75,132.—PIANO-FORTE FRAME.—Andrew Ferdinand Dessau, Washington, D. C.

I claim, 1st, Constructing the bottom beams and frame of a piano of layers of pieces of wood, in the manner substantially as and for the purposes described.

Constructing the beams and frames of pianos by building the same up in the manner substantially as described.

75,133.—GRAIN SEPARATOR.—E. L. Dorsey, Winslow, Ind.

I claim, 1st, The box, B, made in V-shape, and balanced upon the pivoted support, C, so that it will oscillate as and for the purpose set forth.

2d, The screen, E, provided with arms, e e and b b, door-way, R, and slide H, when used in combination with the oscillating box, B, as and for the purpose set forth.

3d, Spout, L, and slide, K, when used in combination with the box and screen as and for the purpose specified.

75,134.—LIFTING JACK AND SPIKE EXTRACTOR.—J. Douglass, McConnellstown, Pa.

I claim, 1st, The removable base, A, in combination with the post, B, when used in a lifting jack or device for extracting spikes, substantially as and for the purposes specified.

2d, The hook, J, with broad serrated edge, as and for the purpose set forth.

3d, The combination of the rod, F, lever, G, rocking fulcrum, H, spring, s, pawl, I, and spring, i, substantially as and for the purpose set forth.

75,135.—GRINDING MILL.—John Ellston, Cleveland, Ohio.

I claim, 1st, The elastic diaphragm, J, and collar, I, in combination with the stone, substantially as and for the purpose set forth.

2d, In combination with the above, the pipe, M, hinged cover, U, with the curb and fan case, arranged as and for the purpose substantially as set forth.

75,136.—LAMP SHADE.—Jas. Emery, Bucksport, Me.

I claim the screen supporter composed of the two wires, B and C, having two helix coils, serpentine bends, and a projection arranged as set forth.

Also, the screen, as made, with the middle pocket to receive the slider, B, made as described.

75,137.—HEEL FOR BOOTS AND SHOES.—T. S. Engledow, Cedar Falls, Iowa.

I claim the hollow hard rubber, gutta-percha, horn, or other similar heel, a b c, with strengthening ribs, g g, on its interior, and with removable base plates or pieces, A, in the manner as herein described.

75,138.—BAG HOLDER.—E. C. Fairchild, Sunderland, Mass.

I claim the funnel-shaped mouth or frame, B, provided upon its lower edge with hooks, d, and upon one side with an arm, C, and combined with a plate A, which said plate is constructed with lugs, a, for the adjustment of the frame, B, and arranged in the manner substantially as set forth.

75,139.—SPOON.—Solon Farrer, New York city.

I claim, 1st, The movable cover, in combination with the bowl of the spoon, substantially as and for the purpose specified.

2d, The combination, with the spoon and the movable cover, of the lever, D, and spring, c, substantially as and for the purpose specified.

75,140.—COTTON-BALE TIE.—Henry Fassmann, New Orleans, La.

I claim the cotton-bale tie, composed of the plate, A, having the slots, a a, between which is a strengthening ridge, d, on one or both sides of the plate, and having its ends strengthened by stout ridges, b b, cast upon the plate, substantially in the manner and for the purpose described.

75,141.—STEAM GENERATOR.—H. F. Fenton, Phila., Pa.

I claim the vertical boiler, its fire box, B, central chamber, D, pipes, E, and tubes, F, the whole being arranged substantially as and for the purpose herein set forth.

75,142.—GRAIN DRILL.—J. R. Finch, Dayton, Ohio.

I claim, 1st, The flanges, e e, in combination with the zigzag wheel or agitator, H, substantially as and for the purpose specified.

2d, The arrangement of the plates, B B, with the movable plate or shut-off C, attached to the bottom of the grain box, A, substantially as and for the purpose set forth.

75,143.—TENTER BAR FOR SHAPING ARTICLES OF CLOTH.—S. L. Fiske, Philadelphia, Pa.

I claim the combination of the parallel tentering bars, b c, their hooks, l, the former, B, and detachable bars, c c, the whole being constructed and arranged substantially as and for the purpose described.

75,144.—FENCE POST.—H. K. Flinchbaugh, Conestoga Center, Pa.

I claim the manner of constructing the sides, A, of a post for a rail fence from a strap iron, in combination with the cap, B, on the spread base, with its feet, a, and braces, C D, arranged substantially in the manner shown and specified.

75,145.—IRON POST FOR WIRE FENCE.—H. K. Flinchbaugh, Conestoga Center, Pa.

I claim the construction and application of the iron post, A, with its spreading base, B B', and feet, b b, when applied in the manner and for the purpose specified.

75,146.—WEIGHING SCALE.—O. Forsyth and J. H. Truex, Rochester, N. Y. Antedated Feb. 20, 1868.

We claim, 1st, Notching the under side of the beams and employing, in combination with the same and the sliding weights, a spring catch, i, operating in the manner and for the purpose specified.

2d, Making the supports, E G, on the pendulum-rod adjustable to different distances apart, in the manner and for the purpose herein set forth.

75,147.—ILLUMINATING OIL.—D. W. Fowler (assignor to himself, G. A. Ewing, and G. G. Kimball), Goshen, Ind.

I claim the combination of the above ingredients, in manner and proportions as set forth and for the purposes specified.

75,148.—HOG-SNOUT SLITTER.—J. J. Gish, Milton, Ohio.

I claim the herein-described slitter, consisting of the frame, B, bar, D, stem, C, spring, G, blade, E, and block, A, all constructed and arranged to operate in the manner and for the purpose specified.

75,149.—MANUFACTURE OF MOLDED ARTICLES.—W. B. Gleason, Boston, Mass.

I claim the process of producing molded articles with an adhering pellicle by the use of a plastic adhesive compound under pressure as a former, substantially as described.

75,150.—SADIRON.—Richard J. P. Goodwin, M.D., Manchester, N. H.

I claim the combination of the hinge joints, E F, and cover, B, with the spring bolt, G, operating in connection with the striker, J, substantially as and for the purpose set forth.

75,151.—PACKING FOR HOSE COUPLING.—R. J. Gould, New York city.

I claim the arrangement of a T-shaped packing piece, a, having the ends of the cross bar flat or V-shaped, in combination with correspondingly shaped recesses, b, in the surfaces to be joined, said packing overlapping the inner surface of both parts, A and R, of the coupling, substantially as and for the purposes set forth.

75,152.—WINDOW SHADE.—J. C. Govers, Washington, D. C.

1 claim, 1st, In combination with the roller, C, the spring, g, and journals, D, with slide, e, attached to move in the grooves, G, when constructed and arranged to operate substantially as described.

2d, The roller, C, spring, g, journals, D, and slide, e, attached, in combination with the groove, G, and cords, a and f, when constructed and arranged to operate substantially as described and for the purpose set forth.

75,153.—ROTARY VALVES FOR STEAM AND OTHER ENGINES.—R. D. Gray (assignor to himself and Wm. B. Brittingham), Lafayette, Ind.

I claim, 1st, The construction of the conical valve, F, with recesses and ends with reference to the chambers, F1 and F2, valve chest, D, and ports, D1 and D2, substantially as herein set forth.

2d, The arrangement of the oscillating valve, F, valve stem, G, arms, L and K, tappet rod, I, stops, I', and tappet arm, H, substantially as described.

75,154.—SCRUBBER HOLDER.—H. B. Grebinger (assignor to himself, B. E. Kendig, and C. B. Herr), Millersville, Pa.

I claim the intervening pieces, F, with their perforations, f, in combination with the slotted sides, B c, headed screw bolt, D, all arranged and applied in the manner and for the purpose specified.

75,155.—FIREPLACE.—C. B. Gregory, Beverly N. J.

I claim a fireplace consisting of a perforated casing, surrounded by a mass of gravel or other equivalent granulated material, through which the air must pass to the fuel, substantially as and for the purpose herein set forth.

75,156.—FLATIRON.—John Grussi, Cleveland, Ohio.

I claim, 1st, The draft holes, d d, arranged below the grate, in combination with the grate, H, and vent, c, and chamber, A', as and for the purpose set forth.

2d, The cover, E, body, A, chamber, A', and vent, c, in combination with the grate, H, draft holes, d d, and door, J, substantially as and for the purpose specified.

75,157.—TUG AND CHAIN CARRIER.—John N. Guger, Peoria, Ill.

I claim a tug and chain-carrier attachment for a harness, constructed in the form herein shown and described, and having hooks, G, and pivoted pin, H, combined therewith, all arranged and operating as specified.

75,158.—INSTRUMENT FOR MAKING LOCAL APPLICATIONS IN Uterine Diseases, etc.—J. R. Hamilton, Portland, Oregon.

I claim the cup, A, as constructed and applied, substantially in the manner herein described, for the purposes specified.

75,159.—HAT HOOK.—John Harvey, Scranton, Pa.

I claim the arrangement of the plate, A, arm, B, and spring, C, when the several parts are constructed, substantially as and for the purpose specified.

75,160.—DEVICE FOR COOLING MILK.—L. T. Hawley, Salina, and Amos Westcott, Syracuse, N. Y.

We claim, 1st, The felt jacket or covering, of other suitable material, in combination with the stopper and ice reservoir, A, arranged substantially as and for the purpose above set forth.

2d, The reservoir for ice or cold water, A, constructed and arranged substantially as above described and for the purpose above specified.

3d, The knobs on the collar of the cover, substantially as and for the purpose above set forth.

75,161.—TONIC OR BITTERS.—Jonathan Heisler, Schuylkill Haven, Pa.

I claim the bitters or tonic, compounded and used substantially in the manner and for the purpose as herein described.

75,162.—CANTHOOK.—G. W. Herring, Bangor, Me.

I claim the pivoting of the hook, C, to the bar, B, when said bar is provided with a lip, x, and constructed to operate substantially as and for the purposes specified.

75,163.—APPARATUS FOR HEATING AND PURIFYING FEED-Water for Steam Generators.—J. S. Hooton, New Carlisle, Ind.

I claim, 1st, The combination of the manholes, a a a a, shelves or plates, 1, 2, 3, 4, 5, 6, 7, 8, and the structure or casing, A, constructed and operating substantially in the manner and for the purposes herein set forth.

2d, The filtering case, C, elbow pipe, L, spouts, G and H, in combination with the casing, A, and plates or shelves, 1, 2, 3, 4, 5, 6, 7, 8, all arranged and operating in the manner substantially as herein set forth.

75,164.—PEN REST.—Robert B. Hugunin, Cleveland, Ohio.

I claim the shield herein described, for the purposes specified.

75,165.—HYDROCARBON BURNER.—J. S. Hull, Cincinnati, O.

I claim, 1st, A heater or burner apparatus, supplied at all points of combustion by the force of compressed air acting upon the fluid, substantially as and for the purpose herein specified.

2d, A cut off valve, C, between the pump, B, and the reservoir, for the purpose set forth.

3d, The location of the air and fluid ducts, a and b, outside of the reservoir, substantially as and for the purpose specified.

4th, The double bosses, f, for attaching the pipe coupling to the reservoir, for the purpose set forth.

5th, The arrangement of the burners G G, in numbers upon different tubes F1 F2, which are set, side by side, or in sets, provided with cut-off valves, so as to increase or diminish or distribute the burners to any desired extent, substantially as herein set forth.

6th, The superheating tubes, F2 F2, extended over the burners and communicating with the pipes, J J, substantially as and for the purpose herein set forth.

7th, The arrangement of flame deflectors, I I, over the superheating tubes, substantially as specified.

8th, The arrangement of numbers of burners G G, in line with one another, so that the burners, I I I, of each set may be connected with one adjusting shaft, and adjusted simultaneously, substantially as specified.

9th, The adjustment of the said burner points separately to their connections with the common adjusting shaft, for the purpose set forth.

10th, The introduction of the superheated steam jets into the flame jets of the burners direct thereto, substantially as and for the purpose herein specified.

11th, The employment of steam for clearing out the supply and burner tubes, which are so arranged as to admit the passage of the steam through them, substantially as herein described.

75,166.—HOP PRESS.—James Hutchinson, Fond du Lac, Wis.

I claim the improved mechanical arrangement for pressing hops and similar substances, consisting of the hinged lever, G, with its eccentric head, H, block, E, provided with the dogs, c, in combination with the ratchet plates, C, and beam, D, provided with the roller, F, and pawls, a, when constructed and arranged to operate as described.

75,167.—MACHINE FOR BORING HUBS.—Niels Johnson, Berlin, Wis.

I claim the bars, H H, clamps, I and J', pinions, L L, rack bar, J, and set screw, K, for forming a universal clamp for hubs, substantially as set forth.

75,168.—CLOTHES SPRINKLER.—E. H. Kirkham, Boston, Mass.

I claim a clothes sprinkler made essentially as herein shown and described, that is to say, so composed of the elastic bulb, a, tubular stem, c, and foraminous cap, d, the latter being provided with ports and valves, substantially in the manner and for the purpose as hereinbefore explained.

Also the before-described mode of forming and applying the valves, g g, that is, as consisting of the annulus, n, and spurs, g g, applied to the neck of the stem, c, and so as to cover the ports, a' a', the whole being arranged and operating as set forth and explained.

75,169.—BRAKE FOR COTTON LAPPERS.—Richard Kitson, Lowell, Mass.

I claim, 1st, The stationary shoe, C, combined with the friction pulley, B, and swinging yoke, in the manner and for the purpose substantially as specified.

2d, The swinging yoke, consisting of the shield, D, and arm, b, arranged and applied substantially in the manner and for the purpose set forth.

3d, The shield, D, arranged to cover the gears, and form one bearing or support for the shaft of the pinion, a, and pulley, B, as explained.

4th, The combination of the shield, D, gear, F, pinion, a, friction pulley, B, stationary shoe, C, arm or lever, b, transverse lever, g, weight, i, connecting rod, d, and foot lever, G, all arranged to operate substantially as and for the purposes set forth.

75,170.—MANUFACTURE OF SOAP.—John L. Klein, N. Y. city.

I claim the combination of paraffine and ceria-japonica to make soap, using for that purpose the aforesaid compound and ingredients, or any other substantially the same, and which will produce the intended effect.

75,171.—RAILROAD SWITCH.—H. K. Leech, Harrisburg, Pa.

I claim the guide, J, hung in fixed and movable bearings, when constructed and adjusted with the rails, substantially as and for the purpose herein set forth.

75,172.—CAR HEATER.—Almerin H. Lighthall and Chas. F. North (assignors to Charles F. North), Cohoes, N. Y.

We claim a heater for railroad cars having cylinders B and C, fire and ash boxes, as described, rod, N, clutch, O, lugs, L, draft funnel, I, griddle, S, and wire, T, constructed, combined, and arranged substantially as specified.

75,173.—MEANS FOR SECURING TUBES IN SURFACE CONDENSERS.—Wm. A. Lighthall, New York city.

I claim making the slotted apertures in the ends of the tubes of surface condensers for steam engines, in the manner and for the purposes set forth.

75,174.—CORN PLANTER.—John T. Lowrey, James A. Case, and Richard Chew, High Banks, Ind.

We claim the combination of the drag, A, so constructed that the part, A', may be detached, in combination with the parts, B C D E F and G, arranged to operate for planting double or single rows, substantially as described.

75,175.—BOTTOM FOR ICE BOX IN REFRIGERATORS.—Levi H. Mace, Westchester, N. Y, and Frederick S. Gwyer, New York city.

We claim the radially corrugated sheet metal bottom, formed and adapted for use in refrigerators, substantially as and with the advantages herein specified.

75,176.—SCAFFOLDING FOR BUILDING.—James H. Martin, Columbus, Ohio. Antedated Feb. 22, 1868.

I claim, 1st, The combination with the brackets, C, of the bars, a, fitted into the joints of the wall, and braced by suitable tension braces, c, against the strain exerted thereon by the aforesaid brackets, substantially as and for the purpose specified.

2d, The arrangement of a removable hoisting frame, D, with reference to the scaffold constructed with detachable supporting brackets, c', substantially as and for the purpose specified.

75,177.—BORING FAUCET.—Samuel McGee, Madison, N. J.

I claim, 1st, The combination of a faucet with an adjustable cutter so arranged that it may be adapted to faucets of various sizes, substantially as set forth.

2d, Constructing a faucet with a diaphragm, a, to form a chamber in the end to receive the cutting made by the bit in entering the barrel, substantially as set forth.

75,178.—CAR COUPLING.—James S. McMurray, Toronto, Canada, assignor to himself, Thomas R. Fuller, and Samuel S. Fuller, Stratford, Canada, West.

I claim the pin, g, upon the coupling link, I, in combination with the inner beveled end of the slot, e, the pivoted pin, C, crank, G, and weighted crank, E, as herein described, for the purpose specified.

75,179.—MACHINE FOR MAKING PLOW CLEVISES.—Thomas Meikle, Louisville, Ky.

I claim, 1st, The combination of the sliding plate, J, having a fixed center piece, R, attached thereto, with the compressing levers or jaws, H, rollers, I, screw, P, and mechanism for operating the sliding plate, substantially as and for the purpose set forth.

2d, The swages and blocks constructed as described, for use successively in forming a flat iron bar, so that the clevis may be completed by bending it in a machine fitted for that purpose, substantially in the manner set forth.

75,180.—BATH TUB.—John H. Mercer, New York city.

I claim, 1st, The perforated plate, q, at the end of the bath, covering up the descending pipes and their cocks, substantially as set forth.

2d, The arrangement of the pipes, g h k and l, at the end of the bath tub, in combination with the cocks, o and p, the handles of which are above the table piece, w, as and for the purposes set forth.

3d, The arrangement of the float, s, and valve, d, operating in the manner set forth, in combination with the bath tub and perforated end plate, q, as specified.

75,181.—BOOT JACK AND BLACKING BRUSH.—Henry J. Miller, Nashua, N. H.

I claim the combination of the boot jack, A, and brushes, B C, when they are connected together and held in the manner specified.

75,182.—MANUFACTURING GIMLETS.—John Mix, West Chesbire, Conn.

I claim the method herein described of forming blanks for gimlets or gimlet bits.

75,183.—CARRIAGE.—Hiram Moon, Red Creek, N. Y.

I claim the combination and arrangement of the upper and lower part of the circle, A A', with spring brace, k, and perch plate, m, as and for the purpose set forth and described.

75,184.—REVERSIBLE KNOB LATCH.—Wallace T. Munger (assignor to Thomas Kennedy), Branford, Conn.

I claim the combination of the follower, K, provided upon its inner side with the points, k k, for operating the latch, and with projections, L L and n, for receiving the hub, I, the said hub, I, being provided upon one side with a shoulder, i, to form a bearing in the plate of the case, and upon the opposite side a slot, J, and shoulder, m, to receive the projections, L L and n, on the follower, and the whole constructed and arranged so as to operate the latch bolt in the manner herein set forth.

75,185.—CULTIVATOR.—John Neff, Jr., Pultney, N. Y.

I claim, 1st, The draft rod, B, when made and applied and supported by a spring, as specified.

2d, The method of fastening and adjusting the handles by means of the support, E, as set forth.

3d, The teeth, F G H I and J, when constructed and arranged substantially as specified; also the furrow board, when made and applied to the teeth, substantially as set forth.

75,186.—BOOT CRIMPING MACHINE.—John A. Nesbit, Charlottesville, Ind.

I claim, 1st, The guide, B, sliding on ways attached to the frame, A, and so cut away on the lower edge that the clamps may be attached to the edges of the leather while on the brake and under pressure, and used in combination with removable brake, C, adjustable jaws, D, and clamps, G, substantially as described.

2d, The arrangement of the reciprocating guide, B, ways, A, removable brake, C, winch, E, and pinion and rack, F, substantially as and for the purpose set forth.

75,187.—GRAIN REGISTER.—Milton W. Nesmith and George W. Nesmith, Metamora, Ill.

We claim, 1st, A grain measuring apparatus, constructed substantially as described, and provided with a registering device operated by a lever, so arranged that by drawing the measure past it in one direction, the register will be operated substantially as described.

2d, The registering device consisting of the dial wheels, v, provided with the pins, x, and having the gear wheels, m, attached, in combination with the double wheel, u, when said parts are arranged as described, and operated by the pawl, P, as and for the purpose set forth.

3d, The pawl, P, having the dog, t, with the stop, r, and spring, n, all arranged substantially as described.

4th, The combination of the registering device, the pawl, P, and the lever, L, all arranged to operate as and for the purpose set forth.

75,188.—SAW JOINTER.—Walter B. Noyes, Dorchester, N. H.

I claim the jointer, g, constructed and operating as and for the purpose set forth.

75,189.—FRUIT CAN.—Peter Numsen, Baltimore, Md.

I claim, 1st, The combination of a hole, C, and cap, D, shown in figs. 1, 4, 5, constructed and operated in the manner and for the purpose herein substantially set forth.

2d, Forming or shaping a hole, C, as shown in figs, 1, 4, 5, in the manner and for the purpose herein set forth.

75,190.—CORN MARKER, ETC.—J. P. Olin, Westfield, Ohio.

I claim the arms, E, braced and hinged to the frame, A, and markers, B', in combination with the frame, A', and adjustable markers, B, substantially as and for the purpose set forth.

75,191.—SIPHON FAUCET.—T. W. Plum, London, England.

I claim a tap or cock so constructed as that its discharging aperture may be opened and closed below the level of the bottom of the cask or vessel into which it is inserted, and whose inner end consists of or terminates in a floating, flexible tube, all substantially in the manner and for the purpose herein set forth.

75,192.—PIVOTING TEETH.—D. H. Porter, Bridgeport, Conn.

I claim the herein described double-headed, U-rivet, for insertion into mineral teeth, in the manner and for the purpose substantially as herein set forth.

75,193.—HAY ELEVATOR.—H. G. Porter, Grand Rapids, Mich.

I claim, 1st, The arrangement of the horse power with the ratchet wheel, D, spool, E, pawl, F, lever, G, and cords, J and K, substantially as and for the purpose set forth.

2d, The combination of the fork with the horse power, ratchet wheel, D, spool, E, pawl, F, lever and cords, when the parts are arranged and operating substantially as and for the purposes set forth.

75,194.—INDICATOR FOR KNITTING MACHINE.—J. C. Potter, Alfred, N. Y.

I claim, 1st, The arrangement of the shaft, E, with the gear wheel, G, ratchet wheel, H, finger, L, and dial plate, F, substantially as and for the purpose set forth.

2d, The combination with the needle supporting bed, and the shaft, C, of a knitting machine, provided with a screw, of the clamp, B, shaft, E, gear wheel, G, finger, L, adjustable dial plate, F, all arranged and operating as set forth.

75,195.—HEAD BLOCK FOR SAW MILLS.—William S. Reeder, St. Louis, Mo.

I claim, 1st, The arrangement and combination of the lever device, E', the graduated limb, E, the rack, D, and the cog wheels, c1, substantially as and for the purposes set forth.

2d, The arrangement and combination of the crank wheel, C', the pawl, c3, ratchet wheel, c2, and the application thereof to actuate the screw, C, to produce the feed motion of the head block, B', as set forth.

3d, The spring brake, F, to prevent small logs from being thrown over too far, when constructed substantially as set forth.

75,196.—MACHINE CLOCK.—Geo. Richardson, Lowell, Mass.

I claim the application of the stationary internal gears, d and l, traveling gears, j and n, and pinions, i and l, when arranged to operate substantially as described and for the purposes fully set forth.

75,197.—PROCESS AND APPARATUS FOR THE MANUFACTURE OF ROOFING FABRIC.—Alfred Robinson, New York city.

I claim, 1st, The process of preparing roofing fabric, substantially as herein specified.

2d, The combination of a system of pressure and saturating rollers, so arranged relatively with each other as to accomplish the purpose of my invention, substantially as herein specified.

75,198.—BOLT HEADING MACHINE.—John Root (assignor to himself and McLagon & Stevens), New Haven, Conn.

I claim, 1st, The arrangement of the cylinder, B, with its projections, f, the levers, c, and die holders, b, so as to force up and withdraw the said die holders, in the manner substantially as described.

2d, The combination of the slide, F, fulcrum pin, i, block, I, and eccentric, L, with the lever, H, all as herein described and for the purpose set forth.

75,199.—WRENCH.—H. Schuyler Ross, Buffalo, N. Y., assignor to Charles G. Ross, New York city.

I claim, 1st, A wrench composed of a stationary jaw, A, a movable jaw, B, cam, D, and handle D, constructed and arranged substantially as and for the purpose specified.

2d, A wrench having its movable jaw, B, operated by a cam, D, pin, h, and groove, C, or their equivalents, substantially as herein specified.

75,200.—TRUNK CORNER.—E. A. G. Roulstone, Roxbury, Mass.

I claim a metal corner for traveling trunks, in which the metal is cut away or incised to form the corner, substantially as set forth.

75,201.—BEEHIVE.—Daniel Rudolph, Sugar Grove, Ohio.

I claim the construction, arrangement and combination of the flanged tin drawers with a wire sieve above, and surrounded by open chambers on each side, as herein described, for the purpose of entrapping moths, millers, and worms, and preventing their infesting the bee-house.

75,202.—HARROW.—J. Ruhl, Defiance, Ohio.

I claim the revolving harrows, B B, hinged frame, C, lever, g, pawl, h, and stationary ratchet wheel, F, all arranged in combination substantially as and for the purpose set forth and described.

75,203.—MODE OF PRESERVING HOPS.—S. Franklin Schoonmaker, New York city. Antedated Feb. 22, 1868.

I claim in connection with a suitably enclosed chamber or compartment, nitrogen gas, when produced from the confined air by the agency of a chemical compound and heat, without the production of carbonic acid gas, substantially as and for the purpose described.

75,204.—COMBINED KNOB LATCH AND LOCK.—Gustav Schumacher, New York city.

I claim a sliding latch bolt, provided with studs, 2, for the cam, b, to act against, and with two talons, 4 and 5, for the key to act upon, in combination with the tumbler, c, stud, 10, and notches, 11 and 19, as and for the purposes set forth.

75,205.—CHURN.—B. W. Shaw and Geo. A. Simmons, Morristown, Vt.

We claim the combination of the cylinder, A, and the wheels, B B, when constructed and operated substantially as and for the purpose herein set forth.

75,206.—RAIL FOR RAILWAYS.—E. R. Shepard, Scranton, Pa.

I claim an inclined and wedge-keyed bolt, constructed substantially as described, in combination with a compound rail, as and for the purpose set forth.

75,207.—COTTON SEED PLANTER.—N. B. Sherwood, Millville, N. Y.

I claim, 1st, The construction and relative arrangement, in connection with the chains, of the conveyer, D, substantially in the manner and for the purposes herein shown and described.

2d, The application of the flat-link chains, C, with conveyers, D, attached to cotton-seed planters, substantially in the manner and for the purposes shown and described.

3d, The sunken channels within the drums, P, and the surface board, J, for the carrier chains, C, or their equivalents, to travel in, for the purposes herein shown and described.

75,208.—APPARATUS FOR ATOMIZING LIQUIDS.—A. M. Shurtleff, Boston, Mass.

I claim in combination with atomizing tubes, an air vessel having means of connection both with the atomizing tubes and a stationary liquid head, substantially as set forth.

75,209.—SCRAPER FOR ICE CREAM FREEZER.—Franz G. Siemers, Winona Minn.

I claim the scraper, E, constructed substantially as described, and made adjustable on the arm, D, as set forth.

75,210.—GAS REGULATOR.—Warren A. Simonds (assignor to himself and Henry H. Hyde), Boston, Mass.

I claim, 1st, The arrangement of cylinder, A, with its interior annular ring or chamber, filled with mercury, and inlet and egress passages, B and D, in connection with floating bell, F, and rod, h, opening and closing valve, I, in valve chest, C, all operating together as and for the purpose described.

2d, The construction of the regulation valve, consisting of valve chest, C, with its triangular opening, n, in plate, O, and having arranged within it slide, l, pressed by spring, m, to open or close the said opening, all operating together as and for the purpose described.

75,211.—CULTIVATOR.—David S. Slater, Poynett, Wis.

I claim a cultivator consisting of the central bar, A, having the adjustable handles, C, and the rigid share, o', attached thereto, in combination with the laterally adjustable side bars, B, having the adjustable shares, o, secured thereto, and all arranged to operate substantially as shown and described.

75,212.—BUTTON HOLE FOR PAPER ARTICLES OF APPAREL.—Benj. M. Smith, New York city.

I claim the metallic shield piece, a, in combination with the button hole, A', of a paper article of apparel, substantially as and for the purpose specified.

75,213.—CARRIAGE WHEEL.—J. C. Sparks (assignor to himself and A. G. Buzby), Philadelphia, Pa.

I claim the arrangement of the ferrule, A, having tapering sockets as described, the fellies, C C', and spoke, B, when projections on the said fellies are recessed for the reception of a tenon on the spoke, which projects through the side of and into the ferrule, all as set forth.

75,214.—WATCH KEY.—George B. St. John (assignor to himself and Norman S. Cate), Boston, Mass.

I claim the combination and arrangement of the elongated swivel or plunger and its surrounding spring with the key-head and the pin, D, substantially in the manner and for the purposes herein shown and described.

75,215.—GRAIN BINDER.—A. S. Stone, Plainview, Minn.

I claim, 1st, The arms, G G', arranged upon the shafts, D D', with the springs, H H', rubber, L, box, O, with twisting device, and pincers, R, and chisels, all constructed, arranged, and operating in the manner substantially as and for the purposes herein fully set forth.

2d, The carrying device, composed of the bar, X, shaft, M, with its cogs, y y1, and wheel, z, with its frame, and revolving pincers, Q, when constructed and used in the manner and for the purposes specified.

3d, The combination of the reaper platform, c, rake shafts, C C', wheels, d d', chains, g g, with rakes, e, and cutters, b b, with the grain binding devices herein described, all arranged and used substantially as specified.

75,216.—COMBINATION PADLOCK.—Enoch E. Stubbs, West Elkton, Ohio.

I claim, 1st, The combination of the safety bolt, f, with the hook, E, and hasp hook, F, arranged and operating substantially as described for the purpose specified.

2d, The spring pawl, D, and eccentric stud, 7, in combination with tumbler, a, and pivoted hook, F, arranged and operating conjointly in the manner and for the purpose described.

75,217.—APPARATUS FOR EXERCISE.—George H. Taylor, New York city.

I claim, 1st, The headed rods, F, driven by any suitable mechanism for producing a reciprocating or circular motion of the headed ends of said rods, substantially as and for the purpose set forth.

2d, The combination, with the headed rods, F, of the lever, G, said lever, G, being driven substantially as described to produce the motion set forth.

3d, The combination, with the headed rods, F, and lever, G, of the crank, K, substantially as and for the purpose set forth.

4th, The combination, with the headed rods, F, and lever, G, of the jointed parallelogram, I, constructed and operating substantially as set forth.

5th, The combination, with the headed rods, F, of the top, B, of the couch, said top, B, being made adjustable to different angles of inclination by means of the hinges, C, and a pawl or prop working in a rack or ratchet, or their equivalents, substantially as set forth.

75,218.—APPARATUS FOR EXERCISE.—George H. Taylor, New York city.

I claim, 1st, The handle, B, driven by any suitable mechanism by which a vibratory or oscillating motion is imparted to it, substantially as and for the purpose set forth.

2d, The shoe or foot-holder, B', driven by any suitable mechanism by which a vibratory or oscillating motion is imparted to it, substantially as and for the purpose set forth.

3d, The combination with the handle, B, of the shaft, A, crank, C, crank, E, and rod, D, substantially as and for the purpose set forth.

4th, The combination, with the foot holder, B', of the shaft, A', cranks, E' and C', and the rod, D', substantially as and for the purpose specified.

5th, The combination, with the handle, B, and foot-holder, B', and their immediate connections, of the driving shaft, F, pulleys G and H, and a suitable means for applying power, as described, the whole constituting a machine constructed and operating substantially as and to the effect set forth.

75,219.—GEAR-CUTTING TOOL.—Henry R. Taylor, Westport, Conn.

I claim the rotary cutter, made up substantially as described, of a stock or holder and loose or separate cutting teeth or blades pivoted to the holder, and forming curvilinear sections outside of the latter, and constructed so as to be self-adjustable therein, or relatively thereto and each other.

75,220.—ELEVATOR FOR BUILDING.—David B. Thompson, Brooklyn, N. Y.

I claim, 1st, The arrangement of a single or double inclined plane on the upper or lower, or both ends of the elevator, substantially as and for the purpose specified.

2d, The single or double inclined plane, arranged upon a vertical axis, at the bottom of the elevator, for operation substantially as and for the purpose set forth.

75,221.—MACHINE FOR HEADING BOLTS.—Hiram Thompson, Worcester, Mass.

I claim, 1st, The improved machine as a whole, arranged as specified, with or without the cutting attachment.

2d, The hollow die, S, in combination with the holding die, u, and die, m, for the purpose specified, when the dies, S and m, are operated by the means and in the order specified.

3d, The chambered die-stock, F, constructed as described, in combination with the dies, S m and u, when said parts are arranged as and for the purpose specified.

4th, As means for operating the discharging punch, the cross-bar, W, incline, 5, and cams, Y, combined.

75,222.—STATIONARY SPITTON FOR CARS.—John C. Tunison, Decatur, Ill.

I claim a spittoon, composed of an open-work top, a conical-shaped body, and a weighted valve to cover an opening, f, in said body, all constructed and arranged to operate substantially in the manner and for the purpose described.

75,223.—COAL STOVE.—H. B. Van Voorhis, Pittsburg, Pa.

I claim connecting the stoves, A and B, together by flue, K, and pipes, C D, in such a manner that the smoke of each can be passed beneath and through the fire of the other, substantially as and for the purpose set forth.

75,224.—GATE POST.—W. F. Veber, Perrysburg, Ohio.

I claim the plates, E, and pin, D, as arranged, in combination with the posts, A B, for the purpose and in the manner substantially as set forth.

75,225.—WATER METER.—Franz Wagner and Louis Sexauer, New York city.

We claim, 1st, The oscillating valve, E, with chambers, n n, and ports, o o' p p' in combination with the reciprocating piston, B, stops, k k, toggle-arms, d' f, spring lever, c, and elbow lever, d d', all constructed and operating substantially as and for the purpose described.

2d, The combination of the valve, t, bolt, u, and plug, I, in the mud cistern, H, substantially as and for the purpose set forth.

3d, The channels, s r, in combination with the supply pipe, G, mud cistern, H, and cylinder, A, substantially as and for the purpose described.

75,226.—WINDOW SASH SUPPORTER.—Philipp Wentzel, Mentz, Germany, assignor to H. C. Lauterback, Roxbury, Mass.

I claim the employment of a presser roll or rolls, containing a spring or springs, the stress of which tends to turn the roll and to raise or support the sash, substantially as set forth.

75,227.—COUPLING AND BRAKE.—Thomas Aldridge Weston, King's Norton, England.

I claim a new or improved coupling and brake for transmitting or regulating or arresting motion, the parts of which are arranged or combined substantially in the manner hereinbefore described, and illustrated in the accompanying drawings.

75,228.—PUMP.—Philo B. White and Henry M. C. White, Dowagiac, Mich.

We claim the submerged box, G, provided with a water inlet in its side, channels, B C C', valves, c c', slotted plunger, D, with its valves, d d', said plunger operated by the lever, E, and shaft, F, all substantially as and for the purposes set forth.

75,229.—HARVESTER.—Abner Whiteley (assignor to William N. Whiteley), Springfield, Ohio.

I claim, 1st, The globular roller, B, placed at the inner end of and in line with the finger bar of a harvesting machine, in combination with the bearing wheel, A, and the driver's seat, D, arranged and operating substantially as described.

2d, The globular roller, B, placed on the end of the finger bar, in combination with said finger bar, the main frame, brace rod, E, and driving wheel, A, as set forth and described.

75,230.—MARBLE CUTTING MACHINE.—William Wickersham, Boston, Mass.

I claim, 1st, In marble cutting machines, the combination of the diamond with a chain, in the manner and for the purpose described.

2d, The clamps, u u, in combination with the diamond, in the manner pecified and for the purpose set forth.

3d, In machines for cutting marble and other stone, the combination of the diamond chain, c, the chain gears, w w', and the standard, g, arranged and operating as described.

4th, A device for moving the chain standard to any position, consisting of he screw, b, the worm gear, f, combined with the chain standard, constructed and operating as described.

5th, In marble-cutting machines, feeding the machine along while it is working by communicating motion from the driving shaft to one or more of the trucks, substantially as described and for the purpose set forth.

6th, A device for cutting underneath blocks of marble in a quarry, consisting of a diamond chain, chain standard and upright shaft, all arranged, as described, to cut grooves in a horizontal plane, in connection with an apparatus for feeding the machine along while it is working, in the manner and for the purpose described.

7th, A device for cutting channels underneath blocks of marble in a quarry, consisting of a disk, c, on an upright shaft attached to the slide, r, working in the manner described, in connection with a feeding apparatus to feed said disk along while working, in the manner and for the purpose set forth.

75,231.—CLOTHES WRINGER.—George L. Witsil, Philadelphia, Pa., assignor to Thomas E. Huuberger.

I claim the combination of a fixed roller, D', yielding upper roller, D, and springs, E, when the latter are formed as set forth, and attached to the frame at both ends, so as to give them staunchness to resist lateral pressure, and also so constructed as to form bearings for the upper roller, by being bent into the shape, substantially as set forth.

75,232.—SPINNING MACHINE.—David C. Wolf, South English, Iowa.

I claim, 1st, The combination of the fork, s, levers, t and r, plate, i, and pin, u, for clamping and liberating the cord, substantially as and for the purpose herein recited.

3d, The bar, h''', operated by the bar, c''', for holding the roller, k', as and for the purpose herein described.

4th, The wheel, x''', having the pin, x''', and the other means and devices connected therewith, substantially as described for the purpose herein recited.

75,233.—BOTTLE STOPPER.—Isidoro Zamboni (assignor to himself, Peter Zoppi and John Ruedy), St. Louis, Mo.

I claim the cap, C, when provided with a packing surface, c4, and combined with the bottle, A, by means of the hinge, c, and latch, c1 c2, c3, substantially in the manner shown and described.

REISSUES.

2,886.—BOOK COVER PROTECTOR.—Charles L. Alexander and Victoria A. Osborn, Wasnington, D. C. Dated September 24, 1867.

We claim, 1st, The elastic or expansible bands or straps, b b b b, connecting the top and bottom folds, D D D D, by means of clasps or other devices, and thus applicable to various sizes of book covers, substantially as and for the purpose set for h.

2d, The elastic bands or straps, a a a a, to form an expansible connection for the two halves of the book cover protector, substantially as described.

3d, Such a book cover protector or mode of covering books, as, by reason of its expansibility and extensibility, may be adjusted to books of various sizes, substantially as described.

2,887.—WATCH.—N. B. Wallace, Fond du Lac, Wis. Dated September 10, 1867.

I claim the two-part cup, F, for the winding post or other axis of a watch movement, substantially as and for the purpose described.

2,888.—LIGHTNING ROD.—William Hall, Dubuque, Iowa. Dated October 18, 1859.

I claim a cylindrical lightning rod, made of sheet copper in sections, where the sheet is made to extend beyond a single cylinder, leaving the edges open or unsoldered, when the same is constructed substantially as and for the purposes herein set forth.

2,889.—MACHINE FOR CUTTING THREADS ON BOLTS OR NUTS.—Schweitzer Patent Bolt Company (assignees of Franzis Schweitzer), New York city. Dated March 5, 1867.

I claim, 1st, The sliding or movable heads, N O, in combination with the lever, P, and cutters or dies, a b, substantially as and for the purpose described.

2d, The adjustable lever, P, provided with arms, d e, substantially as and for the purpose set forth.

3d, The elastic rest, g, constructed and operating substantially as and for the purpose shown and described.

2,890.—LUBRICATOR FOR STEAM ENGINES.—John Storer, New York city. Dated March 13, 1866.

I claim a lubricator for steam engines, having a movable cap or valve, E, and a screw, F, to secure the said cap or valve in position, so arranged that the screw can turn without carrying the said cap or valve around with it, in combination with a soft metal ring for making a tight joint between the cap or valve and the body of the lubricator, all substantially as and for the purposes specified.

DESIGNS.

2,941.—IMITATION BRAID FOR BONNETS.—Samuel A. Blake, Milford, Conn.

2,942.—CUSPADOR.—John P. Connolly, Ravenswood, N. Y.

2,943.—CLOCK CASE.—Carl Muller, New York city.

2,944.—FIGURE AND BASE.—Carl Muller, New York city.

2,945.—TRADE MARK.—Harrison Parker and Jonathan C. Sleeper, Boston, Mass.

2,946.—PITCHER.—Horace C. Wilcox, West Meriden, Conn.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., *37 Park Row, N. Y.*

34,733.—CHIMNEY FOR LAMP.—Harvey Brown, N. Y. city.—Dated March 25, 1862. Application for reissue received and filed February 14, 1868.

I claim the arrangement and construction of a metal top lamp chimney, as a new article of manufacture, substantially in the manner and for the purposes set forth.

52,107.—VULCANIZING FLASK.—A. B. Woodard (assignor to himself and Thomas Ellis), Alfred Center, N. Y. Dated January 16, 1866. Application for reissue received and filed February 15, 1868.

1 claim, 1st, closing the flask, A, within the vulcanizing vessel, by the pressure of steam, substantially as herein shown and described, so that while the rubber is gradually heated the flask is gradually and automatically closed, and the rubber molded when in its most plastic state.

2d, Applying steam pressure to close the flask, A, within the vulcanizing vessel by means of a piston.

3d, Forming segmental flanges, , upon the interior of the vulcanizing vessel or boiler, C, and corresponding segmental flanges, K, upon the exterior of the upper part or cover, b, of the flask, A, substantially as herein shown and described, for the purpose of locking the said flask in and to the said vessel.

4th, The segmental connections, e, of the receiver, B, in combination with the flattened sides of the flask, A, and with the piston, f, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the annular plate, g, and ring packing, i, with the piston, f, and boiler or vulcanizing vessel, C, substantially as herein shown and described, and for the purpose set forth.

66,583.—AXE.—Thomas Bakewell, and John Lippincott, Pittsburg, Pa., assignees of Daniel W. Colburn, Laomi, Ill. Dated July 9, 1867. Application for reissue received and filed Feb. 17, 1868.

We claim, 1st, making that part of the edge of an axe which lies forward of the broadest part of the bit, of a semi-circular shape, or such a modification thereof, as will secure the same results, substantially as and for the purposes hereinbefore set forth.

2d, Continuing the cutting edge of an axe, around the swell of the bit on both ends of the axe, substantially as and for the purposes above set forth.

3d, Extending the bit of a semi-circular bladed axe, beyond the poll at both ends, instead of one end only, so that the poll is reversible, and that the handle may be inserted at either end of the eye.

4th, Making an axe with a poll of gradually increasing width from the eye toward the bit, when combined with a bit having a curved cutting edge extending around and back of its broadest part.

49,484.—BOLT MACHINE.—Abram Alexander, Pittsburg, Pa. Dated August 15, 1865. Application for reissue received and filed February 17, 1868.

I claim, 1st, the use of sector dies operated and arranged, substantially as described, for rounding the shank of bolt blanks.

2d, The combination of the sector dies or swedges, c, frame, A, and sliding frame, g g,', for the purpose of rounding the shank of a bolt blank, and leaving square that part thereof which is for making the head of the bolt, substantially as herein set forth.

23,624.—COOKING STOVE.—Philo P. Stewart, Troy, N. Y. Dated April 12, 1859. Reissue, No. 1,673. Dated May 17, 1864. Application for reissue received and filed February 18, 1868.

I claim, 1st, the method or the means, substantially as herein described and set forth, of preventing heat from passing through to the rising flue leading to the chimney, by separating it from the back oven plate and from the descending flues, by non-conducting partitions, or the equivalents therefor, and for the purpose herein set forth.

2d, I also claim the employment of a double damper, filled in with cement or other equivalent non-conducting material, in combination with the flue above the oven, and with the rising flue leading to the chimney in the manner substantially as and for the purposes herein described and set forth.

3d, I also claim the separating of the direct sheet flue, under the oven, from the return sheet flue immediately below the same, by means of the dividing flue plate, i, or any equivalent therefor, constructed, arranged, and combined with the said sheet flues, in the manner, and by the means, and for the purposes substantially as herein described and set forth.

4th, I also claim the dividing of the space between the bottom plate of the oven, and the bottom plate of the stove, by means of the inclined dividing flue plate, i, or any equivalent therefor, in the manner and for the purposes substantially as herein described and set forth.

5th, I also claim the employment of the space or chambers, S, in combination with the outer edge of the oven bottom plate, and with the back and oven plate, in the manner and for the purposes substantially as herein described and set forth.

6th, I also claim the sheet flue division plate, I, having a recess, b', at each front corner thereof, and the projection, A, between such recesses, substantially as and for the purposes herein described and set forth.

7th, I also claim the employment of a broad or sheet flue division plate, I, or any equivalent thereof, in combination with the oven and oven bottom flues, in the manner and for the purposes substantially as herein described and set forth.

8th, I also claim the additional bottom plate, or incasement, r, in combination with the broad sheet flue, h, or any equivalent therefor, in the manner and for the purposes substantially as herein described and set forth.

23,730.—HARVESTER.—Jacob V. A. Wemple, Quincy, Mich. Dated April 19, 1859. Application for reissue received and filed February 20, 1868.

I claim, 1st, The separating rod or finger, W, for separating the falling grain from that which is being discharged from the platform, substantially as described.

2d, The rod or finger, W, pivoted piece, C, and standard, E, in combination with the rod, B, constructed and operating substantially as specified.

3d, Supporting a movable separating rod or finger upon a single standard or post, located between the platform and main portion of a harvester, so that it can be operated from such post substantially as specified.

37,867.—LAMP.—Care A. Kleeman, Erfurt, Prussia.—Dated March 10, 1863. Application for reissue received and filed Feb. 20, 1868.

I claim, 1st, the notch, l, in the cylinder, f, of the fountain, for the purposes specified.

2d, The cylinder, p, of thin sheet metal, extending from its connection with the cylinder, o, down to the arms, 5, in combination with the chimney holder, r, substantially as and for the purposes specified.

3d, The cone, q, having the air openings, 4, in combination with the chimney holder, r, arms, 5, and cylinder, p, as and for the purposes set forth.

4th, The cup, 3, in combination with the cylinder, p, and wick tube, o, as and for the purposes set forth.

66,522. — PIANOFORTE STOOL. — George Schmidt, Dobb's Ferry, N. Y. Dated July 9, 1867. Application for reissue received and filed February 21, 1868.

As the seats of pianoforte stools have been generally elevated by a screw, and as my invention is designed to overcome the use of a screw for such purpose, by making the seat self-elevating by means of a spring and vertically operating spindle, I therefore disclaim all the use of the screw as a means of elevating the seat of pianoforte stools; but what I do claim is the combination of the seat, A, and spindle, B, with a spring, J, for the purposes hereinbefore set forth, and substantially as described.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* *MUNN & CO., Solicitors of Patents, 37 Park Row, N. Y.*

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SYNOPSIS OF GAS LIGHTING.

James R. Smedberg, of the *American Gas Light Journal*, New York, proposes to publish a work compose l principally of extracts from the "London Journal of Gas Lighting," which, if carried out, will be of vast importance to gas engineers and other persons interested in the manufacture of gas. The extracts will cover such portions from the voluminous London work as is adapted to the practical art in this country, and the work will be furnished, to subscribers only, at $15 per volume. Mr. Smedberg may be addressed at 21 Pine street, New York.

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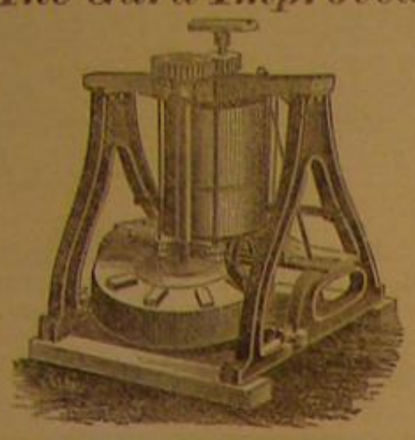

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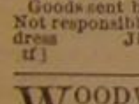

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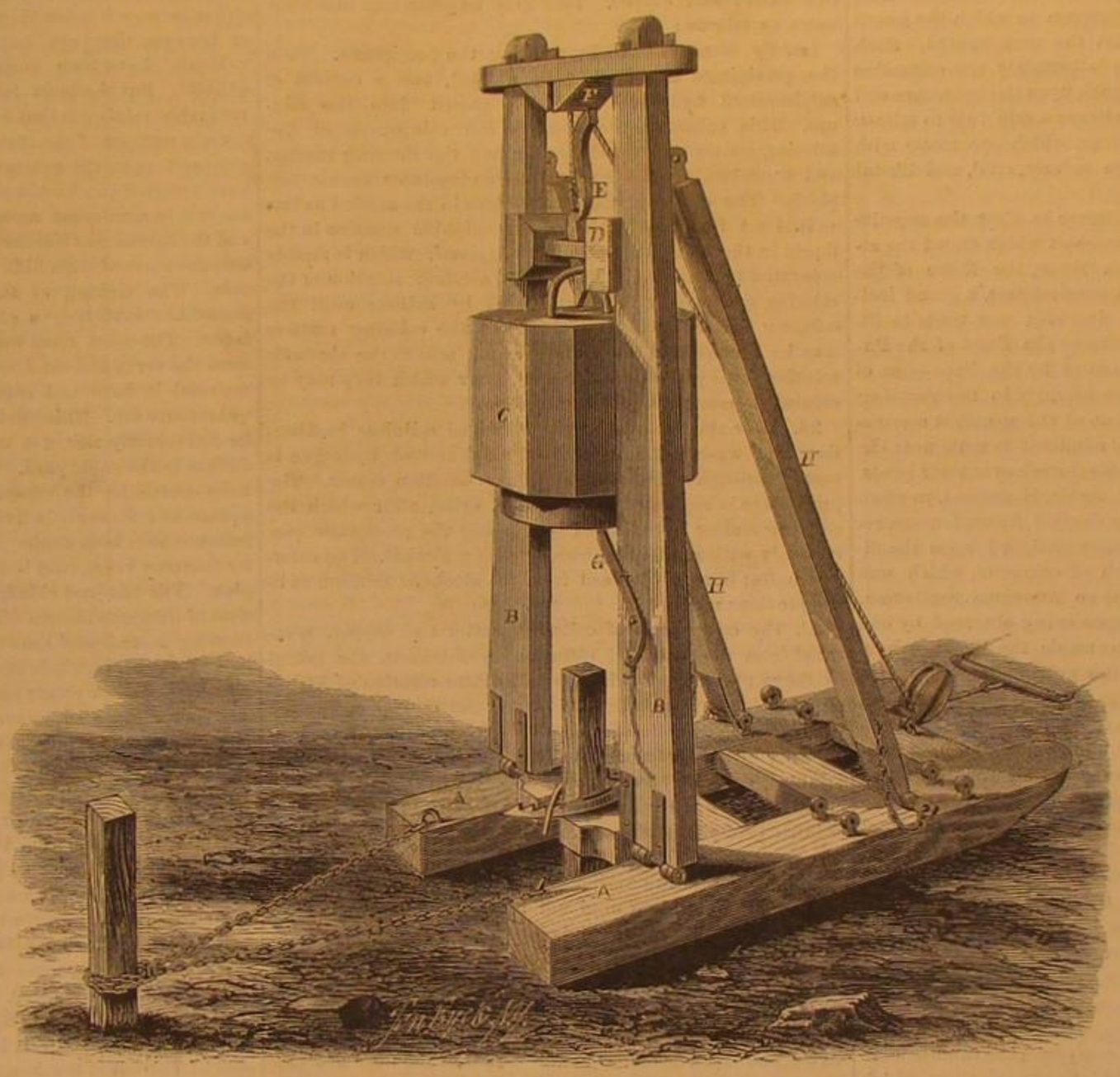
Vol. XVIII.—No. 13. [NEW SERIES.] NEW YORK, MARCH 28, 1868. $3 per Annum [IN ADVANCE.]

Improved Post Driving Machine.

It is claimed that fence posts which are driven will stand firmer and last longer than those which are set with the spade. Certainly, with proper apparatus, posts may be driven with far less labor than they can be set in dug holes. The one of which the accompanying engraving is a correct representation, appears to be admirably adapted to the requirements of fence building. It is strong and efficient, yet light and portable, and may be used equally well on uneven ground and side hills as on a level.

The bottom is a frame consisting of two runners, A, connected and braced by cross pieces, the forward ends of the runners being beveled for facility in drawing the machine from place to place. To this frame are pivoted the uprights, B, connected at the top by a cross framing. These uprights form the slides for the hammer, C, and guide, D the hammer being a block of wood sufficiently heavy for the purpose, and hooped with iron at its face end. A tripping hook, E, and the inclined face, F, are similar in form and arrangement to those on the ordinary pile driver. To hold the hammer or drop in an elevated position, while the machine is being drawn from place to place, and while a post is being adjusted to be driven, a catch latch, G, is attached to one of the uprights. The drop is raised by horse power, by means of a rope and pulleys, as seen. When the machine is to be moved the staple of the horse's whiffletree is attached to a hook at the forward end of the frame, and a graduated or measuring chain, seen attached to the rear ends of the runners, is passed around the post last driven, and the machine moved until the chain is tightened, when the distance of the posts one from the other is thus measured, and the machine is ready to drive another post. To hold the post, to be driven, in place, two adjustable arms which hook into each other are attached to the yoke at the bottom of the uprights. Their form and operation are readily seen in the engraving. At the back of the uprights are diagonal braces, H, which are pivoted to the uprights at one end, and to the runners at the other. These lower ends may be advanced to or receded from the foot of the uprights, and secured to either one of the series of eye-bolts seen on the runners. This will allow the machine to work on uneven ground, or a side hill, while the uprights will remain perpendicular. The inventor claims that the machine will drive posts at equal distances apart as fast as four men can follow up and board.



FITCH'S PATENT FENCE POST DRIVER.

Patented through the Scientific American Patent Agency, May 7, and Nov. 26, 1867, by C. T. Fitch. All letters of inquiry should be addressed to Fitch & Videto, Harbour Creek, Pa.

American Ordnance.

Whatever representations or misrepresentations may have been made on either side of the Atlantic with regard to the performances of American ordnance, it is certain that it comes out very creditably in this respect in the report of the U. S. Chief of Ordnance—General Dyer—just issued. The official facts contained in this report are at once interesting and instructive, and General Dyer demonstrates that the American heavy smooth bores are "the cheapest and most effective gun possessed by any nation."

The report states that the 20-inch gun has been fired with a charge of 200 pounds of powder and a shot weighing 1,100 pounds, and the General states that this may be the regular charge for this gun. The range at 25° elevation was more than four and a half miles. The 15-inch gun, about the performance of which, at Shoeburyness, we in England know something, has been fired as follows:—7 times with 40 pounds of powder and a shell weighing 350 pounds; 5 times with 50 pounds of powder and a shell weighing 350 pounds; 70 times with 50 pounds of powder and a shot weighing 434 pounds; 59 times with 55 pounds of powder, and a shot weighing 435 pounds; once with 60 pounds of powder and a shot weighing 434 pounds; once with 75 pounds of powder and a shot weighing 434 pounds; once with 80 pounds of powder and a shot weighing 434 pounds; once with 90 pounds of powder and a shot weighing 434 pounds; and 125 times with 100 pounds of powder and a shot weighing 434 pounds. The mean range obtained with 100 pounds of powder at an elevation of 32°, was 7,732 yards. The mean initial velocity of the shot with the same charge, was 1,510 feet per second. Ten rounds were fired in 35 minutes, which was as rapidly as the gun could be fired with 100 pounds of powder and a solid shot. An examination of the gun has failed to detect any enlargement of the bore from firing, neither has the metal been cut away by the powder. In fact, the gun is reported to be serviceable in every respect.

If the performances of the 15-inch gun are thus proved to be in every respect satisfactory, no less so are those of the 20-inch gun. This formidable weapon has been fired with 200 pounds of powder and a shot weighing 1,100 pounds, the range at 25° elevation being more than four miles and a half. This gun and its charge are difficult things for us to realize, but here they are, and here are their results, and, what is more, General Dyer has no hesitation in assigning this heavy charge as that which may be regularly used in this gun. However we may argue down the matter in theory, there is no getting over these practical facts, unless we dub General Dyer a fool, and his report a fiction.—*London Mechanics' Magazine.*

Transfusion in Cases of Poisoning.

Hitherto transfusion of healthy blood into the veins of another being was applied only in extreme cases where loss of blood had rendered necessary some desperate means of replacing the loss of red corpuscles and oxygen in the arteries, and restoring respiration and circulation. Quite lately, however, a German and a French physician, Drs. Eulenburg and Landers, have sent to the French Academy a treatise on Transfusion of Blood, in which, by an extended series of experimental researches upon animals, they seek to prove that this process, modified in a certain way, and repeated if necessary, should be viewed as a sovereign mode of treatment in all cases of acute poisoning, viz., of such poisons which, after absorption by the blood, act injuriously upon the vital nervous centers.

The rationale of this theory is given by them as follows: The poisonous substances in question act in this way—they are absorbed into the blood from the stomach or other places of application, and are then carried to those spots in which they exert prominently their deleterious influence (*e. g.*, the *medulla oblongata*, the central organ of respiration and movement of the heart). Once arrived in the blood, these poisons are not to be counteracted by so-called antidotes except in a few cases. In order to produce its effect, however, each poison must be present in a certain quantity, not below some minimum, without which its action on the tissues would not become potent.

Supposing that the blood contained an excess of such poison, it is seen that by removing a portion of this so-to-say saturated solution, and by substituting a proportional quantum of pure blood, the relative quantity of poison would be greatly reduced. By replacing the blood removed, dangers are obviated which might result from its withdrawal. Transfusion in this instance should be viewed as entirely harmless, and may be repeated a number of times, to the total removal of the original supply that had absorbed the poison. In their experiments the authors continued this substitution as long as the symptoms indicated still the presence of poison.

The most successful results were obtained with certain poisonous gases, as carbonic acid, and carbonic oxide. Blood surcharged with carbonic acid causes death under the known phenomena of asphyxia, which are produced in part by the exciting action of the condensed gas, and partly by the simultaneous absence of oxygen. It seems rational to suppose that the best remedy in this case would be to impregnate the blood with oxygen, and to free it at the same time from its excess of carbonic acid. The oxygenated blood for injection used was either arterial and rich in oxygen, or such that had been beaten in the air and turned bright red. Transfusion in this instance proved much more efficacious than artificial respiratory movements, which can only be of use when the heart is yet in action and capable of performing its function of sending the blood from the lungs to the centers. On the contrary, by injecting oxygenated blood through the veins toward the heart, it has been shown by the experiments that the action of the heart, even if reduced to a minimum or even altogether extinguished, could be revived. Similar results were obtained in poisoning by carbonic oxide. There is in this case the aggravating circumstance that this gas when absorbed into the blood takes oxygen from the red corpuscles, rendering them incapable to perform the exchange of gases in the lungs, and that the blood thus, in greater or less measure becomes unfit for respiration. Here it is the corpuscles which are affected and must be replaced, and the truth of this view has already been established by Kuhne in actual cases of poisoning in human subjects and animals.

The experiments instituted to test the method in poisoning by chloroform and ether, as well as by narcotic alkaloids (morphia, strychnia), have given analogous results, the agents being in all cases given in toxical doses.—*Druggists' Circular.*

AN ELECTRICAL CLOCK in the rotunda of the Philadelphia Merchants' Exchange has a running gear of the simplest description, consisting merely of two cog wheels and a ratchet wheel. The driving power is supplied by a weak galvanic battery, the currents from which, transmitted through two galvanometer coils placed one on each side of the clock case, act upon steel bar magnets set within the pendulum ball. The latter swings between the two coils, so that when one of them is "positively charged" the ball is attracted until by contact it becomes similarly electrified, and consequently repelled, then swinging over to the "negative" coil, it becomes negatively charged, again repelled, and thus the vibrations are kept up indefinitely, or as long as the battery continues working. The alternate positive and negative charges are made and broken by a simple slide bar moved by a wire pin on the pendulum rod.

EDITORIAL CORRESPONDENCE.

Rome—Candles—Mass at St. Peter's—Coliseum by Moonlight.

ROME, Feb. 12, 1868.

Upon reaching the frontier,we experienced a tedious delay of upwards of an hour for a change of cars and the examination of passports and baggage. Our trunks were not opened, as our courier had taken the precaution to procure from Rome, in advance, a "*Lascia Passuré*," or "Let Pass," which saves a good deal of bother. Upon signing this document in the presence of the guard, nothing more is demanded. There is no difficulty in entering Rome. All that is now wanted is a passport, which need not be *vised*. The train was filled with Americans,who rush down to Italy to pass the winter months. And here I feel inclined to remark, that it is impossible to travel long in Europe without discovering the existence of a rough fiber in the composition of some of our countrymen, which, though less marked than what one sees in English travelers, is nevertheless the subject of occasional ridicule. For example—one pompous New Yorker, who seems to be "traveling on his muscle," boasted of having knocked down the servant of a family, who was trying to do his duty in keeping some seats for them in a car. Another, impatient of the delay, thrust his head out of the car window and shouted at the top of his lungs: "I say, old liver-sweet, how long have we got to stop here?" in response to which the guard very civilly tried to find out what the man wanted. Such brutality, such coarse impudence is certainly not excusable anywhere; and to presume too much upon the ignorance and forbearance of foreigners is not always a safe rule to follow. These cases, however, are exceptions, which one meets with here; for, as a rule, our people are orderly, civil, and liberal travelers.

One week spent in Rome only serves to whet the appetite for the almost endless objects of interest which crowd the attention. To be in Rome—Pagan Rome, the Rome of the Cesars, Papal Rome—is of itself a magical fact, a grand incident in the life of any one. Our first visit was made to St. Peter's, on Sunday morning, to witness the Feast of the Purification, and the blessing of candles by the Pope—one of the things to be seen. We were up early in the morning and off to St. Peter's to witness one of the grandest ceremonials of the church. Ladies were admitted to seats near the tribune if dressed in black,with veils thrown over their heads. Gentlemen were allowed to stand inside, if dressed, in swallow-tail coats. A guard of gaily dressed Swiss lancers, resembling harlequins in a play, were stationed upon the dividing line, to prevent any breach of etiquette, which was rigidly enforced, as I noticed that an American gentleman, wearing an ordinary frock coat, upon being observed by one of the guards, was invited to step outside the line, not having on the wedding garment. After waiting for upward of an hour, a regiment of soldiers were marched in, and divided, so as to form an open way in the central aisle for the passage of the procession. In a few minutes more, music, proceeding from a side chapel, announced that the Pope was coming, and all eyes turned in that direction. The procession was led by several ecclesiastical dignitaries, richly dressed in robes of gorgeous hues. The Pope, sitting in his grand chair, was borne upon the shoulders of six men, in scarlet gowns, when upon reaching the tribune, His Holiness took his seat upon a throne facing the bronze altar of St. Peter, and looking toward the vast audience. The cardinals—princes, members of the guard, nobles, and other dignitaries of privilege, were all richly clothed, and the whole effect was brilliant in the extreme.

The assemblage having become composed, the candles were passed before the Pope,who placed his hand upon them, which was kissed by the attending priests. This ceremonial being completed, the candles were lighted, a procession formed, the Pope again mounted upon his big chair under a richly embroidered canopy commenced to move around the church to bless the people, returning to his seat in the tribune. Then commenced the ceremony of high mass, in which the Pope assisted, the services lasting upward of an hour. The music, by male voices, was also very fine; indeed, it forms one of the remarkable features of the services of St. Peter's. We have wandered through the Coliseum by moonlight, and have been hooted at by the owls that haunt its immense arches. We have visited the famous Vatican, and traversed the ruins of the Palace of the Cesars, famous baths, temples, churches, catacombs, and prisons, yet dull, dirty old Rome continues to grow in interest.

S. H. W.

Separating Coloring Matter from Madder and other Plants.

Alfred Paraf, of Boston, Mass., has lately received a patent for the above new and useful process of liberating the coloring matter of madder and similar vegetable substances from the ligneous matter or cellulose with which it is combined in the plant, and hereby declares that the following is a full, clear, and exact description of the said invention.

In the ordinary process of dyeing and printing madder colors, only about half the coloring matter is utilized; and this portion is obtained by tedious processes, requiring a large amount of manual labor. The object of this invention is to liberate the coloring matter of the madder root or similar plant from the ligneous matter, so that, practically, the whole amount of coloring matter of the root may be utilized. The invention is based upon the fact that cellulose becomes soluble when in the presence of cupric oxide with ammonia. The madder root, previously dried and reduced to powder by grinding or other means, is washed with water by several successive operations until the sugary matters are separated and removed, which may be ascertained by testing the wash water for sugar with Bareswell's liquor in the usual manner. The damp, washed madder root, drained from the water, is next subjected to the action of cupric oxide with ammonia by steeping, in an open vessel, in aqueous ammonia in which copper turnings have been placed. This operation may be conveniently performed in an earthenware vessel, fitted with a perforated cover, which permits the access of air. In performing the operation, it is expedient to use one pound of metallic copper and seven gallons of aqueous ammonia for each pound of ligneous matter to be removed. Thus, assuming that the madder root contains thirty-eight per cent of ligneous matter, thirty-eight pounds of copper turnings and about two hundred and sixty gallons of aqueous ammonia may be used for each one hundred pounds of dry ground madder root. In the presence of the copper, the aqueous ammonia, and the air, the ligneous matter of the plant is gradually dissolved, while the coloring matter and copper form insoluble compounds, which remain in the liquid in the form of a precipitate. The operation requires generally several days, during which the materials should be occasionally stirred. The ammonia in the liquid also must be renewed, which is conveniently effected by passing a current of gaseous ammonia into the liquid in the vessel. The coloring matter being thus set free from the ligneous matter or cellulose by the solution of the latter, the next operation is the separation of the coloring matter and copper. This may be performed in several ways, as follows:

1st. By filtration, and by washing the precipitate. Then the precipitate is mixed with alcohol, and a current of sulphuretted hydrogen (H. S.) is passed into the mixure. This substance decomposes the compounds of the coloring matter and copper, setting free the coloring matter, and transforming the copper into an insoluble cupric sulphide. The coloring matter dissolves in the alcohol as fast as it is set free, while the cupric sulphide remains in the liquid in the form of a black precipitate, which is readily separated by filtration. The filtered alcoholic solution of the coloring matter may be concentrated by boiling until the coloring matters will crystallize; or, the coloring matters may be precipitated by adding acetic acid to the alcoholic solution until precipitation ceases, after which they may be separated from the liquid by filtration.

2d. After the removal of the dissolved cellulose by filtration and washing, a current of sulphuretted hydrogen is passed through the mixture until precipitation ceases. The precipitate is separated by filtration, dried, after which the coloring matter is extracted by treating the precipitate successively with small quantities of boiling alcohol. The coloring matter may be obtained from the alcoholic solution as in the previous mode.

3d. The compounds of coloring matter and copper, separated from the dissolved cellulose by filtration, are mixed (without previous washing) with a dilute solution of hydrochloric acid (H. Cl.), sufficient to transform the copper into the protochloride of copper, and the excess of ammonia into chloride of ammonium. The liquid is boiled for about ten minutes, or until the copper is dissolved in the form of the chloride, while the coloring matter remains in the form of a reddish precipitate, which is separated by filtration and washing.

4th. If the coloring matter is to be used at once for dyeing, the dissolved cellulose need not be removed from the compounds of coloring matter and copper, but a sufficient amount of hydrochloric acid (H. Cl.) may be added to the liquid to combine with the excess of ammonia, to transform the copper into the soluble protochloride of copper, and to peecipitate the cellulose. The coloring matter, being insoluble in water and acid, remains in the liquid in the form of a precipitate. The precipitated cellulose and coloring matter are then freed of the chlorides of copper and ammonium by filtration and washing, and the product remaining in the filter may be used in the same manner as practised in dyeing with madder root; but, as the coloring matter in this product is liberated from the cellulose, and is only mechanically mixed with it in the same manner as it might be with any inactive, adulterating material, the dyer is able to utilize, practically, the whole of the coloring matter of the plant, instead of only about half of it, as in the ordinary method of using madder.

The filtered solution of cellulose obtained in any of the preceding modes may have hydrochloric acid added to it until the excess of ammonia is neutralized, the copper remaining in the liquid is dissolved in the condition of a chloride, and the cellulose is precipitated. The liquid may then be removed by filtration and washing, and the product utilized for any purpose that is expedient, one of such purposes being the manufacture of paper. When using the product for this purpose, I treat it with sulphuric acid, in the manner practised for transforming paper pulp into artificial parchment.

The material obtained by the above-described operations, designated, respectively, first, second, and third, may be used advantageously for either dyeing or printing, the material, when used for printing, being previously mixed with the acetate of alumina, or of iron, or a mixture of the two, to produce red, purple, or chocolate colors, and being also mixed with gum or stareh in the usual mode of thickening. After printing, the cloths should be steamed in the usual mode, and washed with water, with or without soap. The material obtained by the operation designated fourth is useful specially for dyeing.

Composition for Cleaning Millstones.

Daniel Kindig, of Newville, Cumberland county, Pa., has patented a new solution, which, he says, if applied to the burr stone, keeps the same perfectly clean, and makes a more perfect and much finer article of flour, and a better yield; also enabling the miller, during all seasons, to use the No. 13 bolt, producing thereby a greater quantity of flour. While grinding garlic wheat, it does not become necessary to take up the burrs oftener than once in a fortnight. The solution is to be rubbed on the burrs with a scrubbing brush.

The solution is composed as follows: 1 gallon hot water; 2 oz. of borax; three balls, of the size of a hazel nut each, of sal-prunel; and ¼ pound of washing soda. Mix, and apply it to the burr. When grinding garlic wheat, it is not necessary to take up the burrs at all. It is sufficient to drop through the eye of the burr twice a day one of the above-described balls of sal-prunel, and that, he says, will keep the burrs sharp and clean.

Gold Mining in California.

Though the whole of the gold bearing region of California has been prospected, yet new discoveries of gold fields are continually being made. Many of these, however, are not workable on account of the scarcity of water, although some of them are very rich. Near the San Joaquin valley is a tract of mining region, fifteen by eight miles, rich in ores but entirely destitute of water. A canal has been dug to supply this section, and the result has been to make it one of the liveliest mining localities in the State. The stories of "big strikes, or the discovery of nuggets, which so excited the imagination of early adventurers are now seldom heard, either because it is found expedient to keep such things quiet, or because they are found less frequently. Nuggets, or "*chispas*," have been found weighing 45 pounds, and worth $15,000. But the most interesting, and it is supposed most profitable, mining is that known as the "deep placer mining." Certain sections of the state are traversed by troughs or beds, supposed to be the course of ancient rivers, which for ages have received the washings from the mountains. These beds are rich in auriferous metal. But the deposits are so deep, and the surface has become so hardened, like cement, that the ores are reached with difficulty by shafts, open cuts, or tunnels. The sinking of these often prove very expensive, sometimes involving a cost of $200,000, and several years' labor. The gold from these shafts and tunnels is separated from the earth and sand by sluice-washing. If, however, the material is hard and cemented, it is crushed as the vein or quartz ores are. This sand and gravel is sometimes found to be marvelously rich, not unfrequently yielding thousands of dollars to the cubic yard. On this account the mining laws have restricted the ownership of such sections to fourteen square feet for each individual, from which space handsome fortunes have been made. Hydraulic mining has been in use for fourteen years, and is at once a successful and ingenious plan. The material chiefly operated upon by this plan consists of immense masses of alluvial deposits, drift, and gravel, forming mounds and sometimes high hills. These rest on a base of rock. The whole mass of deposit contains gold grains, which grow more plenty and richer as the rock is approached. To remove these superincumbent masses water alone is employed, and the whole may be said to be literally washed away.

Such is the completeness of the adaptation, however, that the same process by which the earth is removed is made to separate the gold from it. The digging and washing are both effected by the same power—water. In many instances, where the material of these deposits is so compact as to resist the action of the water, a tunnel or drift is run in at the base of the mound, which is filled with powder—sometimes two or three hundred kegs are required for the purpose—and by means of a fuse exploded. Many hundred tuns of earth are thus crumbled and shattered, and so easily carried away by the hydraulic process. It is estimated that one fifth of all the gold of California is taken out by this process. The average price paid to miners in the hydraulic mines is $3 per diem, and the yield per hand varies from $15 to $30 per day.

BEACH MINES.

This class of mines is confined to the northwestern portion of the state, extending into Southwestern Oregon. They are located, as their name implies, directly on the coast. Geologists account for their origin on the hypothesis that ancient rivers carried down these auriferous sands, and deposited them in the ocean. Afterward, by some unheaval of nature, they were thrown up into elevated shores, or sometimes bold bluffs or promontories. These banks are now being reduced by the action of the waves, and the sand containing the gold particles is left on the beach by the receding tides. The prospecting is done after the ebb of the tide, and when a deposit is discovered the sand is gathered quickly by the ever-vigilant miners, and carried to high ground before the tide flows again. As a consequence, these mines are ever shifting, and where a rich haul has been made at one time, in twelve hours there may be no appearance of gold. After the gold bearing sands have been gathered in this way, they are usually packed on mules and carried to sluices, where they undergo the usual washings for purposes of separation. This style of mining is profitable, but the misfortune has thus far been that these gold-bearing beaches have fallen into the hands of a few owners, usually companies, who own stretches of miles together, and thus prevent that individual enterprise so essential to mining success. The daily yield of some of these beach washings runs from $5 to $15 per hand. The wages paid is about $70 per month. Owing to the continual wearing of these gold ridges, and the never-ceasing deposits by the tidal waves, the supply of gold from beach mining may be set down as unceasing.

TAIL WASHING.

This is simply rewashing the refuse matter of the sluices. The earth, sand, and gravel from the washing machines collect in great quantities, and frequently interfere with mining operations. Their removal is then made a matter of convenience, as well as wealth, for gold-bearing earth will frequently

pay after two or three washings. This branch of operations has been resigned principally to the Chinese.

GROUND SLUICING

is a process by which the superincumbent masses of poor gold-producing earth is removed from the richer substrata, by means of water. This process is almost identical with the hydraulic plan—the same agent being employed and the same result accomplished. The only difference is, the latter is confined mainly to the river bed and valley deposits, while the former is made use of only in favorable localities. Some of the claims worked upon this plan pay well, averaging from $10 to $20 per hand.

QUARTZ MINING.

The only other kind of mining operation carried on in California is that known as quartz mining. The mines of this description pierce the mountains and run far below the surface of the earth, following wherever the quartz veins or lodes may chance to lead. The ores of gold are imbedded in the rock, and, in order to extract them, the first operation after they are brought to the surface is that of crushing. This is done with the stamp mill. The ores are then roasted, and the pure gold obtained by chemical processes. The whole number of quartz mills now in operation in the state is not far from 500, running 5,000 stamps, and erected at a cost of $4,000,000. Great improvement has been made in the machinery of these mills during the last few years, and many of them have proved good paying investments. The majority of them are run by steam. Quartz ores yield from $15 to $40 per tun; the latter figure, however, is only reached by a few of the very first quality mines. The veins of ore are often pursued to a great depth. A lode in the celebrated Hayward mine has reached a vertical depth of 1,200 feet beneath the surface.—*Philadelphia Press.*

Sketches from the Late Paris Exposition.

Among the innumerable variety of chemical products and minerals at the late Exposition, it was gratifying to note so many substances which but a few years since, from their rarity, possessed merely a scientific interest, that are now manufactured at will and in large quantities. Wöhler discovered, in the silicate of alumina—pure kaolin—the metal aluminum, and St. Clair Deville, in 1854, first produced it on a large scale, and since then it is used for technical purposes. Although aluminum has not gained the importance which had been predicted for it from its great lightness, it is, notwithstanding, destined to play a conspicuous role in the arts. Cryolite, again, is a mineral which, for a long time known only to the mineralogists as a rarity, was first turned to practical account by Henry Rose. Since the discovery of heavy beds of the "ice-stone," an industry has been established in the extraction of soda and production of fluosilicic acid, a valuable substance, not to be disregarded in the refining of the crude beet molasses. The beautiful iron—free sulphate of alumina, manufactured in large quantities in Natrona, Pa., is being substituted generally for alum, which because of its property of holding a large amount of water of crystallization, increases the expenses of its transportation. The chloride of chromium, a magnificent violet substance, has been applied to the printing of wall paper, imparting a peculiar, beautiful aspect, hitherto unknown. The metal thallium, which was discovered by spectral analysis and exhibited in all its important combinations by Hopkins and Prof. Laury, is already employed by the latter as a substitute for lead, in the manufacture of glass, thus forming a new crude material in the preparation of highly refractory optical lenses, and of brilliant imitations of gems. The indium, exhibited for the first time in bars of several pounds' weight, will find use in pyrotechnics, and, perhaps, also in photography, more so than magnesium, on account of its emitting a chemically, very active light. The naphtaline of the gas works forms the starting point for the preparation of a new coloring principle, which, on account of its relation to the alizarim of the madder, has, with its compounds, found use in dying and printing. The camphor-like smelling sesquichloride of carbon, a substance theoretically important as forming a link between organic and inorganic chemistry, serves at present for the production of the beautiful aniline dyes, not to refer to its value as an antidote to cholera.

Vegetable bases, formerly to be found but in minute doses, were exhibited at the Exposition in enormous quantities. We found among them the rarest opium alkaloids and their derivaties, for the extraction of which at least three hundred pounds of veritable thebaic opium was requisite. The exhibited samples of brilliant crystallized strychnine would have been enough to poison a thousand persons, a single grain being sufficient to destroy life. Four thousand pounds of coffee beans, at least, must have been requisite for the extraction of the amount of caffein we met with. If many of the last mentioned chemicals have not yet gained any technical value, if many are only of pharmaceutical interest, they are nevertheless capable of giving an idea of the extent of technical chemistry and the state of an industry of a country, as their presence proves sufficiently what materials, apparatus, and knowledge must have been at the disposition of the respective establishments. Until a substance has left the laboratory of the investigator, it has no industrial importance; as soon, however, as it comes from the hands of the manufacturer, it is a representative of industy. Hence an enumeration of these preparations would give us an insight into the resources of a country, were the number not too great, nor too tiresome to be calculated. Also those bodies, the discovery of which belonged to a former century, regarded long enough as useless, will give a most brilliant testimonial as to the persistence of progressing science.

MESSRS. JACOBS BROTHERS of Columbus, Ohio, have sent us a specimen of large crystallized sugar, made from sorghum, without chemicals or bone filtration.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Efficiency of Small Fire Engines.

MESSRS. EDITORS:—In your paper of January 11, 1868, page 21, is an account of experiments made in Germany, to prove that small quantities of water thrown from little engines are very efficient for putting out fires. This subject has been understood and acted upon by a few persons in this neighborhood for years, and I now propose to do what I can to bring it into general use by comparing it with the workings of the "Extinguisher," as it is called, which has the past year been exhibited nearly all over the country.

I have no engines now which I care to sell and my motive is the same which prompts me to take my engine to a fire, to save property and prevent distress. I have no doubt whatever that the general introduction of small engines into fire departments, with steam fire engines, will result in preventing at least three fourths of our fires, and of lessening the rate of insurance an equal amount, that is, three fourths. I am sure this will be so when a new kind of engine, of which I intend to write to you soon, is brought into use with the small and the steam fire engines. At present, however, I wish to write only of small engines, and to address myself to the pump makers of the United States. A cast-iron pump can be made by any one, weighing no more than forty pounds, which will stand up when left alone, which can be put at first in a water pail and yet there can be fired from it by one man a perfectly steady stream of water three eighths of an inch in diameter that can be raised to a hight of more than thirty feet, and that water will put out more fire of any kind of wood, tar, kerosene, resin, or, in short, that of any fire, however made or composed, than any "Extinguisher" which has ever been exhibited.

I do not make this assertion without knowledge, but I have such an engine which has done this work, which has been to and extinguished fires quite equal to those described in your article of the German exhibitions, and from fifteen and more years of experience I tell you that the time has come when the people of this country should understand and act upon the knowledge that fires to be combatted successfully must be reached and fought sooner than they are now or will be by the steam fire engines, or by large man engines. Every person has had an opportunity of seeing the apparently wonderful power the "Extinguisher" has over fire. Your article of the German experiments proves that little engines throwing only cold water will, can, and did extinguish more fire than the "Extinguisher" has done. The building experimented upon in Germany was twice as large as those used here for the "Extinguisher" experiments, and only one engine was used for throwing water, while at the trials here half a dozen were always ready and from three to five used. And now will every maker of pumps engage in the effort to prove their great utility and efficiency for checking two of the great evils of our country, fires and insurance; fires first from their disastrous effects, and insurance from the everlasting strain upon the business portion of the people which it involves. A pump, such as I have described, with six feet of hose and ¾-inch pipe should cost at retail no more than twelve dollars, or to towns and cities in large numbers from eight to ten dollars. Will every pump maker make experiments like those in your number of Jan. 11th. They will be astonished, for the idea in this country has been that a stream less than an inch in diameter and a power of fifty men or steam were of no use to quell a fire with. And this is true. There are so few of them and it takes so long to put them at work, that the fire, increasing by geometrical progression, doubling its proportion and power every three minutes, has become uncontrollable before they have got well at work. Take the fire which destroyed the city of Portland, for example. People supposed it was one fire. At first there was one fire, and the great engines from every part of the city rushed to it. Before a stream of water had been thrown upon it from one of them, the burning shingles and sparks of the fire had been taken by the high wind which was blowing to other places and set six other fires, so that by the time that the first engine got water upon the first fire there were seven fires in the city in a gale of wind, and before the engines could be put at work upon them, they had in their time made more fires than there were engines in the city. The result we all know. Now let us suppose that there had been, beside the large engines, five hundred such as are described in your paper of the 11th of January, or as much better as a Yankee can make, and that they were equally distributed about the city, in the houses of careful and judicious working men, and that each one who could extinguish a fire before a large engine could be put to work should have five dollars. The six fires before spoken of when they were seen were no larger than a man's hat, and one of them could have been extinguished in half a minute. So of all the others. There would never again be a great fire like that at Portland after a common sense fire preventive system were adopted like that of our people who, when at war, used every means large and small, but vastly more of the last than the first, to destroy an enemy.

JOSEPH BIRD.

Mt. Auburn, Mass.

Things to be Remembered by Machinists.

MESSRS. EDITORS:—Believing the observance of the following points to be indispensable to good workmanship, I make no apology for submitting them to you. If they were carried out in every shop in the land we should have fewer complaints of slovenly workmanship:

Never turn a shaft without drilled centers. Never turn the body until the ends are squared to the center and to the length. Never allow a nut and bolt to pass that will not run down properly on each other. Never pass a nut that does not screw down fair on its seat. Never take the last cut on a thin casting, whether in the lathe or planer, without easing off the chuck or clamp that confines it. Never use a tool square across the face to rough-off with. Never attempt to work steel that is harsh from want of proper annealing; better carry it back to the smith and have it annealed properly than waste time and tools in doing what will be only a poor job. If you can buy good tools cheaper than you can make them, buy them.

E. P. W.

New York city.

The So-called Heat Shadows.

MESSRS. EDITORS:—Your correspondents, in attempting to explain the above-mentioned phenomenon in your number of Feb. 15, p. 101, overlook the true cause of the details they so minutely and correctly describe; it is not that heated and rarefied air transmits the light more perfectly, but simply that the deviation of the light from its naturally straight course, called refraction, caused by those surfaces of the heated and rarefied air when they are in contact with the colder and denser air. Descartes discovered, two hundred years ago, the law of refraction which governs the changes in the direction of light when passing from a rarer into a denser medium, or *vice versa*; the phenomenon in question is simply one of the consequences of this law of refraction of Descartes. Complete explanations of this law are found in all good text books on Natural Philosophy, to which I refer for further details. I will here only speak of it in so far as regards the case in question.

When light falls from one transparent medium perpendicularly on the surface of another, its direction undergoes no change; when it falls obliquely its direction does change, and this change in direction, or this refraction, is greater in proportion to the obliquity and the difference in the density of the two media. When now, heated air is in contact with cold air, and a ray of light passes from one to the other, and in falling on such a part where both the media are in contact, passes obliquely through the surface of contact, its direction must necessarily change. When a stove is surrounded by a layer of a transparent medium denser than the air, it would act similarly to a glass lens, and converge the rays; but the air around a hot stove being, on the contrary, expanded, rarer than the surrounding air, it will do the contrary thing, and diverge the rays; that means the light will be refracted outward from the stove, making the shadow of a hot stove larger than of a cold one. The light passing close along the stove will consequently be refracted in such a way that it will fall where other unrefracted light is falling, will reinforce it, and this is the cause of the lighter band, very correctly represented in the figure on page 101. The tremulous motions are simply caused by the continually changing position of the surfaces between the hot and cold air, consequent on the continuous upward motion of the hot rarefied and lighter air; the direction of the rays of light, when passing through such air, is therefore necessarily also continually changing—here increasing the light in one spot, there obstructing it from another; therefore these so called shadows are simply results of continually changing refractions, and are no more shadows than the image in the camera obscura, which also is a result of refraction by means of a properly adjusted glass lens.

By the same cause (refraction), the sun and moon appear, when rising or setting, one half degree higher than they really are, and may be seen in slowly changing forms, and even sometimes in vibration by a similar cause.

P. H. VANDER WEYDE.

Calculating Nominal Horse Power of Engines.

MESSRS. EDITORS:—I have seen the following rule for nominal horse power of the steam engine: Multiply the square of the diameter of the cylinder in inches by the cube root of the length of stroke in feet, and divide by 47, the quotient is the horse power.

Now, suppose we take two engines, each having 70 inches diameter of cylinder, one having 10 feet stroke, the other 5 feet stroke, and ascertain the nominal horse power of each:

$70^2 \times \sqrt[3]{10} \div 47 = 224{\cdot}6$ horses.

$70^2 \times \sqrt[3]{5} \div 47 = 178{\cdot}2$ horses.

Now, if the pressure of steam had been the same in these two cylinders, and both pistons moved with the same velocity, it is manifest that the powers will be the same, or nearly so. Yet, by this rule, they are made widely different; and if they are made so widely different, when the pressure of steam is supposed to remain constant, how would it be to use 40 pounds in one and 80 pounds in the other?

W. E. CRANE.

New Britain, Conn.

[It appears to us that two very important elements are left out of the above proposition—the pressure of steam and the velocity of piston.—EDS.

NEW ELECTRICAL BATTERIES.—M. Balsamo has presented to the French Academy a battery, both elements of which consist of iron, the one being immersed in a solution of chloride of calcium, the other in dilcted sulphuric acid, the two solutions being separated by a porous cell. The iron in the sulphuric acid acted as the positive element, and the other as negative. A constant and quite an intense current is obtained by this arrangement. Another novel battery, termed an "electric buoy," is now being experimented upon at Cherbourg. It consists of a zinc plate and a cylinder of carbon, attached to a cross piece of wood, having sea water as an exciting liquid. Still another variety is that of M. Miergue, of Bonfarik, consisting of a cylindrical cell of porous carbon, containing nitric acid, and an exterior cylinder of amalgamated zinc in a cell full of water.

ROHRER'S IMPROVED GUTTER BRACKET AND SUPPORT.

The engraving represents a method of securing eaves gutters to buildings whereby beauty and usefulness are both secured. The brackets, now usually merely ornamental appendages, are, in this device, made of use in supporting the gutter, while that service does not detract from their office as ornaments. The tops of the brackets—which may be made of any form desired—are hollowed to receive the gutter, the back edge of which is held in place by the projection of the

eaves, and the front by strips of metal secured to the front edges of the brackets, and provided with a hooked end to embrace the edge of the gutter. The result is a neat and secure device for supporting eaves gutters. The attention of builders and others is directed to this economical and efficient device. Territorial and manufacturing rights are for sale by the patentee.

Patented through the Scientific American Patent Agency, Feb. 4, 1868, by Jeremiah E. Rohrer, Rohrersville, Md.

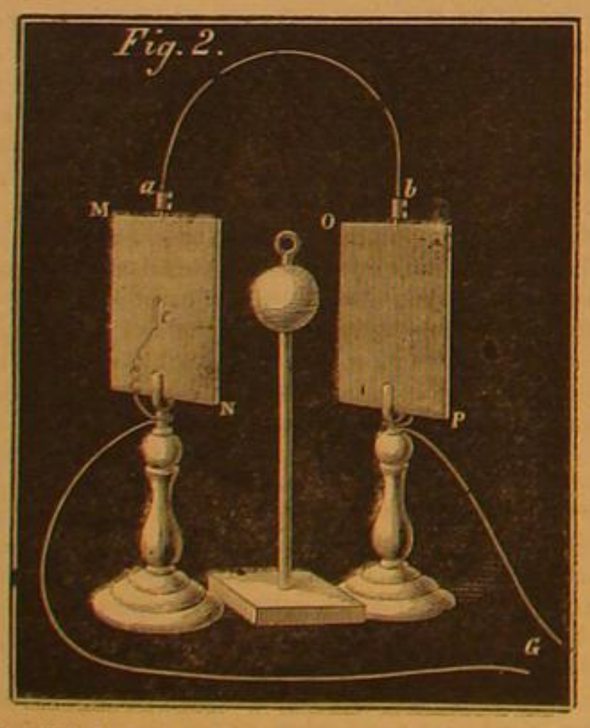
Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., F.R.S.

Lecture V.—Continued.

You see I have here two sheets of tin, M N and O P, one covered with lampblack, and the other uncovered. I place them facing each other, and I put this stand exactly midway between them. Now, I have a little device here—a telltale—

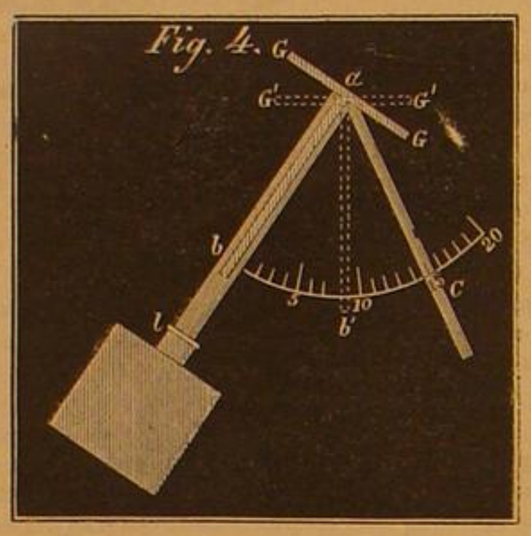


which will inform me which of these plates is heated. Suppose I heat this plate. Observe what occurs at the magnetic needle. I simply warm that plate by putting my finger upon it. The red end of the needle moves towards me. I cannot explain the wonderful power which moves the needle. It is what we call an electric current, and is produced by the union the two metals of the thermo-electric pile. When the plate is heated you see that a deflection of the needle is produced. The needle will return to zero when I withdraw my hand. I want you now to judge which of these two surfaces absorbs radiant heat most freely. The needle will not rest at zero unless these two plates are exactly at the same temperature. If one becomes warmer than the other the needle will deviate from zero. Thus we have it in our power to determine which plate absorbs heat most greedily. Now Mr. Cottrell will give me a ball of copper which is heated to redness. You observe it is radiating its heat as a luminous body radiates light [The red hot copper ball was placed equidistant between the two plates of tin, one of which was coated with lampblack. In a few seconds the needle of the pole began to travel from the zero.] Thus we prove that this surface coated with lampblack, which is the best radiator, is also the best absorber We might experiment with a variety of substances in this way, and prove that great differences exist as regards their absorptive powers.

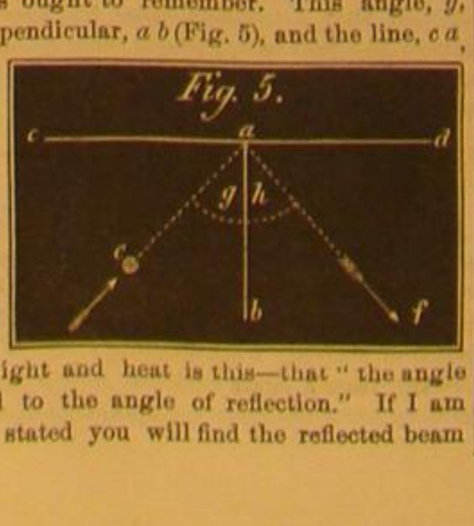
It is very wonderful what a slight and trivial thing will be sufficient to prevent the absorption of radiant heat. I have here an exceedingly instructive substance. It is a piece of paint given me by Mr. Hills, of the firm of Bell and Co. A portion of this paint is coated with gold leaf, and though the gold leaf is infinitesimally thin, it has been competent to protect the surface of the paint from the action of radient heat to which the whole thing was exposed, while the other part

of the surface, which was not covered with gold leaf, has become blistered. Where the gold leaf was present it prevented the rapid absorption of the heat.

I have here a sheet of paper covered on one side with iodide of mercury, a substance which has its color discharged by heat. On the other side of the paper there are certain figures represented by a thin coating of metal. I place the paper with the iodide of mercury side downwards; and over the other side I will hold a hot spatula which will radiate heat to the surface of the paper. Where the thin coating of metal is, the heat will be rejected, but where the paper is not coated the heat will be absorbed, and then it will reach the iodide of mercury on the other side and destroy its color. You will find that in this way we shall produce on the underside of the paper a perfect picture of the figures on the upper side, for you will find that the red color of the iodide of mercury will remain underneath the metal coating, for that coating has the power of rejecting the heat as the gold leaf rejected the heat in the other case, and so protected the paint and prevented its blistering. [The experiment was performed with a successful result.]

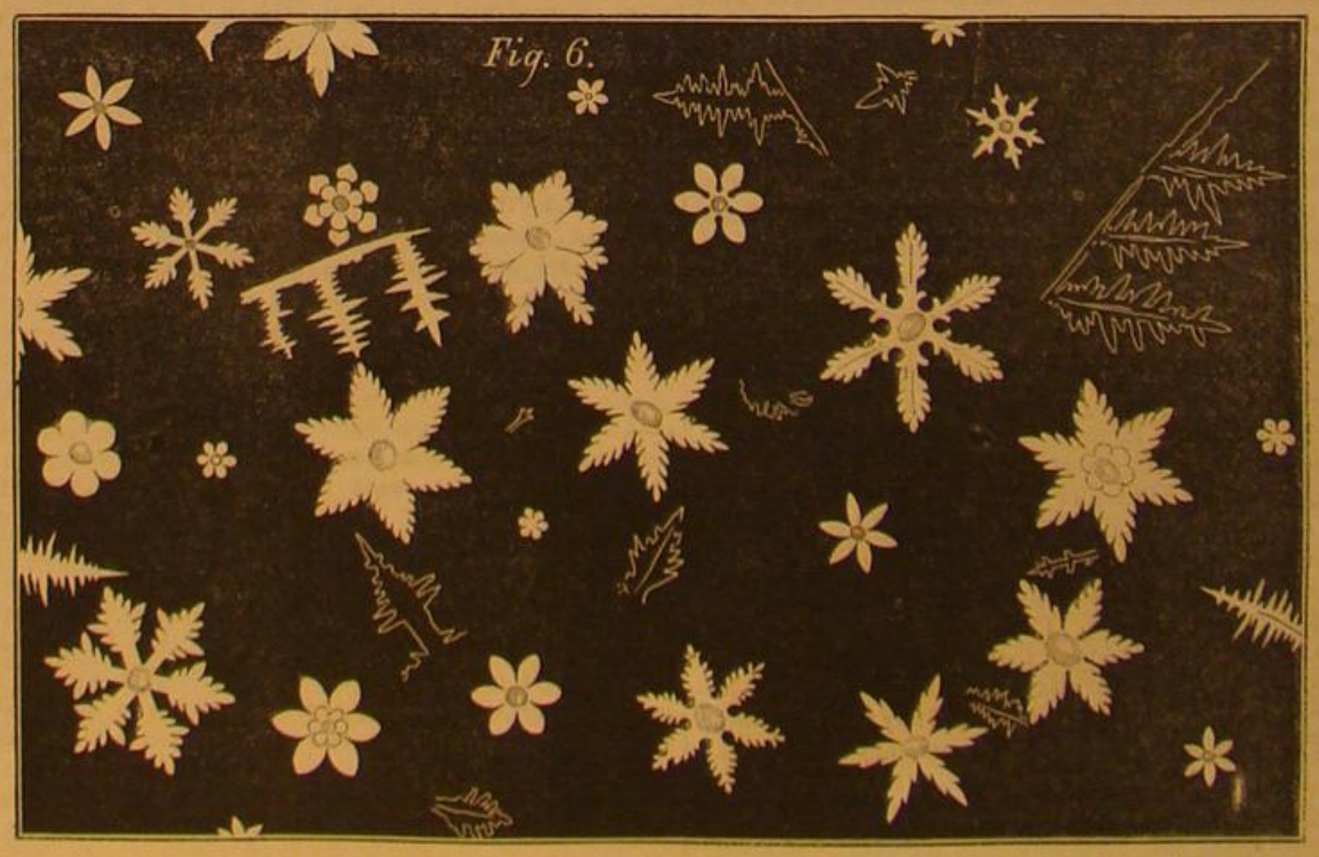


The radiation of heat obeys the same laws as the radiation of light, and it obeys the law of reflection due to light. This we can illustrate by means of our beautiful thermo-electric pile; but I will first of all make a single experiment that shall impress upon our minds the law according to which light is reflected. It is a very simple experiment, but I trust it will be very effective as far as regards the proof of the law. Mr. Cottrell, who knows my requirements very well, is now placing there in front a little looking-glass, G G. I intend to send a beam of light, *a b*, from the electric lamp, *l*, towards the mirror G G. The beam will strike upon the mirror, and be reflected. How? So that the reflected beam will lie as much on the left of this index, *a b*, which is perpendicular to the mirror, as the direct beam lies upon the right side of it. There are two terms employed in connection with this subject which the elder boys ought to remember. This angle, *g*, made between the perpendicular, *a b* (Fig. 5), and the line, *c a*, along which the direct ray goes to the mirror, is called the *angle of incidence*.—The angle, *h*, between the perpendicular *a b*, and the resected ray, *a f*, is called the *angle of reflection*: and the law as regards both light and heat is this—that "the angle of incidence is equal to the angle of reflection." If I am right in what I have stated you will find the reflected beam as far from the perpendicular on one side as the direct beam is from the perpendicular on the other side. I want now to prove the same with regard to radiant heat by a very rough experiment, and show you that it obeys the same law as light. I take this piece of tin, which will reflect heat, and hold it so that the radiant heat from this fire will fall upon it, and then be reflected, according to the law I have just mentioned, on to the face of the pile. I have no doubt that reflected heat will warm the face of the pile, and cause the needle to move towards me. We thus see that heat exhibits the same law in this respect as light.



I wanted to make one or two experiments more, and I wished to do so, as before, by means of our thermo-electric pile; but I find that the needle does not act freely although the pile does its duty. Hence I think I must tell you by my tongue what that needle, if it were in a proper condition, would have told you by its motion. I intended to make the needle my voice but it has become dumb. I wanted to show you that this thing we call radiant heat passes in very different degrees through different bodies. I wanted first to compare the passage of heat through glass with its passage through other bodies. I have here a piece of rough glass, and I have also a beautiful substance—a very common one, but to me more precious than the diamond, though the diamond is a beautiful thing. This substance is rock salt. This would allow heat to pass through it with perfect freedom, while the glass would cut it off. So with different liquids. I have here a liquid called bisulphide of carbon, and here I have some of the well known liquid called water. If I filled one cell with water and another with bisulphide of carbon, I should find that the bisulphide of carbon would transmit heat with great freedom, while the water would not transmit it at all. Water is, indeed, as regards heat, one of the most opaque bodies in nature to all but incandescent or luminous heat. It is a perfectly opaque body to all rays emitted, say from the surface of a boiling kettle, or from the heated cube, or from the cheek of the young philosopher who helped me in an experiment in the early part of this lecture. During the burning of Her Majesty's Theater the heat struck upon the windows of a club house opposite, and as the glass would not allow the heat to pass through, the windows became hot, and thus the glass was broken. Had those windows been composed of rock salt the heat would have passed through them, and they would have remained perfectly cool, although there might have been an efflux of the most powerful radiant heat. If time allows, I will show you in the next lecture that we can boil water by radiant heat passing through bisulphide of carbon, though the same heat does not boil the bisulphide of carbon through which it is transmitted, notwithstanding that bisulphide of carbon boils at a lower temperature than water.

I have told you that different bodies, both solid and liquid, possess the power of transmitting heat in different degrees. Now, the body which absorbs the radiant heat, instead of transmitting it, becomes warm by the absorption. Ice is a body which is exceedingly opaque to the rays of heat, but allows light to pass through with freedom. I intend to place a piece of ice in the path of a beam from the electric lamp, and which will be a mixed ray of heat and light. The ice will stop by far the greater portion of the radiant heat, and the heat will be lodged within the ice. But the temperature of ice cannot be raised beyond 32° Fahrenheit without the ice beginning to melt, so that the portion of the beam arrested by the ice will occupy itself in liquefying the interior of the



ice. It will liquefy the ice internally, and I want you to see the wonder and the beauty involved in this beautiful substance which you skate over every winter, but, perhaps, never think of. This beam of light and heat passing into the ice will dissect the ice and separate the crystals, and you will see the beautiful figures into which the ice resolves itself. The ice will break up internally into most beautiful flowers consisting of six petals. In order to enable you to see these figures I must magnify them very much, and for that purpose I shall cause an image of them to be thrown on this large white screen. The lamp is placed in the gallery to increase the distance from the screen, and so make the figures appear larger. Mr. Cottrell has a lens there, and he will now take a piece of ice, and make the surface smooth by putting it on a warm body, and then place it in the path of the

beam. The ice has been cut parallel to the plane of freezing from a block of the so-called Wenham Lake ice. It has been cut, I say, parallel to the surface along which the ice grows. [After a short time the image of the ice-flowers began to appear on the screen.] I do not know any experiment that I have ever made which is more delicate and beautiful than this. The flowers are growing larger and larger. First of all you see these leaves, and within you see a crimping. Those spaces which you see are spaces entirely devoid of air, for you know that the water occupies less space than the ice. The ice is larger than the water which formed it, and as the inner portions of this piece of ice melt, the water occupies less space than the ice, and a small vacuum is produced at that spot. This screen presents a glorious surface of ice-flowers. Every particle of ice is built up in this beautiful way. The ice has now become disintegrated, but I do not think your patience has been ill rewarded.

TURNING A MOVABLE WHEEL AROUND A FIXED WHEEL.

"How many revolutions on its own axis will a movable wheel make in rolling once around a fixed wheel of the same diameter?"

In the earlier stage of this discussion, the two-revolution philosophers found no fault with the terms of the original question, as above presented, but without any qualification took the position that our answer, "one," was an error, and theirs, "two," the only true and correct reply. One of these champions, referring to the terms of the question, says, "It seems impossible to conceive how it could have been more clearly put, and we think its propounder deserves great credit for its extremely direct and explicit language."

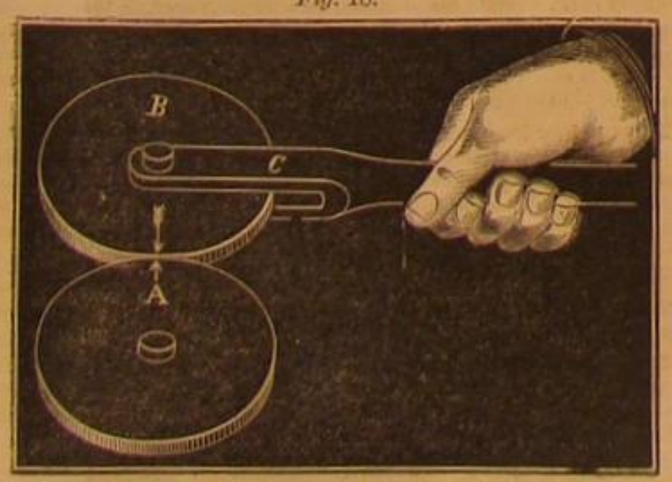
But as the discussion proceeds, the two-revolution philosophers appear to have become sensible of the necessity of attaching new conditions or explanations to the original question, in order to render their several positions tenable. One portion of them think that it ought to be expressly stated as part of the question, whether the axis is to be stationary, or is to revolve with the wheel; for if it revolves, the wheel will turn only once on its axis, but if stationary the wheel will turn twice on its axis.

To these we have replied that they might make the axis fixed or stationary, just as best suited them. In our view, the number of revolutions made by the wheel upon its own axis, will be precisely the same in either case, namely, one. Others of the dual philosophers deem it important that the word axis should be more explicitly defined. Some want the axle-tree, or journal on which a wheel ordinarily turns, to be defined as the axis. Others want the axis to be settled as being an imaginary point or line, drawn through the center of the moving wheel. To these we have answered that they might take their choice, as it did not affect the practical result, for the wheel will make the same turns on its own axis, whether the latter is defined as a point or a bearing.

With another portion of the two-revolution philosophers the daylight is beginning to dawn. They begin to see that unless the axial plane of both wheels is the same, all their mathematical calculations, postulates, theorems, astronomical references, and other supports, together with the dual conclusion based thereon, are likely to fall. They have been invited to answer explicitly whether the movable wheel in figure 11, made *one* or *two* revolutions upon its own axis; but have not yet responded. We also learn that our city two-revolution friends have been too modest to appear at the Printing Wheel Manufactory to claim their prizes, worth $10 each, deliverable on showing that the printing wheel turned twice on its own axis in rolling once around a fixed wheel of the same diameter. Perhaps they did not wish to bankrupt the correspondent who made the offer, by carrying off his entire stock in trade.

Here is a diagram of a little contrivance on the same principle as the printing wheel which any two-revolution philosopher, residing at a distance may readily construct. B is a

Fig. 18.



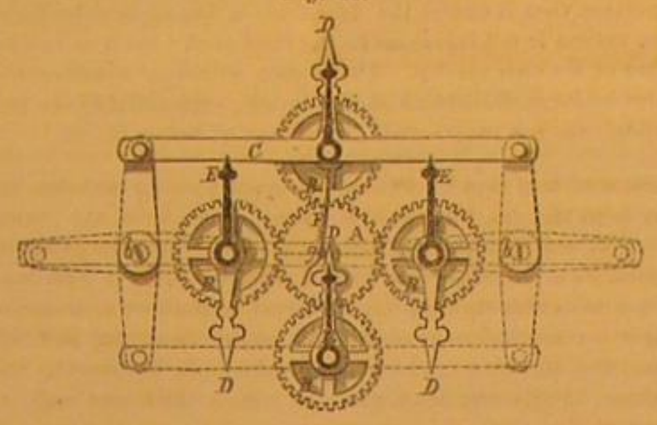
wheel set in a forked handle, C. Now roll B once around a fixed wheel, A, of same diameter, such as a table leg or a bottle and if you succeed in making B turn more than once upon its axis, then come to town with confidence and take home one of the $10 prizes offered last week.

We have lately made count of the wheel letters, and find we have some five hundred on hand; and still they come. We beg to remind correspondents that there are many other interesting topics that should engage their attention; and for fear that all their ideas will turn into wheels if the discussion is prolonged, we feel under the necessity of now moving the previous question. Those of our way of thinking will say "one." Contrary minds "one and a quarter," "two," "three," or "four," according to their several positions. Except for some novel or interesting comment we propose with the present number to dismiss the subject.

To the many esteemed correspondents who have taken part in the discussion we return our thanks for the candid and courteous manner in which they have presented their views.

MESSRS. EDITORS:—I think in counting the revolutions of a wheel on its axis from a pointer indicating its axial line, said pointer should not be allowed to revolve (as in W. E. H.'s model) but should always point in the same direction, say to one of the points of the compass. The mere changing of its position is no reason why it should change its direction. On referring to the accompanying diagram, it will be readily seen that the movable wheel, B, makes two revolutions on its axis while passing around the fixed wheel, A, once, its pointer, D, having been in conjunction with the pointer, E, indicating the axial line twice during its circuit.

Fig. 19.



I would add that the fact of the movable wheel winding the end of a string around itself only once while performing its circuit, the other end being held across the center of the fixed wheel, is not a proof of one revolution, as some of my "one revolution" friends will have it, but a distinct proof of two revolutions, which I think I can make clear by the following illustration.

It being conceded that the moon makes a revolution on its axis while passing around the earth, we will suppose one end of a line fastened to the moon and the other end held on the earth. How many times would the moon wind the line around itself while passing once around the earth? We must answer, *no times*. Now suppose that by some cause it made two revolutions instead of one on its axis, how many times would the line be wound around on completing a circuit. We now answer once, of course, consequently proving "two revolutions" instead of "one."

Two miter wheels, one fixed and the other held in position by means of an axle fastened at right angles to the axle of the fixed wheel and made to revolve around it in gear with the fixed wheel, seems to be regarded as an illustration of the "one revolution" theory. I think it should not be noticed in connection with this question, it being in fact but a wheel rolling on a plane, describing a circle of its own diameter, the plane of the wheel being at right angles (or nearly so) to the plane on which it rolls. A. W. BROWNE.

Brooklyn, N. Y.

A. W. B.'s letter was accompanied by a very neat model, of which the diagram, Fig. 19, is a view. A fixed wheel, B, movable wheel, and C, a bar-carrier, which conveys the wheel, B, around A. The ends of bar, C, are pivoted upon wrists, *b*; the dotted lines indicate different positions of C. D, index attached to B; E, index attached to bar, C; the center pin of E forms the journal or axle on which B turns.

This device differs not essentially from those presented by W. E. H., pages 150 and 166. In all of them that portion of the carrier which supports the movable wheel has the axis of motion at the center of the fixed wheel. In Fig. 19, the movable wheel makes one revolution on its own axis in rolling once around the fixed wheel, as may be readily proved by extending the cord, F, from *g*, to the movable wheel on which the cord will wind once. But A. W. B. appeals to the moon and earth to prove that, because a cord from a fixed wheel to a moving wheel winds once, therefore the latter turns twice on its axis. As neither of the bodies on which he depends are fixed, we submit that his appeal cannot rest.

Having called A. W. B.'s attention last week to Fig. 11, in which the one revolution of the moving wheel upon its own axis is isolated, and made distinctive, our correspondent, it will be observed, declines to attempt to apply his two-revolution doctrines thereto.

MESSRS. EDITORS:—While the learned are demonstrating that a wheel revolving around another of the same size, the latter being fixed, will turn on its own axis twice, will you permit an unlettered farmer to have his say? I have carefully studied the diagrams on page 106, present volume, and, notwithstanding the apparent clearness of the demonstrations, I can demonstrate their fallacy thus: Postulate, attach one end of a cord to the rim of a wheel, and the other end to a fixed axle projecting from the center of the wheel, and the cord will be wound once around the projection at each revolution of the wheel, on its own axis. Now, any one can see, by experiments, or by a careful study of the diagram of Mr. Hepburn, that such a cord would be wound but once around the supposed projection, while the wheel was passing once around its fellow. *Ergo*, the wheel made but one revolution on its own axis. WM. BASSETT.

Birmingham, Mich.

P. S.—Of course these gentlemen will find out, in due time, that one of the revolutions of the wheel is not on its own axis, but on the axis of the fixed wheel. N. B.

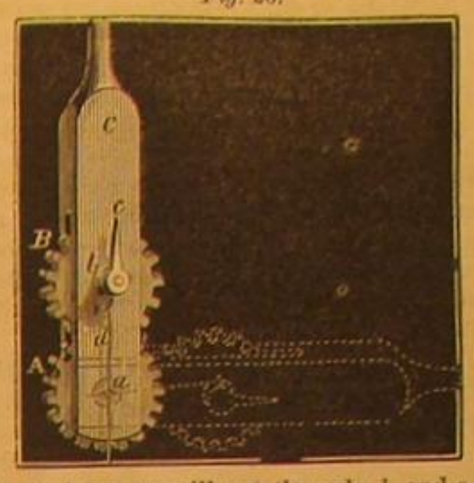
MESSRS. EDITORS:—The "wheel problem" has probably excited more thought and investigation, and will end in more benefit to a large class of your readers than any similar question started in your paper for years. With a simple model it is not difficult to convince nine out of ten that the wheel revolves twice on its axis in rolling once around the fixed wheel, and very difficult to convince them that the axis being carried around the circle with the revolving wheel neutralizes one half the apparent result, showing the revolution on its axis to be "once." The writer is not, therefore, "astonished at your patience" in keeping the question *open*, the result of which will be to *open* the eyes of many o your readers, and also to increase your subscription list.

INVESTIGATOR.

West Pittsfield, Mass.

MESSRS. EDITORS:—I am searching for new and important principles in scientific knowledge, and at first I did not see the benefit that could possibly be derived from the discussion of the wheel question. But, now, I really think I see the point; and I conceive it to be in the center of the fixed wheel in the form of a pivot, *a*, upon which we will place a lever,

Fig. 20.



C, fixed to the lever we will put the axle, *b*, and a pointer, *c*. Now we will place upon the axle the movable wheel, B, and we are ready for the original question, to which we shall pay special attention.

How many revolutions will a movable wheel make rolling *around* a fixed wheel? Around is the word that governs the answer, and signifies moving in a circle. Every circle has a center—no matter if it is only imaginary—and for the benefit of my many friends, I have provided the lever with a convenient handle to the center of the fixed wheel, so they can all take hold and roll the movable wheel once around the fixed wheel, and then they will be able to decide by carefully watching the change of position of the pointer, how many times the movable wheel turns on its own axis. I am for "one." L. J. COHOON.

Whitesville, Ind.

MESSRS. EDITORS:—I would like to ask you just "one" question about the "two" wheel problem. If you should slide (not revolve) the movable wheel entirely around the fixed wheel, would the movable wheel make a revolution, or any part of a revolution, upon its axis?

What a tempest you have raised upon this subject. The old and the young are in a jangle over it. The unmarried of uncertain ages still adhere to "one." The pretty young ladies declare they *must* be "won." Under your lead the "ones" have it. Their hope is in *you*, and, like Sumner, their cry is, "Stick," that "one"-ders may not cease.

Woburn, Mass. R. W. P.

MESSRS. EDITORS:—We have tried the wheel experiment repeatedly, looked at it in every possible light, and have finally come to the conclusion that you are right. This is the universal verdict of many persons here. To the superficial observer it would appear to make two revolutions, but upon trial I can readily see that the movable wheel makes but one revolution on its own axis, and one revolution around the center of the fixed wheel. T. D.

Mt. Lebanon, N. Y.

Bringing the Wheel Question to a practical issue:

MESSRS. EDITORS:—I have always held that a movable wheel makes but one revolution *on its own axis* in rolling once around a fixed wheel of the same size. I have borne the assaults and researches of the "two revolution" party with commendable patience. I have been kept out of bed until two o'clock in the morning quietly answering objections. My plate has been revolved until my pork and beans were cold. My biscuits have come to table lined and figured, evidently with a piece of burnt wood. Bridget has complained of a mysterious disappearance of sauce-pan lids. My sulky wheels have several times been removed. Yesterday, however, my equable temper broke down, when one of the "two revolutionists" brought the *moon* into the discussion. Now I take notice that when one calls the moon to his assistance he is in a bad case. For example, when a man tries to convince me that the moon is made of green cheese, he is a fool, or takes me for one. The old woman, who tried to dissuade her son from Sabbath breaking by citing the shocking example and punishment of the "Man in the Moon," was at fault both in religion and science. Messrs. Editors, that old woman is not dead yet. In short, I am a plain, matter-of-fact man, and consider all those kinds of celestial appeals, come they from professor or pedler, as mere moonshine.

This question can be brought to a practical issue: If a *whole* wheel makes *two* revolutions in rolling once around a fixed wheel of the same size, a *half* wheel must make *one whole* revolution in rolling half way around a fixed wheel of equal diameter. A corduroy road and a wheel-barrow having but a half wheel, will furnish the apparatus to try this on. See sketch, which explains itself.

Any one wishing to try the experiment may address

JOB STUBBS.

Practical Lodge, Western Wilderness.

Fig. 21.

WHEELER—"*Two* Revolutions, or *One?*"
WHEELEE—"*Oh! ONE!*"

The Saline Springs of Onondaga, N. Y.

The brine from these springs results from water penetrating immense subterranean deposits of rock salt, made by the natural evaporations of salt water lakes, like the Great Salt Lake, Caspian Sea, etc., which lakes existed in geological periods millions of years ago, the basins forming them being afterward covered up by later deposits. They belong all to the upper silurian era, and are at such great depths that they are perhaps inaccessible to man, but the way the salt is obtained there is so economical that it is far superior to the quarrying done in dry salt mines; it is simply pumped up in solution through comparatively narrow and inexpensive tubes. When we take in consideration that most of the natural rock salt has to be dissolved, filtered, and recrystallized, we see here that nature has done the dissolving and filtering, in fact the brine in Syracuse is so clear that a simple evaporation, either by fire or solar heat, is sufficient to produce a superior article of table salt.

The state owns the springs, pumps up the water, chiefly by the water power of that part of the Erie canal passing through Syracuse, and sells the brine to the manufacturers of the salt. The total quantity of salt obtained in Onondaga county since 1797 is not less than 200,000,000 bushels, half of which was obtained during the last fifteen years. Each bushel contains 56 pounds of salt. Taking now in consideration that one cubic foot of solid salt weighs 140 pounds, 15 cubic feet make a tun. The amount of salt, therefore, removed during the seventy years that the springs have been in operation amounts to 5,000,000 tuns or 80,000,000 cubic feet of solid salt. This would form a single excavation in the earth of about 450 feet long, wide, and high; but the salt is not all removed in one breadth and the excavations are certainly distributed irregularly, over a large extent of subterranean territory. As the brine contains about 15 per cent of salt, it took seven times that amount of water to dissolve it; 560,000,000 cubic feet or 5,000,000,000 gallons of water have therefore all been evaporated by the heat applied during seventy years, and probably more, as the brines formerly used were not so strong by far as those obtained later by boring to a greater depth.

Editorial Summary.

Greek Fire.—In anticipation of further Fenian demonstrations, a memorandum relative to the treatment of nitroglycerin and Greek fire has been issued in England by order of the Home Secretary. Of the former explosive, the simplest mode of disposal recommended is to sink the containing vessels in deep water without attempting to open them. True Greek fire, it says, is simply a solid, highly-combustible composition, consisting of sulphur and phosphorus dissolved in the bi sulphide of carbon, to which occasionally some mineral oil is added, with the view of increasing its incendiary powers. When the liquid is thrown on any surface exposed to the air, the solvent evaporates, leaving a film of the phosphorus or sulphide of phosphorus, which then inflames spontaneously. The proper mode of extinguishing such a fire is to throw damp sand, ashes, sawdust, lime, or any powder, wet sacking or carpeting, in short, any material which will exclude the air from the fire. No attempt should be made to remove the covering for some time after the flame has been extinguished. The place should afterward be thoroughly washed by a powerful jet of water forced upon it.

Concerning Frozen Potatoes.—Dr. Adolph Ott, a frequent contributor to these columns, has been examining frozen potatoes for the purpose of confirming or disproving the truth of the common theory that the sweet principle of frozen potatoes is due to the conversion of starch into sugar. After a long series of experiments he concluded that this sweet principle was caused, during the freezing and thawing, by the sap bursting the cell and thus destroying vitality; at the same time decomposition sets in, which, though retarded by the cold, is not entirely arrested; the more so as at the season most likely to freeze, and especially during a snow storm, there abounds that powerful oxidizing agent, ozone. The outer portions, no doubt, are first attacked by it, and may thus be transformed into diastase, a body possessing the power of converting a comparatively large quantity of starch first into dextrine, and then, at the temperature of 140° to 170° as in the process of cooking, into sugar.

Observing the Bessemer Converter Flame.—At the Atlas Steel Works, Glasgow, a very neat contrivance has for some time been used for enabling the observer to determine the point when the combustion of the carbon is completed. A square thin frame contains a combination of colored glasses, for instance, one dark yellow and two blue, or any other colors giving together a very dark neutral tint. Looking at the flame through these glasses affords the double advantage of preserving the eye from unpleasant effects of the intense light, and of making all smoke and other disturbing changes invisible. The flame, when thus viewed, looks white so long as the intense brilliancy due to the burning up of the carbon continues, but changes to a deep red at the moment all the latter has been consumed.

Utilization of Spongy Cellulose.—In the process of making paper from wood, as practiced in Europe, round disks of wood are first subjected to the action of hydrochloric acid to dissolve out the spungy cellulose. This latter has, until lately, been a waste product, but is now converted into alcohol in this way: The wood is boiled for twelve hours in hydrochloric acid, diluted with ten times its volume of water. The acid liquid, which is charged with grape sugar formed from the spongy cellulose, is then withdrawn, the excess of acid saturated with lime or chalk, and a small quantity of yeast is added, the temperature being kept at about 68° Fah. Fermentation soon ensues, and when bubbles of carbonic acid gas are no longer evolved, the liquid is distilled to obtain the alcohol.

The Poison of Rattlesnakes.—A Philadelphia physician, Dr. S. W. Mitchell, has been experimenting upon the venom of rattlesnakes, and concludes that there is no antidote to the poison, the remedies usually applied being nearly or entirely useless. Carbolic acid applied externally sometimes delays the result merely by affecting the local circulation. He has also confirmed the general belief that the poison is absolutely innocuous when swallowed, it being incapable of passing through the mucous surfaces; also that it is so altered during digestion that it enters the blood as a harmless substance. The venom is not injurious to the rattlesnake itself or to any other of its own species. The doctor attaches considerable value to large doses of alcoholic liquors, especially where the patient was not intoxicated at the time of being bitten.

Smoke from Gas Lights is not usually occasioned by impurity in the gas, but the evil arises either from the flame being raised so high that some of its forked points give out smoke, or more frequently from a careless mode in lighting. When we suddenly open the stop cock and allow a stream of gas to escape before applying the match, a strong puff follows the lighting and a cloud of black smoke rises to the ceiling. Daily repetition gives in time a blackened wall.

Gardiner, in his "Music of Nature," asserts that dogs in a state of nature never bark—they simply whine, howl, and growl. The Australian dog never barks, and Columbus found that the dogs he had previously carried to America had lost their propensity for barking. This peculiar explosive seems to be an acquired faculty, which the animal derives from his associations with man.

Tiers-Argent.—This beautiful white alloy, first made by Talourcau, consists of two thirds of aluminum and one third silver. It is now made perfectly homogeneous, and is easily fabricated. Its hardness and lightness are valuable qualities in table furniture. Spoons, forks, goblets, and salvers made of this material are rapidly coming into use in Paris.

Leuwenhock has computed that 100 single threads of a full grown spider do not equal the diameter of the hair of the beard, and when the young spiders begin to spin, 400 of them are not larger than one of a full growth, consequently 4,000,000 of a young spider,s threads are about the size of a single hair of a man's beard.

M. Salverte, in his work on the occult sciences, shows the probability that the ancients defended their buildings from lightning by conductors, and that the Temple of Solomon was thus protected.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

A bill to incorporate the Idaho, Oregon and Puget Sound Railroad Company has been introduced in Congress, petitioning for power to build a railroad from a point on the Union Pacific 113° 30′ west longitude, north to Snake river valley, thence northwesterly to Columbia river valley, thence to Portland, Oregon, and finally to Puget Sound. The company ask for every alternate section of public non-mineral lands to the amount of twenty alternate sections per mile on each side of the railroad line; also, United State bonds to the amount of $16,000 and $32,000 per mile for level and mountain routes respectively. A branch road is to extend to Montana.

One of the furnaces of the Crane Iron Company, at Catasauqua, Pa., lately turned out two hundred and forty tuns of iron in one week; a yield scarcely ever equalled in this or any other country.

The only coal mines which last year were worked within the limits of the Pacific territory, were those of Bellingham Bay and Monte Diablo, while the amount extracted was but 8,816 tuns from the former, and 71,322 from the latter, making a total of 80,138 tuns, against a product during the preceding year of 90,000 tuns. At the Monte Diablo mines increased facilities for transportation to tide water have been created by the construction of railroads, and it is expected that the beneficial results of these improvements will be felt another year.

A well of naphtha has been discovered at Kudaca, in the Caucasus, by boring. The liquid was first struck at a depth of 274 feet from the surface, and the yield for several weeks was at the rate of 1,500 barrels a day. Since then a fresh source has been met and a jet of naphtha, four inches in diameter, rises with great force to the hight of forty feet above the ground, affording a supply of 3,000 barrels daily.

The famous Thames tunnel, which for the twenty-five years since its completion has proved an indifferent speculation, is at last to be made of some practical use. It is stated that two railroads on opposite sides of the river propose forming a junction by means of this subaqueous passage-way, and will make gradual entrances a mile distant from either bank. The original cost of the tunnel was over $2,000,000. It was sold a few years ago for one half that amount, and even at this sacrifice the purchasers have found it to be a very unfortunate investment, the receipts, principally tolls from foot passengers drawn thither by curiosity, averaging but $125 per week, which have been entirely consumed by expenses. Under the railway management, the tunnel may possibly become a pecuniary success.

The manufacture of salt commenced in the United States at Syracuse, in the year 1797, since which time this locality has produced eighty millions of bushels. Last year's yield amounted to 10,000,000 pounds, or about two thirds of all the salt consumed in this country. A correspondent writes that salt of excellent quality is manufactured in Oneida county, Idaho Territory.

The citizens of Minneapolis are very much concerned over the unpleasant fact that the Falls of St. Anthony are receding up stream at the rate of three hundred feet per year. All efforts to prevent this stampede of the rapids, by protecting the ledge, have proved insufficient, and the inhabitants are fearing the total destruction of the water power upon which their prosperity depends, and the consequent degeneration of the city to the rank of a mere village.

The iron and steel works at Birmingham, Conn., used 4,000 tuns of scrap last year, making 3,500 tuns of finished iron, 350 tuns of imported steel in carriage and truck springs, and made 1,000 tuns of iron into axles of all grades and styles.

MM. Carver & Co., of St. Etcinne, France, have successfully utilized the gases given off in converting bituminous coal into coke. These gases are collected, drawn off into pipes, and cooled. From the liquids, condensed benzine, naphtha, sulphate of ammonia, and several dyestuffs are made; the uncondensed gas is used for illuminating purposes.

An establishment in Vienna manufactures knives from tungsten steel, which are so hard as to cut glass like the diamond.

A singular gas explosion in an oil well is reported in the Titusville *Herald*, the like of which, it says, has never been known in the oil regions. While drilling an oil well, near Enterprise, the tools broke through the second sand rock into a crevice where an immense quantity of gas had collected. Thus liberated, the gas rushed out with a loud rumbling sound, tearing out the driving pipe and throwing it upward into the derrick. A loud explosion ensued on the gas becoming ignited from the fire in the engine, and the derrick and engine house were both destroyed.

The manufacture of starch from potatoes is extensively carried on in the Northern and Eastern States. A single firm in New England consumed 25,000 bushels of potatoes for this purpose in 1867.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Watches.—George Frederick Roskopf, Chaux de Fonds, Switzerland.—This invention relates to an improvement in the construction of watches, which consists in having that portion of the mechanism of a watch known as the "escapement," fitted or attached to a plate or frame separate from the frame in which the "train" or other portion of the movement is fitted, the plate or frame to which the escapement is fitted being attached to the frame of the train in such a manner that it may be readily detached when necessary, and any of the known escapements, on a similar detachable plate or frame fitted or applied to the other portion of the movement. It also consists in constructing the detachable plate in such a manner, or arranging the several parts comprising the escapement on said plate in such a way that the 'scape wheel may be readily adjusted in a proper relative position with the pallets or other part or parts which work in contact with the teeth of the 'scape wheel, the detachable plate being secured to or in the frame which contains the train, or part of the watch movement, in such a manner that it may be adjusted so that the pinion on the 'scape wheel axle may always be adjusted properly in gear with the wheel of the train in which it is designed to work.

Manufacture of Hats, Caps, Bonnets, Neckties, and Ribbons.—Treflé Garceau and Edward de la Granja, Boston, Mass.—This invention consists in combining paper pulp, india rubber, and paraffine in certain proportions, and thereby forming a composition peculiarly adapted to the manufacture of hats, caps, bonnets, neckties, ribbons, and other similar articles.

Cultivator Tooth.—M. F. Lowth and T. J. Howe, Owatonna, Minn.—In this invention the tooth is hinged, and provided with a brace, by which the angle of the tooth with the ground can be regulated, and which also operates to prevent the breaking of the tooth or beam by obstacles in the way of the cultivator.

Animal Trap.—Major B. Marshall, Draw Bridge, Md.—This improved trap is designed particularly to catch animals that travel in paths or leads, and the invention consists in so constructing it that it can be more easily sprung, and will more effectually secure the animal than will the traps hitherto in use.

Fluid Meter.—Leicester Allen, N Y city.—In this invention a piston is balanced by a spring in such a manner that the piston, actuated by the flow of the water, will open a valve and give free passage to the water as long as there is no back flow, and when there is any back action will close, or partially close the valve and stop the flow. A registering apparatus records the amount that has passed through the valve.

Cotton Seed Planter.—A. J. Going, M. D., Clinton, La.—This invention relates to a machine for planting cotton seed, and consists in a peculiar construction and arrangement of parts pertaining to the seed-distributing apparatus, whereby the seed may be sown with certainty and without the liability of the hopper becoming choked or clogged. It also consists in using in combination with the seed distributing apparatus above alluded to a furrow opener and seed-covering device.

Holder for Razor Strops.—George Scott, Steubenville, Ohio.—This invention relates to a holder for razor strops, and to the manner of securing the strop thereto, and consists in making the holder of a metallic spring band, curved or bent in the direction of its length, within the strop, extended between its two ends and there secured, at its full tension or thereabouts, and also in so bending the ends to the band that the strop can be secured thereto without the use of rivets or any additional fastening devices of any nature.

Knitting Machine.—Henry Bogel, Watertown, Wis.—This invention relates to a knitting machine for making plain knit fabrics of any number of stitches. It is of very simple construction, works almost without any noise, and can be easily taken apart for the purpose of removing or replacing needles, and for repairing and cleaning the whole machine. Two sets of needles, each working independently of the other, are arranged in the machine, of which both or either one may be operated at a time, and thus one or two pieces of fabric may be knit at once.

Wind Wheel.—Wm. C. Day, Mohawk, N. Y., and P. B. Day, Shelby, Mich. This invention relates to a wind wheel of that class in which vertical wings or sails are employed, and the wheel enclosed within a box provided with doors, by opening or closing which more or less wind is admitted to the wheel, and the speed of the same regulated as desired, and by closing the doors the motion of the wheel entirely stopped. The invention consists in the application to the doors of the box which encloses the wheel, of a chain or cord connected with a windlass, and arranged in such a manner that by operating the windlass all the doors of the box may be opened and closed simultaneously, and the wheel kept running at a uniform speed, or stopped entirely, when required, with the greatest facility.

Subsoil Attachment for Plows.—Charles Hayden, Collinsville, Conn.—This invention relates to a mode of attaching a subsoil plow or share to an ordinary plow, whereby the share may be adjusted, raised, or lowered, with far greater facility than hitherto,—readily detached when not required for use, so that the plow to which it is applied may be used as an ordinary plow; be simple in construction and capable of being manufactured at a small cost, and be of light or easy draft.

Folding Bow Dish for Spring Balances.—Richard Murdock, Baltimore, Md.—In this invention the dish or platform upon which the articles are placed to be weighed by a spring balance is supported at its four corners by arms bowed or curved outward and so arranged that they can be readily fixed in position or not, and when not in use, can be folded together upon the dish so as to occupy but little room.

Frame for Hop Vines.—Abram Shoemaker and Wallace Phelps, Concsville, N. Y.—This invention relates to a useful improvement in the construction and arrangement of frames for training hop vines.

Hop Picking Tool.—John Dean, Baraboo, Wis.—This invention relates to a new device for picking hops from the pole, and consists in the use of a rake with curved tines and with cutters at the ends which serve to cut the vines as the tool is drawn along the pole.

Hydrant Fire Plug.—T. R. Bailey, Jr., Lockport, N. Y.—This invention relates to a method of constructing fire plugs or hydrants, and the invention consists in operating a cylinder valve in a suitable case and in the arrangement and combination of parts connected therewith.

Machine for Coiling Springs.—John Freeland and Daniel Ward, New York city.—This invention relates to a machine for coiling patent volute and other similar springs while hot, and consists in a frame constructed with head and tail blocks like a turning lathe having suitable driving gear and an adjustable spindle or mandrill around which the spring is coiled.

Bridge.—Frederick H. Smith, Baltimore, Md.—This invention has for its object to improve the construction of bridges so that any desired part of the bottom chord can be readily adjusted to tighten or loosen any desired part of the bridge or to allow any desired part of the woodwork to be removed and replaced.

Angular Shaft Coupling.—John M. Case, Athens, Ohio.—This invention has for its object to furnish an improved coupling or gearing for connecting shafts to each other at any desired angle which shall be so constructed and arranged as to securely couple the shafts, run with less noise, and with less friction than the ordinary bevel gearing, and which shall at the same time require less material for its construction.

SASH BEAD FASTENER.—Daniel W. Dyer and James H. McVaugh, Philadelphia, Pa.—This invention has for its object to furnish an improved means for removably securing sash beads to the casing which shall be simple in construction, easily attached, and easily operated.

LUBRICATING BOX FOR CRANKS, ETC.—T. J. Rowley and Wm. Poland, Chillicothe, Ohio.—The object of this invention is to feed the oil for lubrication of cranks, crank pins or wrists, and journals, in stationary bearings.

ROLLING IRON, ETC.—W. P. Porter, Pittsburgh, Pa.—This invention relates to an improvement in rolling iron and other metals in the form of railroad axles and other metal bars.

ANVIL CUTTER.—Valmore A. Dunn, West Peru, Me.—This invention relates to an anvil cutter, and consists in a pair of shears one jaw of which is fixed by an arm with a block or anvil, and the shears are thrown open by a spring.

BASIN WATER COCK.—Robert P. Ross, Bethlehem, Pa.—This invention consists in arranging a drop valve with an elastic face which is operated by a screw whereby all leakage is prevented.

WELL BORER.—George W. Bowen, Fort Wayne, Ind.—This invention relates to an implement for the boring or sinking of wells in quicksand, or for cleaning out wells; it is of such a construction as to enable the work to be done with great rapidity, facility, and safety, and in the most satisfactory and perfect manner.

COTTON-BALE TIE OR HOOP LOCK.—E. S. Roberts, Columbus, Ga.—This invention consists of a metallic box of quadrilateral form, having an open outer side to receive the ends of the hoop, which are bent so as to form loops through which and the sides of the box metal pins pass and firmly connect the ends of the hoop together, the box, under the expansion of the bale when relieved of pressure, sinking into the bale so that the ends of the hoop, which are secured in the box, will not project out beyond the side of the bale.

IRON AND STONE RAILROAD TRACK.—Dominicus N. Clark, Eastport, Me.—This invention has for its object to furnish an improved railroad track, superior to those now in use in durability and safety.

SCHOOL DESK.—Rev. R. Cruikshank, Lawrenceville, N. J.—This invention has for its object to improve the construction of the school desk patented by the same inventor May 24, 1864, and numbered 42,859, so as to make it more convenient and satisfactory in use.

CAR MOVER.—H. B. Morrison, Le Roy, N. Y.—This invention has for its object to furnish an improved machine by means of which freight cars may be easily moved about in the freight house, for convenience in loading or unloading them.

DOVETAILING MACHINE.—Robert Woli, Burlington, Iowa.—This invention relates to a machine for dovetailing the side pieces as well as the front and back pieces of drawers, boxes, and other articles, and consists of two parts, one for sawing the side pieces and the other for chiselling the front and back pieces.

PHOTOMETER.—H. Vogel, Berlin, Prussia.—The object of this invention is to determine with exactness the time required for copying photographic negatives.

CUTTING AND CARVING MACHINE.—Isaac Hall, New York city.—This invention has for its object to furnish an improved machine by means of which any desired design or pattern may be cut or carved upon ivory, wood, stone, metal, or other suitable substance.

PETROLEUM STOVE.—Daniel Kellogg, Jackson, Mich.—This invention relates to a stove for burning petroleum or other inflammable oils or fluids, and consists of a tripod base supporting a burner within a chamber provided with a bottom dish for adjusting the supply of air, a lateral damper and a disk of radial wings, the latter being situated immediately over the flame, for aerating the same and causing the more perfect oxidation of its carbonaceous particles.

CRIBBING PREVENTER.—Ben. J. Davis and Isaac S. Cramer, Sergeantsville, N. J.—This invention relates to an attachment for bridles, for the purpose of preventing horses from indulging in the vicious and hurtful habit of cribbing, so called. It consists of a pricking point inclosed and guarded by a cylindrical cap working within a larger cylindrical base, to which it is attached by a telescopic point. The two cylindrical parts inclose the pricking point, which is firmly seated in the throat strap, and presents its point through a central hole in the cap when the latter is pressed against the tension of a spring which otherwise keeps the cap out and over the pricking point.

DREDGING SCOOP.—Harris W. Thornburg, Shelbyville, Ind.—This invention refers to a scoop which is particularly designed for cleaning out wells and sinks, but may successfully be employed for other purposes where the conditions of operation are of the same nature. It consists of a scoop formed in two equal parts hinged together and so attached to ropes or chains that the scoop can be lowered into a well or sink in such position that the lower edges of the parts will encounter the bottom of the well, and when the lifting rope is drawn these parts will be brought together, thus scooping up a portion of the bottom on which they rested.

HAT BUCKLE.—J. A. Burton, Senoia, Ga.—This invention relates to a buckle for hat bands, and its object is to so arrange it that railroad or other tickets can be firmly held by the same, and can, whenever desired, be easily removed therefrom.

BEDSTEAD FASTENING.—J. E. Milliken, Bridgeton, Me.—This invention relates to a method of securing the rails to the posts of bedsteads, so that they are more easily taken apart or moved, and rendered more secure. It consists of a metallic hinge attached to the side rail of the bedstead, the pivot of which may be easily removed, and upon which the post is turned upon the side rail. It consists, also, in a hook and staples, by means of which the post is secured to the nail in an upright position.

WHIP LOCK.—Francis M. Gifford, Erie, Pa.—This invention relates to a method of constructing locks for securing the whip within the socket by an attachment independent of the socket itself, whereby the whip cannot be moved from the socket without the key. It consists of two metallic arms provided upon each end with jaws, the upper side of one of the arms having a nut, the other a socket, this socket having a nut, and the nut a thread to receive a screw by means of which the jaws are drawn or forced together the head of the screw being so constructed and concealed so that only a key of a peculiar construction will unscrew or unlock the jaws, and loose the whip from the socket

CORN PLANTER.—William Daggett, Cordova, Ill.—This invention relates to a method of constructing hand corn planters, whereby corn is more rapidly and economically planted. It consists of a planter composed of three chambers, through which slides a plunger provided with a valve by means of which the required quantity of corn is carried from one chamber to another, and finally to the ground. Also, in the bottom of the under chamber, being formed of steel or other elastic substance, which closes the outlet of the same, until the plunger in the downward movement of the same forces the corn upon the said springing bottom through the outlet into the ground, whereby the required quantity of corn for a single hill is always in readiness to be forced into the ground at the next downward movement of the plunger.

PAPER "LINEN."—B. M. Smith, No. 4 Dey street, New York city.—The manufacture of paper collars and cuffs, scarcely yet fifteen years old, has been carried to a perfection, while the consumption has risen to a magnitude, of which few persons have any conception. These articles, every one of which, of course, is thrown away as soon as soiled, are made and used up in the United States by hundreds of millions every year. Three or four hundred manufactories are in operation, some employing a capital of no less than $500,000, and thirty or forty paper mills run constantly on paper of the various qualities required. The styles in which collars and cuffs are manufactured of paper, for both sexes, are as varied, and some of them as elaborate and beautiful, as those made of linen and lace. The best substitutes for linen collars and cuffs are exquisitely stitched and corded at the edges (in appearance), and are even made to imitate exactly the surface of a starched and ironed linen fabric. Their chief imperfection has been the lack of strength in the button-holes, which are often torn out in the first attempt to put them on, and still oftener fail to serve a second day. For this defect a variety of remedies have been tried one of the best of which was the combination of two thicknesses of paper with an intermediate layer of coarse linen. This gave all the strength desired, but doubled or tripled both the cost and the clumsiness of the article. A cheaper but less effective expedient is adopted by some manufacturers, who paste a small patch of linen under the place of the button-hole. Most of these goods, however, are punched without any strengthening whatever. We have just been shown a novel specimen, having a perfect button-hole, durable enough for a hundred buttonings and unbuttonings, yet not appreciably increasing the cost of manufacture. Indeed, it is said that the machinery to be employed will turn them out cheaper than ever. The improvement consists in binding the edge of the rounded end or eye of the button-hole with a delicate film of silvered metal, not over one thirty-second of an inch broad, and so thin as not to increase the thickness of the paper edge, into which it is stamped with a minute bead to hold it immovably in place. The open ends of the metallic edging are each brought to a point and turned backward into the paper, so as not to catch and tear out. The button-hole works freely and flexibly; and never tears. This is a smaller invention than the wire connections for Venetian blinds, and like many a small thing, will be among the most profitable of improvements for the inventor.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

A. G. F., of Ohio, is running a saw and grist mill combined and the end of the main shaft to which the saw gate is attached thumps every time the gate is about half way coming down. The shaft is in line and the top box of the end journal has been screwed down until it heated but all to no avail. We think our correspondent will find, on examination, first, that the cap does not have a bearing on the box; second, that the interior of the box, as a whole, does not show a complete circle in cross section, but an ellipse. The box should be of the exact diameter of the shaft, and no box, especially one for a shaft subjected to reciprocatory motion should be left partly open.

W. L. B., of Mass., asks what is the composition of the glossy black paint used in lettering show cards. Lampblack from which the oil has been burned by roasting is the basis and may be used by mixing with the whites of eggs, which makes a very brilliant paint, or varnish, turpentine, and japan may be the vehicle.

A. S. S., of Mich.—The information you require in relation to atmospheric currents can be obtained from Espy's "Theory of Storms" or Maury's "Physical Geography of the Sea," and other meteorological works.

S. J., of N. J.—"How many pounds of steam pressure is equal to 130 pounds cold water pressure?" 130 pounds pressure is that and nothing else whether created by steam or water. Probably, however, our correspondent wants to know how much steam may be safely carried on a boiler which has had a hydrostatic test of 130 lbs. The general practice is to reduce one fourth, which would give a steam pressure of nearly 100 lbs.

F. G. S., of Mass.—Your theory of the explosive quality of non-aerated water in a steam boiler is not new, and it has heretofore been quite extensively discussed in our columns. Devices for forcing air into the water are in use, but we more strongly approve of your advice to blow off oftener.

R. M., Jr., of Canada, asks for a recipe for opaque glue. Boil ordinary glue with very fine bone dust. This correspondent also says that a friend from Spain left with him, last summer, a quantity of clay, called *terra de vino*, used in Spain for clarifying wine, which it did excellently well also in Canada. It will also remove grease and other stains from cloths. He offers to send a sample. We shall be glad to have him. Perhaps we will analyze and test it.

P. G., of N. Y.—"Why is the sun's center on the meridian ever back of the clock?" Because of the elliptical orbit of the earth and the inclination of the earth's axis to the ecliptic.

W. P. T., of N. J.—"Is there any coating or solution which will cause brass wire to permanently resist the action of carbonic acid?" Yes; electroplating or gilding.

S. B., of Mass.—We know of no liquid solution equal to good glue for immediately and permanently uniting two pieces of cotton webbing. If it will unite leather belts, subjected as they are to enormous strain, it certainly should answer for a cotton fabric.

C. W. D., of Md.—We believe there are tables of latitude and departures calculated for the quadrant in some treatises on surveying but cannot name them. Send to D. Van Nostrand, 192 Broadway or to John Wiley & Son, 535 Broadway, New York city.

W. R. W., of N. H.—This correspondent asks, "which way should a fly wheel run having curved arms, in the direction that the arms crook or the opposite?" With the letter comes a drawing representing a wheel with the ordinary curved arms so frequently used on pulleys, fly, and other wheels. We presume that it makes, practically, little difference which way the wheel turns, as the arms are usually slight and their cross section is of oval or lozenge form; but, preferably, we have always in practice presented the convex side of the curve to the line of motion, the result of which, if any, would be to direct the air impinging on the arms to slip or slide off toward the rim of the wheel.

G. S. D., of Tenn., asks how to deposit pure iron on iron or steel by the battery. In one or two of our back numbers we described or alluded to the process. We presume that there is no secret in the matter. Those who understand the deposition of metals by the battery will probably find no peculiar difficulties in the management of iron.

R. S. T., of Mass.—"I have observed that in 'blowing off,' the steam pressure, by the gage, does not lessen perceptibly until the water is all or nearly all blown out of the boiler. Now if the steam that was in the boiler has to fill its own and also the space occupied by the water, why, as the water blows out, does not the steam pressure proportionally diminish?" Our correspondent is wrong in two of his above assumptions. For an understanding of the matter, for the details of which we have no room, we refer him to "Heat, Water and Steam," by Charles Wye Williams, published by Henry Carey Baird, Philadelphia, Pa.

E. C. J., of Conn.—"What will remove superfluous hair from the face without injuring the skin?" We know of no chemical preparation having those qualities. The razor or tweezers will do best.

R. R. M., of Cal.—"What is the recipe for japan for iron work. That which I have tried is not so hard, smooth, and durable as I would like." We give Cooley's recipe for black japan, which, however, may have been improved upon by practitioners, to whom our correspondent had better apply for information. Cooley says, "burnt umber, 8 oz.; pure asphaltum, 3 or 4 oz.; boiled linseed oil, 1 gallon; grind the umber in a little of the oil; add the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil, boil, cool, and thin with a sufficient quantity of the oil of turpentine. It is flexible."

R. D., of Conn.—"How are saws straightened?" Simply by judicious hammering. It requires an expert to do it, but an experienced hand can straighten the most crooked saw. All saws have to be straightened, by hammering, after being hardened.

I. L., of Ind.—"What amount of water per hour is required per horse-power to run an ordinary steam engine?" One cubic foot per hour per horse-power is the general rule, modified, of course, by the condition of engine, at what point it cuts off, etc.

J. C., of Pa.—"Our large leather drying loft is heated by steam, the pipes fed by an inch pipe with a return pipe of the same diameter discharging into our engine exhaust pipe. Can we get as much heat with the return pipe wide open as partially closed?" Have your "return" or exhaust wide open to get the full heat. Is not live steam hotter than condensed, or than warm water?

J. S., of Iowa.—Like others, this correspondent has experienced difficulty in the management of his feed pump for a steam boiler. He proposes to build an elevated water heater or tank, connecting with a supply tank at a lower elevation—the bottom of the first being on a level with the top of the latter—a steam pipe leading from the boiler to the upper part of the supply tank, and a water pipe leading from its bottom to the water space of the boiler. (The plan is illustrated by a diagram we do not think it necessary to reproduce.) Our correspondent thinks it would save power. In reply we would say that a boiler *may* be fed by this device. Several patents have been granted within the past thirty-five years for boiler feeders involving the principles in various forms. We have never investigated their practical workings; but, from the fact that none of them have come into general use we infer that they are not reliable feeders, *under all circumstances.*

J. A. G., of Me.—"How can I cut a piece of glass five eighths of an inch square into sections of one eighth thick?" By employing a practical glazier, skilled in the use of the diamond to do it for you.

J. O. L.—The use of sponge for mattresses is old.

Business and Personal.

The charge for insertion under this head is one dollar a line.

A Gentleman late of the Paris Exhibition, going to Europe, solicits the sale of American Inventions and all kinds of Machinery. Address Abelseth, 817 Race st., Philadelphia, Pa.

Mill-stone Dressing and Glaziers' Diamonds. Also, for all Mechanical purposes. Send stamp for circular. John Dickinson, 61 Nassau st., New York.

For Patent Engine Lathes and Upright Drills, Planer Centers, Lathe Chucks, Planer Chucks, and all kinds of Cutlery Machinery, address Thomas Iron Works, Worcester, Mass.

For sample of a neat little Self-lighting Pocket Repeating Cigar Lighter, with wholesale price, send 65c. to L. F. Standish, Springfield, Mass

Two Valuable Patents for sale—one for a Fertilizer, and the other for Harness Wardrobe. Address H. E. Pond, Franklin, Mass.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. Bartlett Machine and Needle Depot 569 Broadway, N. Y

Merriman's Patent Bolt Cutters—Best in Use. Address, for circulars, etc., H. B. Brown and Co., New Haven, Conn.

For all sizes of Tube for Steam, Gas, or Water, and the most improved Tools for Cutting off and screwing the same, address Camden Tool and Tube Works Co., Camden, N. J.

Waugh's Combined Circle and Square Shears for Tinners and Paper-box Manufacturers. For circular address J. Waugh, Elmira, N. Y.

Pistol Machinery. Parties desirous of manufacturing wrought iron carriage hardware, address J. H. Atkinson, 31 Chambers st., N. Y.

Winans' Anti-incrustation Powder, (11 Wall st., N. Y.,) reliable and uninjurious in preventing scale in Boilers. 12 years in use.

Parties knowing where fibrous Asbestus or Amianthus can be obtained, will please address Geo. Raymond, Fitchburgh, Mass., stating quantity, color, price per ton, or any other facts respecting it.

For Sale—One half interest, or whole of the most valuable Plow improvement of the Age. Address L. G. Binkly, Baughman P. O., Wayne county, Ohio.

Wanted—Address of Manufacturers of Inkstands. J. M. Kennedy, Box 15, Vicksburgh, Miss.

Manufacturers of all kinds of Woolen Machinery please send catalogues with prices to Garrett & Brown, Manchester, Tenn.

For Sale—A valuable Patent Right for the State of Kentucky. Address Lament Brothers, Milford, Pike county, Pa.

EXTENSION NOTICES.

John Brown, of New York city, having petitioned for the extension of a patent granted to him the 30th day of May, 1854, for an improvement in hot water apparatus, for seven years from the expiration of said patent, which takes place on the 30th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of May next.

Thomas T. Jarrett, of Horsham, Pa., having petitioned for the extension of a patent granted to him the 30th day of May, 1854, for an improvement in hay elevators, for seven years from the expiration of said patent, which takes place on the 30th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of May next.

Levi Dederick, of Albany, N. Y., having petitioned for the extension of a patent granted to him the 6th day of June, 1854, for an improvement in hay presses, for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Charles F. Martine, of Boston, Mass., having petitioned for the extension of a patent granted to him the 6th day of June, 1854, and reissued the 25th day of December, 1855, and again reissued the 27th day of August, 1867, for an improvement in sofa bedsteads for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Edward Harrison, of New Haven, Conn., having petitioned for the extension of a patent granted to him the 6th day of June, 1854, and reissued the 16th day of November, 1858, for an improvement in grinding mills, for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Jacob Sennett, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 18th day of July, 1854, for an improvement in weavers' heddles, for seven years from the expiration of said patent, which takes place on the 18th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 29th day of June next.

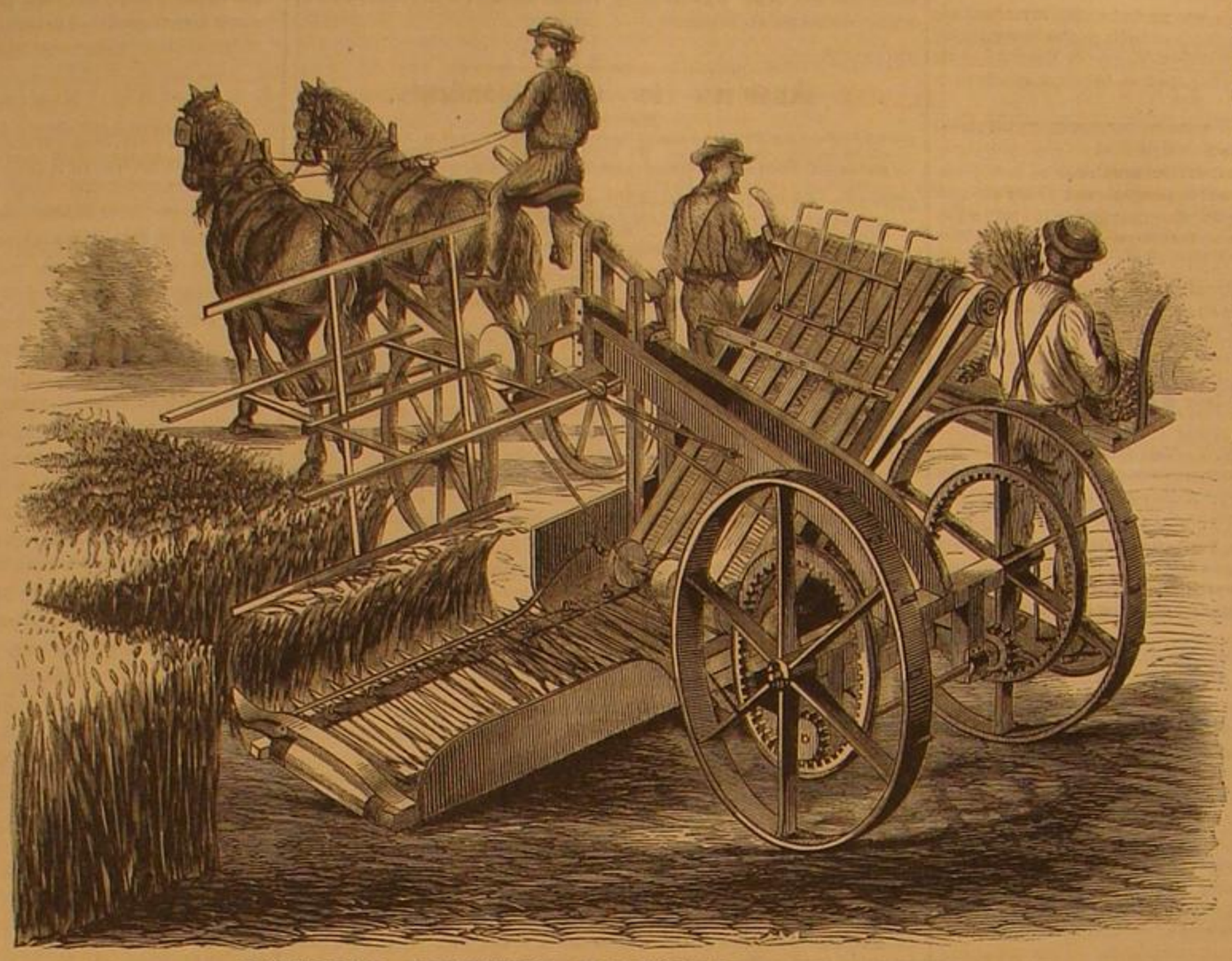
Jacob Sennett, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 22d day of August, 1854, for an improvement in machines for casting metallic eyes, or malls of heddles for looms, for seven years from the expiration of said patent, which takes place on the 22d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 3d day of August next.

Caleb Swan, executor of the estate of Daniel Hayward, deceased, of Easton, Mass., having petitioned for the extension of a patent granted to the said Hayward the 29th day of August, 1854, for an improvement in manufacture of india rubber, for seven years from the expiration of said patent, which takes place on the 29th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 3d day of August next.

Improved Self-Delivering Harvester.

This machine differs from other self-delivering harvesters in depositing the gavels on a table or platform, instead of the ground, and in carrying the binders on the machine, their work, as seen in the engraving, being done with the body in an upright position, involving much less labor and fatigue than when the binding is done in a stooping posture. The driving wheels are four feet in diameter, making the draft quite light. From the main wheels the motion is given to the cutters, in the usual method, by means of internal gears, pinions, and bevel gears, one of the latter of which is on the cutter bar crank shaft, which crosses the machine at a point between the two main wheels. From this crank shaft the vibrating connecting rod that drives the cutters, runs to the further or outer end of the cutter bar, giving thus a long connection with much less friction, wear, and tear than when the connection is short.

The binders stand on a footboard suspended at one end from the axletree and resting at the other on the finger bar. They stand back to an endless apron or carrier, by which the grain is carried from the finger-bar platform to a table in front of the operators. The endless apron passes over a roller at the outer end of the finger bar, and then horizontally the length of the cutters to the cross crank shaft, rollers upon which hold it in place and guide it in an inclined direction to a roller at the top of the machine, the roller being driven by pulley and belt from the crank shaft. The inclined portion of the endless apron is covered by a guard of wooden slats, the grain being carried by the apron under these slats, which are pivoted to the crank shaft and may be made to rise and fall according to the quantity of grain that is passing up.



EMMERT'S COMBINED HARVESTER AND MOWER.

The table, upon which the grain is delivered, is made to slide transversely across the machine on a track which is slightly oval or inclined from the center to each end. This is designed to be moved by the binders, giving each an alternate gavel, and when slightly pushed, runs on its inclined track without assistance. There is a stop of hooked rods secured to the upper part of the guard, which, by rungs on the sliding table, is raised or lowered as desired. When the table is being moved from one operator to the other, this stop is down, the hooked ends preventing the delivery of the grain until the table is in position, when they rise and allow the grain to pass. The reel for holding the grain to the knife is driven by a belt from one of the main wheels.

The seat of the driver is a saddle on a pivoted lever, the seat being arranged to be moved toward or from the end of the lever. The weight of the driver can thus be utilized to balance that of the finger bar and its appurtenances, and to accommodate that portion of the machine to inequalities of surface.

As a mowing machine, the endless apron, carrier, and binders' platform can be removed in a few minutes, as also the double divider, when it becomes a complete and effective mowing machine.

Patented through the Scientific American Patent Agency, Jan. 28, 1868, by Ezra Emmert, who may be addressed on the subject of territorial rights or for other information, at Franklin Grove, Lee county, Ill.

Improved Apparatus for Punching Shoe Uppers.

The machine illustrated in the engravings is intended for punching the eyelets or string holes in shoes, and the apertures for the tongues of buckles for straps harnesses, etc. It is simple, elegant, and easily adapted to any required curvature of the work. It can be operated by any person of ordinary intelligence; even a child of ten years of age can work it with ease.

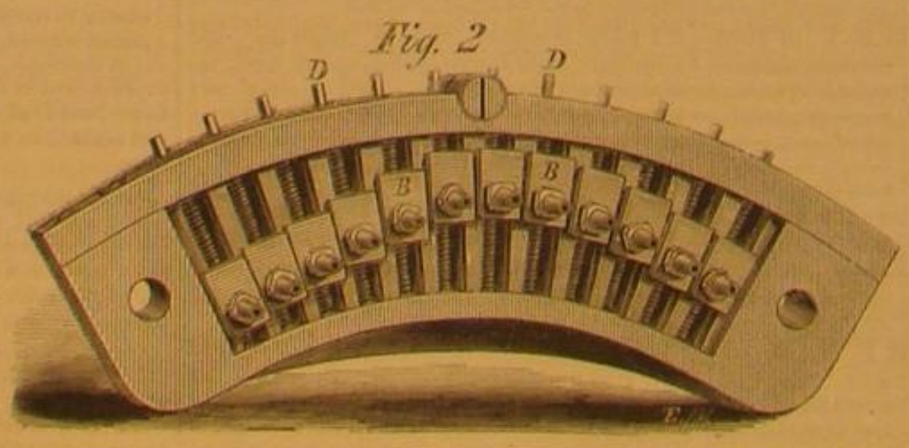
Fig. 1 shows the power, a toggle joint, adjusted by a nut and screw, A, so that the punches, B, are prevented from cutting into the copper bed, C, after they have passed entirely through the leather to be punched, thus protecting the punches from any unnecessary wear and tear.

Fig. 2 shows the arrangement of the punches, B, which by the use of a key on the axes of the screws, D, are moved to any position required, so as to correspond with the shape of the shoe to be punched. The machine is set for use by drawing the punches, by the use of the key, to the edge of the patterns, from which the shoe itself has been cut, and setting the stops, three of which are seen under the punches, so that these will cut at the proper space on the upper of the shoe to be punched. By this the holes in the shoe will be found to be on a perfect line from the edge, and of equal distances apart.

The upper part of the shoe is placed under the puncher, B, or rather upon the bed, C, and gently pushed up to the stops. The lever is brought down by the foot, and the work is done.

The engraving shows twelve punches, but the number can be increased or diminished; twenty-four can be used at one time, as well as three or four only. For small sizes of children's shoes, a supplementary set of punches, placed to act nearer together, may be used. There are several other claims contained in this patent, which may be used, but the inventor has thought best to have the machine as simple as possible in its operation, and at the same time a strong and perfect machine. For punching harness and skate straps, it is only necessary to set the punches in a straight line. Patented through the Scientific American Agency, Oct. 30th, 1866, by J. H. Keating. The entire patent for sale. Address P. K. Holbrook, 135 Federal street, Boston, Mass.

Fig. 2



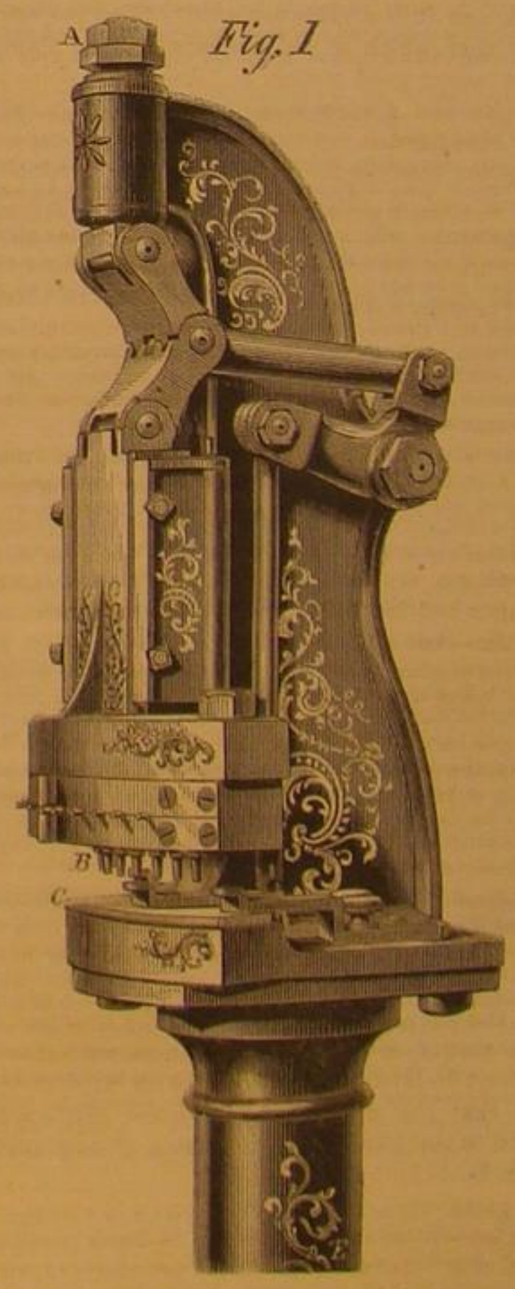
A New Invention in Gas Illumination.

M. Bourbouze, a French physician, has lately contrived an ingenious apparatus, which will undoubtedly be received with great satisfaction by all those who take interest in improvements in gas illumination. In presenting his invention to a learned society in France, it was done with a view to facilitate the experiments with the solar microscope, in the courses of public instruction; but to-day we are led to believe that it will have a more general application. It is well known that is was proposed, some time since, to substitute for the ordinary gas light the more intense Drummond light, which is produced by introducing a piece of quick lime or magnesia into the flame of a mixture of oxygen and street gas. The effects thus obtained surpass those of the latter so considerably, that this mode of creating light, in regard to the illumination of cities, was doubted the less the more progress chemistry made in the manufacture of oxygen gas. M. Bourbouze has now constructed an apparatus which does away entirely with the preparation of oxygen, affording at the same time a great economy in regard to the quantity of gas employed. The former is substituted by atmospheric air, the practical arrangement for effecting the combustion being the following: The gases are admitted into one common tube, from thence they pass through a sheet of metal, perforated with a great many holes, in order to be divided into many small jets; these are delivered through a gauze of platinum wire, when they are lighted. The metal, in being heated, soon becomes red, then white, and thus diffuses a dazzling light. Experiments have shown, that, with a tension of 15 inches mercury, 1,308 cubic yards of gas are consumed per hour, the light emitted being equal to that of seven lamps of Gilbert. With a pressure of 7 4-5 inches, 45 cubic inches are burned per hour, they giving a light of four lamps of Gilbert. In employing low carburetted gas, this process will be still more economical. We are informed that some places in Paris will be illuminated in the mode described.

Pickling Brass.

The work, to be brightened and colored, is first annealed in a red hot muffle, or over an open fire, allowing the cooling to extend over one hour; the object of the heating being to remove the grease or dirt that may have accumulated during the process of fitting. Soft soldered work, however, must be annealed before fitted together, and afterward boiled in a lye of potash; this is also done with work having ornamental surfaces. Next, it is immersed in a bath of diluted oil of vitriol or aquafortis, which may be made with two or three parts of water, and one of acid; but the old acid that contains a small quantity of copper, in solution, is frequently preferred. The work is allowed to remain in this liquid for one or two hours, according to the strength of the acid; it is then well rinsed in water, and scoured with sand, which is applied with an ordinary scrubbing-brush, and washed. The "pickling bath" is made by dissolving 1 part of zinc in 3 parts of nitric acid of 36° Baumé, in a porcelain vessel, and adding a mixture of 8 parts of nitric acid, and 8 parts of oil of vitriol. Heat is then applied, and when the liquid is boiling, the work is plunged into it for half a minute, or until the violent development of nitrous vapors ceases, and the surface is getting uniform. Then it is plunged into clean water, and well rinsed, to remove the acid. The ordinary, dark grayish, yellow tint, which is thus very often produced, is removed in immersing the works again in aquafortis for a very short time. Then they are plunged into clean or slightly alkaline water, well rinsed to remove the acid, and plunged into warm dry beech or boxwood sawdust, and rubbed until quite dry. To prevent the action of the atmosphere they are lackered; if a green tint is to be produced, the lacker is colored with turmeric. A dark, grayish, but agreeable tint,

Fig. 1



KEATING'S ADJUSTABLE GANG PUNCH

is obtained by immersing the work previously in a solution of white arsenic in hydrochloric acid, or in a solution of bichloride of platinum, under addition of some vinegar, or rubbing with plumbago.

A piece of lace has been woven by a native of India, ten yards long and one yard wide, weighing but 3 oz. 2 dwts., and which could easily be passed through a very small finger ring.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street,
☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents of the SCIENTIFIC AMERICAN.

VOL. XVIII., No. 13....[NEW SERIES.].. *Twenty-third Year.*

NEW YORK, SATURDAY, MARCH 28, 1868.

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IS THE CAREER OF CHOLERA ENDED?

Two hundred years ago there were two great pestilences which from time to time smote the human race with sudden and wide-spread destruction, hurrying vast numbers to untimely graves, and filling the hearts of survivors with unspeakable terror. One of these was the small pox, the other was called the plague. The small pox yet lingers among us, and the plague is still well known in the southern countries of Europe, but both diseases have ceased their ravages as epidemics, and have been shorn of their terrors. The small-pox is made harmless by the curious process of passing the disease through one of our domestic animals. The plague has probably been banished by the general improvement in modes of living, though its cessation has been attributed to the introduction of the potato as an article of diet.

About forty years ago a new and strange pestilence made its appearance in Europe in the course of its desolating march from Asia, and it has since repeatedly filled the world with fear like that which of old accompanied the plague. But there now seems good reason to believe that epidemic cholera, like its two predecessors, has been conquered by the power of intelligence.

Among the many substances that are produced when bituminous coal is subjected to destructive distillation at that temperature which is required for the manufacture of illuminating gas, is a compound which has acquired the name of carbolic gas, though, as its properties are those of an alcohol and not those of an acid, a more appropriate name would be carbolic alcohol. It is this substance which seems to have given man control over the last and most terrible of the pestilences that have desolated the world.

The New York Board of Health, in one of their reports in 1865, made the statement that pestilences among men have generally been preceded by epidemics in cattle, and they regarded the prevalence of pleuro-pneumonia as one reason for apprehending a visitation of cholera. Besides their advent as harbinger and follower, there are other intimate relations between these two epidemics.

In 1849 it was announced that a microscopist in Michigan had discovered minute animalculæ in the fæces of cholera patients, but this discovery being American, had to wait, like anæsthesia, the Ruhmkorff coil, and so many other American discoveries, till it could be rediscovered or appropriated by some European pretender. When an Englishman, Mr. Beale, found similar animalculæ in the blood of cattle suffering with pleuro-pneumonia, the most eminent masters of science proclaimed the important discovery.

In the case of pleuro-pneumonia, Mr. Crookes passed the breath of diseased cattle through tufts of cotton wool, and produced the disease in healthy cattle by inoculating them with the matter thus collected. In a recent lecture, Dr. F. Crace Calvert declared his agreement with Mr. Crookes in the inference that the breath of the diseased cattle must have transferred to the cotton wool the germs of the animalculæ which Mr. Beale found in the blood.

As the presence of carbolic acid even in the form of vapor, and in extremely minute quantities, is death to all organic germs, it was inferred that by its use the propagation of pleuro-pneumonia from diseased to healthy cattle might be effectually prevented. The brilliant success of Mr. Crookes in the practical application of this theory, as set forth in the report of the Royal Commission, has already been published in our columns. Dr. Calvert, in the lecture above referred to, says that the spread of pleuro-pneumonia was arrested in Belgium and Holland, as well as in England, by the use of carbolic acid. There is no room left to doubt that pleuro-pneumonia in cattle can be controlled by carbolic acid: will this substance also stop the spread of cholera?

During the summer and fall of 1866 the cholera several times secured a foothold in this city, and every time it was stamped out by the Board of Health. Dr. Harris and other members of the Board regard carbolic acid as the most efficient agent which they employed. It was also used with similar success in several other of our principal cities. Dr. Calvert refers to numerous cases in England where the spread of the cholera was absolutely stopped by the same agent.

Whatever may be the theory of the disease, the numerous and rapidly multiplying facts give us at least a reasonable hope that the means have been discovered for stopping effectually the spread of Asiatic cholera, and that terrible pestilence will scourge the earth no more. If this should prove to be the case, the discovery must take rank as by far the most valuable and beneficent of any one that has been made in the nineteenth century—a century so prolific in great discoveries.

PLASTER MOLDS FOR THE CASTING OF LOW FUSIBLE METALS.

Plaster of Paris is one of the most useful substances employed in the arts. Its generic name is gypsum, and it is largely used as a fertilizer, the mineral being coarsely ground in a mill and scattered broadcast over the land, or plowed in. Its constituents are sulphuric acid, 46.3; Lime, 32.9; water, 20.8, the nitric acid and lime combined being its fertilizing properties. It is known under various specific terms: as gypsum, alabaster, marble, etc., owing to the varying proportions of its constituents. It is the substance which ornaments subterranean caves with brilliant stalactites and stalagmites, and is known in the arts frequently by the name of crystal. French clocks, so popular as parlor ornaments, have their supports and frames composed of selected specimens of this widely diffused mineral, some of which are almost transparent and most of which are translucent.

The use, however, of the substance as a fertilizer and as an ornamental material in the fine arts is, in its application, less extensive than in mechanical processes. Our dentists would find much difficulty in the progress of their business if plaster of Paris was rejected. In the taking of casts of the mouth, and of the living, as well the dead, for portraits and busts this substance is invaluable. It combines readily with water and dries rapidly, taking the minuest lines of the pattern and faithfully reproducing them. Combined with sand and lime it makes a durable, hard, and smooth cement used in Spain and France for floors and vaults.

In the use of plaster of Paris for metal molds our mechanics require some instruction. It is adapted to the casting of the low fusible metals, if the mold after being once made is properly prepared. To prepare these molds they should first be submitted to the action of the atmosphere for several hours, that the water mechanically combined with the plaster shall be driven off or evaporated; then, to expel the water chemically combined with the plaster, it is necessary that the mold should be exposed to a heat of at least 400° F., for about four hours to make it fit to receive the metal without cracking and ruining the casting. By the following table it will be seen what is the fusible point of various metals and their combinations. We quote from a table arranged by Prof. P. H. Vander Weyde, all the compositions of which we believe can be cast successfully in plaster molds.

Boiling water is 212° F. But some metals or compositions of metals melt or fuse at a still lower heat. For instance, a composition of 5 parts bismuth, 2 of tin, 3 of lead, and 1 of mercury fuses at 167° F.; 4 parts bismuth, 1 of lead, and ½ mercury melts at 185° F.; 4 of bismuth, 1 tin, 1 lead, at 203° F.; 5 bismuth, 4 tin, 1 lead, 257° F.; 1 bismuth, 1 tin, 284° F.; 3 tin, 2 lead, 329° F.; 3 tin, 1 lead, 338° F.; Tin, pure, 428° F.; Bismuth 500° F.; Lead 617° F.

All these compositions and others may be cast successfully in molds of plaster of Paris. The condition is that the cast or mold should be allowed to dry thoroughly in the atmosphere or rather in a warm room and then be exposed to a heat of at least 400° for several hours. If the mold becomes red hot so that it is nearly transparent it will not receive injury if properly treated. Such molds should be allowed to cool gradually, when, if they have been properly managed it will be found they will give sharp and clean impressions of the metals they receive.

THE DETROIT DILEMMA.

We are indebted to Stanley G. Wight, Esq., one of the commissioners, for the sixteenth annual report of the Detroit Board of Water Commissioners for the year 1867. There is the usual amount of statistical information of merely local value, but one feature of the report is of general interest. We refer to the efforts of the commissioners in devising some way of preventing the ice from choking up the main inlet pipe. This pipe extends 150 feet into the river, and terminates in a bell-shaped mouth elbow, three feet in diameter, turned upward, in water twenty-five feet deep. Covering the end of the pipe is a boiler-plate strainer, perforated with half-inch holes, 144 to the square foot. Inside the shell of the strainer is a diaphragm plate with similar holes, and below this the strainer shell has four-inch holes, to allow the sand to pass through, so as not to bank upon the outside of the strainer. When the engine is pumping, the water is required to pass through the strainer holes at the rate of 120 barrels per minute. This is the full supply, but in extreme cold weather, under certain circumstances, it is with great difficulty any water can be obtained, in consequence of the accumulation of ice. The circumstances under which the difficulty occurs are, when the weather is cold and ice is forming in the lake above, and on the shores of the river, and the river is free from ice over the strainer. But when the river is covered with ice over the strainer, the difficulty does not occur at any degree of cold. The great difficulty occurs when the thermometer ranges from 7° or 8° to 18° or 20° above zero; but when the mercury rises above 20° the difficulty soon ceases. The greatest number of detentions, it has been observed, occurs at night, and when the sun is obscured by clouds, but when the sun is unclouded, no difficulty is ever experienced.

With the rapidly increasing consumption of water, the commissioners foresaw that the time would very soon arrive when it would not be safe to permit any detention to the pumping engines, and that this remarkable phenomenon must be solved and the difficulty overcome. The committee have adopted every accessible means of investigation to obtain suggestions and information on this subject. Attention has been called to it in published reports, and by the press. Men of science have been seen and corresponded with, and scientific associations have been requested to investigate the subject, but as yet no complete remedy has been discovered. As no experiments had ever been previously made, and the theory was so strongly presented that the trouble was wholly from anchor ice forming on the strainer, an opening was cut through the down-stream side of the strainer, and a self-acting door was hung, but this and the plan of suspending a line of booms so as to retain a covering of ice over it when the rest of the river was not covered, both failed to accomplish the object sought. The theory that the covering of the entire surface of the river by ice prevented radiation, and by that means the ice did not form on the strainer, was strongly urged; but, if so, any covering over the strainer would answer the same purpose. To test it, last summer submarine divers built a submerged platform of planks immediately over the strainer, but this proved of no avail, for the stoppages occurred at a higher temperature than before.

On the 29th of last December, when but a very limited supply of water could be obtained, divers went down, examined the strainer, and found that it and its surrounding piles, were one mass of ice particles collected into a mound some ten feet high and about fifteen feet in diameter, and that large quantities of minute crystals of ice were rapidly passing and adding to the mass already collected. Specimens of the ice were brought to the surface in a bag. It was in sheets and particles thin as paper, translucent, with sharp, pointed edges. A further examination developed the fact that the small amount of water the pump was then receiving came through the lower or down stream side of the strainer, this being the only point where the diver could approach it, and which was found but slightly covered with ice. Having ascertained the existing state of affairs, the commissioners felt confident that a remedy could now be provided, and with a large piece of canvas they had the strainer completely covered and encircled, except on the down-stream side, but temporary relief only was afforded by this expedient, and another descent to the strainer was undertaken. The diver went down and found out this very important fact, that with the temperature of the atmosphere at 29°, the water at the surface was 33°, while at the bottom of the river it was 35°. At this descent much less ice was found on the strainer and its surroundings than at the first time. The lower side was clear, but on the upper side the action of the current had worn the ice into elongated cones, pointing up stream. At this time the pump was receiving a full supply of water. About three hours later, the diver again descended (thermometer 33°); he found the ice had entirely disappeared. The wooden platform was removed, since which time no trouble was experienced, until the surface ice of the river began to move, when there was a few hours during which no water could be obtained, but with this exception no further delays have since occurred.

It is clearly proved that ice particles are ever present in the river, and are continually passing down by the action of the current, collecting upon whatever obstructions they happen to meet with in their passage. The commissioners, therefore, advise the entire removal of all spiles and other substances adjacent to the strainer, believing that with nothing but the smooth dome of the strainer for these particles to lodge upon, the quantity that will accumulate cannot very seriously prevent the flow of water to the inlet pipe.

RELIEF TO MANUFACTURERS.

Probably no measure proposed in the present Congress is of more importance to the manufacturing and mechanical interests of the country, and to the country at large, than the bill reported by Mr. Schenck from the Commitee of Ways and Means and passed by the House of Representatives by a vote of one hundred and twenty-two to two. It will also undoubtedly receive the sanction of the Senate and the President, when it will become a law, to take effect on the first of next May. Its most valuable provision is the total repeal of section 95 of the internal revenue law, which taxed and re-taxed manufactured articles at almost every step of their progress of manufacture. It repeals all revenue tax on manufactures of every description except on the manufacture of gas, petroleum, lubricating and illuminating oils, liquors, tobacco, and snuff.

When this bill, becomes a law, it will give an impetus to business which the country greatly needs, and remove a load grievous to be borne, from the shoulders of our industrial clases.

Rumford Chemical Works.

In the list of patents for the week ending March 11th, we notice an unusual number granted to Messrs. Horsford & Wilson, President and Treasurer of the Rumford Chemical Works, Providence, R. I., upon improvements relating to the manufacture of phosphoric acid. This article, which is the basis of the self-raising flour so largely manufactured by

Messrs. Hecker and others throughout the country, is the acid constituent of Horsford's self-raising bread preparation and of the Rumford Yeast Powders, which have come into such extensive use. In these preparations the properties usually lost with the bran in bolting, are restored to the flour, greatly increasing its nutritive value.

DOUBLE-WALL ICE PITCHERS.

The following letter from Professor S. Dana Hayes, State Assayer of Massachusetts, contains facts that should be read by all persons that have occasion to buy or use double-wall ice pitchers. Messrs. Reed & Barton, the patentees and manufacturers of the Seamless Lined Ice Pitchers, are the oldest and one of the largest and most celebrated manufacturers of silver plated ware in this country. The old lining, made in two pieces of different kinds of metal, and now in common use, renders water deleterious to health in four hours, and in twenty-four hours sufficient poisonous metals have been dissolved to impart taste to the water. This result is surprising, and it is still more so that attention has not been sooner called to this source of ill health.

State Assayer's Office,
No. 20 State street, Boston, Jan. 23, 1868.

Messrs. Reed & Barton, Taunton, Mass.:

Gentlemen: I have been much interested in investigating the corrosion of linings for ice pitchers, and the consequent poisoning of the water, after standing in them.

The lining, or inner chamber, of the greater part of the ice pitchers in common use is made from two different metals or alloys. As it is necessary that the bottom should be quite strong, to resist the blows from the ice when carelessly thrown in, this part has been made of nickel silver, copper, or other hard metal, while the sides of the chamber are generally made of Britannia or "white metal," the two parts being soldered together and then silver-plated.

The corrosion of this lining and solution of the metals in water naturally results from this mode of manufacture; because these different metals, in contact, under water, form a galvanic arrangement. If a silver coin be placed above the tongue, and a piece of zinc below, allowing the edges to come in contact, a metallic taste will be perceived in the mouth, from the galvanic action and solution of one of the metals. And the action is similar in these linings, only that it is not so violent at first.

Several of these linings, made as above and in common use, have been examined; some of them are very badly corroded, and it is noticeable that the solder has been first attacked. In one of these a nearly pure water was left for several hours that the effect might be noted.

In 1 hour the water contained traces of lead and copper.
In 4 hours the water contained 0·7 grain of lead and copper.
In 12 hours the water contained 1·6 grains of lead and copper.
In 24 hours the water contained 3 grains of lead and copper.

And, with a natural well water, this action is still more energetic.

It is hardly necessary to tell you, that metallic poisoning is one of the greatest enemies we have to contend with in the struggle for life, and it is common knowledge that lead and copper are highly poisonous and accumulative.

I have also submitted your new patent lining to careful chemical tests. This is formed from one piece of metal, without any seams, or soldering, the bottom being strengthened on the outside. There is no galvanic action here.

Analyses—This lining was nearly filled with the same water as the other, the temperature and all other conditions being the same in both cases. After standing for forty-eight hours the water did not contain a trace of metal. It was then boiled in the lining for an hour, and analyzed twice during that time, but it was still perfectly free from metals of any kind.

It is certainly fortunate that you can make these linings from one piece of metal, to take the place of the others, as a safe ice-pitcher is a great luxury.

Respectfully,
S. Dana Hayes,
State Assayer of Mass.

Polishing Powder for Gold Articles.

Dr. W. Hofman has analyzed a polishing powder sold by gold workers in Germany, which always commands a very high price, and hence, it may be inferred, is well adapted for the purpose. He found it to be a very simple composition, being a mixture of about 70 per cent of sesquioxide of iron and 30 per cent of sal-ammoniac. To prepare it, protochloride of iron, prepared by dissolving iron in hydrochloric acid, is treated with liquid ammonia until a percipitate is no longer formed. The precipitate is collected on a filter, and without washing, is dried at such a temperature that the adhering sal-ammoniac shall not be volatilized. The protoxide of iron precipitate at first becomes charged with sesquioxide.

The Steam Man.

This automaton, which has furnished a number of paragraphs for the press, is on exhibition at 538 Broadway, New York city, nearly opposite the site of Barnum's Museum; but owing to some objection on the part of the owner of the hall, he is not permitted to "travel on his muscle," but is hung in slings and merely "marks time," as our military friends would say. We understand, however, that his managers have decided to test his powers more effectually, when we shall probably have more to say of him.

Electrical Jewels.—One of the latest Parisian novelties is a scarf pin for gentlemen's wear in which a curious application of electricity is introduced. The pins are finished with imitation human heads the eyes of which are made to open or shut at the will of the owner. The electro-motor is a simple voltaic element of zinc and carbon, or zinc and platinum, the whole being inclosed in a small brass case conveniently carried in the vest pocket. The carbon is fixed in a vessel partly filled with a solution of sulphate of mercury, and the zinc is attached to the lid of the case. No electrical action is generated as long as the case is carried perpendicularly, but if laid on its side a current is formed.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING MARCH 10, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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On granting the Extension	$50
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On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

75,234.—Boat Detaching Block.—Nelson B. Adams, San Francisco, Cal.

I claim in combination with a block, the jaws, E E, with the long arms, F F, the short levers, H H, with shoulders, a a, forming a knee joint, the operating lever, J, having its fulcrum at G, and pivoted to the knee joint, I, the whole constructed, combined and operating as a detaching apparatus, substantially as and for the purposes herein described.

75,235.—Leakage Measure, Alarm, and Indicator.—Thomas P. Akers, New York city.

I claim, 1st, Providing for indicating the hight of leakage water in the hold of a vessel by means of weights of greater specific gravity than water, suspended from a pulley, so that one of the weights shall rise and descend with the rise and fall of the water, and the other make similar movements, but in a reverse manner, and by its movements communicate motion to registering, indicating, and alarm mechanism, substantially as described.

2d, The combination of a leakage measure which consists of two weights, and a chain, which is arranged to unwind from a pulley as fast as it winds upon the same, with an alarm, or with an indicator, or with a combined alarm and indicator, substantially as described.

3d, The combination of the wheels, L L', chain, F, weights, G G', pulley F, and disks, C C', substantially as and for the purpose described.

4th, The combination of a leakage measure, operating substantially as described, with the figured disks, the alarm devices, and gearing, L L and M, substantially in the manner and for the purpose described.

5th, The curved piece, h, constructed and applied to the hammer arm substantially in the manner and for the purpose described.

6th, The combination of the weight, G, cylinder, H, pendulum, K, and double-acting poppet valve, substantially as and for the purpose described.

7th, Arranging all the gearing, the alarm devices, the indicating disks, and the pulley of the weight chain or cord, upon a frame or spider of the case, A, substantially as described.

75,236.—Floor Cleaner.—Abraham Armstrong, Newburg, Ohio.

I claim in a floor cleaner, as described, adjusting the rubber and intervening plates by means of the set screws, for the purpose set forth.

75,237.—Colter Holder.—Jefferson Aughe, Dayton, Ohio.

I claim the combination of the plates or disks, C, colter, B, beam, A, and bolt, e, substantially as described and for the purpose specified.

75,238.—Apparatus for Burning Crude Petroleum.—Henry Baldwin, Titusville, Pa.

I claim, 1st, The jacket, c, as arranged to surround the supply pipes and a portion of the heater, and used in combination with the same, substantially as and for the purposes set forth.

2d, The reflector, f, as arranged with relation to the heater, when used in conjunction with the same, substantially as and for the purposes set forth.

3d, The supplementary reflector, g, and blow pipe, h, as arranged with relation to the reflector, f, and heater, a, substantially as and for the purposes set forth.

75,239.—Bolt Threading Machine.—Wm. B. Bement, Philadelphia, Pa.

I claim, 1st, For opening and closing the dies while the machine is in motion, two or more cranked or eccentric spindles, f, each carrying a toothed segment or pinion, adapted to internal teeth in a loose disk, which is controlled partly by a spring, d, and partly by the friction clamp herein described, or any equivalent to the same, the whole being combined with the spindle of a screwing machine substantially as specified.

2d, The cutting dies, l l, secured to the blocks, n n, but admitting of an adjustment independently of the latter, substantially as specified.

3d, The pump, with its piston and spring, in combination with the spindle, B, and its eccentric or cam, substantially as and for the purpose herein set forth.

4th, The within-described lever, spring pawl, and rack, arranged for operating the sliding head or plate, substantially as set forth.

75,240.—Process of Purifying Iron and Steel.—John F. Bennett, Pittsburg, Pa. Antedated Feb. 28, 1868.

I claim the use of carbonic acid gas, either alone or mixed with atmospheric air, or with other gases or vapors, when introduced into the body of molten iron or other metal, in combination with or immediately following the pneumatic process, for the purpose of removing sulphur, phosphorus, and any other impurities which will form chemical combinations with the oxygen of the carbonic acid, and deposit the carbon substantially as herein-before described.

75,241.—Metronome.—Hiram S. Blunt, New York city.

I claim the adjustable rings or plates, A A' A'' A''', separated or united, in the form of a drum, with pins or stops, n n n n, secured to and forming a part of the movable shaft, C and B, in combination with the index or hand, d, and with or without the dial, D, for the purpose of indicating the number of beats in a bar of music, in the manner substantially as described and shown in the drawings.

75,242.—Mode of Preserving Eggs.—Joseph Brakeley, Bordentown, N. Y.

I claim the preservation of eggs of hens or other fowls in the manner substantially as set forth above, that is to say, by drying them within their natural integument.

75,243.—Brick Carrying Car.—John K. Caldwell, Pittsburg, Pa.

I claim, 1st, A series of tables, b, resting and turning on recesses in the supports, a, in a brick drying car, substantially as and for the purposes set forth.

2d, In a brick drying and bearing car, the supports, a, having ledges, c, incline, c', and tenons, e, constructed and used substantially as and for the purposes set forth.

3d, The combination of the tables, b, supports, a, ledges, c, inclines, c', and tenons, e, in a brick drying car, when constructed and arranged as and for the purpose specified.

75,244.—Letter Balance.—Benjamin Chambers, Jr., Washington, D. C.

I claim the knife edges in holes passing through the lugs, as herein described, and covered, the covering plate at one end being pivoted, whereby the knife edges are kept in place, and can be readily removed when it is required to remove them.

75,245.—Process of Deodorizing and Refining Saccharine and other Fluids.—William Clough, Cincinnati, Ohio.

I claim the process of refining and deodorizing saccharine and other fluids herein specified.

75,246.—Rocking Chair.—C. W. Conant, Gardner, Mass.

I claim the arrangement as well as the combination of the spring, D, and the arch piece, C, with the chair seat, A, the rockers, c c, and the supporting frame, B, thereof, the whole being to operate substantially as described.

75,247.—Mop Press.—L. S. Covey and John Duffy, St. Croix county, Wis.

We claim the box or receiver, E, constructed and operated substantially as described, in combination with the plunger, C, the lever, D, and the cross beam, F, and grooves, e e, all constructed and arranged substantially as and for the purpose described.

75,248.—Gun Lock.—John F. Crabtree and Wm. N. Crabtree, Visalia, Cal.

We claim, 1st, The pawl piece, B, in combination with the trigger, E, and the lever, F, acted upon by the main spring, G.

2d, The spring catch, I, in combination with the lever, M, with the inclined oblong slot, O, for the purposes described and in a manner substantially as set forth.

75,249.—Device for Raising and Lowering Window Sashes.—John D. Cramer, San Francisco, Cal.

I claim the combination and arrangement of the several parts of my device, namely, the recess, A, with the slotted plate, B, and the plate, D, connected to the staff, C, by the curved piece, c, substantially as described.

75,250.—Hame.—Benjamin Crawford, Allegheny City, Pa.

I claim, 1st, Making fastenings for connecting harness tugs or traces to hames, adjustable by an eye through the inner or forward end of each, such eye to be operated on a staple, d or d', in connection with proper locks or supports, e e', the same being attached to the hame or hames plate, for holding such fastenings at the proper point of adjustment, substantially as and for the purposes described.

2d, The shoulders, l l', constructed on the fastenings, f f', in combination with the supports, e e', for the purpose of relieving the strain which would otherwise come on the staples, d d', substantially in the manner above described.

75,251.—Clothes Dryer.—H. Du Bois, Marlborough, N. Y.

I claim, 1st, The combination in a folding clothes dryer, of the arms, B B, latches, a a, and springs, b b, with the central polygonal shaft, A, arranged and constructed substantially as and for the purposes herein described and set forth.

2d, The combination of the arms, C C, and legs, D D, with the shaft, A, arranged and constructed to fold up, substantially as herein described and set forth.

75,252.—Machine for Distributing Fertilizers.—Jesse S. Edwards, Medford, N. J.

I claim the arrangement of the hopper, A, distributing shaft, G, wheels, C and D, and plows, B, as and for the purpose specified.

75,253.—Mop Head.—Richard W. English, Buffalo, N. Y.

I claim, 1st, The cross head, H, and shank, B, in combination with a screw ferrule, K, provided with a slot, R, as and for the purposes substantially described.

2d, The thumb nut, C, in combination with the parts, E E, and collar, D, substantially as and for the purposes described.

3d, The employment of the binding wire, for holding the collar, D, and parts, E E, together, as herein shown and set forth.

75,254.—Bedstead Fastening.—Bartholome Essig, Sacramento, Cal.

I claim the plate, C, for attaching the side rail of a bedstead to the post, having an arm, c, an oblique lug, b, so as to be firmly secured to the post by the tenon on the end rail, substantially as described.

And in combination with the plate, C, the plate D, fastened to the side rail, having a lug or key, g, fitting into a slot or groove on the plate, C, substantially as and for the purposes described.

75,255.—Hay Knife.—Green Fenton, Streetsboro, Ohio.

I claim the handle, A, spring, C, pin, a, arm, c, and blade B, all constructed and arranged in the manner as and for the purpose specified.

75,256.—Lamp Bracket.—E. L. Ferguson (assignor to himself and Charles B. Clark), Buffalo, N. Y.

I claim, 1st, The combination of the two jointed arms, A' A'', provided with suitable jaws for holding lamps of different sizes.

2d, The india-rubber ring, E, in combination with the said arms, arranged substantially in the manner set forth.

3d, The combination of the arms, A' A'', ring, E, and cam, f, or equivalent, for distending the jaws of the clamp, substantially as set forth.

4th, The peculiar construction of the jaws, D D, provided with shoulder, m, flange, n, and contracted bottom, as shown and described, for holding lamps and fountains of different forms and sizes.

5th, The peculiarly formed casting, C, constructed and arranged with the plate, B, and bracket arm, A, so as to secure the latter in its socket, and also form a receptacle for matches, in the manner shown and described.

75,257.—Harness Trimming.—Milton A. Fisk (assignor to Edward M. Wesson), Springfield, Mass.

I claim as a new article of manufacture, a rosette or harness trimming, when constructed as herein described and for the purpose specified.

75,258.—Plating Spoons and Other Articles.—Marshall L. Forbes (assignor to the Meriden Britannia Co.), West Meriden, Conn.

I claim the mode, substantially as before set forth, of coating spoons and similar articles with a regulated unequal thickness of the plating metal by immersing different portions of the article for different periods in the bath of the electroplating apparatus with which the article is connected.

Also the combination of a holder, adapted to confine the article to be coated, with regulating mechanism to hold the articles partially immersed to the required extent in the depositing bath, substantially as before set forth.

Also the combination of a holder, adapted to confine articles, with mechanism for tilting the article, so as to vary the extent of immersion in the depositing bath, substantially as before set forth.

75,259.—Machinery for Printing Yarn.—John Forrest (assignor to himself, John Archibald, and John Taylor), Lawrence, Mass.

I claim the combination as well as the arrangement of the two carriers for carrying skeins of yarn, in the manner described, with one or two series of printing wheels, composed of annular disks, their color rollers and cellular troughs, the whole being provided with mechanism to operate them substantially as and for the purpose specified.

Also the combination of the drying cylinder or apparatus, the two carriers as above, one or two series of printing wheels, their color rollers and cellular troughs, the whole being provided with mechanism to operate them, substantially as and for the purpose specified.

75,260.—Knitting Machine.—Guy P. Fuller, Adrian, Mich.

I claim the combination of the finger, A, the disk or dial plate, B, the geared wheel, C, the pinion, D, or their equivalents, the frame E, the ratchet F, the lever, G, the friction wheel, H, the nut, I, the shaft, J, the plate, K, when constructed substantially as described, for the purposes herein set forth.

75,261.—Milking Machine.—B. F. Graves, Groton, Mass.

I claim the arrangement of the pump, with the flexible tubes, teat cups, glass tubes, stop cocks, devices for adjusting the teat cups to the udder of the cow, all constructed and arranged substantially as described and for the purposes specified.

75,262.—Mode of Attaching Animals to Carriages.—Henry B. Hale and Thomas Flagler, Grass Lake, Mich.

We claim the construction of a draft or extension bar, with or without joints, in connection with pulleys, straps, chains, and rods, arranged in the manner and for the purposes specified.

75,263.—Harvester Rake.—Thos. Harding, Springfield, O.

I claim an automatic device which opens the switch, g, at each revolution of the rake and reel, and at the same time is under the control of the driver to make the raking only when it is necessary, in combination with a revolving reel and rake on a harvester, substantially as set forth and described.

The collar, O, provided with the clutch pin, n, and lug, o, in combination with the tripper, l, clutch lever, n, and switch, g, whereby the driver while on his seat may depress said collar and throw the clutch pin, n, out of connection with the head, L, to stop the rake from sweeping the grain from the platform, as desired.

Working the switch, g, automatically by means of the tripper lever, l, and a lug attached to a collar surrounding and revolved by the rake shaft, substantially as set forth.

Arranging the tripper, l, between the guide way and the rake-arm head upon the box or bearing of the rake shaft, substantially as set forth.

The combination and arrangement of the switch, g, provided with the arm j, and spring, k, with the tripper, l, and lug, o, or its equivalent.

75,264.—Composition for Stuffing Leather.—John Haseltine, Warren, N. H., assignor to himself and Person Noyes, Lowell, Mass.

I claim the combination of the herein-described ingredients in about the proportion specified, for the purpose and in the manner substantially as described.

75,265.—Invalid Bedstead.—Wm. Heath, Bath, Me.

I claim the combination of the recesses, K K i L, or their equivalents, with the frame, A, the two frames, D E, and mechanism for moving and depressing or operating the back frame, E, substantially in manner described.

Also, the combination of the folding legs, M M, the toothed sectors, and their arms, f f, the frame, A, and the parts, B C D and E, arranged and connected substantially as specified.

75,266.—Shank Spring.—Ed. Heaton, New Haven, Conn.

I claim the construction of shank springs, when cut or stamped out of the sheet without scrap or waste, substantially as specified.

75,267.—Cotton-bale Tie.—John W. Hedenberg, Chicago, Ill.

I claim a cotton-tie buckle, made and constructed substantially in the manner described.

75,268.—Gang Plow.—Chas. Hess, Lyons City, Iowa.

1 claim, 1st, The slot, T, in the head piece, and axle to adjust the tongue.

2d, The iron beams, when used in a gang plow.

3d, The combination and arrangement of the parts, when constructed and used as above set forth.

75,269.—Straw Cutter.—L. B. Hoit, Cedar Falls, Iowa.

I claim, 1st, The balance wheel, B, when provided with recessed and beveled arms, r r, and curved knives, E, attached thereto, in combination with the bevel gears, e f, the interchangeable feed rollers, C C D, and crank, g, as and for the purpose specified.

2d, The within-described arrangement of the intermediate spokes, r, of the balance wheel, with reference to the knife-carrying spokes, r, thereof, and the interchangeable feed rollers, C C, substantially as and for the purpose specified.

3d, The method, herein-described, of graduating the feed by the detachable or interchangeable rolls, C, of different sizes, arranged to operate underneath the yielding roll, D, and operated by the crank, g.

75,270.—Car Coupling.—Winfield H. Hoover, North Benton, Ohio.

I claim the combination of the pivoted drop, E, link, D, pin, C, and drawhead, B, when operated by the bar, F, with its side levers, H H, all constructed and used substantially as and for the purposes set forth.

75,271.—Preparation of Acid Phosphate of Lime.—E. N. Horsford, Cambridge, Mass.

I claim, 1st, The method of producing a pulverulent acid phosphate of lime, substantially as and for the purposes above set forth.

2d, The product obtained by the process, substantially as and for the purposes above described.

75,272.—Manufacture of Acid Phosphate to be Used in Food.—E. N. Horsford, Cambridge, Mass.

I claim the manufacture of liquid acid phosphate of lime, for use as a condiment or article of diet, or ingredient to be employed in beverages or food, substantially as and for the purposes herein set forth.

75,273.—Grinding Mill.—G. W. Hubbard and S. A. Smith, (assignors to Cresson & Smith), Philadelphia, Pa.

We claim, 1st, The lever, B, combined with and trued by the disk, a, substantially as described.

2d, The shell, D, with its inclined edge adapted to the plate, E, substantially as set forth.

3d, The spindle, A, with its burr, when confined in its place within the shell by two adjustable collars arranged upon the spindle, as specified.

75,274.—Baby Creeper or Walker.—P. H. Hurd (assignor to Clara Hurd and E. D. Horton), Croton, Mich.

I claim, 1st, Frame, A, chair, B, and rollers, C, in combination, substantially as described.

2d, Revolving chair, B, with flexible seat, D, and strap, E, in combination with frame, A, substantially as and for the purpose described.

75,275.—Closing Fruit Jars.—William M. Imlay, Philadelphia, Pa.

I claim, 1st, Making and adapting the neck of a fruit-jar so as to be used for a spiral wire coil, substantially as and for the purposes set forth.

2d, A wire coil, arranged and used about or around the neck of a fruit jar, so as to make a fastening for fruit jars, substantially as set forth.

3d, The arrangement and construction of a wire coil about the neck of a fruit jar, so as to make an elastic pressure on the cover, as described.

4th, The broad-seated ring or gasket, H, when retained in place by the beveled or inclined top, I, substantially as and for the purposes specified.

75,276.—Gate.—J. L. Janewa, Flemington, N. J.

I claim the continued arrangement of an ornamental or garden gate, B, with the stationary posts, A A, swivel bar, C, pivoted disks, l s, and caster rolls, m m, the whole constructed and operating as described for the purposes set forth.

75,277.—Grain Drier.—J. B. Johnson, Indianapolis, Ind., assignor to himself, T. E. Johnson, and B. F. Johnson.

I claim, 1st, Making the top of the furnace of drying kilns of cobblestones

or boulders, or their equivalents, arranged substantially in the manner and for the purpose set forth.

3d, The deflecting plates, D, in combination with the furnace, constructed as described, substantially as and for the purpose set forth.

75,278.—ROCKER FOR CHILD'S CARRIAGE.—A. D. Judson, Wooster, Ohio.

I claim the adjustable plate, C hooks, D, standard, E, and spring, F, as arranged, in combination with the rockers, A B, for the purpose and in the manner substantially as set forth.

75,279.—TUBE OF STEAM GENERATOR.—Peter M. Kafer, Trenton, N. J.

I claim, 1st, The continuous spiral guide, of uniform pitch, forming a continuous channel in vertical or inclined water tubes of steam boilers, substantially as set forth and described.

2d, The V-shaped piece, e, substantially as described and for the purpose set forth.

75,280.—LOCOMOTIVE ENGINE.—S. L. Langdon, New Orleans, La. Antedated Feb. 28, 1868.

I claim the arrangement of the cylinder of a street railroad locomotive engine on the under side of the cylindrical portion of the boiler by means of plates, J, or their equivalents, formed on the cylinder, one head of which is rigidly secured to the fire box, substantially as and for the purposes set forth.

75,281.—LAMP-WICK TUBE.—A. D. Laws, Bridgeport, Conn.

I claim a flat lamp burner tube, or lamp burner tube adapted to the use of flat wicks formed of a piece of sheet metal bent round and overlapped along the whole edge, substantially as herein shown and described.

75,282.—HORSE HAY FORK.—James E. Lobdell, Center Lisle, N. Y.

I claim, 1st, The sliding bar, B, with a knuckle head, f, and slots, e e, when used in combination with the main bar, A, and hooks or prongs, d d, substantially as set forth.

2d, The arrangement and combination of the main cutting bar and blade, A, slide bar, B, latch, c, and cutting hooks, d d, substantially as and for the purpose set forth.

75,283.—STEAM ENGINE.—J. L. Lowry, Pittsburgh, Pa. Antedated Feb. 20, 1868.

I claim an arrangement of the cylinders, valves, and passages for the steam by which I am enabled to use the steam alternately below and above the piston, substantially as herein described.

Also, in combination with the above-described arrangement, the reservoir for the reception of steam from the first and primary cylinder, substantially as herein described.

75,284.—PUMPING ENGINE.—J. L. Lowry, Pittsburgh, Pa. Antedated Feb. 24, 1868.

I claim the herein-described engine, when arranged as shown, and in combination with the pumps for raising water, substantially as shown and described.

75,285.—NASAL IRRIGATOR.—Morris Mattison, New York city.

I claim, 1st, The nasal plug, A, so shaped as to fit and close nostrils of different sizes, constructed sustantially as described.

2d, The combination of the nasal plug, A, constructed substantially as described, with the syringe, B C D, substantially as and for the purse set forth.

75,286.—CHURN DASHER.—Henry McDonough, N. Y. city.

I claim the dasher, b, constructed as specified, and mounted on the rod, c, to which a revolving movement is communicated by the spiral rib or groove as the parts are reciprocated, as and for the purposes set forth.

75,287.—BRICK MACHINE.—J. C. McKenzie, Adrian, Mich.

I claim, 1st, The springs, W, arranged and operating in combination with the bolts, X, and sliding hangers, X2, to afford an elastic support for the mold rack, substantially as and for the purpose described.

2d, The scraper, N, adjustable by means of slots, n, and set screws, m, employed in combination with the pivoted plunger, E, as and for purpose specified.

3d, Making some or all of the bars, L L', removable, by means of the buttons, l', or their equivalents, substantially as and for the purpose set forth.

4th, The segmental racks, J J, constructed substantially as represented and described, so as to admit of their reversal when worn.

75,288.—MACHINE FOR MARKING GROUND FOR PLANTING.—W. R. McKinley, Lucas county, Iowa.

I claim the frame, c c, wheels, a a a a, rods, f f f f, in all combined, constructed, and arranged as shown and described.

75,289.—PROCESS OF TREATING GOLD BULLION TO TOUGHEN and Refine It.—F. B. Miller, Sydney, New South Wales.

I claim the process of refining gold by applying chlorine to it while in a molten state, substantially as hereinbefore set forth.

75,290.—RACK FOR CARDING ENGINE.—L. Monroe, Lowell, assignor to himself and C. G. Sargent, Graniteville, Mass.

I claim, 1st, A series of slats or bars, g, constructed and operating substantially as described for the purpose set forth.

2d, The links, d, in combination with the pivoted slats or bars, g, as and for the purpose set forth.

3d, In combination with the two series of oscillating bars, the link or rod, D, for connecting one series of such slats or bars with the other series of similar bars, and for operating the same, substantially as and for the purpose specified.

4th, The eccentric, e, and slotted arm, c, or the equivalent thereof, combined with the series of pivoted slats or bars, and arranged to operate the same in the manner and for the purpose substantially as specified.

5th, The end connection, H, provided with a pivot, a, and stud, b, for connecting and operating the slats or bars, as set forth.

75,291.—STOVEPIPE CLEANER.—J. W. Mortimer, Peoria, Ill.

I claim a stovepipe cleaner having disk, A, arm, B, rod, C, and washer, D, constructed, combined, and operating substantially as and for the purposes herein specified.

75,292.—MANUFACTURE OF ELASTIC ROLLS.—Joel Moulton, Boston, Mass.

I claim, as an improved manufacture, the elastic roll or tubing, made substantially as herein shown and described, that is, as composed of india-rubber or other analogous gum, and a suitable webbing, with the fibers of the latter radiating from the center, or about the center, of the roll outward, as explained.

75,293.—PROCESS OF EXTRACTING THE PRECIOUS METALS from Ores.—Adolph Ott, New York city, assignor to Antonio Pelletier, Washington, D. C.

I claim, 1st, Roasting sulphurets, tailings, and residua from other treatments, either alone or mixed with chemicals, in the progressive and continuous manner herein described.

2d, In the roasting process of the ore or tailings, the use of chloride of iron, copper, or magnesium, and of hypochlorites of an alkaline, earthy, or metallic base, mixed with the ore or tailings, and employed as specified.

3d, The introduction of hyponitrous acid gas, or oxygen gas, obtained as set forth, in the roasting process.

4th, Precipitating precious metals from a solution of their soluble salts by means and with the use of the sulphuretted hydrogen gas produced in the process of roasting said ore, or by a solution of the same in water.

5th, The extraction of silver, or of silver and gold, from the roasted ore, by means and with the use of the double sulphite of an alkaline base ($KO\,2SO_2$, or $NaO,\,2SO_2$,) and of the hyposulphites of an earthy or metallic base, in the manner specified.

75,294.—APPARATUS FOR EXTRACTING PRECIOUS METALS.—Adolph Ott, New York city, assignor to Antonio Pelletier, Washington, D. C.

I claim, 1st, The ore-roasting furnace, A, composed of a series of ovens, C D E, with alternate flat and depressed hearths, in combination with the shaft, I, arms, L L' L'', flues, P P' P'' P''', flues, M and N, and chambers, R and F, arranged and operating as set forth.

2d, In an oven for roasting ore, the flue, S, and tank, T.

3d, The combination of the flue, U, holes, V V V V, and ovens, C D E, with the pipe, x and y.

4th, The apparatus, B, composed of the apparatus, a, tank, b b b, and strainer, h, arranged together and operating as specified.

75,295.—PENSTOCK FOR UNDERGROUND DRAINS.—David A. Parks, Fairview, Ill.

I claim the combination of the stock, A A, partition, D, gate, E, and pipes, B B, arranged substantially as and for the purpose herein described.

75,296.—STEAM GENERATOR.—Patrick Quinn (assignor to himself and C. R. Paul), Newmarket, N. H.

I claim the combination and arrangement of the coiled pipe, o, deflector, q, jacket, g, and flues, k and l, the whole being arranged and operating together to produce the results before described.

75,297.—HARVESTER RAKE.—O. Redmond, Rochester, N. Y.

I claim producing the automatic movements of a sweep rake for harvesters by the employment of a crank, D, and a rock lever, E, jointed as described, the whole operating in the manner and for the purpose herein set forth.

75,298.—SCROLL FOR WATER WHEEL.—Timothy Rose, Cortlandville, N. Y.

I claim, 1st, Making the curb, D, between the guides, b, and openings, a, concentric with and inclosing the wheel so as to form a closed case to the buckets of the wheel between each guide and opening, in the manner herein described.

2d, The hinged gate, F, the concentric curb, D, with its issues, a, and projecting guides, b, when arranged and combined as described.

3d, The gate, F, hinged within the scroll, for the purpose of shortening or diminishing the length of the same, to adapt it to the supply of water.

75,299.—YOKE FOR HORSES.—E. Sanford, Meriden, Conn.

I claim, 1st, The peculiar construction of the ordinary hames, such as are used in draft-harness for horses, so as to dispense with traces and connect them for draft with a beam or yoke passing under the horses' necks, by lengthening and extending downward through mortises in the ends of said yoke, and fastened by pin on the under side, as shown in the drawings.

2d, The slide plate, D, secured to the under part of the beam, by which means the hames may be adjusted to the necks of the horses, and them firmly secured in position by the set screw, as shown in the drawings.

75,300.—FURNACE.—Gottlieb Schreyer, Columbus, Ohio.

I claim, 1st, The contracted throat, b, which is formed by two independent streams of air escape, and meet or cross one another in said throat, substantially as and for the purpose described.

2d, The construction and relative arrangement of the independent air-receiving air conduits, a a, and escape aperture, b, in the fire chamber, in the manner and for the purposes described.

75,301.—STEAM AND WATER PACKING.—William C. Selden, Brooklyn, N. Y.

I claim, 1st, A packing for steam engines, pumps, etc., made substantially as described, by combining cloth or fibrous material with paper, or with compounds in which paper is an element.

2d, Combining vulcanized india-rubber, or other equivalent elastic substance, with paper packing in any of its various forms, or with compounds for packing purposes in which paper is an element, in the manner substantially as described, to secure the results specified.

3d, Saturating packing with tallow to accomplish the purpose specified.

75,302.—METAL TOP FOR LAMP CHIMNEY.—F. I. Seymour, Wolcottville, Conn.

I claim, 1st, Connecting the lapped edges of the sheet metal cap, near the upper or smaller end, by means of a rivet, or its equivalent, for the purposes and substantially as set forth.

2d, An expansive ring, introduced in the head formed near the base of the sheet-metal cone, for the purposes and substantially as set forth.

75,303.—CLAMP FOR FORMING SHEET-METAL CONES.—F. I. Seymour, Wolcottville, Conn.

I claim, 1st, The clamp for sheet-metal cones, formed of the cones, a and c, locked together, as and for the purposes set forth.

2d, And, in combination therewith, the sleeve, e, surrounding the cone, c, substantially as and for the purposes set forth.

75,304.—DIFFERENTIAL GEAR POWER MACHINE.—Henry Franklin Shaw, West Roxbury, Mass.

I claim the two pulleys or winding barrels in the differential gear-power machine, connected by gear as described, eccentrically hung upon a free revolving actuating shaft, operating substantially as described and for the purpose set forth.

75,305.—LOOM.—James Shaw, Ballardvale, Mass.

I claim the combination of the short shaft, C, pinion, D, shaft, E, pinion, H, shaft, F, pinion, G, tappets, k k, roller arm, l, vertical shaft, g, spring, i, and lever, e, all constructed and arranged with the loom frame, as and for the purpose set forth.

75,306.—SEAT FOR HARVESTER.—Edward A. Smith, St. Albans, Vt., assignor to himself and John W. Newton.

I claim the seat for mowers or reapers, formed with sockets on the under side of the seat, receiving helical or spiral springs, in combination with the sockets on the crown piece or seat supporter, and with the connecting link, l, substantially as and for the purposes set forth.

75,307.—FLOUR BOLT.—Scott A Smith (assignor to Cresson & Smith), Philadelphia, Pa.

I claim, 1st, The bolt, unsupported, excepting at its opposite ends, and having a belt arranged for being struck by recoiling springs, or other equivalent devices, all substantially as and for the purpose herein set forth.

2d, In combination with the above, a spring or springs secured to the bolt, or to the box containing the same, and operated substantially in the manner herein set forth and for the purpose specified.

75,308.—APPARATUS FOR CHARGING GAS RETORTS.—James F. Snediker and William F. Bailey, Bristol, Pa.

We claim, 1st, The truck, A, and its swivel bearings, d, in combination with a series of scoops, C, the handles of which rest on and slide in the said bearings, substantially as and for the purpose described.

2d, A sliding bottom, F, in combination with a scoop, C, substantially as and for the purpose specified.

3d, A scoop, consisting of adjustable side pieces, m m, and bottom pieces, o o', constructed, arranged, and connected to the handle, I, substantially as and for the purpose set forth.

4th, The wheels, i, in combination with a scoop, C, for the purpose described.

75,309.—PAVEMENT.—Charles W. Stafford, Saybrook, Conn.

I claim, 1st, The arrangement of the oblong blocks, decreasing in depth from the center to the sides, so as to form a camber in the street, while resting on a level metallic base, C.

2d, In combination with the base of a sectional pavement, the spanner, G, and screw, H, operating as described.

3d, The combination and arrangement of the flanges, n n, link, p, and keys, s s, substantially as and for the purpose described.

75,310.—STEAM PLOW AND CULTIVATOR.—Philander H. Standish, Martinez, Cal., assignor to himself and Oliver C. Coffin.

I claim, 1st, A steam plow, having the rotary knives, I I, operating in a horizontal plane and transversely to the travel of the machine, and the supporting arms, k k, or their equivalents, together with the vertical shafts, b, the whole constructed and operating substantially as herein described.

2d, The movable frame, U, and the arms, a a, together with the chains, V, and capstans, W, for raising and depressing the plows, substantially as herein described.

3d, Operating the plows, when moving in a horizontal plane, directly from the engine by the belt, b, or an equivalent device, substantially as described.

75,311.—WASHSTAND.—A. Stankowitch, Philadelphia, Pa.

I claim a water reservoir, H, secured to the lid of a washstand, and so arranged as to be received by the basin, G, when the lid is closed, all substantially as described.

75,312.—SOLDER FOR ALUMINUM.—Alfred Starr, N. Y. city.

I claim the compound or alloy specified, as a solder for aluminum.

75,313.—FLUID METER.—Charles Stein, Philadelphia, Pa.

I claim the combination, substantially as described, of a revolving or oscillating magnet and the registering bar, J, or its equivalent, with a fluid meter, for the purpose specified.

75,314.—MODE OF SECURING THE ENDS OF FELLIES AND SPOKES IN CARRIAGE WHEELS.—John Switzer, Lynn, Mass.

I claim the improved mode of fastening the ends of the fellies and the spokes in carriage wheels, by means of the metallic block, E, constructed and applied and secured by the bolts, d d, as explained.

75,315.—DEVICE FOR PREVENTING WATER PIPES FROM BURSTING.—R. H. Smith Thompson, Georgetown, D. C.

I claim the arrangement at the joints of water pipes of two concentric cylinders, the interior cylinder to be of elastic material, and thus form an air cushion, and to operate substantially as described.

75,316.—FOLDED FAN.—T. S. Thorn, South Amboy, N. J.

I claim, 1st, The combination, with the ribs, B C and C', and handle, D, of the ferrule, G, substantially as and for the purpose set forth.

2d, The combination, with the ribs, C and C', of the clasp, F, ferrule, G, and handle, D, substantially as and for the purpose set forth.

75,317.—LAMP EXTINGUISHER.—Edwin J. Toof, Fort Madison, Iowa.

I claim, 1st, So combining a hinged cone, D, extinguisher or cap, B, and a connecting arm, C, or its equivalent, that the opening of the cone will remove the extinguisher from the wick tube, substantially as herein specified and set forth.

2d, In combination with said extinguisher, cone, and connecting arm, the arrangement of a suitable support, E, to retain the extinguisher away from the wick tube when the cone is closed, substantially as herein specified and described.

3d, The combination of a finger, d, operating through a slot in the external case of the burner, in combination with the arm, E, connecting arm, C, extinguisher, B, and cone, D, substantially in the manner and for the purposes set forth.

4th, In combination with the cone, D, hinged as described, and the arm, E, arranged in connection therewith, substantially as described, a stop or rest, F, upon the case of the burner, arranged so as to sustain the cone in place, and prevent its swinging over upon its hinge, substantially in the manner described.

5th, In combination with the extinguisher, B, cone, D, connecting arm, C, arm, E, provided with a suitable rest and a lever, e, the shaft, H, and arm, J, arranged to operate substantially in the manner herein set forth.

75,318.—WICK REGULATOR.—Edwin J. Toof, Fort Madison, Iowa.

I claim, 1st, In combination with a wick tube, provided with vertical slots, a' a', the arrangement of a slide, b, upon the outside of the tube, provided with points, b' b', projecting into said tube through said slots, so as to operate in the manner and for the purposes described.

2d, The combination of the slotted wick tube, a, the slide, b, provided with points, b' b', and the shaft, d', or its equivalent, arranged and operating substantially as and for the purposes set forth.

3d, The arrangement of a spring, in combination with the above, operating as and for the purposes set forth.

4th, The combination of the tube, a, slide, b, shaft, d', and springs, with the chimney clamp, D E F, as and for the purposes specified.

75,319.—COTTON BALE TIE.—William Trowbridge, New Orleans, La.

I claim the device herein described, to wit, a section or piece of wire, so formed as to be provided with the loop or eye, C, and the hooks, B and B', as herein described for the purpose set forth.

75,320.—MACHINE FOR MAKING BUTT HINGES.—William H. Van Glesen, Passaic N. J., and John J. Crooke, New York city.

We claim, 1st, The combination of transferring fingers, with dies, c' e', when said fingers and dies are operated by mechanism substantially as and for the purpose set forth.

2d, The combination of the levers, y2, cam, a', and fingers, l, with the slides, b' b', the whole being arranged substantially as and for the purpose hereinabove specified.

75,321.—BED BOTTOM.—Henry B. Walbridge, Toledo Ohio.

I claim, 1st, A bed bottom, which is composed of a hinged sectional frame, B B', having the sacking secured permanently to one section, and applied to the other section by means of a flat bar, c, and clamps, g g, substantially as described.

2d, Constructing the sacking frame, B B', and applying the sacking thereto, in such manner that, while the sacking can be more or less slackened or tightened at pleasure, one section of said frame will serve as a means for forcibly tightening the sacking, in combination with retaining cleats and removable pins applied in the bedstead rails, substantially as described.

75,322.—ADDING MACHINE.—C. H. Webb, New York city.

I claim, 1st, The duplicate series of numbers, arranged upon the margin of the numerator wheel, B, substantially as and for the purpose specified.

2d, In combination with the above, the semi-circular slot, L, in the dial plate, J, corresponding in extent with one of the duplicate series of numbers, for the purpose substantially as described.

3d, Arranging, on the dial plate, J, a series of numbers corresponding in extent with one of the series of numbers upon the numerator wheel, B, substantially as described and for the purposes specified.

4th, The prefix of a cypher, upon the numerator wheel, B, to the digital numbers from zero (0) to nine (9) inclusive, for the purpose specified.

5th, In combination with the numerator wheel, B, the revolving multiplying wheel, when arranged in apposition to the numerator wheel, and having its edge in contact, or nearly in contact, therewith.

6th, In combination with the elements of the above, the slot K, in the dial plate, J, for the purpose specified.

7th, The arrangement of the numerator wheel, B, lever, G, and multiplying wheel, E, all constructed substantially as described and for the purposes specified.

8th, In combination with the arrangement above specified, the slotted dial plate, J, when constructed substantially as and for the purposes specified.

75,323.—SELF-OILING HUB FOR PULLEY, ETC.—David M. Weston, Boston, Mass.

I claim, 1st, A loose wheel or pulley, having its hub provided with the chamber, D, and opening, E, with the partition, a, or its equivalent, when constructed and arranged to operate substantially as described.

2d, In combination with the chamber, D, the dove-tailed recess, l, with the passages, e, leading into said chamber, substantially as and for the purpose set forth.

75,324.—GATE AND DOOR SPRING.—Benjamin F. Whitaker, Whitestown, Ind.

I claim the application of the circular rod, and also the coil of wire used as a circular spring, as set forth in the drawing.

75,325.—MANUFACTURE OF PHOSPHATIC FERTILIZER.—George F. Wilson, East Providence, R. I.

I claim, 1st, The method of decomposing the said bone phosphates by the said salt cakes, substantially as above described.

2d, The fertilizing product, produced substantially as above described.

3d, The revolving cylinder, substantially as above described, when used in connection with the manufacture of either nitric, muriatic, or sulphuric acid, or two or more of them, for the purpose of producing the aforesaid fertilizer or compound, substantially as above described.

4th, The manufacture of the aforesaid fertilizer in connection with either, any, or all of the aforesaid acids, by the use of the resulting residuary salt cake or cakes, substantially as and for the purpose above described.

75,326.—PREPARATION OF BONES FOR THE MANUFACTURE OF PHOSPHORIC ACID AND PHOSPHATES.—George F. Wilson, East Providence, R. I.

I claim, 1st, My new and improved process of burning and roasting bones gray, substantially as and for the purposes hereinbefore described, as preliminary to the extraction therefrom of acid phosphate of lime.

2d, As an improvement in the process of preparing acid phosphate of lime, the use of bone coal treated substantially as hereinbefore described.

3d, The improved furnace, constructed and operating substantially as and for the purposes as hereinbefore described.

75,327.—MANUFACTURE OF PHOSPHATES FOR AGRICULTURAL PURPOSES.—George F. Wilson, East Providence, R. I.

I claim this process of reducing bones with acid, substantially as above described, whereby I have made the manufacture of a fertilizer under the name of superphosphate of lime, more economical and more valuable than any other process heretofore known.

75,328.—MANUFACTURE OF ACID PHOSPHATES.—George F. Wilson, East Providence, R. I.

I claim, 1st, The improved process hereinbefore described, of mixing farinaceous matter with acid phosphate of lime, in the manner and for the purpose above described.

2d, The improved grinding or disintegrating apparatus, constructed and operating substantially in the manner and for the purposes as above described.

3d, The application of granite rollers in the manner and for the purpose above described.

4th, The combination of the grinding rollers and their connections with the self-adjusting pressure lever, substantially as and for the purposes described.

75,329.—PREPARING BONES FOR THE MANUFACTURE OF ACID PHOSPHATES.—George F. Wilson, East Providence, R. I.

I claim, 1st, The new and improved method or process of destructive distillation of bones, whereby the products of distillation are principally condensed, the ammoniacal products thereof preserved, and the remaining gases conveyed to the furnace, thereby adding heat to the flame and destroying the offensive odors, substantially as above described.

2d, A new and improved means or method of destructive distillation of bones by the use of horizontal retorts, in connection with the coolers above described, whereby the retorts of the furnace may be continuously used without losing their heat, while at the same time the burned or distilled bone is being cooled and excluded from the air in said coolers.

3d, The combination of the retorts, A, the reservoir, E, the condenser, B, and the chamber, D, with its mechanical agitator, or its equivalent, and the connecting pipes above described, substantially as and for the purpose hereinbefore set forth.

4th, The combination of the retorts, A, the reservoir, E, the condenser, B, and the connecting pipe, g2 g1, for the purpose above described.

75,330.—DRYING ACID PHOSPHATES.—Geo. F. Wilson, East Providence, R. I.

I claim, 1st, My improved process of drying the granulated acid phosphate of lime by exposing the same to continuous currents of heated air on both sides of the columns thereof, substantially as and for the purposes described.

2d, The application of the improved apparatus, constructed and operated substantially as described for the purpose aforesaid.

3d, The arrangement of the revolving troughs, or their equivalent, combined with the vertical lattice flues, substantially as above described, by which the process of drying is rendered uniform and continuous.

75,331.—PROCESS AND APPARATUS FOR THE MANUFACTURE OF ACID PHOSPHATE.—Geo. F. Wilson, East Providence, R. I.

I claim the improved mechanism for sifting this mixture of coarsely and finely powdered acid phosphate of lime, as described under Horsford's patents, and separating the coarser parts of the same, substantially as and for the purpose described.

75,332.—BURNING BONES FOR THE MANUFACTURE OF ACID PHOSPHATES.—Geo. F. Wilson, East Providence, R. I.

I claim, 1st, The new and improved furnace, substantially as above described, whereby the flame is carried under the hearth thereof, and is introduced into the chamber which contains the bones, where it burns with the combustible products of distillation and atmospheric air, admitted in regulated quantities, and thus, while the offensive odors are destroyed, the heat of the chamber is intensified to the degree required for the production of white burned bone, without converting the same into an insoluble pyrophosphate of lime, the flame and products of combustion then passing into the flues over the chamber into the escape flues.

2d, The new and improved process of burning bones white, whereby I am enabled to obtain from them a pure phosphate of lime, in the manner and for the purpose above specified.

75,333.—GRINDING AND PULVERIZING ACID PHOSPHATES.—Geo. F. Wilson, East Providence, R. I.

I claim, 1st, An improved process of disintegrating and pulvering the dried and granulated mixture of acid phosphate of lime and farinaceous matters, substantially in the manner and for the purposes described, whereby the heating thereof is prevented, by causing the pulverizing action of the mill to be applied to any particular portion of the mixture to be at intervals, which allow time for cooling between successive impacts.

2d, The application of the above described apparatus to the pulverization of acid phosphate of lime mixed with farinaceous matters, substantially as above described.

75,334.—GRANULATING ACID PHOSPHATES.—Geo. F. Wilson, East Providence, R. I.

I claim, 1st, The process of dividing the lumps of mixed acid phosphate of lime and farinaceous matter into small lumps, substantially as and for the purpose specified.

2d, The combination of the feeding spout and vibrating sieve or grater, constructed and operated substantially as above described and for the purpose above set forth.

75,335.—APPARATUS FOR CONVEYING ACID PHOSPHATES AND OTHER ACID LIQUIDS.—Geo. F. Wilson, East Providence, R. I.

I claim, 1st, My improved pump, constructed of lead and vulcanized rubber, or gutta percha, substantially as and for the purpose above specified.

2d, The application of vulcanized rubber or gutta percha hose, in combination with the above described pump, for the transfer of acid phosphate of lime liquor, for the purpose above set forth.

75,336.—MANUFACTURE OF PHOSPHATE AND EXTRACTING PHOSPHORIC ACID FROM BONES.—Geo. F. Wilson, Providence, R. I., and Eben Norton Horsford, Cambridge, Mass.

We claim, 1st, The new and improved process of extracting acid phosphate of lime from bones, as hereinbefore stated.

2d, The continuous agitation of the mixture of sulphuric acid, acid phosphate of lime and pulverized gray bones, by which the action of the sulphuric acid is rendered uniform, and the sulphate of lime, produced in the decomposition of the gray bone, is prevented from setting or hardening in lumps, or in mass, which would interfere with leaching, as well as with the perfect decomposition of the gray bones.

3d, The distribution of the mass to be leached in broad, shallow pans, in the manner and for the purpose above described.

4th, The use of vessels made of lead, or lined with lead, for the purpose above described.

5th, The application of the tamping operation, or its equivalent, to the mixed acid phosphate of lime, carbon, and sulphate of lime, to keep them as nearly as possible of uniform thickness and consistency upon the leach cloth, in order to the more uniform and perfect leaching thereof.

6th, The treatment of the burned bones above described with sulphuric acid, diluted to or beyond the point of precipitating the sulphate of lead present therein, this dilution being made with a weak solution of acid phosphate of lime.

7th, The apparatus above and substantially as described, as a whole, for the purpose of obtaining liquid acid phosphate of lime, substantially as above described.

75,337.—TREATING THE MIXTURE OF ACID PHOSPHATE OF LIME AND FARINACEOUS MATTERS IN ORDER TO GRANULATE THEM.—Geo. F. Wilson, East Providence, R. I., and Eben Norton Horsford, Cambridge, Mass.

We claim the new and improved process of treating acid phosphate of lime when mixed with farinaceous matter, for the purpose of so drying and ageing the same as to prepare it for the successful application of mechanism for granulation, in the manner substantially as and for the purpose above described.

75,338.—PROCESS OF TREATING ACID PHOSPHATES IN THE MANUFACTURE OF YEAST POWDERS, ETC.—Geo. F. Wilson, East Providence, R. I., and Eben Norton Horsford, Cambridge, Mass.

We claim the use of the kettle or common receptacle for mixing together the viscid mass resulting from each day's work, after partial crystallization, with farinaceous dilutants, in the manner and for the purpose above set forth.

75,339.—APPARATUS FOR CONCENTRATING ACID PHOSPHATES OF LIME.—Geo. F. Wilson, East Providence, R. I., and Eben Norton Horsford, Cambridge, Mass.

We claim, 1st, The new and improved method or process of concentrating the acid phosphate of lime liquor by means of the apparatus constructed and arranged substantially as and for the purposes above described.

2d, The use of metallic evaporating kettles lined with porcelain, for concentrating the solution of acid phosphate of lime, in the manufacture of Horsford's puiverulent phosphoric acid.

3d, The improved fire pot, substantially as described, consisting of fire brick, lining a short metallic tube, or a short continuous fire-brick tube, with a surrounding air space, in connection with the use of the porcelain-lined kettle, for concentrating acid phosphate of lime liquor.

4th, The movable grate, in combination with the fire pot and porcelain-lined kettle, substantially as and for the purpose above described.

5th, The arrangement of the series or bench of single kettles above described, having a separate fire for each, in the manner and for the purpose set forth.

75,340.—EGG BEATER.—Sylvanus C. Wilson (assignor to himself, Edward Mathews and Wm. N. Strong), Central Falls, R. I.

I claim a dasher attached to the lower extremity of the rod, C, perforated with round holes, having a concave surface, upon which are soldered narrow strips of tin, passing across the center of the holes, substantially as described and for the purposes specified.

75,341.—MACHINE FOR CUTTING RAGS.—Alexander Allen (assignor to himself, W. G. Wood, John G. Walker and W. R. Walpole), Chicago, Ill.

I claim, 1st, The combination of the table, A, shears, a b, and movable bed, or guard, B, all arranged and operating in the manner and for the purposes described and set forth.

2d, In combination with said shears, a b, the rock shaft, b, arm, m, paw

wheel, C, when arranged with connecting arms and joints, substantially as specified and for the purposes described.

75,342.—FLUID METER.—Leicester Allen, New York city, assignor to himself and Solomon P. Smith, Waterford, N. Y.

I claim, 1st, The combination of the openings, b and l, with valves fixed to a pivoted arm, v', in such a manner that by the movement of the arm the openings shall always be proportionately uncovered or closed, when this combination is used in a fluid meter, substantially as and for the purposes specified.

2d, The cylinder, C, provided with the piston, D, and the opening, e, or their equivalent, when used in a fluid meter, substantially as and for the purpose specified.

3d, The chamber, J, provided with the diaphragm, m, substantially as and for the purpose specified.

4th, The arrangement, in a fluid meter, of the chambers, B B', cylinder, C, piston and rod, D D', arm v', and valves v v'', substantially in the manner and for the purposes set forth.

75,343.—MAP AND CHART HOLDER.—E. A. Apgar and A. C. Apgar, Trenton, N. J.

We claim the self-adjusting rotary compound hinge, as described, and for the purposes set forth.

75,344.—HYDRANT.—T. R. Bailey, Jr., Lockport, N. Y.

I claim, 1st, A hydrant or water-plug, constructed substantially as shown and described, that is to say, with the parts A and B connected together as shown, and with a cylinder valve and a waste water valve connected and operated in combination, substantially as herein specified.

2d, The arrangement of the parts, A B, valve, D, case, C, and stuffing box, H, as herein described for the purpose specified.

75,345.—RAILROAD CAR HEATER.—Wm. C. Baker, New York city.

I claim, 1st, A circulating hot water apparatus, adapted to railroad cars and other vehicles, in which a rising water pipe from the heater opens into a water vessel, in combination with a descending pipe and radiating or heating tubes, substantially as and for the purposes set forth,

2d, The heating tubes, arranged as shown, to run from the side of the car beneath the respective seats, and furnish warmth to the individual passengers, in combination with the aforesaid hot water heating apparatus set forth.

75,346.—FIREPROOF SAFE.—R. A. Ballou, Boston, Mass.

I claim embedding in the filling of a fireproof safe a stratum or strata of wood, arranged substantially as described, for the purpose of enhancing the non-conduction power of the safe walls, as specified.

75,347.—SASH-STOP FOR WINDOWS AND DOORS.—Frederick Baumgartner, Brooklyn, N. Y.

I claim the combination with the sash and frame of a sliding window or door of a combined spring, A, and roller, B, arranged and operating substantially as and for the purposes herein specified.

75,348.—SELF-PROPELLING ENGINE.—N. S. Bean, Manchester, N. H.

I claim in a steam fire engine, in which the steam and pump cylinders are arranged as described, operating the wheels of the engine to propel it over the road, substantially as specified.

Also, the arrangement on the shaft driven by the steam cylinders which work the main pumps of steam fire engines of the driving wheel, d, or its equivalent, so that it can be made fast or loose on said shaft, substantially as and for the purpose specified.

Also, the combination of the axle of the steering wheel with the hand wheel, o, by means of the chains, s, windlass barrels, l, shaft, j, worm gear k, worm, m, shaft, n, substantially as and for the purpose specified.

75,349.—MOTH-PROOF BEEHIVE PORTAL.—Enoch Beard, Salem, Iowa.

I claim, 1st, The platform, H, with its crevices, D D D and E E, and flap, F, and crevice, G, when constructed and used as set forth.

2d, The back, I, when combined with the box, J, and constructed and used as shown.

3d, The box, J, separated into stories by the floor, U, when constructed and used as set forth.

4th, The tubes, T T, when constructed and used as herein shown.

5th, The drawer, C, when combined with the partition, N2, and constructed and used as shown.

6th, The slide, M, in combination with the movable gage, L, when constructed and used as set forth.

7th, The partition, N2, attached to the under surface of the platform, H, when constructed and used as set forth.

75,350.—MACHINE FOR THREADING SCREWS.—Jason A. Bidwell, East Boston, Mass.

I claim, 1st, The construction of the threading clamps or dies, E E, with cutters and recesses, in such manner as to form counterparts of the screws which they are designed to produce, substantially as described.

2d, The application of threading clamps, E E, to laterally vibrating jaws or carriers, E1, in combination with a device for holding screw blanks while they are being threaded, substantially as described.

3d, The laterally vibrating and rectilinear reciprocating die carriers, E1 E1, in combination with the leader screw, c, substantially as described.

4th, The application of elastic yielding half-nuts, d d, to vibrating threading die carriers, E1 E1, substantially as described.

5th, The combination of closing cams, B B, and opening spring, c, with the threading die carriers, E1, substantially as described.

6th, The combination with the machinery substantially as herein described, for producing threads on screw blanks, of the griping jaws, g g, and cams, g1 g1, applied and arranged so as to operate substantially as herein described.

7th, In a machine for producing threads upon screw blanks, the griping jaws, g, cams, g1, and toggles, h1, combined with a sliding collar, H, and applied to a spindle, all substantially as described.

8th, The arrangement of the devices specified for adjusting the cams, g1 g1, in the screw blank threading machine, herein shown and described, for the purpose set forth.

9th, In a screw thread cutting machine employing an intermittent rotating spindle carrying the blank-holders, the index wheel, O, with its dog, p p, applied substantially as described.

10th, In combination with the wheel, O, with its dogs, p p, the vibrating lever, N, latches, P P1, and lever, L, said parts being applied to a screw cutting machine, so as to operate substantially as and for the purposes described.

11th, The spring arms, M M, the lifting lever, N, right and left latches, P P1, and the vibrating lever frame, L, carrying the shifting gear, L1 L2, all combined and applied to a screw threading machine, substantially as described.

12th, The pitman rod, L3, with its check stud, n, and the slotted guide, n1, in combination with the lever frame, L, substantially as described.

13th, Providing the lever frame, L, with right and left latches, P P1, for arresting this frame at the termini of its strokes, said parts being applied to a screw threading machine, and operating substantially as described.

14th, The driving of the leader screw shaft, F, and the griping jaw, carrying spindle, G, by means of a single wheel, J, which receives intermittent rotary or oscillating motions from shifting wheels, L1 L2, substantially as described.

15th, The adjustable yoke, B1, applied upon the cam rods, B B, for the purpose of regulating the amount of lateral vibration of jaws, E1, carrying threading dies or cutters, E, substantially as described.

75,351.—LAMP CHIMNEY CLEANER.—James S. Black, Oakland, Ill.

I claim the disk, D, in combination with the springs, B, and sliding central rod, C, all arranged as described, whereby the springs are prevented from bending inward as they are extended, as herein shown and described.

75,352.—MACHINE FOR CUTTING HOOPS FROM THE EDGE OF A BOARD.—S. C. Blinn, J. J. Alvord and H. Brewer, Tecumseh, Mich., assignor to S. C. Blinn.

We claim the combination of the knife, K, arms, M and M', and guides, N and N', with the crank, B2, pitman, K', and rods, L, when the parts are constructed and arranged to operate so as to permit the knife to travel with a reciprocating and curved transverse movement, substantially as set forth.

75,353.—KNITTING MACHINE.—Henry Bogel, Watertown, Wis.

I claim, 1st, The arrangement of the grooves, p, q, r and S, in the lower surface of the plate, D, in connection with the movable plate, t, whereby the groove, S, may be closed, and the grooves, p and r, connected directly with each other, all as set forth.

2d, The plate, M, sliding on the plate, D, and operating the plates, t, and arms, g' and b', substantially as and for the purposes herein shown and described,

3d, The device for taking up the slack of the thread, consisting of the bars, c' (or d'), in combination with springs, e', and arms, g' (or b'), the latter being operated by the plate, M, all made and operating substantially as herein shown and described.

4th, The elastic extension, b', of the spools, I, and the bars, c' (or d'), for taking up the slack of the thread, substantially as described.

5th, The slotted latch opener, N, in combination with the thread holder, l, and supports, K K, of the spool, all made and operating substantially as herein shown and described.

75,354.—LANTERN.—Wm. H. Bonnell, Buffalo, N. Y.

I claim the combination and arrangement of the springs, I I, with the rims, A or B, and openings, C C, as and for the purposes described.

75,355.—WELL BORER.—Geo. W. Bowen, Fort Wayne, Ind.

I claim, The circular plate, D, for well cleaning, when provided with holes, a for the purpose of allowing the escape of water from the dirt or sand, being lifted from the well, as herein set forth for the purpose specified.

2d, The plate, D, having spring cutting edges, all formed in one piece and provided with holes, a, as and for the purpose specified.

3d, The application of the ropes to the plate, D, for the purpose of elevating the tool from the well, as and for the purpose specified.

4th, The tool for cleaning wells, constructed as described, consisting of the perforated disk, D, having spring cutting edges, surrounded by the rim, F, and provided with adjustable handle, A B, as herein shown and described.

75,356.—GATE.—John Bowers, Clinton, Wis., assignor to Elijah W. Blaisdell, Jr., Rockport, Ill.

I claim, 1st, The extension of the main levers, F F, and the application to the lower end of the same of the balance weight, A.

2d, The double pulley block, with dead-eyes to keep the cord on the pulleys, suspended on a single rod, or working with journals in the head of the gate, and operating with a swinging or lateral motion on the opening and shutting of the same, as shown by diagram.

75,357.—CAR TRUCK.—Alfred Bridges, Newton, Mass.

I claim the combination of the journal boxes and housings with the links for supporting the car body, and the cross-heads upon which said links are held, in the manner described, so that the said boxes, while having a free, lateral motion, shall be prevented from twisting in their housings, as herein shown and set forth.

75,358.—TRUNK.—James H. Burnett, Jr., Newark, N. J.

I claim in combination with a trunk constructed as described, the lid, X X, made in two sections, hinged together, one section being also hinged to the front edge of the trunk at Y, and the other adapted to fit against the vertical part of the trunk, both forming an obtuse angle, the removable partition, A2, in the body of the trunk, and the hat receptacle, as herein shown and described.

75,359.—HAT BUCKLE.—J. N. Burton, Senoia, Ga.

I claim as a new article of manufacture a ticket-holding attachment for hats, consisting of the buckle, A, carrying the spring, C, all made and operating substantially as herein shown and described.

75,360.—COMBINED KNOB LATCH AND DOOR LATCH.—Henry W. Busse, Chicago, Ill.

I claim the combination in a door lock of the latch, B, provided with a notch, b, the bolt, C, provided with a slot, c, and notches, e f, the bent arm, D, the bar, F F', provided with a tongue, t, the spring, a a', and the plate, G, all arranged and operating substantially as and for the purposes specified.

75,361.—UNIVERSAL JOINT.—J. J. Butts and A. S. Stone, Plainview, Minn.

We claim the ball, B, and arms, A A, constructed and connected substantially in the manner and for the purpose specified.

75,362.—PIANO FORTE.—L. Caldera and L. Montu, Turin, Italy.

We claim, 1st, The method of prolonging the vibrations of the strings of a piano, substantially in the manner and by the means herein shown and described.

2d, The combination, with the ordinary striking hammer, damper, and other parts of the action of a piano, of an auxiliary or vibrating hammer and clock work, or equivalent mechanism for imparting the desired motion to the same, substantially in the manner and for the purposes herein shown and described.

75,363.—LAMP BURNER.—Geo. J. Capewell, West Cheshire, Conn.

I claim, in a lamp burner, such as herein described, the rim, B, and standard, E, provided with the springs, c and d, when the latter are constructed and arranged in the manner as herein shown and specified, and for the purposes set forth.

75,364.—ANGULAR SHAFT COUPLING.—John M. Case, Athens, Ohio.

I claim the combination of the oblong frames, C, having cogs or teeth, c', formed upon the ends of their forward sides, and the pivoted connecting bars, D, with each other, and with the ends of the connected or coupled shafts, substantially as herein shown and described, and for the purpose set forth.

75,365.—INSULATOR.—Alfred H. Castle, Ann Arbor, Mich.

I claim, 1st, A telegraph insulator or bracket, constructed with a groove, E, substantially as and for the purpose set forth.

2d, The cavity or chamber, B, and groove, E, in combination with the bracket, A, substantially as set forth.

75,366.—ELEVATOR.—Simeon B. Castle, Cortland, N. Y.

I claim, 1st, The slotted frame, A, in combination with the cross-head elevators, B, for the uses and purposes set forth.

2d, The adjustable table, b, in combination with the elevator heads, for the purpose described.

3d, The quadrant-shaped bars, c' c', in combination with the frame, A, and axle of the driving wheels, for the purpose of raising and lowering the main apparatus.

75,367.—BUNG.—N. L. Chappell, New York city, and C. H. Pettit, Jersey City, N. J.

We claim, 1st, The sliding dogs, C, formed with inclined planes or faces, e', and operated by the eccentric grooves, c, in combination with the two parts or portions, A B, substantially as and for the purpose herein set forth.

2d, The spurs, or projections, f, formed upon the lower part, B, of the bung, substantially as and for the purpose specified.

75,368.—HAND CORN SHELLER.—Charles Christian, Milwaukee, Wis.

I claim, in combination with the hand corn sheller, A A, the curved guard-plates, D D, substantially as and for the purpose set forth.

Also, in combination with the hand corn-sheller, A A, the set screw, E, substantially as and for the purpose set forth.

Also, a hand corn-sheller, constructed with the plates, A A, as described, and provided with the guard plates, D D, springs, I I, and set screw, E, substantially as and for the purpose set forth.

75,369.—CLAMP FOR SCRUB BRUSH.—Charles B. Clark, Buffalo, N. Y.

I claim constructing the sliding collar, c, with the flange, s, when arranged on the inclined shank, d, and operated by a nut, E, in the manner and for the purpose shown and described.

75,370.—RAILWAY CHAIR AND FASTENING.—Dominicus N. Clark, Eastport, Me.

I claim, 1st, The chairs, C, clamps, E, ties, F, and sleepers, B, when said parts are constructed and combined with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the iron ties, F, having an enlargement or shoulder, f1, upon each end, with the chairs, C, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the intermediate ties, F, constructed with stationary jaws, f2, and shoulders, i3, formed upon them, and removable jaws, i4, with the rails, A, and sleepers, B, substantially as herein shown and described, and for the purpose set forth.

75,371.—HEAD BLOCK.—Thaddeus L. Clark, Mt. Vernon, O.

I claim, 1st, The indicating wheels, K K, provided with grooves, x x, and different series of figures on their peripheries in combination with the indicators, j j, as and for the purpose set forth.

2d, The combination of the shafts, C C, indicating wheels, K K, and ratchet wheels, D D, with the housings, H H, quadrants, I I, and levers, E, when constructed and operated substantially as described and used for the purpose set forth.

75,372.—LOCK FOR FRUIT BOXES, ETC.—Charles Colby, Madison, Wis.

I claim, 1st, Fastening and holding the band or cord of the box by means of a single loop, m, with double grooves, b c, which double, forms a hook which keeps the loop in mortise or slot, k; also the double groove, d e f, which, when bent, forms a groove to receive and hold the end, e e, of band or strip, substantially as set forth and described.

2d, In combination with the subject matter of the above, the double bearings or rests, n n, for the bottom of the box, substantially as set forth.

75,373.—COTTAGE CHAIR.—Claudius O. Collignon (assignor to himself and Nicholas Collignon), Closter, N. J.

I claim the combination of the back, A, seat, B, and brace, F, with the grooves, h, and bar, G, and their several connections, as and for the purpose set forth.

75,374.—WATER CLOSET VALVE.—William S. Cooper, Philadelphia, Pa.

I claim, 1st, The valve, D, constructed as described, and provided with the cup leathers, e and e', substantially as specified.

2d, The fixed hollow central stem, m, of the cap, C, with the water passages, k, in combination with the valve, D, and chamber, B, substantially as set forth.

3d, The combination of the regulating screw, H, fixed central stem, m, of the cap, C, passages, k, and chamber, B, substantially as described and for the purpose specified.

75,375.—WATER CLOSET.—Wm. S. Cooper, Philadelphia, Pa.

I claim, 1st, A water closet top plate, provided with lug, R, so constructed that the horizontal lever, L, may be raised higher than the top plate, as and for the purpose specified.

2d, A water closet articulated lifting rod, R', combined with lever, L, piece, C D, and thumbscrew, T' S', constructed and operated in the manner and for the purpose above set forth and described.

75,376.—VALVE COCK.—Wm. S. Cooper, Philadelphia, Pa.

I claim the combination of the valve, n, spindle, H, with its screw, S, the cap, C, with its chamber, M, and waste passage, t', substantially as specified, and for the purpose described.

75,377.—REFRIGERATOR COFFIN.—J. S. Cox, Delaware, O.

We claim the double walled refrigerator coffin, constructed as described, with the ice chambers, a c, at the head and foot of the corpse chamber, b, said ice chambers having exterior openings, f f, for the escape of water, and communicating with the corpse chamber containing the rack, by means of openings in the bottom of the inner walls of said chambers, as herein described, for the purpose specified.

75,378.—CREASER FOR CLOTH.—W. J. Crane, Carbondale, Pa.

I claim the creasers, C, a a', and D, constructed as described, combined with the clamp, A, and set screw, b, as and for the purpose set forth.

75,379.—DESK AND SEAT.—Robert Cruikshank, Lawrenceville, N. J.

I claim, 1st, Connecting the lower end of a curved arm, D, with the end frames, A, by means of sliding blocks, E, and horizontal guide rods, F, substantially as herein shown and described.

2d, The combination of the rubber block, G, or equivalent spring, with the guide rod, F, and with the sliding block, E, said spring or rubber block being placed in such a position that the said sliding block will strike against it, both when the seat, C, is in a horizontal and when in a vertical position.

3d, The supporting end pieces, A, when cast with dovetailed upper ends, adapted to fit into corresponding grooves formed in the under side of the top, B, of the desk, as herein shown and described, for the purpose specified.

75,380.—CORN PLANTER.—Wm. Daggett, 4th, Cordova, Ill.

I claim, 1st, The gage, a2, for regulating the size of the cavity, a3, in the plunger, E, of a hand corn planter, substantially as described.

2d, The corn planter constructed as described, and consisting of the box, A, having partitions, D d, spring plate, a, scraper, d', plunger, E, having cavity, a3, gage, a2, and pin, a1, all constructed, arranged, and operating as set forth.

75,381.—UMBRELLA RUNNER.—Anthony G. Davis, Watertown, Conn.

I claim the cylinder, A, and flanged cap, a, in combination with the head, b', the latter being constructed of the slotted strip, B shaped as described, and arranged in such manner that the slots lie contiguous to each other, the bends between being solid metal, substandaly as and for the purpose set forth.

75,382.—CRIBBING PREVENTER.—Benjamin J. Davis, and Isaac S. Cramer, Sergeantsville, N. J.

We claim the parts, C, and B, the one sliding within the other, in combination with the pricking point, a, and spring, s, all substantially as shown and described, for the purpose of preventing horses from indulging in the so-called habit of cribbing, all as set forth.

75,383.—HARVESTER.—John S. Davis, Tiffin, Ohio.

I claim, Attaching the adjustable bar, G', to a harvester in such a manner that the finger bar, H, and connecting rod, b, may be held in the same line, or parallel with each other, as and for the purposes set forth.

2d, The adjustable arm, G, in combination with the frame, C, and shoe, E, as and for the purpose specified.

3d, The block, x, in combination with the adjustable arm, G, shoe, E, and frame, C, substantially as and for the purpose set forth.

4th, The arrangement of the seat, K, with the bar, M, so that middle of said seat is in a line with the middle of the axle, A, substantially as and for the purposes set forth.

5th, The draw irons, L L, in combination with the cross bar, N, draft pole, T, and arm, M, as arranged and for the purpose specified.

6th, The arrangement of the frame, C, beneath the axle, A, with the draw irons, L L, tongue, T, and bar, M, so that the rear end of the said frame, C, may be raised or elevated without elevating or throwing up the driver in the seat, substantially as specified and for the purpose set forth.

75,384.—WINDMILL.—William C. Day, Mohawk, N. Y., and Pardon B. Day, Shelby, Minn.

We claim, 1st, The arrangement of chain or rope, C, windlass, B, and pulleys, e f, with the doors, A, surrounding the wind wheel, E, substantially as shown and described.

2d, The combination of chain or rope, C, doors, A, and springs, D, substantially in the manner as and for the purpose set forth.

75,385.—HOP-PICKING TOOL.—John Dean, Baraboo, Wis.

I claim, 1st, A hop-picking instrument, consisting of a rake, having curved teeth, C, and cutters, D D, at the ends, substantially as herein shown and described.

2d, The diamond-shaped teeth, C, with concave front edges, substantially as and for the purpose herein shown and described.

75,386.—GRAIN DRYER.—Julius De Bary, Offenbach, Germany, assignor to William Einstein, New York city.

I claim, in a malt and grain-drying machine, the outer wooden case, A, inner metallic case, a, with an interposed air space, the adjustable endless main scrapers, E, perforated plates, G I, imperforate plate, H, pipes, I x, and zigzag hot air flue, D, when constructed, arranged, and operating as described, for the purpose specified.

75,387.—VALVE GEAR FOR STEAM ENGINE.—Edward N. Dickerson, New York city.

I claim, 1st, A reversing link, vibrated by one eccentric, capable of being moved in the direction of its length for reversing, suspended at its neutral point by a radius bar, or other equivalent device, upon which it vibrates, and upon the opposite side of which it works the valve for the forward and backward motion of the engine, substantially as described, in combination with an independent cut off apparatus of any sort, for closing the ports which it opens.

3d, An independent cut off apparatus, adjustable while the engine is in motion, by altering the angular position of the eccentric which works the independent cut off slide, in reference to the line of the crank, substantially as described.

3d, The combination of a pin or block fixed in the main shaft, with a pipe surrounding the main shaft, to which the cut off eccentrics are fixed, and with an exterior sliding sleeve surrounding the said pipe, provided with two grooves, one of which receives the end of the fixed pin, and the other of which receives a block or pin fixed upon the eccentric pipe, and one or both of which grooves are spiral, as a device for the purpose of varying the angular position of the cut off eccentrics upon the main shaft, substantially as described.

4th, A graduated opening, through the main port, or valve, in combination with the exhaust openings, so arranged as that one exhaust aperture will be opened before the other closes, and with an independent adjustable cut off for the purpose of preventing a "cushion" of the steam and the shock of sudden admission, without "wire drawing" through the graduated opening in cutting off, substantially as described.

75,388.—CARD-SETTING MACHINERY.—Thomas A. Dickinson, Worcester, Mass.

I claim, 1st, The round slide, M, constructed and operating as described.

2d, The combination of the slide, M, slide, I, link, P, and lever, Q, in the manner described.

3d, The mode described of clamping the wire to the slide, M, by means of the jaw, L, and spring, K, operating as specified.

4th, The clamping jaws, c d, operated by the spring, S, substantially in the manner set forth.

5th, The cutter cylinder, V, constructed and operating as described.

75,389.—DOOR OF FIRE PROOF SAFE.—William B. Dodds (assignor to Dodds, MacNeale & Urban), Cinn, O.

I claim the provision, in a fire proof safe, of the auxiliary door, C, hinged to, and when open, affording access to, the entire lock and door bolt movement and filling of the door proper, as set forth.

75,390.—LAMP SHADE.—T. B. Doolittle, Bridgeport, Conn., assignor to himself, George Doolittle, and George H. Dimond.

I claim, 1st, A lamp shade or reflector, formed of sheet metal, adapted to be applied to the chimney of a lamp, and so corrugated or crimped as to be capable of sufficient spring or elasticity to permit it to be sprung on to the chimney, substantially as described.

2d, The employment, in combination with a shade or reflector, of a spiral or coil spring or springs, arranged in the upper edge of the shade, so as to roll over a spring back, substantially as described for the purpose set forth.

3d, Forming a corrugated or crimped metallic shade, with projecting metallic teals or lips, s s, substantially as described for the purpose set forth.

75,391.—APPARATUS FOR TANNING IN VACUO, AND FOR OTHER PURPOSES.—Charles Doty, St. Louis, Mo.

I claim the vessels, A and B, when coupled together with the pipe, D, and otherwise provided with the cocks, C a', and h, and doors, a b, all arranged and operated substantially as herein shown and described.

75,392.—SAFETY VALVE.—S. B. Dougherty, Bordentown, N. J., assignor to himself and John Ashcroft, New York city.

I claim the arrangement of the cylinder, A, with its perforations, f f, annular chambers, E a H, and valve seats, I I, substantially as described and set forth.

Also, the construction of the inner cylinder, or double seat valve, K, with its recess, L, shoulder, m, seats, k and k,' and internal steam exit opening, n n', substantially as set forth and described.

75,393.—MODE OF IMITATING CLUSTER JEWELRY.—William O. Draper, Albert C. Sweetland, and George H. Draper, North Attleboro, Mass.

We claim the method of constructing cluster work jewelry, substantially as herein described.

75,394.—PRINTING PRESS.—A. A. Dunk, Philadelphia, Pa.

I claim, 1st, The combination of the form cylinder, D', the cylinder, G, separated into as many segmental platens as there are forms on the said cylinder, D', and nippers, constructed in the manner described, or any equivalent to the same, but, in number one in excess of that of the forms or segmental platens, and arranged to revolve in a circle larger in diameter than, but eccentric with, that of the platen roller, all substantially as and for the purpose herein set forth.

2d, The grooves or channels, b, of the cylinder, G, and intervening segmental platens, in combination with the series of nippers, so many in number in respect to the grooves, and revolving in a course so eccentric with that of the cylinder that each set of nippers will transfer a sheet from one platen to the other, and will find its way from one groove to another, all substantially as and for the purpose herein set forth.

3d, The said revolving nippers, moving in a circle eccentric with the cylinder, G, having segmental platens, in number, one less than that of the nippers, in combination with the devices herein described, or any equivalent to the same, by the aid of which the paper, carried by any one set of nippers, shall be released, but not before it has been carried round as many times as there are platens on the said cylinder.

75,395.—ANVIL CUTTER.—Valmore A. Dunn, West Peru, Me.

I claim the improved shears, composed of the fixed arm, b, and jaw, B, lever, C', C, and spring, D, combined and arranged in manner substantially as above set forth and described.

75,396.—SASH BEAD FASTERER.—Daniel W. Dyer, and James H. McVaugh, Philadelphia, Pa.

We claim the catch, E, constructed substantially as herein shown and described, in combination with the slotted plates, F and D, beads, B and C, either or both, and casing, A, as and for the purpose herein set forth.

75,397.—SEAT FOR VEHICLE.—Walter A. Eddy, East Randolph, N. Y.

I claim the arrangement of the lever, B, with the connecting rods, C C, plates, D D, when secured or adjusted to the bottom of a seat, A, for the purpose of securing the same on a buggy, wagon, or cutter top, substantially as and for the purpose herein set forth.

75,398.—BOOT AND SHOE.—Henry Eldridge, Lynn, Mass.

I claim suspending and combining the rolls of material in the manner described, whereby they may be unwound and lapped one upon another, essentially as herein shown and specified.

75,399.—WRENCH.—John J. Ellis, Auburn, N. Y.

I claim the shank, B, extending through the handle, A, and furnished at one end with a screw thread, upon which is screwed hammer, C, the opposite end of shank B being formed with a jaw, all arranged in combination with jaw, D, and slide, E, substantially for the purpose set forth.

75,400.—PETROLEUM OR GAS STOVE.—D. L. Emerson, Rockford, Ill.

I claim the oil reservoir, D, and lamp, D, as one vessel, in combination with the tubes, B B, and burners, E E', and F F', constructed as described and operating as and for the purposes set forth.

75,401.—HARVESTER.—E. W. Fairman, Orfordville, Wis.

I claim the hinged or pivoted plate, A*, combined with the lever, E, cam wheel, C, and lever, G, arranged and operating substantially as and for the puopose specified.

75,402.—FILING MACHINE.—Moritz Fiedler (assignor to himself and to John Klein), Rochester, N. Y.

I claim the combination of the table, a, toothed segment, d, and worm, c, with the slotted pitman, n, and crank, r, arranged substantially as described.

75,403.—CORN HUSKER.—Charles Ford, Forest city, Ill.

I claim, 1st, A serrated feed hard roller, H, and rubber roller, I, used, as herein set forth, for husking corn, by catching the husk and stalks and passing them through beneath, while the ear is left on top.

2d, The rollers made, as herein set forth, fig. 2, smaller for near one third their length at the front end, to admit the stalks between the rollers.

3d, The use of the gain thread, J, which increases the acuteness of its angle with the roller, as it runs back, see fig. 3, from the point to the swell of the rollers, thereby pulling the cornstalk gently over at first, but more quickly afterward, and also keeping the stalks parallel with the threads that pull them, thus avoiding the danger of breaking them off before they get into the hopper.

4th, The use of the right hand gain thread, on the front end of the left hand roller, and the left hand gain thread, see fig. I J, on the right hand roller, in connection with the inward and downward motion of the rollers.

5th, The hopper, F, made and used as herein set forth.

6th, The snapper, G, made and used for breaking the ears from the stalks and husk, while the latter are held firmly beneath, between the rubber and serrated rollers, and also for carrying the ears back under the presser.

7th, The presser, T, for pressing the ears down and rolling them over as it passes them back between the rubber and serrated rollers, so that any remaining husk or silk may be taken off before they pass out on to the dropper.

8th, The dropper, L, arranged as herein described, in connection with the mouth, m, of the machine, in such manner that the ear corn is delivered in a wagon, if driven for that purpose, without other assistance.

9th, The breaker, Z, made and used as herein set forth, to break the tops of the stalks back, so they will pass down between the rollers before they get far back on them.

10th, The combination of the gain thread, J, rubber roller, I, serrated roller, H, fenders, S, snapper, G, presser, T, hopper, F, dropper, L, gearing, N and frame, D, arranged and used as herein described.

75,404.—MANUFACTURE OF VINEGAR.—Andre Foubert, New York city.

I claim an evaporating tub containing platforms and vapor tubes, in combination with the apparatus for supplying water and vinegar, and with the vat containing shavings, substantially as and for the purposes set forth.

75,405.—MACHINE FOR COILING SPRINGS.—John Freeland and Daniel Ward, New York city.

We claim, 1st, The slotted coiling spindle, e, and the sliding screw, E, in combination with the chuck, b, all constructed, arranged, and operating substantially as and for the purpose herein described.

2d, The guide rest, H, and the sliding block, I, in combination with the coiling spindle, e, constructed and operating substantially as and for the purpose herein described.

3d, The combination of the pulleys, C, the chuck, b, the coiling spindle, e, the sliding screw, E, the guide rest, H, and the sliding block, I, constructed, arranged and operating substantially as and for the purposes set forth and described.

75,406.—FABRIC FOR THE MANUFACTURE OF HATS, CAPS, ETC.—Treflé Garceau and Edward De La Granja, Boston, Mass.

We claim, 1st, The composition above described, substantially as and for the purpose set forth.

2d, The process of manufacturing hats, caps, bonnets, neckties, and ribbons, substantially as specified.

75,407.—JOINT FOR PIPES.—Benjamin Garvin and R. J. Pettibone, Oshkosh, Wis.

We claim the parts, A A, constructed as specified and used with the bolt, a, which said bolt passes transversely through both of said parts and is suitably secured on both of their outer sides by nuts and washers, or their equivalents, as set forth.

75,408.—SINGLE TREE.—George Gibbs and William Gibbs, Canton, Ohio.

We claim the tree, a, provided with the short disconnected springs, b b, loops, c c, and one or more indicators, e, for marking the numbers on said loops, all combined and used substantially as set forth.

75,409.—WHIP LOCK.—Francis M. Gifford (assignor to himself and John C. Selden), Erie, Pa.

I claim, 1st, A lock for securing a whip in the socket upon the dasher of any vehicle, composed of the arms, A, forming two sets of jaws operated by a screw, D, and key, E, and a spring, a, or its equivalent, substantially as shown and described and for the purposes set forth.

2d, The arms, A, in combination with the vibrating nut, C, and the wire spring, a, and the vibrating socket, B, and the screw, D, substantially as shown and described and for the purposes set forth.

75,410.—COTTON SEED PLANTER.—A. J. Going, M. D., Clinton, La.

I claim, 1st, The fixed metallic strips, g g, in combination with the laterally-adjustable metallic strips, h h, placed at the bottom of the hopper, i, and constructed and arranged for joint operation, substantially in the manner as and for the purpose set forth.

2d, The furrow opener, H, and harrow, F, in combination with the cotton seed distributing mechanism, all constructed, arranged and applied for joint operation, substantially as and for the purpose specified.

75,411.—GRINDER FOR KNIFE FOR PLANER.—John Grant, Northampton, Mass.

I claim a device for sharpening the knives of planers and similar tools, consisting of the screw, H, piece, G, wheel, D, and ground spindle, f, the parts and the whole being constructed and arranged substantially as shown.

75,412.—SURGICAL CUP.—John G. Hadfield, Cincinnati, Ohio.

I claim the provision, in a surgical cup, of a groove, a, to receive and hold an india-rubber lip, B, in the manner set forth.

75,413.—MACHINE FOR CARVING IN WOOD.—Isaac Hall, New York city.

I claim, 1st, The combination of one or more pivoted or swinging frames, I J, constructed substantially as herein shown and described, with the pivoted frame, H, as and for the purpose herein set forth.

2d, The frame, H, adjustable with relation to the pivoting frame, C, for the purpose of carving two exact copies of the pattern at the same time, or increasing or diminishing the size of the copy in exact proportion to the pattern, substantially as herein shown and described.

3d, The tracer, S, adjustably secured to the slotted bar or arm, O, of the swinging or pivoted frame, I, by means of the slotted bar, V, rods, W Y, and sockets, T Z X, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the slotted bar, V, pivoted rod, W, and adjustable pivoting rod, Y, with each other and with the tracer, S, and slotted bar or arm, O, of the pivoted frame, I, substantially as herein shown and described and for the purpose set forth.

5th, The combination and arrangement of the pulleys, L and N, with the pivoted frame or frames, I and J, frame, H, and driving pulleys, D E, for the purpose of keeping the band or bands, F, taut while operating the cutters, whatever may be the relative positions of the said frames, substantially as herein shown and described.

6th, The arrangement of the holder and frame, P, with relation to the pivoted frame, I, tracer, S, and cutter in the arm, i, substantially as described and for the purpose specified.

75,414.—MODE OF ATTACHING COLTERS TO PLOW BEAMS.—James H. Hall, Maysville, Ky.

I claim the said wrought-iron sliding plate, with its flanges, mortises, and adaptation to the purpose of regulating the position of and holding fast the cutter to a plow beam.

75,415.—FURNACE FOR SMELTING ORES OF LEAD AND OTHER METALS.—R. Henry Hall, Taunton, Mass.

I claim the application of a receiving basin, as herein described, to furnaces used for smelting ores of gold, silver, or lead.

75,416.—HAY RAKER AND LOADER.—John Harper, Hillsboro, Iowa.

I claim, 1st, The revolving rake head, G, attached to arms, E E, and used in combination with the elevating cords, I, and spool, C, and the ratchet, F', and pawl, H, said parts being arranged to operate substantially in the manner and for the purpose set forth.

2d, In combination with the frame, A, and elevating arms, E, the pieces, D, pivoted to the frame, and held extended by the pins, D', so as to permit the width of the frame to be diminished when necessary, substantially in the manner set forth.

75,417.—GRAIN SEPARATOR.—Samuel Harris, Springfield, Mass.

I claim, 1st, The combination of the slotted rod, E, having rollers, c, with the triangular surface cam, D, when used and arranged upon a sifter, substantially as herein described.

2d, In combination with the above, the double-inclined agitators, e e, etc., arranged as described.

75,418.—LAMP SHADE.—Henry M. Hartshorn, Malden, assignor to himself and Daniel Forbes, Boston, Mass.

I claim as my invention the folding shade made of trapezoids, connected at their edges by strips of cloth, or the equivalent thereof, so that the several sections may be either folded or unfolded, as specified.

Also, the combination, as well as the arrangement, of the series of sectional supporters, c and a folding shade composed of a series of trapezoids, a, arranged and connected or hinged together at their edges, substantially in manner as specified.

75,419.—SUBSOIL ATTACHMENT FOR PLOWS.—Charles Hayden, Collinsville, Conn.

I claim, 1st, The share standard, F, fitted in the plates, E G, and retained at the desired hight by the pin, d, in one of a series of holes, e, substantially as and for the purpose specified.

2d, The combination of the lever, I, and pins, e, with the share standard, F, all constructed, arranged and applied substantially in the manner as and for the purpose set forth.

75,420.—CAR COUPLING.—G. W. Haynie, Olney, Ill.

I claim, 1st, The combination of the segmental cam pinion, B b, and coupling pin, E e, when the same are adapted to be operated by the coupling link, substantially as described.

2d, The spring, F, applied and operating substantially as and for the purpose specified.

75,421.—SCRUB BRUSH.—Daniel E. Hayward, Malden, Mass.

I claim, as an article of manufacture, the brush as described, viz., when composed of alternate rows of rubber and bristles.

75,422.—CLOTHES PIN.—D. K. Hickok, Morrisville, Vt.

I claim the blocks, A and B, constructed substantially as described, and connected together by means of the bands or elastic straps, C C, as and for the purpose set forth.

75,423.—TRAMMEL FOR STAIR RAIL.—George Hoover, Richmond, Ind.

I claim, 1st, The herein-described tram, composed of the cylinder, F, and arm, E, in combination with rod, I, substantially as described, and for the purpose set forth.

2d, The horizontal rod, I, vertical adjustable rods, G and H, in combination with the collars, K and K, clutches, J and J, and draft board, A, substantially as set forth and for the purpose specified.

75,424.—STEAM WATER ELEVATOR.—William L. Horne, Batavia, Ill.

I claim the combination of the siphon, a, with the steam water elevator, constructed and arranged substantially as herein set forth.

Also the combination of the slide bar, k, the wedge, m', and the auxiliary treadle lever, o, with the toggles and their operative pitman and treadle lever.

Also each last as made with the extra or lower foot, arranged with the main foot, and being for the purposes as set forth.

75,429.—GAS HEATER.—Daniel Kellogg, Jackson, Mich.

I claim, 1st, The employment of a revolving disk, substantially as shown and described, for the purpose of spreading the flame of a gas or oil stove, all as set forth.

2d, The adjustable dish, H, in combination with the burner, b, and disk, K, substantially as and for the purpose shown and described.

3d, The rod, e, and elevating screws, m m, for adjusting the hight of the disk above the burner, substantially as shown and described.

4th, Providing the rod, e, with a screw thread or other equivalent device, for the lateral adjustment of the disk, substantially as and for the purpose shown and described.

5th, The ring damper, G, in combination with the disk, K, substantially as shown and described and for the purpose specified.

75,430.—HORSE HAY FORK.—George Kinney, Bristol, Ind.

I claim the combination of the stem or central prong, A, cross bar, B, side prongs, C, arm, D, pivoted hooks or fingers, E, shield, F, and trip lever, G, with each other, said parts being constructed and arranged substantially as herein shown and described and for the purpose set forth.

75,431.—ARTIFICIAL TEETH.—A. A. Knowlton, St. Albans, Vt.

I claim artificial teeth provided with holes, formed with a screw thread, when secured to a vulcanite or rubber base, b, by means of screws, d, of the same material, all constructed and arranged substantially as and for the purpose set forth.

75,432.—HYGROMETER.—A. E. Lazell, West Meriden, Conn.

I claim the curvilinear strip of wood, constructed as described, and having one of its surfaces rendered impervious to moisture, in combination with an index, substantially as and for the purpose specified.

75,433.—FAGGOT FOR RAILROAD RAIL.—William Leighton, Wyandotte, Mich.

I claim the Y or dovetail shaped piece of steel, with V-shaped top, in conjunction with any suitable faggot which will make a rail, as shown in fig. 2.

75,434.—CATAMENIAL SACK.—H. W. Libbey, Cleveland, Ohio.

I claim the sack, A, having the elastic pieces, a a, in each side to give it shape, and the elastic band, B, in combination with the adjustable belt, D, all constructed in the manner described, as and for the purpose set forth.

75,435.—CORN PLANTER.—Noyes Liddell and Morris Liddell, Lafayette, N. Y.

I claim, 1st, The combination and arrangement of the tube, C, lever, E, pin, D, and bell, H, for the purpose described.

2d, The slide, J, as described.

3d, The method described of adjusting the feed wheels on the shaft, O.

4th, The method described of throwing the shaft, O, in and out of gear.

75,436.—CULTIVATOR TOOTH.—M. F. Lowth and T. J. Howe, Owatonna, Minn.

We claim the combination of the beam, A, having the mortises, m n, as described, with the link, c, wedge, w, and hinged tooth, T, having the brace, B, substantially as and for the purposes set forth.

75,437.—STRAW CUTTER.—C. A. Lundy, Marshalltown, Iowa.

I claim the box, A, provided with the V-shaped knife, in combination with spring, N, feeder, L, gate, H, spring gage, m, all arranged in the manner herein set forth and described.

75,438.—ANIMAL TRAP.—M. B. Marshall, Draw Bridge, Md.

I claim, 1st, In an animal trap, a table, A, having two slots, a a, and a central aperture, B, and provided with legs, c c c c, and standards, D D', substantially as and for the purpose specified.

2d, The combination of the spring pole, O, cords, C e e, bar, N, rods, R and T, and chokers, o o, substantially as and for the purpose set forth.

3d, The notched and graduated bar, N, when used in a trap of this description, substantially as and for the purpose set forth.

75,439.—LAMP BURNER.—George A. Mason, Chelsea, Mass.

I claim, 1st, The arrangement of a chimney sustaining spring, intermediately between the deflector or cone, C, and the base, A, of the lamp top, substantially as and for the purpose set forth.

2d, The guide piece, G, and socket, D, in combination with the base plate, A, and wick tube, B, when said guide piece and socket are constructed as and for the purpose herein specified.

75,440.—TREBLE-TREE.—W. W. Mathews, Yates City, Ill.

I claim, 1st, The staple attachment, D E, of the inner ends of drawing bars, a a, and

2d, The curved hook, b, shown in fig. 2, each and all substantially as shown, and in combination as and for the uses and purposes herein expressed.

75,441.—MODE OF PRODUCING MOTION FOR SAWING MACHINES.—James W. Maxey, Plymouth, Ind.

I claim the hand levers, F F, operating alternately, and connected to wheels, D and R, by pitmen, E E, and combined with shaft, B, wheel, G, shaft C, drums, H, and balance wheels, I I, when constructed to operate substantially as described.

75,442.—MODE OF PRODUCING HOT BLAST IN FURNACES.—Theodore McDowell, Light Street, Pa., assignor to T. McDowell and A. McDowell.

I claim the engine, c', pump, c, pipes, I, vessels, F, and chamber, H, when combined substantially as and for the purpose explained.

75,443.—TUMBLER WASHER.—J. P. Milburn, Washington, D.C.

I claim, 1st, The combination with the central pipe over which the tumbler is placed, of an annular pipe or a series of pipes for discharging water upon the exterior of the tumbler, and a valve mechanism operated by the weight of the tumbler, so as to admit water to both the central and the exterior pipe or pipes, substantially as and for the purposes herein shown and set forth.

2d, The arrangement of the nozzles or orifices through which water is discharged upon the exterior of the tumbler in the manner described, so that the jets of water shall be discharged tangentially or thereabouts to the tumbler, substantially as and for the purposes herein shown and set forth.

3d, The combination with the central pipe of the annular or exterior pipe and adjusting screws or equivalent mechanism for regulating the pressure of water in the said pipe, substantially as and for the purposes herein shown and specified.

75,444.—HARVESTER.—Charles G. Miller, Springfield, Ohio.

I claim, 1st, Stopping the rake automatically at the rear of the platform during each alternate revolution of the driving wheel, by means of the herein described mechanism, or the equivalent thereof, for the purpose set forth.

2d, The combination of the strap, s'', eccentric, n', and pinions, p', and A', with the hubs of the driving wheel and rake's crank, substantially as described, for the purpose of throwing the rake in or out of gear automatically, as described.

3d, The combination and arrangement of the foot lever, g'', collar, g', clutch pin, h', running through the arm of the driving wheel into the driving pinion, A, for the purpose of throwing the rake out of gear at the will of the attendant.

4th, The combination of the catch, b'', on the end of the hub of the driving wheel, C, the collar, j', provided with the catches, c'' and d'', and the catch, a'', on the hub of the rake crank, substantially as and for the purpose set forth.

5th, The shoe, P, constructed as described, so that it may be adjusted and fixed at its forward end, in the manner set forth.

6th, The reel post, Q, mounted upon the inner shoe, and curved forward, so that the attendant may grasp its upper end as a lever to raise the outer end of the cutting apparatus from the ground, as set forth.

7th, The sliding carriage, t, connected with the rake head by the arm, u, and link, v, arranged substantially as set forth, so as to push the rake backward with the teeth vertical, and draw said rake forward again with the teeth horizontal.

8th, The reel sliding head, t'', constructed with the loose nut bar, p'', as and for the purpose set forth.

9th, The spring latch, s', constructed as described and for the purpose set forth.

10th, The construction or arrangement of the cutting apparatus, shoe, P, automatic reciprocating rake, reel, P'', and their operating mechanism, in relation to the main frame, so that the cutting apparatus, with its rake and reel, may be folded and so maintained while being moved from place to place, substantially as shown and described.

11th, The guide rods, d' and b', for the outer end of the rake, constructed and arranged as set forth and described, combined with the outer or guide tooth, u'' of the rake.

12th, The hook, and flange, v'', to retain the rake upon its side while being drawn forward, as set forth and described.

75,445.—BEDSTEAD FASTENING.—J. E. Milliken, Bridgeton, Me.

I claim the hinge, C, constructed as described, its leaves pivoted together at their upper ends, P, one leaf extending across the edge of the rail, B, and beneath it, and fitting at its angle upon the shoulder, a, of the vertical leaf secured to the post, A, all arranged as described, whereby the post, A, is adapted to swing up or down upon the pivot, P, as and for the purpose specified.

75,446.—WINDOW SHADE FIXTURE.—Jacob B. Moore, New York city.

I claim, 1st, Rolling or unrolling the curtain automatically, by means of the cord, and the small axes of the roller, substantially as described.

2d, Creating an equilibrium between the roller of the window shade and the lower rod, F, through the medium of the suspended cord and small axes D, whereby the shade is rolled or unrolled, substantially as herein shown and described.

3d, In combination with the shade suspended upon axes, D, and the lower rod, F, the weight, H, whereby the said shade is held at any desired point, substantially as described, for the purpose specified.

75,447.—CAR MOVER.—H. B. Morrison, Le Roy, N. Y.

I claim, 1st, In a car mover constructed as described, the two driving wheels, D and E, placed in line with each other, so as to run upon the same rail of the track, and connected to each other with and endless chain, F, substantially as herein shown and described and for the purpose set forth.

2d, The combination of a side wheel, U', with the projecting end of the axle, B, of the car mover, substantially as herein shown and described, and for the purpose set forth.

3d, The driving wheels, D and E, constructed with grooves of peculiar shape for the reception of the endless chain, F, and to enable them to hug the rail more closely, substantially as herein shown and described.

4th, The combination of the elbow lever, G' R', bars, F' D' and G' K', and pawls, A1 and R', with each other and with the cog wheel, d', formed upon or attached to the driving wheel, D, substantially as herein shown and described, for the purpose of operating the machine.

5th, The combination of the adjustable slide, E', with the bars, F' and D', substantially as herein shown and described and for the purpose set forth.

6th, The combination of the adjustable slide, F', with the lever, G', and bar, O', substantially as herein shown and described and for the purpose set forth.

7th, The combination of the reversible pawl, A', having a handle, a2, attached to its upper end, and coiled spring, C', with the socket, B' and cog wheel, d', substantially as herein shown and described and for the purpose set forth.

8th, The combination of the pawl, B', having a handle, b', attached to its upper end, spring, J', arm, M', coiled spring, L', and socket arm, I', with each other and with the cog wheel, d', and bar, K' substantially as herein shown and described and for the purpose set forth.

9th, The combination of the bar, K, slide blocks, N and O, screw, P, adjustable bars, M U, slide, V, adjustable standard, R, and pivoted socket, S, with each other and with the elbow lever, T W, and frame, G, substantially as herein shown and described and for the purpose set forth.

10th, The combination of the slide bar, T', with the frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

11th, The combination of the guide stays, A2, with the shaft, H, ferrules, B2, and sockets, S, substantially as herein shown and described and for the purpose set forth.

75,448.—SUSPENDING SCALE PAN.—Richard Murdoch, Baltimore, Md.

I claim, 1st, A dish for spring balances, constructed with two or more bowed arms, a a', so operating that they can be folded together when not in use, substantially as described.

2d, The combination of the standards, s s, sliding rings, t t, and pivoted arms or bails, a a', substantially as and for the purposes set forth.

75,449.—TINNING.—Peter Naylor, New York city.

I claim the means, herein specified, for applying flux to the interior of a length of lead pipe previous to tinning the same with melted tin, as specified.

75,450.—HAY RAKER AND LOADER.—W. T. Nichols, Rutland, Vt.

I claim, 1st, The combination of the gathering and loading rake, q' q', etc. and the supplementary elastic teeth, q q, substantially as and for the purposes set forth and described.

2d, The combination of the vibrating gathering rake, and the auxiliary loading frame, f f, substantially as set forth and described.

3d, Driving the auxiliary loading frame, f, by the carrying wheels, s, or their equivalent, said wheels being attached to and vibrating with the gathering frame, q' q', substantially as set forth.

4th, The combination of the land wheel, a, pinions, b and c, cranks, d, and rock shaft, e, substantially as and for the purpose set forth.

5th, The small wheels, n n, located between the teeth q' q', and having their bearing attached to said teeth, substantially as set forth.

6th, The connecting frame, l l l, attached to rake frames, as and for the purposes set forth and described.

75,451.—LUNCH BOX.—Peter H. Niles, Boston, Mass. Antedated March 6, 1868.

I claim a portable collapsing lunch box, composed of a top and bottom, in combination with double-acting end pieces and single-acting sides, substantially as described.

75,452.—HORSE HAY FORK.—S. Page, McAlistersville, Pa.

I claim the strap, D, provided with slots, x x, in the upper ends of which is a jog or offset, the rod or bar, F, and its hooks, G G, the frame, E, tines, J J, and lever, H, with its cord, the several parts being constructed, used, and operating in the manner and for the purpose set forth.

75,453.—SKATE-BUCKLING TONGS.—Wm. P. Patton (assignor to James M. Foster), Harrisburg, Pa.

I claim the within-described tongs, when constructed substantially as and for the purpose herein set forth.

75,454.—AUGER.—Ira T. Payne, Chester, Conn. Antedated February 28, 1868.

I claim the projection, C, on the floor-lip, for the purposes set forth.

75,455.—PLOW.—John D. Peck, Triangle, N. Y.

I claim the application of a cap or roof to the common farm plow, as herein described, and for the purposes herein set forth.

75,456.—FORMING HORSE-SHOE BLANK.—Charles H. Perkins, Providence, R. I.

I claim the improved double blank for horse-shoes herein described, as an article of manufacture.

75,457.—MACHINE FOR ROLLING AXLES.—Wm. P. Porter, Pittsburg, Pa.

I claim the combination of the adjustable rolls, A and B, and the roll, C, constructed and arranged in relation to one another, and to the frame which supports them, as and for the purpose herein described.

75,458.—ARMLET PORT-MONNAIE.—Aaron W. Pratt, Pultneyville, N. Y.

I claim the combination of the retaining-bolts, l, lock, f, slotted box, A c c, and retaining-bands, B B, as herein shown, and for the purpose described.

75,459.—VALVE GEAR FOR STEAM ENGINE.—Robert L. Reaney, Jersey City, N. J., and John S. Cornell, Brooklyn, N. Y., assignors to John S. Cornell and H. F. Pease, Brooklyn, N. Y.

We claim, 1st, The arrangement of the cylinder, B, the valve passages, b c d e, and inlet and outlet pipes, I J, so that the steam chest, K, and cylinder cover being in one piece, may cover both the end of the cylinder, its valve, and passages, substantially as shown and described.

2d, The construction and arrangement of the valve, L, the shaft, C, and its eccentric pin, g, relatively to the cylinder, B, connecting rod, F, and rod or ram, G, essentially as shown and described.

3d, The slide valve, L, with its ears, h h, acted upon by an eccentric pin or roller on the end of the main shaft, c, as shown and described.

75,460.—WHEEL HOE.—Edmund D. Reynolds and O. Bradford Reynolds, North Bridgewater, Mass.

We claim, 1st, In combination with the center blades, h (made vertically adjustable), the rear blades, l, made adjustable, both vertically and laterally, substantially as shown and described.

2d, Supporting the vertically-adjustable standards between guide-lips, g, substantially as described.

3d, In combination with the plate to which the blades, l, are secured, the laterally-sliding supports, m, substantially as described.

4th, Forming each hoe-blade and its standard from a plate, bent both at right angles, and with an inclination rearward, substantially as shown and described.

5th, Forming the standard of the two forward blades, by welding together the two vertical plates, substantially as described.

6th, In a hoe in which the blades are made adjustable, as described, applying the handle with provision for vertical adjustment, substantially as set forth.

75,461.—COTTON BALE TIE.—E. S. Roberts, Columbus, Ga.

I claim the cotton bale tie, constructed as described, and consisting of the open box, B, provided near each end with a transverse removable pin, b, around which the hoop, A, passes, the extremities of said hoop, after passing around the pins, being bent back between the bale and the hoop, in which position they are held by the outward pressure of the bale, all arranged as described for the purpose specified.

75,462.—LATHE FOR TURNING BUTTONS.—D. C. Robie (assignor to himself and H. E. Bostwick), Springfield, Mass.

I claim, 1st, The two spindles, B and C, operated by a shipper, so as to bring them alternately against the stock at opposite sides, when constructed and arranged substantially as described.

2d, The clutch, consisting of the stationary jaw, m, and pivoted jaw, n, operated by the treadle, K, and spring, L, arranged and constructed substantially as shown, when used in connection with my device, in the manner described.

75,463.—CHANGEABLE ESCAPEMENT FOR WATCHES.—Geo. Frederick Roskopf, Chaux de Fonds, Switzerland, assignor to himself and Jules D. Huguenin, Vuilleumin, New York city.

I claim, 1st, Placing or attaching the escapement of a watch to a separate or independent plate or frame, applied or fitted to the plates or frame which contain the "train" or other portion of the watch movement, in such a manner that the escapement attached may be removed at will, and another escapement substituted therefor, substantially as shown and described.

2d, The slot, i, in the escapement plate, B, and the screw, k, inserted therein, or an equivalent means for the purpose of adjusting the 'scape wheel and the lever pallets in a proper relative position with each other, substantially as set forth.

75,464.—BASIN FAUCET.—Robert P. Ross, Bethlehem, Pa.

I claim, 1st, The cap, C, when made hollow for the reception of the stem of the valve, D, said valve having its seat upon the tube, A, within the chamber, B, as herein described for the purpose specified.

2d, The loose valve, D, in the tight cap, C, fitting into the upper end of the chamber, B, the packing, E, of said valve resting upon the upper end of the stem, A, when the water is shut off by turning down said chamber, and lifted above the end of the stem, A, when the water is turned on, by turning up said chamber, as herein shown and described.

75,465.—LUBRICATING BOX.—Thomas J. Rowley and Wm. Poland, Chillicothe, Ohio.

We claim the lubricating box, C, when provided with the central annular chamber, a, surrounding the central portion of the thimble box, B, and communicating with the wrist, A, by means of the transverse openings, c, all constructed and arranged as described for the purpose specified.

75,466.—MACHINE FOR PLANTING COTTON SEED AND CORN.—Andrew Runstetler and Albert Windeck, Peoria, Ill.

We claim, 1st, In a convertible corn and cotton planter, the movable metallic box, O, having separating wires, w, x and y, in combination with the revolving forks, d e f, and the stirrer, P, substantially as set forth.

2d, The combination, in such a machine, of the perforated block, Q, drill, R, cut-off, S, and tongue, T, so constructed and arranged that they may be alternately with the cotton seeding mechanism, attached substantially as set forth.

3d, The combination of the reciprocating cogged slide, I, rollers, o g, adjustable crank, K, and driving rod, J, for communicating motion from the roller, F, to the seeding mechanism of either the corn or cotton planter, substantially as set forth.

4th, The combination of the drill teeth, b, track clearers, a, and harrow, q, arranged substantially as set forth.

75,467.—LAMP.—Lewis J. Sagendorph (assignor to himself and Samuel C. Moore), Boston, Mass.

I claim the blaze cap, C, so arranged with reference to the imperforate base plate, B, as to direct the air to the flame through an annular passage or opening around the blaze cap, in the manner and for purpose specified.

Also, supporting the blaze cap by pins resting in slits in the upright flange, B', of the base plate, in the manner described.

75,468.—MACHINE FOR CARBURETTING AIR.—James Sangster (assignor to himself and Daniel H. Burtiss), Buffalo, N. Y.

I claim, 1st, The construction and arrangement of the air wheel, A, in combination with the guard, B, substantially as and for the purpose herein described and set forth.

2d, The arrangement and form of the frame, M, as and for the purpose described in claim third of this specification or description.

3d, The combination of the weight, A4, and tube, C4, as and for the purposes described.

4th, The coupling, B5, as and for the purposes herein set forth and described.

75,469.—MACHINE FOR CARBURETTING AIR.—James Sangster (assignor to himself and Daniel H. Burtiss), Buffalo, N. Y.

I claim, 1st, The combination of an air forcing wheel with a stationary air tube and a non-forcing air chamber, I, provided with openings, K, the whole being constructed to operate substantially as and for the purposes herein set forth and described.

2d, The combination of an air-floating vessel, D, and an air-discharging tube, the discharging end, E, of which projects above the carburetting liquid as and for the purposes substantially described.

3d, The supplemental tube, F2, as and for the purposes substantially as described.
4th, The tapering movable gas holder, A, as and for the purposes substantially described.

75,470.—APPARATUS FOR DISTILLING SPIRITUOUS LIQUIDS.—Wm. Shilling, Baltimore, Md.
I claim, 1st, The combination of the condenser, J, and the low-wine reservoir, L, or their substantial equivalents, with the doubler and the cooler, C, essentially as described.
2d, The combination of the low-wine reservoir, L, and condenser, J, with the cooler, C, and the meter, substantially as described.
3d, The low-wine reservoir, L, arranged in relation to the doubler, for the purposes substantially as described.
4th, The combination of the low-wine reservoir, and the condenser, or their substantial equivalents.
5th, The condenser having its bottom sunk and its top raised, in the manner and for the purpose substantially as described.
6th, The perforated disk, p.
7th, The condenser having a collar, d, essentially as described.
8th, The combination of the supply pipe, s, and cock, S, and draw-off cock, x, or their equivalents, with a condensed substantially as described.

75,471.—HOLDER FOR RAZOR STROP.—Geo. Scott, Steubenville, Ohio.
I claim, as a new article of manufacture, the razor strop, when the leather thereof is secured to the curled ends of the spring steel back, whereby said leather is prevented from slackening by stretching, and is kept in a constant state of tension, as herein shown and described.

75,472.—STOVE DRUM.—Emel Selbach, Columbus, Ohio.
I claim the pan, D, in combination with the drum, C, operating and arranged substantially as and for the purpose set forth.

75,473.—COMPOSITION CEMENT FOR PAVEMENT, ETC.—A. M. Shaw, Lebanon, N. H.
I claim a cement for pavements and flooring, roofing, and other purposes, composed of the ingredients above named, mixed, applied, and finished in the manner above described.

75,474.—FRAME FOR HOP VINE.—A. Shoemaker and W. Phelps, Conesville, N. Y.
We claim an improved hop-vine frame formed in squares of four stakes, a a, joined together at top by the cross ties, b b, in combination with the bent poles, c c, arranged as and for the purposes herein described.

75,475.—RAILROAD CHAIR.—W. S. Shotwell, Paterson, N. J.
I claim, in chairs for railroad rails, holding the rails by sheet metal presented edgewise to the rails, substantially as and in the manner herein set forth.

75,476.—RAILWAY TRUCK.—W. S. Shotwell, Paterson, N. J.
I claim, 1st, The wheels, D, with grooved periphery, in combination with shaft, B, provided with a flange or flanged collar, a, substantially as and for the purpose specified.
2d, The arrangement of the bars, H H, with the cross ties, K K, the wheels, D D, and the axles, B B, whereby I am enabled to have a double number of bearings, and to have said bearings at any desirable point between the wheels A, or outside of them if necessary, as is herein fully set forth.

75,477.—BRIDGE.—F. H. Smith, Baltimore, Md.
I claim, 1st, A bottom chord, formed of clusters of rods connected, as described, in the panels, and connected to each other through the brace blocks, by a single rod, substantially as and for the purpose specified.
2d, The combination of the clusters of rods, D, nut plates, E, single rods, G, angle blocks, B, and nuts, H, with each other, with the horizontal cross rods M, by which the various lines of clusters are connected to each other, and with the vertical rods, I, by which the bottom chord and superstructure of the bridge are connected together, substantially as herein shown and described and for the purpose set forth.

75,478.—CLOTHESPIN OR CLASP.—H. C. Smith, Dublin, Ind.
I claim the within-described clothes clasp, made of India-rubber, and having the aperture, a, side division, b, and projections, c c, substantially as and for the purpose herein specified.

75,479.—LAMP.—W. H. Smith, New York city.
I claim, 1st, The round wick tube, A, provided with a flange, K, on its outside, and a passage, B, in combination with the worm pipe, D, constructed with an inward flange at its top, substantially as herein shown and for the purposes described.
2d, Constructing the wick tube, A, with a slot, B, made in the manner and for the purpose substantially as herein shown.
3d, Providing the two openings, e and f, on the tube, M, arranged in relation to each other, substantially as and for the purpose herein set forth.
4th, The construction and arrangement of the top edge of the spiral tube, D, being below the edge of the tube, A, for the purpose of preventing the flame to reach the tube, D, and heating the burner, substantially as herein shown.
5th, The tube, F, tightly jointed, and uniting with the wick tube, A, substantially as and for the purpose herein described.

75,480.—FLY TRAP.—Albert Snyder, Jackson, Mich.
I claim the combination of the dome, A, and platform, C, with the holes, I I, dish, D, and rim, B, as and for the purpose set forth.

75,481.—HORSE HAY FORK.—Harvey B. Steele, West Winsted, Conn.
I claim the shield or scabbard, A, constructed as described, in combination with the lever, B E, connecting rod, F, and prong, G, arranged and operating substantially as and for the purposes set forth.

75,482.—PHOTOGRAPHIC PRINTING APPARATUS.—J. Stehman, Lancaster, Pa.
I claim the additional printing process, substantially in the manner specified.

75,483.—LAMP BURNER.—C. St. John, Charleston, Mass.
I claim, in combination with the wick tube applied to the capscrew or lamp body, so as to be movable vertically, relatively to the air-deflector or chimney supporter, substantially in manner as specified, the foraminous cup or guard, D, made and arranged with the chimney supporter and the air deflector, substantially as specified.
Also, the combination and arrangement of the guide, K, with the standards E E, and the chimney supporter, C, and the part, D, applied thereto as specified.
Also, the improved lamp-burner as composed of the chimney-holding springs, I I, the chimney-supporting cone and air-deflector, C, the perforated cup, D, the standards, E E, the screw cap, B, and the wick tube, A, and its guide, K, arranged as described, and having the wick movable in the cap, B, and guide, K, by means and in manner as described.

75,484.—TRUSS PAD.—Fred. A. Stohlmann, Brooklyn, N. Y.
I claim a truss pad, formed with spring-fingers, padded and attached to the truss spring, as and for the purposes set forth.

75,485.—SYRINGE.—Fred. A. Stohlmann, Brooklyn, N. Y.
I claim a syringe with a hollow piston rod, d, piston, e, screw-head or cap, b, and neck, g, as and for the purposes set forth.

75,486.—HORSE HAY FORK.—Hiram C. Stouffer and Abraham Stouffer, Bever Township, Ohio.
We claim the tines, B C, links, E D, and shaft, A, in combination with the lever, F, all constructed and arranged to operate in the manner as set forth.

75,487.—MACHINE FOR FORMING TUBULAR BEADS ON SHEET METAL GUTTERS.—O. W. Stow, Plantsville, Conn.
I claim the combination of the cam lever, F G, with the pivoted jaws, D D, whereby the jaws are closed to form the bead, substantially as described for the purpose specified.

75,488.—BOLT FASTENING.—Enoch E. Stubbs, West Elkton, Ohio.
I claim the combination of key, d, dog, a, and spring, e, with the clasp, D, and recessed bolt, A, when the several parts are constructed, arranged, and operated conjointly in the manner and for the purpose specified.

75,489.—CAR COUPLING.—A. W. Sullenberger, Laurel, Ind.
I claim, in combination with the shaft, E, segment, D, and pin, C, suspended therefrom, the yoke, B, and trigger, G, for holding the pin suspended in a vertical position and dropping it automatically, on the entrance of the link into the drawhead, substantially as described.

75,490.—SPRING BED BOTTOM.—Richard Tattershall, Beloit, Wis.
I claim the employment of the device herein described for securing the supporters, C, to the bedstead, D, as set forth.
Also, the guard bands, H, or their equivalent, in combination with the supports, C, brackets, E, locking pins, e, hooks, b, the transverse slat, I, rubber springs, B, and slats, A, when constructed and arranged substantially as herein set forth and described, for the purpose specified.

75,491.—COAL STOVE.—Jasper Van Wormer and Michael McGarvey, Albany, N. Y.
We claim, 1st, In base burning or magazine stoves, a funnel or hopper attached to or supported by the top or outside casing of the stove, in combination with the open top magazine cylinder, K, as and for the purpose set forth.
2d, The perforated check-draft plate, I, in a downward draft flue, provided with a register, X, so arranged as to pass the soot and ashes that collect upon them, through the register and plate, into the escape flue, when the register is traversed for that purpose.

75,492.—TELEGRAPH POLE.—Cromwell Fleetwood Varley, New York city.
I claim the combination of a conducting wire, running to the ground, with the telegraph pole and the insulators attached thereto, substantially as and for the purpose set forth.

75,493.—PHOTOMETER.—Dr. H. Vogel, Berlin, Prussia, assignor to Wilson & Hood, Philadelphia, Pa.
I claim, 1st, The arrangement of the transparent paper strips, C, which arranged in sters, and which are divided into sections, each section having an opaque partition, substantially as herein shown and described.
The box, A, when provided with a cover, B, having a glass plate b, and the step-formed paper, C, and with the sliding false bottom, D, pressed against the paper, C, by means of a spring, E, as set forth, all made and operating substantially as herein shown and described.
3d, The paper strips, saturated with alkaline chromate, when they are applied to a photometer, substantially as herein shown and described.

75,494.—ATTACHING HORSESHOE.—John Wagner, Washington, D. C.
I claim attaching the bands, C and D to a horseshoe, B, in the manner substantially as shown and described and for the purpose set forth.

75,495.—DEVICE FOR CONVERTING ROTARY INTO RECIPROCATING MOTION.—Eaton Walker, Dundee, Ill.
I claim the combination of the wheels, A, provided with the cams, a, the oscillating lever, D, provided with the friction rollers, f, and the arm, F, all constructed and arranged to operate substantially as described.

75,496.—VAPOR BURNER.—Thomas Ward, Columbus, Ohio.
I claim, 1st, The application of the double packing, H and I, to regulate the fluid and gas, as set forth in the above specification.
2d, The brass or metal plate, F, having the lower end formed into a cap, D attached to the burner, and its upper end bent inward toward the generating chamber, all constructed as herein shown, and arranged in relation to the aperture, g, substantially as and for the purposes set forth.

75,497.—OIL FOR PAINT, ETC.—William Ward, Cleveland, O.
I claim, 1st, The herein-described compound, consisting of the waste and linseed oil, or its equivalent, when compounded in the manner, and in any proportion, for the purpose substantially as set forth.
2d, The cement, consisting of waste, linseed oil, and lime, or its equivalents, when compounded in the manner and for the purpose substantially as described.
3d, The utilizing of the waste from the bleaching apparatus of paper mills, by compounding the said waste with linseed oil, or its equivalents, or with crude petroleum, or with its distillates; also, in compounding the same with lime in its various conditions, and with the pigments used for paint, in the manner substantially as described.

75,498.—PLANER'S CHUCK.—William H. Warren, Worcester, Mass.
I claim, 1st, The improved planer's chuck, herein described, when its several parts are constructed and arranged substantially as set forth.
2d, The sliding jaw, G, having the slotted blocks, E E, attached thereto, in combination with bed plate and set screws, all constructed as and for the purpose set forth.
3d, The subject matter of second claim, in combination with the movable pins, C C, when arranged to operate in the manner substantially as specified.

75,499.—INKING APPARATUS FOR COLOR PRINTING.—Lawrence B. Waterman, Indianapolis, Ind., assignor to John Carlton & Co.
I claim, 1st, The screw rod, D, and nuts, e e, in combination with sectional plates, c c, having slots, c' c', all combined and arranged substantially as and for the purpose set forth.
2d, The inking roller, I, provided with the removable shaft, K, working in a sliding gearing, H, in combination with the distributing roller, J, having fixed bearings, J', substantially as and for the purpose set forth.

75,500.—DEVICE FOR WEAVING CHAIR SEAT.—G. A. Watkins, Proctorsville, Vt.
I claim a needle or shuttle, of flat shape or bar form, constructed as described, to hold the splints at their one end in such a manner as that the splint may be readily detachable therefrom after it has been passed through the warp, and shaped to form a batten for beating up the filling, substantially as specified.

75,501.—CAR BRAKE.—James White and Thomas Lingle, South Amboy, N. J.
We claim, 1st, The suspended frame, C, in combination with the shaft, E, axle, A, and band, d, and the devices for preserving the tension of the band, substantially as described, for the purpose specified.
2d, The sliding clutch and sleeve, F, with brake chain, G, attached, substantially as described, for the purpose specified.
3d, In combination with the sliding clutch, the rod, e, pin, f, bell crank, g, and rod, h, substantially as described, for the purpose specified.
4th, The self-acting gage, when the same is arranged for the purposes set forth, and when consisting of the adjustable bar, j, arranged as described, in combination with the bar, e, bell crank, g, or its equivalent, and rod, h, all made and operating substantially as and for the purpose herein shown and described.
5th, The adjustable gage, j, in combination with grooved sleeve, F, and rod, e, substantially as described, for the purpose specified.
6th, The device for operating the brakes by the chain, G, said device consisting of the arrangement and combination with the lever, K, of the lever, O, having an arm, r, the sliding bar, N, spring, s, and pulleys, p p, and q, all made and operating substantially as and for the purpose herein shown and described.
7th, The lever, K, in combination with the lever, O, and chain, L, for the purpose of combining the hand brake with that which is operated from the locomotive, substantially as set forth.
8th, The ratchet wheel, k, and spring pawl, l, in combination with the sleeve, F, all constructed as described, for the purpose specified.

75,502.—BRIDGE.—T. B. White, New Brighton, Pa.
I claim the clamps and packing blocks, E F, and G, made of wrought iron, and constructed and arranged for use substantially as described, and for the purposes set forth.

75,503.—HOP DRYER.—Jonathan Whitney, Fort Winnebago, Wis.
I claim, 1st, A hop dryer, consisting of a drying room, E, and store room F, and provided with a curbed frame, B, having tilting drying floors, mounted on a track, D, all constructed and arranged to operate substantially as described, and for the purpose set forth.
2d, The curbed frame, B, and tilting drying floors, A, constructed and arranged to operate substantially as described, and for the purpose set forth.

75,504.—PAVEMENT.—C. Williams, New York city.
I claim the construction and arrangement in a wooden pavement of the blocks, A A, in such a manner that double dovetailed grooves shall be formed between said blocks, so that when the same are filled with cement, as herein described, such filling will operate as a tie to said blocks, substantially as set forth.

75,505.—WATCH CASE.—Gile J. Willson, Reading, Pa.
I claim, 1st, The application of a separate entire ring to the center of an ordinary watch case, new or old, which the movement of the watch will connect with, in the manner set forth, made of any convenient material, and of any size, shape, or form, to answer the purposes set forth.
2d, The application of a conical pointed tube, with its bearing or packing on the movement of a watch or some elastic substance, and connected with the cap of the watch in any convenient manner, to answer the purposes set forth.

75,506.—DOVETAIL MACHINE.—Robert Wolf, Burlington, Iowa.
I claim, 1st, The combination of the cam, F, and jointed lever, G, with the fork, f, pin, g, and carriage, I, all made and operating so that a suitable oscillating motion is imparted to the carriage, I, substantially as and for the purpose herein shown and described.
2d, The longitudinally movable frame, H, in combination with the oscillating carriage, I, and laterally movable bed, J, all made as described, and and operating with the saw, E, substantially as and for the purpose herein shown and described.
3d, The combination of the lever, K, pawl, J, slotted adjustable pawl, k, spring catch, l, and bed, D, all constructed, arranged, and operating substantially as described.
4th, The combination of the oscillating plate, P, slide, u, levers, M O, and chisel, N, substantially as described for the purpose specified.
5th, The levers, o M, and chisel, N, in combination with the cam, L, operating substantially as described, for the purpose specified.
6th, The combination of the bed, T, tripping levers, b' c', sliding rack, U, and the slide, V, constructed and operating substantially as described, for the purpose specified.

REISSUES.

2,891.—FOLDING CHAIR.—Benjamin J. Harrison, and James Condie, New York city. Patented July 17, 1866.
We claim, 1st, The pair of legs, A, connected by the seat rail, b, at their upper ends, and by the rail, a, near their lower ends, in combination with the pair of legs, B, pivoted at c, to the legs, A, and united only at their upper ends at the seat rail, C, as specified, so that the rail, b, can pass entirely through, beneath the rail, C, when the legs are folded, as set forth.
2d, The seat rail, C, into which the side pieces or arms, E, of the back are framed, and extended through to the bar, G, in combination with the tie bolt, e, that connects the legs, B, and forms the axis on which the back E F swings, substantially as specified.
3d, Connecting the frame forming the back to the folding legs by a riveted bar or pivots above the point at which the flexible seat is united to the back seat rail, substantially as set forth, so that the flexible seat maintains the back in an upright position.

2,892.—BASKET.—Lansing Marble and Townsend North, Vassar, Mich., assignees of Lansing Marble. Patented Jan. 7, 1862.
We claim, 1st, A basket formed of two series of overlapping splints, A A', substantially as described, and fastened in any suitable manner.
2d, In combination with the above, the hoops, a a D and G G, substantially as and for the purpose specified.

2,893.—HYDROCARBON VAPOR APPARATUS.—F. S. Pease, Buffalo, N. Y. Patented March 13, 1860.
I claim, 1st, The combination of the box, A, one or more pans, B, for containing hydrocarbon liquid, the supply pipe, C, at or near the top, the exit pipe, D, at or near the bottom, and the condenser, E, the whole operating substantially as and for the purposes herein set forth.
2d, Condenser, employed in connection with an air carbureting apparatus, substantially as and for the purposes set forth.
3d, The combination with the pans or trays B, of the perforated plates b, through which the air passes in its course through the carbureting chamber.

2,894.—FRUIT BOX OR BASKET.—Jabez W. Hayes, Newark, N. J. Patented Aug. 12, 1856.
I claim, 1st, A box or basket formed of veneers or laminæ of wood, laid across each other and turned up to form the sides, so that the bottom is made of two thicknesses, secured together substantially as specified, and the sides of single thicknesses.
2d, A box or basket formed of veneers of laminæ of wood, crossing each other at the bottom and turned up to form the sides, in combination with a cord, or its equivalent, passing around the sides to hold them together, substantially as set forth.
3d, A box or basket in which on laminæ of woods forms, two of the sides and one thickness of the double bottom, substantially as set forth.

2,895.—COAL STOVE.—J. J. Savage, Troy, N. Y. Patented Feb. 12, 1867. Division B.
I claim, 1st, Constructing a heating stove with its fuel doorway or aperture B, below and forward of its flame or combustion chamber and contiguous to or adjoining its fire box A, in manner substantially as and for the purposes herein set forth.
2d, The combination of the fuel doorway or aperture B, and fire box A, extended contiguously thereunder, as applied to heating stoves in manner substantially as and for the purposes set forth.
3d, I combination with a heating stove having its fuel doorway in the position as herein described, the employment therewith of a lifting lever F, substantially in manner as and for the purposes herein set forth.
4th, In a heating stove, in combination with its fire box back lining plates and its fuel doorway or aperture B, the arrangement of a front lining plate E, in position between the flame chamber C, and the said fuel aperture, in manner substantially as and for the purpose set forth.
5th, In combination with a lever lifter F, as applied to heating stoves in manner as herein described, the employment of a holding hook b, and catch ridge c, substantially as and for the purpose set forth.
6th, A heating stove so constructed that fresh fuel may be cast or fed directly into vacant room or open places, previously formed or made for it in, below, and between the ignited fuel or coke, within the fire box of said stove, by the means and operation in manner substantially as hereinbefore fully described and shown, for the purposes as set forth.

2,896.—TRELLIS FOR STRAWBERRY AND OTHER PLANTS.—Wm. W. Wilcox, Middletown, Conn. Patented Aug. 27, 1867.
I claim a trellis, a, made substantially as described, with an upright post or posts, e, and branching arms, c, or their equivalent.

DESIGNS.

2,947.—HOOP SKIRT.—Charles S. Chaffee and Charles H. Vandercook, Birmingham, Conn.

2,948.—AX LABEL.—James H. Mann, Lewistown, Pa.
2,949.—REED ORGAN CASE.—John Schatz, New Haven, Conn.
2,950.—TRADE MARK.—Junius Schenck, New York city.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., 37 *Park Row, N. Y.*

[ISSUED FOR WEEK ENDING TUESDAY, MARCH 3, 1868.]

20,647.—GANG PLOW.—Don Carlos Matteson, Stockton, Cal.
Dated June 22, 1858. Application for reissue received and filed February 24, 1868.
I claim the arrangement as described, of the false beam, N, goose neck, G, axle, u, lever, i, catch, L, and the system of plows, attached to their frame as set forth, the whole being constructed and operating substantially as and for the purposes specified.
I further claim the gage wheels and irons, v v, and the axles, w, arranged substantially in the manner as and for the purpose set forth.

19,896.—LAMP.—P. Hannay, Washington, D. C., and Hudson Taylor, Poughkeepsie, N. Y., assignees by mesne assignments of Pascal Plant, Washington, D. C. Dated April 6, 1858. Application for reissue received and filed February 28, 1868.—Division A.
1st, I claim causing a current of air to impinge upon or commingle with the lower or blue part of the flame of a hydro-carbon lamp, through the instrumentality of a cap piece or burner, without the aid of a chimney, substantially as described.
2d, A cap piece or burner, combined with and applied to a hydro-carbon lamp, for the purpose of producing combustion without the aid of a chimney, substantially as described.
3d, Making the cap piece or burner adjustable, relatively, to the wick and wick tube, substantially as described.

19,896.—LAMP.—P. Hannay, Washington, D. C., and Hudson Taylor, Poughkeepsie, N. Y., assignees by mesne assignments of Pascal Plant, Washington, D. C. Dated April 6, 1858. Application for reissue received and filed February 28, 1868.—Division B.
1st, I claim combining the cap piece or burner, with the wick tube, or lamptop of a hydro-carbon lamp, in such manner that the burner may be thrown back from the wick tube, substantially as and for the purposes described.
2d, The combination of a hinged cap piece, or burner, with the means of adjusting the same relatively to the wick tube, substantially as described.
3d, A hinged burner, or cap piece, for a hydro-carbon lamp, substantially as described.

65,168.—VEHICLE.—The American Hard Rubber Wagon Company, New York city, assignees by mesne assignments of John S. Campbell, Newton, N. J. Dated May 28, 1867. Application for reissue received and filed February 28, 1868.—Division A.
We claim, 1st, The bodies of vehicles constructed wholly or in part of india rubber or other plastic material, substantially in the manner herein set forth as a new article of manufacture.
2d, The arrangement of the flanges, b and c, and cross pieces, d, or either of them, in the bodies of vehicles made from india-rubber or other plastic material, substantially as and for the purpose described.

65,168.—VEHICLE.—The American Hard Rubber Wagon Company, New York city, assignee by mesne assignments of John S. Campbell, Newton, N. J. Dated May 28, 1867. Application for reissue received and filed February 28, 1868.—Division B.
We claim the running gear of vehicles constructed of india rubber or other plastic material, substantially in the manner described, as a new article of manufacture.

65,168.—VEHICLE.—The American Hard Rubber Wagon Company, New York city, assignees by mesne assignments of John S. Campbell, Newton, N. J. Dated May 28, 1867. Application for reissue received and filed February 28, 1868.—Division C.
We claim the running gear of vehicles constructed of india rubber or other plastic material, substantially as herein set forth as a new article of manufacture.

65,168.—VEHICLE.—The American Hard Rubber Wagon Company, New York city, assignees by mesne assignments of John S. Campbell, Newton, N. J. Dated May 28, 1867. Application for reissue received and filed February 28, 1868.—Division D.
We claim the dash boards of vehicles constructed from india rubber or other plastic material, substantially in the manner herein set forth as a new article of manufacture, whether the dash board be provided with the iron frame or parts thereof or not.

25,209.—ARGAND GAS BURNER.—M. H. Collins, Chelsea, Mass., assignee by mesne assignments of Hippolyte Monier, Paris, France. Dated August 23, 1859. Application for reissue received and filed February 25, 1868.—Division A.
I claim, 1st, The construction of the argand burner, with its grate, a, and external tube, b, of clay, porcelain, or other incorrosible, refractory non-conducting material, and with its inner tube and stem of metal, the several parts being combined substantially as herein described.
2d, Combining with the chimney and the base on which it rests, elastic internal supports, q q, inclined outwardly from the top towards the bottom, and bearing against the inner surface of the chimney above its base, substantially as and for the purpose set forth.

25,209.—ARGAND GAS BURNER.—M. H. Collins, Chelsea, Mass., assignee by mesne assignments of Hippolyte Monier, Paris, France. Dated August 23, 1859. Application for reissue received and filed February 25, 1868.—Division B.
I claim the glass chimney of an argand or other burner, constructed without a flange upon its base, and having the lower portion cylindrical, and the upper part tapering towards the top, substantially as described.

63,486.—SAW.—Henry Disston (assignee of Charles Disston), Philadelphia, Pa. Dated April 2, 1867. Application for reissue received and filed February 28, 1868.
I claim, 1st, A projection, b, on a detachable saw tooth, having a circular base, adapted to a corresponding recess in the blade, in combination with a shoulder, f, on the latter, against which the said projection may be brought to bear by partly turning the tooth in the recess of the blade, all substantially as and for the purpose herein set forth.
2d, The lips, l, on the edge of the projection, d, of a saw tooth, or on the edge of a recess in the blade, in combination with a groove and recess, m, in the projection or in the blade, substantially as specified.

69,344.—SAD IRON.—A. Y. Hubbell, Elmira, N. Y. Dated October 1, 1867. Application for reissue received and filed Feb. 29, 1868.
I claim the parts, A B, arranged in combination with a non-conducting substance, an air chamber or vacuum, substantially as set forth and described.

65,580.—MEDICAL PREPARATION.—Charles L. Lege, San Antonio, Texas. Dated June 11, 1867. Application for reissue received and filed February 29, 1868.
I claim a medicament produced from the material specified.

44,964.—CLOTHES DRYER.—Lorenzo Ling, Pulaski, N. Y. Dated November 8, 1864. Application for reissue received and filed February 29, 1868.
I claim, 1st, The independently pivoted arms, B, fitted in the head, A, when used in connection with suitable automatic locks or fastenings for the purpose specified.
2d, The slides, C, on the arms, B, provided with the recesses, f, in combination with the points or spurs, e, at the ends of the flanges, a, of the head, A, and the shoulders, g, on the upper edges of said flanges, all arranged substantially as and for the purpose herein set forth.
3d, The employment or use of lines, D, one or more, when applied to the bars, B, to serve as braces or stays, for the same, substantially as shown and described.

67,469.—LUBRICATOR.—G. Waters, Cincinnati, Ohio. Dated August 6, 1867. Application for reissue received and filed Feb. 7, 1868.
The detachable combined glass reservoir and stem, A a, having a single aperture so large as to admit of easy filling by "pouring," and at the same time so small as to prevent the discharge of the oil by its own gravity, substantially as hereinbefore described, for the purposes set forth.
Also, the combined tube and socket, D C, when made out of a single piece of cast metal, substantially as described and used, in combination with a glass reservoir.
Also, a lubricator, consisting of a glass reservoir, A, attached to the tube, D, by means of the socket, C, and elastic packing, B, as and for the purposes described.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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385.—BOILER ALARM.—Thomas P. Akers, New York city. Feb. 4, 1868.
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405.—STEAM GAGE.—David M. Greene, Troy, N. Y. Feb. 6, 1868.
408.—SEWING MACHINE.—Thos. A. Macaulay, New York city. Feb. 6, 1868.
422.—LOCK.—Charles B. Eiffler, New York city. Feb. 7, 1868.

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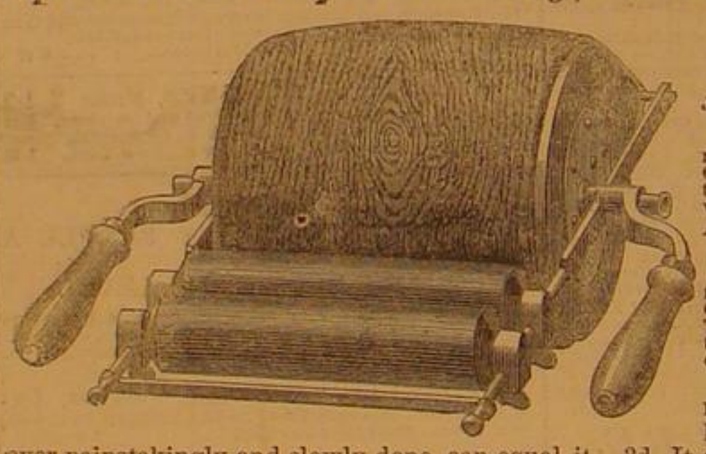

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☞ This machine has taken the First Premium at the American Institute Fair, this year. See Report of Committee. Also, see Scientific American, August 3, 1867. Samples of the work done on exhibition at the office. For circulars and further particulars address,

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1868.

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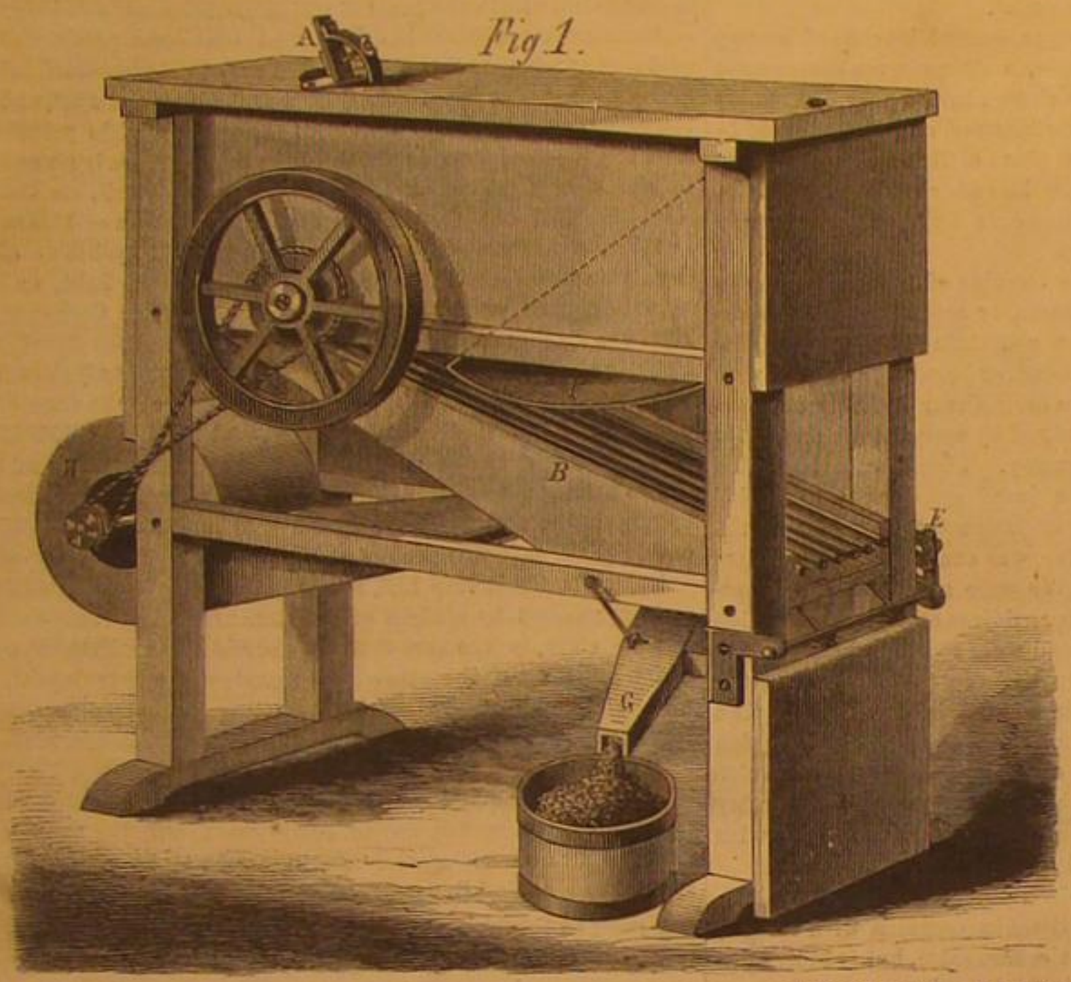
Vol. XVIII.—No. 14. [NEW SERIES.] NEW YORK, APRIL 4, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Corn-Shelling Machines.

In this machine the ears of corn are fed into the sheller which, with the spout, A, is of ordinary construction, and is worked by suitable gearing from the driving shaft. B is a cradle furnished on the top with longitudinal bars placed at such a distance apart as to allow the corn to pass between the interstices, but not the cobs, which slide down into any receptacle placed for them. The corn kernels fall through on a sieve in the bottom of the cradle, the sieve being shown at

Fig 1.



CHIPRON'S PATENT CORN SHELLER.

C, Fig. 2. The passage of the corn and the cobs is facilitated by a rapid oscillating motion imparted to the cradle, which is suspended by a rod at one end and is driven by a crank, connecting rod, and bell crank lever, seen at D E F, Fig. 2, and E, Fig. 1. The meshes of the sieve are of such a grade as to allow the broken kernels, dust, and other impurities to pass through, while the sound grain passes into a pan or receiver provided with a delivery spout, G. A blower, H, run at a rapid rate by belt from the driven shaft, D, forces a strong current of air up through the cradle, blowing away the dust and dirt from the corn. A shield or partition, seen in Fig. 1, by the dotted line, prevents the corn from being thrown out by the rapid oscillation of the cradle, and a curved shield, I, prevents the dust and dirt, after having been blown out, from again entering the cradle.

From the above it will be seen that in one operation this machine will separate the corn from the cob, and the sound grain from the imperfect, and from dirt and other impurities the corn being fanned perfectly clean, and left in condition for the market or mill, and delivered into a measure, sack, or other desired receptacle. It has taken the first premium at several Western fairs, and wherever used has given entire satisfaction. It may be driven by manual or any other power, as desired.

Patented through the Scientific American Patent Agency, Feb. 11, 1868, by P. C. Chripron, who may be addressed at Highland, Madison Co., Ill.

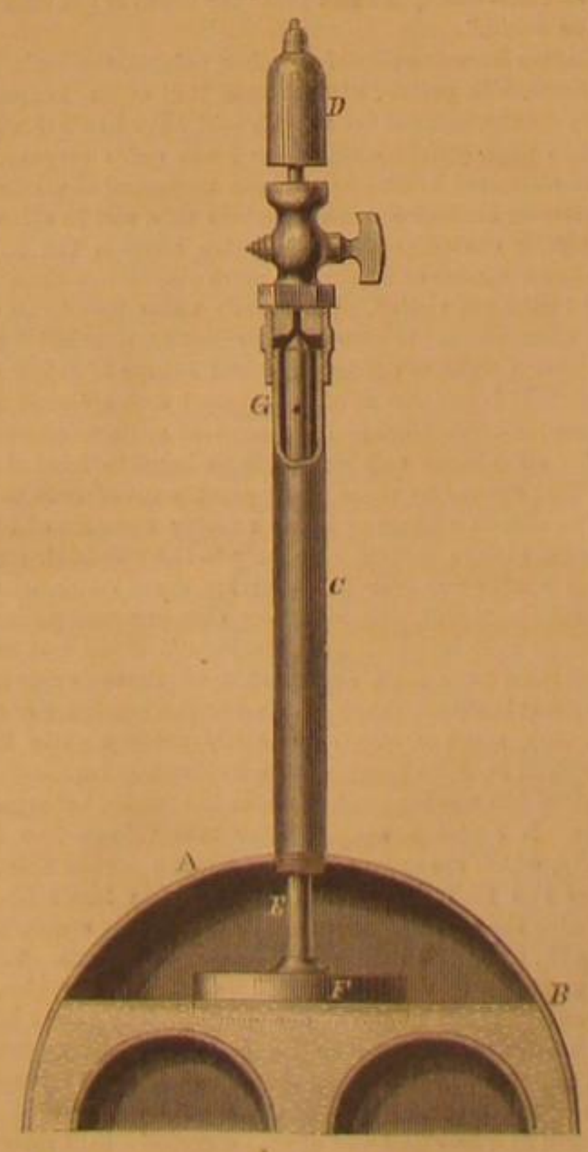
Iron and Chromium and Chromium Steel.

Iron and chromium may be alloyed in every proportion by heating the mixed oxides strongly under addition of charcoal powder, to effect reduction. Fremy formed an alloy by heating in a blast furnace oxide of chromium and metallic iron, thereby obtaining a product resembling cast iron. These alloys are generally hard, brittle, with a bright fracture, and crystalline in structure. When they contain a large percentage of chromium they crystallize in long needles. They are also less fusible, not as magnetic, no so easily attacked by acids as iron. The alloy of 95 per cent iron and 5 per cent chromium is stated to be hard, splitting under the hammer and scratching glass. The fracture is very bright, with crystalline plates extending across the fractured surface. The alloy of 75·2 per cent iron is readily reduced to powder, its fracture is tin white, finely granular and crystalline; that of 50·3 iron yields a somewhat spongy button with metallic globules; its fracture finely granular, bright and grayish white. The alloy of 25·3 per cent iron is obtained as an imperfectly fused spongy mass, of less coherence than the former, a yellowish-gray white color and somewhat dull luster. The alloy containing 17 per cent of chromium is described by Berthier as almost silver white, fibrous in structure, and with difficulty attacked by acids. That containing 60 per cent of chromium scratches glass better than tungsten steel, and almost as deeply as the diamond.

With regard to steel Berthier found that one or two per cent of chromium when added to molten metal communicates hardness and the property of taking a very beautiful damask, without diminishing its malleability. Faraday and Stodart examined steel containing nearly three per cent of chromium, and found it to be as malleable as pure iron and giving a very fine damask. The damask was removed by polishing and restored by heat without the use of any acid.

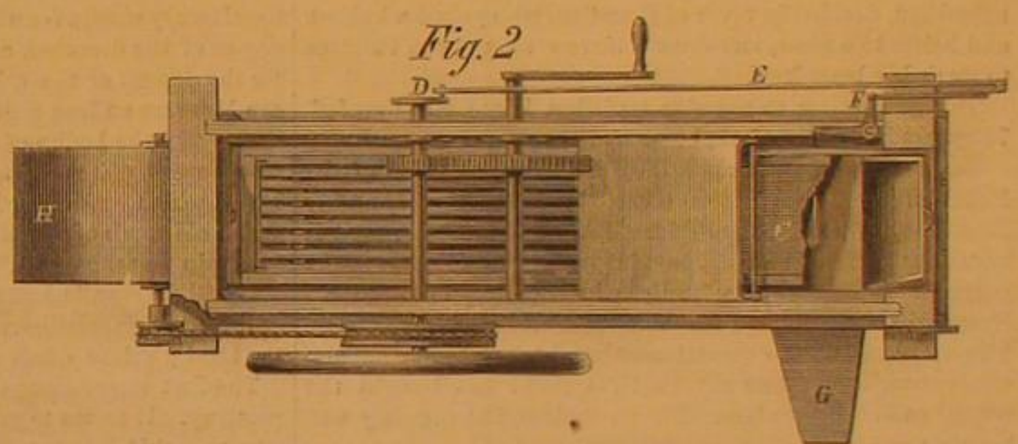
DAVENPORT'S PATENT LOW WATER ALARM.

Quite a number of low water detecters for steam boilers are in use, and some of them work well when new and properly attached; but others are either so complicated in their mechanism or so influenced by unseen contingencies that they, in time, prove unreliable. The one herewith illustrated and described appears, however, to be so simple in construction and direct in action that it commends itself to the attention of the engineer.



The upper portion of the engraving represents a vertical central section of the instrument, showing its internal arrangement. A represents the shell of the boiler, B is the water line. C is a tube which is screwed into the shell of the boiler on the top end of which there is a steam whistle, D, as shown in the engraving. The lower part of the aperture in this whistle is countersunk and forms a seat for a conical valve. E is an interior tube which passes down into the boiler where it is attached to a float, F, which rests upon the surface of the water as seen. The tube, E, is about three eighths of an inch smaller in external diameter than the bore of tube, C, so that the steam may escape up through the annular space between the two. Steam is admitted to the interior of the float by a small orifice, G, near the upper end of the tube, E, for the purpose of producing an equilibrium of pressure on the float to prevent its collapsing. The top of tube, E, is closed and forms a conical valve which fits the seat in the lower part of the whistle. By these details it will be seen that when the water in the boiler is at the proper hight, the valve on the top of tube, E, will be lifted to its seat and close the aperture in the whistle, preventing the escape of steam, but when the water falls below the desired point the valve will be withdrawn and steam will escape to

Fig. 2



the whistle by the annular space between the two tubes and give the required alarm.

When so required these alarms are fitted with a brass cap instead of a whistle, the alarm being given simply by the escape of steam through a small aperture; this arrangement is sometimes preferred where the noise of a whistle is objectionable. The whistles are also furnished with or without a stop cock, whichever way may be preferred. It will be seen that in this instrument there are no closely fitted parts, consequently it cannot stick, and that the working parts being so much above the water level, all obstruction on account of the accumulation of dirt is avoided, and perfect reliability of action insured.

Patented through the Scientific American Patent Agency January 7, 1868. The right to manufacture for the Eastern States is for sale. Letters for further information on the subject should be addressed to F. S. Davenport, Jerseyville, Ill.

Composition for Coating Wood, Iron, Paper, etc.

Patented by Antonio Pelletier, Washington, D. C.

I take the pulp of any fibrous matter, preferring that from bamboo, sugar cane, cornstalks, or other similar substances, prepared as for the making of paper, soapstone, or any mineral substance of a similar nature, and silicate of soda, in a liquid or any suitable state, in about equal quantities by weight, and thoroughly mix and incorporate the whole mass until it becomes soft and plastic. To this mixture, when desirable, a small quantity of red lead and litharge, in about equal proportions, may be added, the two together making about one eighth or one ninth of the whole mixture.

The composition thus made, with or without the red lead and litharge, or similar substances, while in its plastic state, I apply, with any suitable instrument, to the surface of any kind of wood, whether green or dry, or to the surface of paper, pasteboard, cloth, leather, brick, stone, or other fibrous or porous materials, which I desire to make water and fire-proof, or to iron or other metal surfaces that I desire to protect from the action of fire. When this coating is about half dry, I treat it with coal or common tar. This tar may be either hot or cold. I prefer to use it hot, as it is then thinner and works easier. This tar may be applied with a brush or any other suitable instrument. Before it becomes dry, I cover it with as much powdered steatite, talc, or other similar "refractory substance," as it will hold, rubbing it well in with a roller or any suitable instrument. This done, the cement will be found completely water and fire-proof.

My composition I also make into sheets, of any size that may be desired, either for immediate use in the vicinity where made, or in convenient size for transportation, having made

them fire and water-proof, as above described. In this form, my composition can be very conveniently used for roofing purposes of all kinds, whether for houses, railroad cars, locomotives, decks of steamboats, etc., etc., or for covering marine boilers, or lining wood or other surfaces exposed to the action of water or fire.

EDITORIAL CORRESPONDENCE.

Rome and its Ruins—How the People Subsist—Ancient Tombs and Columbaria—Burning the Dead—Modern Rome—Its Old Basilicas and Modern Churches—Interesting Facts in their History—St. Peter and St. Paul—The Divine Bambino—Monasteries—Novel Mode of Burying Monks—Lotteries—Carnival.

ROME, Feb. 19, 1868.

It is presumed that every one is familiar with the story of Romulus and Remus, but in these days, when old things pass away and all things become new so rapidly, it will not be amiss briefly to re-state the story by way of prelude to this letter.

One of the vestal virgins became the mother of twins by the god Mars, and as the result of her broken vow to live and die unmarried, her babes were doomed to be drowned in the river; but, in consequence of the overflow of the Tiber, the cradle in which the babes were placed was stranded at the foot of the Palatine hill. A she-wolf carried them into her den and suckled them, being assisted by a woodpecker, a bird sacred to Mars, who brought other kinds of food for their nourishment. A bronze figure of the she-wolf and sucklings is preserved as one of the most curious and precious antiquities of the Capitol Museum. The boys were afterwards recognized by their grandfather, and carried off to the Alban hills; but the impressions of their childhood were so strong, that they wanted to found a city on the Tiber. Differing as to the location, a quarrel arose between them, but finally it was agreed to submit the question to the gods. Romulus took the Palatine, Remus took the Aventine. Remus saw six vultures fly by, Romulus saw twelve. Each claimed the augury in his own favor; but the shepherd to whose decision it was submitted, decided in favor of Romulus, who yoked a bullock and heifer to a plow, and drew a furrow around the Palatine to mark his boundary.

Thus, according to popular tradition, Rome was founded, 750 years before the Christian era.

The Palatine is now covered by the immense ruins of the Palace of the Cesars, in part owned by the present Emperor Napoleon, who considers himself a modern Cesar, and is spending considerable money in trying to discover some grand memorials of this family, whose history is to ancient Rome what that of the Bonaparte family is to modern France. The result of these excavations thus far has been comparatively fruitless. Some say that Napoleon has bought the wrong end of the palace. But no matter, the digging will benefit some body.

At the birth of Christianity, Rome was an imperial city, numbering its millions, and swaying the destinies of the world. At the present moment, under the influence of Christianity, Rome contains about two hundred and fifty thousand people, who appear to exist in a sort of miraculous charity, which flows through all the mystic channels of communication with the millions of believers in the Old Church. And I must say that, as a general rule, the inhabitants were having a poor time of it, if one may judge by the hordes of idle people, dirty monks, and miserable beggars, and an entire absence of all that appears cheerful and even social among the the masses who throng the streets and public places.

Rome and its environs contain so much of interest that months might be employed in hunting about their ancient palaces and ruins, every fragment of which speaks a tale of the joys, sorrows, and destiny of our common humanity. I have wandered day after day on the Campagna, and along the Appian Way—one of the most striking vestiges of antiquity that remain to us, over which the conquering legion of the Cesars came from the East with their long train of captives, elephants, dromedaries, and other spoils of war. Here are to be seen giant masses of brick ruins covered by a growth of shrubs and rank weeds—also fragments of marble, base, column, cornice, and pediment—sculpture of heads, arms, trunks, legs and feet—of the long line of splendid tombs that once stood perfect, but now crumbling to dust on either side. Mounting upon the top of one of these monuments, and with glass in hand the eye takes in a wide sweep of country, dotted here and there with detachable portions of extensive aqueducts, grand temples, palaces, circuses, and other proud structures of the old city where the Gauls—

> "Entering at sunrise through her open gate,
> And through her streets, silent and desolate,
> Marching to slay, thought they saw gods, not men.
> The city that by temperance, fortitude,
> And love of glory, towers above the clouds,
> Then fell, but falling kept the highest seat,
> And in her loneliness, her pomp of woe,
> Where now she dwells, withdrawn into the wild,
> Still o'er the mind maintains from age to age
> Her empire undiminished."

The martial games, with the cars and chariots that once glittered on these old causeways, have vanished, the splendid tumult has passed away, and silence, desolation and death brood over the Campagna, once the busy haunt of men, the camping ground of mighty armies.

The ruins of ancient Rome are almost innumerable, but those more generally sought for are the Coliseum, whose broken walls, 157 feet high, once encircled an area of nearly six acres, and had seats for 87,000 spectators. The palace of the Cesars, to which I have referred, the Roman Forum of Trajan, with its rostrum, from which Mark Antony came "to bury Cesar, not to praise him,"—the famous Claudian Aqueduct—the tombs and Columbaria—the theater of Marcellus, and the baths of Titus and Caracalla—which last are among the most surprising of all the ruins to be found in Rome. We are accustomed to regard an establishment for bathing as some small structure of a temporary character, but not so with these imperial baths. They were on a scale of magnificence and grandeur of which it is difficult for us to form an idea. Baths were provided for 3,000 persons, and above them were arranged royal apartments, gymnasiums, besides other conveniences and luxuries of an imperial palace. These ruins resemble vast fortresses of brick and mortar, and it would seem that nothing but an earthquake or gunpowder could have reduced them to their present condition. In excavating the debris from these baths, some of the finest specimens of ancient sculpture now in the museum of the Vatican were discovered.

Near to the Coliseum is the brick basin, or Sudarium, where the gladiators were accustomed to wash after their combats. Here is also the splendid arch of Constantine, erected to commemorate his victory over Maxentius, and a little beyond is the arch of Titus, one of the most beautiful in Rome. A well worn foot path around the arch testifies how faithfully the Jew adheres to the traditions and prejudices of his race. They remember that their own dear Jerusalem was once encompassed by armies, therefore they refuse to pass beneath the arch which commemorates the event.

The Pantheon, built by Agrippa, cannot be classed among the ruins of Rome. This noble, well preserved structure was consecrated as a Christian church in the year 608, under the name of Holy Mary and the Martyrs, and made sacred in the history of art as the burial place of Raphael. So also of the Mausoleum of Hadrian, now known as the castle of St. Angelo, and from whose battlements bristle the guns and bayonets of the Papal Zouaves.

Among the many interesting remains of the early Romans are the well preserved Columbaria, or sepulchres for the deposit and safe keeping of urns containing the ashes of the dead, after the process of cremation, or burning, a custom very general during the time of the early Cesars. Many of these sepulchres were built and managed by speculators, similar to some cemeteries in our own country. They are provided with recesses, or semi-circular niches, just large enough to receive the cinerary urns, over which were fastened tablets bearing the names of the deceased, and a fee was exacted by the owners for the deposit of the ashes. We were shown in the Etruscan Museum an iron bedstead, or gridiron on legs, upon which it was said the bodies of the dead were roasted until the flesh was burned off, preparatory to the process of calcining the bones, which was carried on in a small bronze retort. The grand old tomb of Metellus, and those of the Scipios, which "contain no ashes now," and of Sempronius, whose "voice was still for war," awaken a thrilling interest in the history of those whose families, and whose names are associated with the most glorious deeds of old Rome.

The first impressions of modern Rome are usually disappointing. It seems to possess little in common with the old city, in fact it does not occupy the same site, but is built upon the spot of the Campus Martius, where Roman youth went through with their military exercises. The Piazza del Popolo forms a sort of head for a tripod of streets, which extend from it; the center one being the famous Corso, which runs about a mile toward the Roman Forum. The street is narrow, but possesses considerable grandeur from the number of elegant palaces and tolerably decent small shops on either side, but it is inferior to Broadway in length, width, as also in the number and variety of fine buildings. Some writer, however, whose imagination seems to have run away with his common sense, declares that "the Corso is the finest street in the world."

Modern Rome is a city of churches, palaces, cardinals, priests, students, idle people, dirty streets, foul odors, beggars, and filthy monks, many of whom, it is said, have a rule to wash but once in three years—a story that I was quite prepared to believe whenever I saw one of these unwashed characters, and the streets are full of them; besides this, and in spite of the purifying character of the Christian religion, the habits of the lower classes of Rome are more disgusting than in any city I have yet visited. They don't know how to be decent, and no one seems to care whether they are so or not. Strangers have a right to expect a marked degree of refinement in Rome. It is the throne of a temporal and spiritual pontiff, whose influence reaches the hearts of millions of devotees; and if cleanliness and godliness go hand in hand, I should say that outwardly there was a great want of both in Rome.

The church edifices of Rome number upwards of 350, and it must always remain a mystery to the uninitiated how so much wealth was ever gathered for their construction and liberal adornment, and even how they are now maintained. Millions were lavished upon St. Peter's alone, and millions more must have been expended upon three or four more of the great basilicas, to say nothing of the hundreds of smaller churches, some of which are costly edifices. The fine old church of St. John Lateran, with its singular baptistry, where Constantine was baptized, is under the pastoral charge of the Pope. It contains, among other rare things, two human skulls, which are exposed several times a year as those of St. Peter and St. Paul. The church of Santa Maria Maggiore contains the splendid new sepulchre recently consecrated by Pius IX. for his own burial, also some rich chapels. This gorgeous church of the Jesuits has its precious marbles, and a miracle-working image of the Virgin. The gaudy Minerva is historically celebrated as the place where Galileo was tried and sentenced for the belief that our planet had a proper motion and revolved around the sun, a truth which he afterward abjured as a heretical and absurd doctrine. Still more splendid is the church of St. Paul, recently built upon the site of an old basilica destroyed by fire, and which is situated on an open plain some two miles beyond the gate of St. Paul, upon the spot where the great apostle was buried. To my mind this is the most chaste, simple, and elegant church edifice in all Europe. Externally, it has neither merit nor pretension; internally, it is marvellously beautiful.

About a mile beyond the church of St. Paul, in a lonely, fever-stricken valley, and within a little enclosure, are three churches that cannot fail to interest every visitor. One, a very ancient basilica, is dedicated to two saints, whose bones lie buried beneath the pavement. Another, called the Stairs of Heaven, stands over the cemetery of St. Zeno, in which were buried 12,000 Christians, who were compelled to work on the baths erected by Diocletian. The third, even still more interesting, is the chapel of the Three Fountains, built upon the spot, where, according to tradition, St. Paul was beheaded, and as the head fell from the body, it bounded three times, and upon each spot where it struck, springs of water miraculously gushed forth, which to this day continue to supply excellent water. The stone pillar upon which he is said to have suffered decapitation, is also kept as a sacred relic. Over the three springs they have erected altars, supported by black porphry columns, unique for their size and beauty.

Upon the Janiculum hill, which commands a magnificent view of Rome, stands the church and monastery of St. Peter in Montario, within the court of which tradition says St. Peter—though some scholars have declared that not a particle of evidence exists that this Apostle was ever in Rome—suffered martyrdom under Nero. A small chapel covers the spot, and the monk in attendance is happy to scoop up a little yellow sand to give to visitors as a relic of the event; there is no end to the supply. The church of St. Peter in Vincoli, on the Esquiline hill contains the great clumsy statute of Moses, by Michael Angelo—"frowning with the terrific eyebrows of Olympian Jove"—with goats horns upon his little head, and legs heavy enough to support an arch of the Coliseum. Here are also presented the chains that bound the Apostle Peter in the prison at Jerusalem. The chains are only shown on the festival of the saint, which happened at the time of our visit. The church was decorated, and brilliantly lighted by a hundred chandeliers; the music was exceeding fine, and it was amusing as well as interesting to witness with what eagerness the assembled crowd hugged and kissed the venerable chain as it was presented to them by a priest.

Upon the Capitoline hill, near the Palace of the Senator, and approached by a flight of one hundred and twenty-four marble steps, is the Ara Cœli, a church of the Franciscan friars, built upon the site of the temple of Jupiter Capitolinus. It is one of the most interesting sacred edifices in Rome, not only on account of its high antiquity, but from the fact, as Gibbon tells us, that "on the 15th of October, 1764," in this church, as he "sat musing amidst the ruins of the Capitol, while the barefooted friars were singing vespers, that the idea of writing the "Decline and Fall of Rome" first started to his mind."

I refer to this church, however, more particularly for the reason that it contains among its venerated treasures a most extraordinary image called the "Santissimo Bambino," a wooden figure of the infant Savior, which is alleged to possess the miraculous power of healing the sick. We were curious to see this image, and therefore climbed the fatiguing staircase, and finding one of the friar-monks, to whom we made known the object of our visit, he kindly conducted us through the church and sacristy into a small side chapel in which is fitted up a very respectable looking cupboard expressly for the safe keeping of the little image. After lighting a couple of candles—a custom always observed—the friar proceeded to unlock the door, took out a box, and after devoutly kissing it, commenced to uncover a figure about two feet long, having an elegant silver crown upon its head, gold shoes upon its feet, and the body swathed in garments of the richest description, studded with precious stones. With a view of gratifying a laudable curiosity, we made inquiry of the friar—who was a prodigious snuff-taker and was the owner of very capacious nostrils—concerning the history and miraculous power of the "Divine Bambino." He informed us that it was carved by a Franciscan monk from a tree which grew upon the Mount of Olives, and that upon the completion of his exquisite work he was sadly puzzled to know how and in what way he could apply the necessary coloring. In his deep distress he called for aid, and in answer to his fervent prayer a divine artist mysteriously completed the work while the friar was asleep. When on its voyage to Rome, the Bambino fell into the hands of Satan; but somehow it got to its destination, by the way of Leghorn, and for centuries has been an object of pious devotion on the part of the sick, so that at one time its income exceeded that of any other doctor in Rome. During the exile of Pius IX., the Bambino made its family calls in the papal carriage, but on the return of his Holiness the image resorted again to its own old brown vehicle, and still continues to visit its patients, with the professional ceremony of a medical attendant. The friar further informed us that at the special request of a sick lady of wealth and distinction, the Bambino was permitted to remain at her house for several days, during which time she had a duplicate made, and sent to the Ara Coeli. The trick, however, was discovered in a most miraculous manner. At an unusual hour the chimes of the church bells rung a supernatural peal, which caused the people to flock towards it, when the real, genuine Bambino was found standing upon the high altar, having made its escape from the sick lady's custody and returned to the church.

The friar told us these and many other stories with all the gravity possible, although to us, not being accustomed to such things, there was too strong a smell of improbability about the truth of the statements for us to accept them, even in spite of the certificate of Dr. Van Swygenhoven, an eminent physician who had the honor to belong to thirty-seven

different learned societies, and who testifies that after himself and wife had exercised a vivid faith, the Bambino cured her at once of a chronic heart disease.

I am drawing no fancy sketch to amuse the reader. Every visitor to Rome has either heard of or has seen the "Santissimo Bambino," which has long been one of the harmless lions of the city. It is not only made the subject of solemn religious ceremonials, but its fame has already become the subject of an eloquent sermon by Antonio of Cypress, who graphically recounts the history of the Bambino—its many vicissitudes and miracles—to which is appended the usual certificates of cure.

The Church of St. Clement is another very interesting edifice. Some writers think it may have been a pagan temple, but the discovery of another church underneath, which possesses unmistakable evidences of the Christian faith makes the upper St. Clement comparatively modern. Excavations still going on underneath show an almost perfect church structure, a primitive bastlica abandoned and unknown for nearly a thousand years. Still below this another buried edifice has recently been unearthed, consisting of a small chapel and suite of adjoining rooms, which are believed to have belonged to St. Clement's house. What a strange combination have we here! A Christian church and chapel, buried for centuries underground, and standing above them both, another church, so very ancient that for centuries it was supposed to have been erected to an unknown god.

Beneath the Church of St. Joseph, near the forum are the famous Mamertime prisons or dungeons, where Jugertha was starved to death and where the Cataline conspirators were strangled. It is stated that St. Peter and St. Paul were both imprisoned here, and a place is shown in the travertine wall —now covered by an iron grating—as the spot where St. Peter's head was struck, forming a considerable depression—a hard head, and a tough story to believe.

Monasteries are numerous in Rome, although the number of their inmates is gradually decreasing. One of the strange sights of Rome is to visit the chambers under the church of the Capuchins, to witness the extraordinary system of burial practiced by the monks. Here are a series of vaulted apartments provided with holy mold brought from Jerusalem, which is supposed to possess peculiar dessicating properties. When a monk dies the body is buried in the earth, or oldest grave, from which the last occupant was removed. The bare bones and skull are exhumed, and arranged fantastically about the walls and ceilings in the shape of scales, chandeliers, rosettes, crosses, and other emblems of business and religion, the whole forming a very cheerful and pleasing spectacle of our frail mortality. The bones of the more favored dead brethren are wired together and rehabilitated in the brown sack and cowl of the order, such as were worn by them during life, and thus attired they are arranged in sitting posture, in recesses, where they sit and grin and stare upon visitors through eyeless sockets, thus presenting "amiable and lovely death" in that attractive form so pathetically coveted by Queen Constance. So much for the novelties of the Roman churches.

Lottery offices are about as numerous in Rome as the churches. They are regularly licensed by the authorities; some are even uncharitable enough to say that the government has an interest in the spoils. It almost always happens that the poorer the people are, the more they seem willing to squander their money on these lottery swindles, and the Romans are no exception to this rule. They waste a great deal in this way, and entertain many singular superstitions about the mode of choosing lucky numbers. Dream books are largely consulted, and the most trivial circumstance is often construed into an omen of success on certain numbers. Sometimes children are sent into the streets to inquire of a stranger the time of day, and the figures given are used in selecting numbers in the lottery. These people are more to be pitied than blamed.

We happened to be in Rome at the opening of the carnival. It was a strange sight to see the grotesque costumes, the indiscriminate throwing of *confettos* and bouquets, the gorgeous procession of the Senators and other high dignitaries of the city, and the running of horses through the Corso without riders. It is a strange people, and a strange government that delights in and encourages such things.

S. H. W.

Improved Concrete Pavement.

Patented by Wells H. White, of Troy, Ohio. Take of hard or distilled tar, five parts, of common coal tar, one part, and boil them for several hours. Then take of good sand or fine gravel, three parts, and of stone-coal ashes, from one to two parts, according to the degree of hardness it is intended to give the composition when first laid down, and mix them thoroughly together, and put them into a flat-bottomed heater made of heavy sheet iron, and heat the whole mass to a high temperature, stirring them while heating. Then pour into the mixture several bucketsful of saturated solution of salt, according to the quantity of gravel and ashes. Then pour into the foregoing mixture the boiling composition of hard and soft tar, and mix thoroughly. Then take out in suitable vessels, and pour the mixture over the ground to be paved, duly prepared to receive it, and spread it evenly, and, while yet hot, roll it with a heavy hot iron roller until the composition is perfectly packed and smooth, using marble dust as a parting sand, until the pavement is finished as desired. In about ten hours it will be hardened into a firm, smooth pavement.

GAY LUSSAC has observed bars of iron which became almost as brittle as glass by remaining for a long time at a high temperature in an oven.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Clock Repairing.

We condense a letter received from a correspondent which seems to give some valuable suggestions on the above subject. The writer says: "I live in the country and have followed clock and watch repairing nearly twenty years. There seems to be a general complaint among people, all over the country, about their clocks not being properly repaired. People carry their clocks long distances to be repaired, pay a good price for the work, take them home, and find they wont go. By examining these clocks I find that the pivot holes had been too large and that the punch and hammer had been used to 'upset' them for the purpose of making them smaller.

"My way is to take good brass wire, a little larger than the pinion, drill a hole lengthways in the wire, a little deeper than the thickness of the plate, cut it off, put it on an arbor, and turn it slightly tapering. Then make the old pivot hole perfectly round and large enough to receive the box, which drive in from the inside of the plate, file it down level, and ream the new pivot hole to fit the pivot. No solder is used for fitting the boxes, and I never knew one to come loose. Some may think it is too much trouble to make boxes and put them in; but to those I will say, I make mine when I have an hour or so to spare, and the fitting is but little more work than using the punch and hammer." G. F. A.

Sing Sing, N. Y.

Curious Optical Effect.

MESSRS. EDITORS:—Two straight lines or forms, placed in relation to each other as indicated in the diagram,

seem greatly disproportionate in length, although they are exactly equal. I have tried the illusory experiment a hundred times on as many different persons, and they have invariably pronounced the perpendicular line much the longest. Will some one or more of the "*Scientific Americans*" please give us an explanation of this deception? J. HERVA JR.

Rockford, Ill.

Colorless Drying Oil for Paint.

MESSRS. EDITORS:—The article on page 153, current volume, entitled "Chemistry of Paint," gives Mulder the credit for inventing a new process for obtaining a colorless drying oil. I am in possession of a book published in Magdeburg in 1821, and brought to this country in 1837—at least that was when I saw it—in which the same process, with the same results, is described. It seems, however, to be superior to Mulder's. I subjoin a translation: Take 5 gallons of water, heat it to the boiling point in a vessel holding 15 gallons; when about to boil add 5 gallons of linseed oil and 1 pound of red lead. Keep it constantly boiling and stirred up for two hours over a slow fire. If not constantly stirred the lead will sink to the bottom and cause the oil to spatter. It is then taken from the fire and left to settle, when it will be found that the oil is clear and colorless. J. HECKEL.

Decatur, Ill.

How to Catch Rats.

MESSRS. EDITORS:—For catching rats in a cheap and effectual manner allow me to recommend the following: Cover a common barrel with stiff, stout paper, tying the edge around the barrel; place a board so that the rats may have easy access to the top; sprinkle cheese parings or other "feed" for the rats on the paper for several days, until they begin to believe they have a right to their daily rations from this source. Then place in the bottom of the barrel a piece of rock about six or seven inches high, filling with water until only enough of it projects above the water for one rat to lodge upon. Now replace the paper, first cutting a cross in the middle, and the first rat that comes on the barrel top goes through into the water and climbs on the rock. The paper comes back to place and the second rat follows the first. Then begins a fight for the possession of the dry place on the stone, the noise of which attracts the rest, who share the same fate.

Decatur, Ill. J. H.

The Value of Dried Potatoes.

MESSRS. EDITORS:—Allow me to invite your attention to a recent discovery that must prove invaluable to the South, now that cotton can no longer be profitably raised.

Cotton had been known for generations, but only to supply the family's need, until the genius of Whitney responded to a world's demand So, also, the sweet potato can be grown in fabulous quantity; but its perishable nature confines it to home consumption. The present discovery, however, will render this also a staple article of commerce.

A bushel, when pared with the knife, which wastes much, weighs fifty-two pounds; but, when dried, only ten pounds, having lost in bulk three fourths, and in weight four fifths! Half a pound, when boiled three quarters of an hour in an earthen vessel (tin discolors), fills a large dish, in color and flavor precisely like the root on your table at this season of the year. Twenty cents a dish would not be considered high, and yet it gives three dollars and seventy cents a bushel to the planter: for ten cents will pay the cost of drying, and twenty cents that of boxing and freight to market. Now strike off one half for margin and merchant's profit. and did cotton ever pay anything like this—when you consider that five hundred bushels to the acre is not uncommon?

You are aware that the sweet potato undergoes a chemical change, a few weeks after being dug. At first it is dry and mealy, and is a universal favorite, but then it becomes soft and soggy, and is by many rejected. It is evident that no such change can take place in the specimen herewith inclosed, hard as flint stone. This delicious vegetable can therefore now be placed on the table every day of the year, in its best condition.

There will be a great foreign demand, for in Europe it is scarcely known; and even in our own country, west and north, it is seldom seen.

You will find, also, specimens of Irish potato. The first trial with this was a complete failure; they came forth almost black, and I gave it up in despair. But further reflection suggested that, when cooked, they are white. What is the difference? Heat. Accordingly they were submitted for a few minutes to steam, in order that the outer surface might be cooked, and form a mucillage impervious to the atmosphere. The result was a complete triumph; they came forth bright, and almost semi-transparent. If you slice some potatoes, and boil them, they cannot be distinguished from the dried when similarly treated.

It is evident they will keep during the longest voyage. How valuable for sea stores, with only one fourth their original bulk, and one fifth their weight. How important in a sanitary point of view, for there is no scurvy with potatoes twice a week! FRANCIS H. SMITH.

Baltimore, Md.

[The specimens of sweet potatoes inclosed are hard and almost transparent, resembling raw hide as prepared for loom pickers. The Irish potatoes are of a chalky whiteness, and equally hard. The invention appears to be valuable. During the war dessicated vegetables were largely used in the army, with the happiest results.—EDS.

Self-adjusting Telegraph Magnet.

MESSRS. EDITORS:—I noticed, on page 178, current volume, a communication, signed "S," in which he states that a self-adjusting telegraph magnet is an impossibility. I hardly think the writer is safe in making such an assertion, as a self-adjusting relay has already been invented by Messrs. Duxbury & Roberts—two very intelligent practical electricians of Boston—which has been thoroughly tested by experienced electricians on the Western Union Company's lines between Boston and Portland.

This relay readily adjusts itself, by means of a reverse current, to the changes of current on the wire caused by "escapes," "crosses," "grounds," etc.

Although the elasticity of a small wire spring commonly used on relays, admits of a finer adjustment than a common magnet, this relay seems to do its work as well as any spring adjusted by hand. Although this is a great invention, I do not call it so wonderful as that invention for sending and receiving dispatches over the same wire, at the same time; and I think it would be hardly safe for "S" to call *that* an impossibility, as it is now being done over the Franklin Company's lines between New York and Boston.

Portland, Me. D. C. S.

Science Familiarly Illustrated.

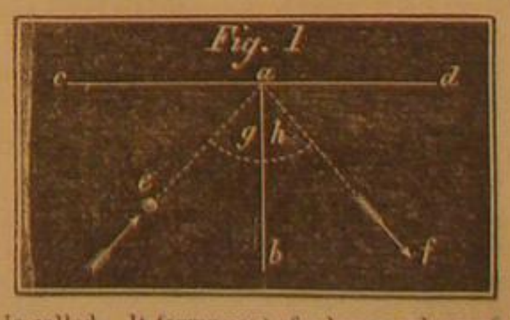
HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D, F.R.S.

Lecture VI.

In our last lecture I endeavored to explain to you the law according to which radiant heat is reflected. I then made use of some terms which were, perhaps, rather difficult to remember. I explained to you that the angle of incidence was equal to the angle of reflection, so that if you suppose the surface of this table, *c d*, to be a reflecting surface, and this rod, *a b*, a perpendicular to the surface, when a ray of light, *e a*, falls upon the surface, striking the bottom of that perpendicular, the ray is reflected so as to lie as far to the left of the perpendicular as the direct ray lies upon the opposite side of it. That is to say, the angle of incidence, *g*, on the one side is equal to the angle of reflection, *h*, which is on the other.

And now I have to draw your attention for a moment, not to the reflection of light or radiant heat from planes or flat surfaces, but to the reflection of radiant heat from curved surfaces. I have such a surface here. It is a large concave mir-



ror, as it is called. It forms part of a large sphere of glass; it is, as it were, a slice cut from a large sphere of glass. Now, suppose a sunbeam to come in this direction, and fall plumb upon the mirror: you see that the edges of the mirror are beveled or slanted off, and the consequence is that that sunbeam striking on it would be reflected in such a way that the reflected rays would converge and form a cone of convergent rays. I want to show you that when light is thus reflected from a concave mirror it is gathered up to a point which is called a focus. We will now throw a beam of light upon it. You cannot see light itself, but you can see bodies illuminated by the light; and in this room, and especially in London air, and indeed in all air, there is a considerable quantity of common dirt floating in the air, and these dirt particles will be illuminated by the beam of light; and I think this will enable you to see that after reflection the beam of light will be gathered up and brought to a focus. You see the beam is now reflected from the concave mirror and is gathered up in this wonderful way into that convergent cone. If we had time, we might

prove that this must be the manner in which the rays would behave after reflection in accordance with the law that the angle of incidence is equal to the angle of reflection.

Now, having shown you this convergence of the rays of light, I want to show you the reflection of the rays of heat: and for that purpose I have not a single mirror, but two mirrors. They are called "conjugate mirrors," and one is suspended over the other. I have here the means of obtaining the beautiful electric light from a battery of fifty cells: if I now place this light in the focus of this mirror the rays will be reflected upwards, and if the mirror were perfectly true they would be reflected upwards in a parallel beam, or, so to say, a solid cylinder of light. Now remember what occurs. The rays of light will fall upon this lower mirror; they will be reflected upwards by it in a straight cylinder; that cylinder of light will stike upon the upper mirror, and will be converged, and reflected again from the upper mirror, and brought to a point in what is called the focus of the upper mirror. You will see these rays of light going upward through the dust of the room when the room is darkened. I intended to have a silver bead in the upper mirror; and if it were there you would see it shining with the brilliancy of the sun, owing to the convergence of these rays of light in the upper mirror. If I put the light in the upper mirror instead of the lower one the rays would be brought to a focus in the lower mirror. I want to show you this with heat; and for that purpose I will take some boiling water. I lower the upper mirror and hang in its focus a flask of hot water; and now we will examine what occurs with the rays of heat. Having placed the flask in position, I draw the mirror up into its former place near the top of the house; and now the rays of heat are coming down from that hot water. Although you cannot see them, they are coming down as the rays of light which were given off from the electric light just now. The rays of heat are striking upon the surface of this mirror, and they are collected and brought to a focus here. I think that by means of our beautiful thermo-electric pile I shall be able to show that this is really the case. I now bring the face of the pile under the mirror, turning it downwards—not upwards, towards the hot water. You observe that the needle very soon moves, in virtue of the heat which is reflected by the lower mirror and collected to a focus in this way. I will now turn the face of the pile towards the cool region of the room, and allow its heat to waste itself; and now for the flask of hot water I will substitute a totally different body—a very cold one. I will, in fact, place a freezing mixture in the focus of the upper mirror, and then operate with the pile exactly as I did when the flask of hot water was there. You will now observe that the needle will move in the opposite direction. It will first come down to zero, and then move up on the opposite side. There will be a very sensible deflection, indeed, if I hit the right point. [The deflection took place as indicated.] Now, I dare say many boys here present think that, as rays of heat issued from the vessel containing the hot water, so rays of cold issue from the vessel containing the freezing mixture. That, however, is not the case. In the case of the freezing mixture our thermo-electric pile is the warm body. It is hot compared with the freezing mixture, and that pile radiates its heat against this lower mirror; the heat is reflected above, is re-reflected against that mirror, and is then absorbed and drunk up utterly by the freezing mixture, so that the pile in this way wastes or loses its heat, and therefore gives that deflection of the needle due to cold. Instead of this freezing mixture or the bottle of hot water, I will now place in the focus of the mirror a body which I hope will be given to me in a bright cherry-red hot state. A copper ball has been placed in the fire in the next room; we will suspend that copper ball when it is red hot in the place which was occupied by the freezing mixture, and see whether we cannot get very visible evidence of its radiation. I do not like to use the thermo-electric pile in this experiment; but I have here some black paper, and sometimes we are able to make paper smoke in the lower focus. I place this paper below in the focus, but I see the ball is not hot enough to burn it; there is no apparent action; but I can feel the heat very strongly indeed, through the reflection of the rays, so that my hand can not rest there. Some of this paper smoked freely yesterday when brought within the focus. If I place the face of the thermo-electric pile there for a single moment, you will find what I said to be true. The action of the needle proves that you have there the focal heat I have been endeavoring to describe.

Now we have to pass on to the still further consideration of these rays of heat; and I will first of all try to make plain to you wherein consists this wonderful light that we have been operating with so often. I will take a thin slice of this light and try to unravel it before you. The screen will be lowered in order to enable me to do this, and we will lower the roof so as to darken the room. You will see the beam of electric light making itself evident in the dust of the room; and this lens enables me to obtain a beautiful image on the screen. Now I want to twist that beam aside. That white mass of light which you see, is due to a mixture of lights of various colors. I will twist this beam aside by means of a prism, and separate these colors one from the other. First of all I will send the light through a single prism, thus, which gives this wonderful, rich display of colors upon the screen. Nothing can be more beautiful than this—so rich and lovely. And now I will try and make the band still bigger, not richer; it is imposible to have it richer or more beautiful than that. For the purpose of increasing the size of this band of colors I will send the beam through another of these prisms, which will pull it aside still further, and spread these colors still more. You now have the beam passing through a second prism, and when I bring the beam into the field you have this splendid band thrown on the screen. This is called a spectrum. This was the great discovery of Sir Isaac Newton. He found that white light was composed of all these colors; and if it were consistent with our present course of lectures, we could make these colors combine again and form white light. We will now turn up the gas, and you see how dead the spectrum becomes when the light falls upon it. I asked for the gas light in order to choose a boy "ruddy, and of a fair countenance." [The lecturer then selected a boy answering to this discription, and led him to the screen. The room was then again darkened.] You will find what happens to the color of his face when I lift him into the midst of this spectrum. Here [holding the boy's face in the red light] he is blooming like a rose. Now [transferring him to the yellow] he is like something very different from a rose.

Now I want to say a few words upon this wonderful spectrum. You see a great mass of light here, and you might suppose that that is all which comes out of that wonderful electric lamp; but that is, in reality, not at all the case. You have here a certain distance which is rendered visible to the eye by these splendid colors, but there are rays extending about as far on the outside of the extreme red, as the green color is on the other side of it. The most powerful radiation emitted by the electric light does not fall on any part of the visible spectrum, but it falls as far on one side of the red as the green is from the other. And so also at the other end of the spectrum we have a vast body of rays stretching out beyond the visible portion; but all these ultra-violet rays and the ultra-red rays are perfectly incompetent to produce vision, although a great number of them reach the retina. I now want to make evident to you the prolongation of the spectrum in the direction of the violet, and for that purpose I must make use of a less expensive spectrum. We have produced this by means of prisms of liquid, but I must now make use of a prism of glass, or else have only one of the liquid prisms instead of two. I want to give you an idea of the comparative power of the luminous rays and those dark rays I have spoken of. I have now produced this present spectrum by means of one of the liquid prisms. We might, as Sir William Herschel did when he first discovered the dark rays of the sun, place a thermometer in this dark part beyond the red, and we should find that it would show an augmented temperature because of the heat falling on it from the electric light. Then if we traveled from this red end of the spectrum towards the other, we should find that the thermometer would gradually sink, and if we went back again it would rise gradually through the violet, through the blue, through the green, and the yellow, and the orange to the red, the red being the hottest part of the visible spectrum. But Sir William Herschel did not stop here, but made a further discovery. Far beyond the red he found very powerful rays falling upon the thermometer, and he represented the rise of the temperature by lines of certain length. He represented the least heated part by a short line, and the next by a longer one; the line representing the heat of the green is of a certain length; and the heat of the yellow was marked by a longer line still. The whole visible radiation from the sun was determined in this way by Sir William Herschel; but we have now far finer methods, and with the electric lamp which you now see before you, we went over these colors with a thermo-electric pile. The whole radiation of the visible portion of the spectrum is represented by this small colored area that you see represented on the diagram; but over and above that and beyond the red end of the spectrum, you have an amount of heat which is represented by this great mountainous peak. The invisible radiation is nearly eight times the visible; that is to say, only one-eighth part of the rays emitted by the electric light is competent to excite vision, all the rest are rays of heat, and not rays of light.

And now I want to show you the prolongation of the spectrum in the other direction; and for this purpose I will make use of a prism of flint glass instead of this prism of bisulphide of carbon. I place the prism exactly as in the former case; the display of colors is not now quite so brilliant, but the glass is more transparent to the rays that I want to show you than the bisulphide of carbon is. I have here a certain substance called sulphate of quinine; and I have here also a screen of white paper which was wetted with this substance before the lecture. It was found by Professor Stokes that this substance has the extraordinary power of rendering visible these invisible rays of light beyond the violet. Now, observe this band of light which becomes visible beyond the violet, when I introduce the paper screen which has been spread with the sulphate of quinine. There is darkness when the screen is not there, but when it is held up you see this lovely band of color produced. If I take the liquid itself and daub it upon a piece of paper, it will render the invisible rays visible. I have here also the means of changing the color of rays by means of this beautiful violet glass, and rendering rays visible which were hardly visible before. Here is a piece of paper, on which are printed the words "A happy new year." As you look at it you see nothing upon it, by the ordinary light, but if we put up the violet glass observe how beautifully the letters come out.

So much, then, for the existence of rays beyond the red end of the spectrum, and also beyond the violet end, which are incompetent to excite vision. These are what are called invisible rays. Before I proceed further I should like to show you an experiment by means of these powders. Professor Stokes has called that action which makes the sulphate of quinine visible "fluorescence." The phenomenon called fluorescence has been known to philosophers a long time. It was observed that certain substances had the power, so to speak, of drinking in light, and then giving it out gradually. M. Edmond Becquerel, of Paris, has rendered himself exceedingly famous by his investigations on this subject, and the powders I have here were selected by him. I am indebted to Sir Charles Wheatstone for them. I will show you that if these powders are shown upon by the electric light, and then the lamp is extinguished, the powders will still retain their luminosity; they will still have the power of giving out light. They, as it were, drink in the light and then give it out slowly and by degrees. [The powders were exposed to the electric light for a short time, and the light was then extinguished.] There, you see the powders are self-luminous, and emit this beautiful light. I have here a beautiful butterfly formed of these powders. It is painted upon glass. You see the surface of the glass is now perfectly dark. It emits no light; but if I allow the light of the sun or the light of the electric lamp to shine upon it for a short time, you will see that it has the power of drinking in that light, and emitting it gradually. [The surface of glass on which the butterfly was painted with the fluorescent powders was exposed to the electric light. The light was then withdrawn and the butterfly was seen to have become luminous.] This beautiful butterfly is produced by means of these fluorescent powders selected by M. Edmond Becquerel.

COLE'S METHOD OF RAISING WATER.

The specifications accompanying the application for letter patent of this device declare that the object is to "construct a machine which, by the application of but little power will raise a column of water to any desired hight, to furnish motive power for machinery and other purposes."

Fig. 1.

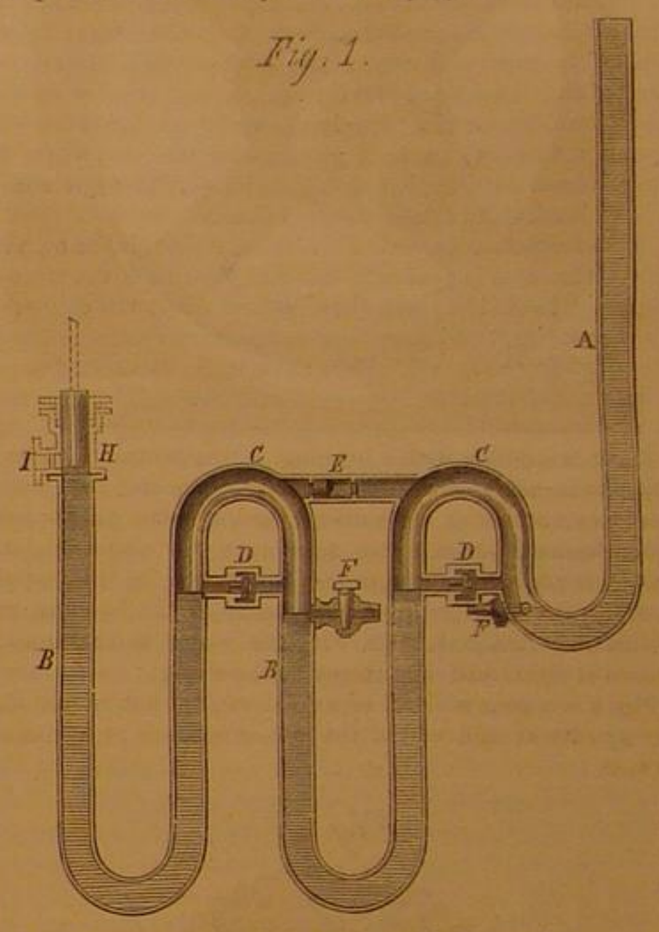
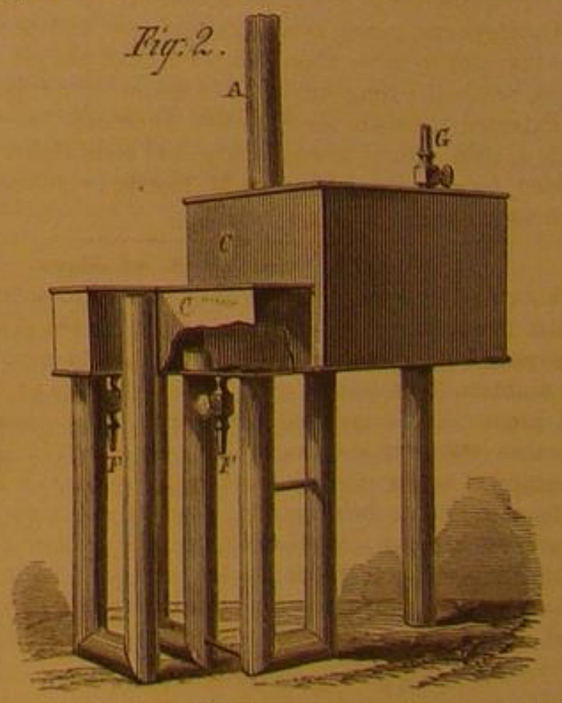


Fig. 1 represents a tube bent into the form of a compound syphon, having a vertical extension, A, above the water line equal to the columns B. The upper portions, C, are air chambers; D, are water communications between the legs of the syphons, having valves similar to ordinary check valves. E is a communication between the air chambers, having a piston working either way. F are water cocks for keeping the level of the water down to the required position.

Fig. 2 is a modification of the device, the air chambers, C, being boxes of a rectangular form affixed to the tops of the tubes, and dispensing with the communications C and D, in Fig. 1. As in Fig. 1, F represents the cocks for drawing the level of the water down below the level of the pipes which project up into the chambers. G is a cock for admitting air to the large chamber.

Fig. 2.



In operation a pump, H, Fig. 1, forces the water admitted to the syphon, at I, Fig. 1, into the pipes composing that syphon. The action of the pump, as in the Bramah or hydrostatic press, depends on the compression of air on a column of water. The inventor believes that with the elastic quality of air, he can, by the exertion of a small amount of mechanical force, and the reduplication of air chambers, force water to any requisite hight, without the expenditure of the same amount of power now used in ordinary contrivances for the same purpose. The action of the pump produces a pulsation on the columns of water, which, the inventor believes, is re-

produced through the sucessive syphons with constantly diminishing expenditure of power, yet with equal force, indefinitely.

Patented through Scientific American Patent Agency, Dec. 10, 1867. Other improvements are being applied for through the same means. Address J. R Cole, Kenton Station, Obion county, Tenn. for any further information.

IMPROVED DEVICE FOR OILING LOOSE PULLEYS AND GEARS.

On page 178, current volume, we published a description and illustration of a simple device for saving oil in loose pulleys. The improvement represented in the engravings is an advance in the same direction. It is designed for saving oil, which is so outrageously wasted in lubricating loose pulleys and gears running on fixed studs. The inventor states that a loose pulley, on his plan, ran three weeks, ten hours per day, with the same quantity of oil usually applied in lubricating a loose pulley once, the test being made on a shaft of one and a half inches diameter running 150 revolutions per minute.

Fig. 1.

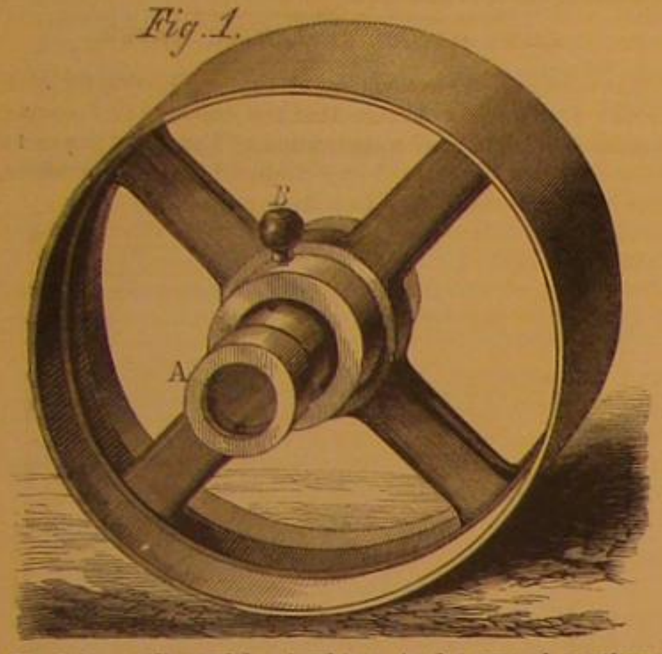
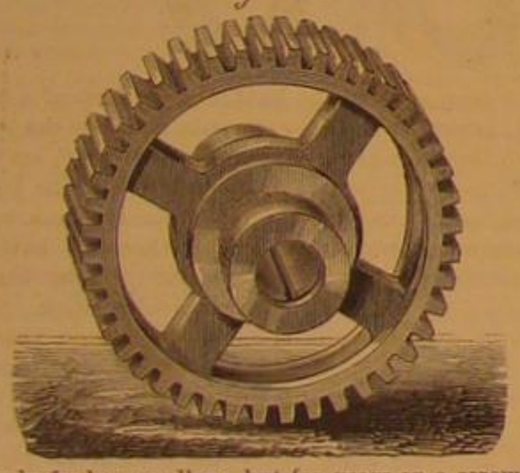


Fig. 1 is a pulley with a bushing, A, the central portion of which is turned to a smaller diameter than the end bosses, and has a number of holes drilled leading from the recessed circumferential space to an annular recess near each end. The oil is poured in through the hole closed by the stopple, B, filling the space between the outside of the bushing and the inside of the hub, from which it passes to the annular groove at either end, and thence to the shaft.

Fig. 2 is a gear without separate bushing, but having similar grooves at each end of the hub, connected by a channel, as seen.

Fig. 2



Not only for loose pulleys, but for gears on a screw-cutting lathe, this device appears to be well adapted, and, also, to all circumstances of a similar character. It is applicable to old pulleys and gears, at a slight expense, and is claimed by the inventor to save about 90 per cent of the oil commonly used, beside the time employed in frequent oilings.

Patented through the Scientific American Patent Agency, Feb. 4, 1868. Shop, town, county, and state rights can be obtained by addressing George M. Morris, or John McCreary, Cohoes, N. Y.

Glycerin and Yolk of Eggs.

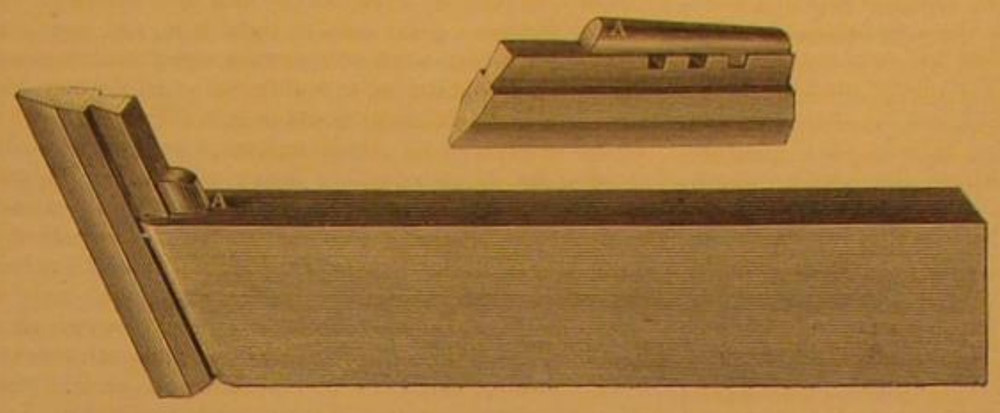
Four parts by weight, of yolk of egg rubbed in a mortar with five parts of glycerin, according to the Philadelphia *Journal of Pharmacy*, gives a preparation of great value as an unguent for application to broken surfaces of the skin of all kinds. The compound has a horny-like consistency, in unctous like fatty substances, but over which it has the advantage of being quickly removed by water. It is unalterable, a specimen having laid exposed to the air for three years unchanged. Applied to the skin it forms a varnish which effectually excludes the air, and prevents its irritating effects. These properties render it serviceable for erysipelas and cutaneous affections, of which it allays the action.

An "Elephant" Indeed.

The owners of the *Great Eastern*, mourning not simply a non-appearance of dividends, but a very heavy expense in keeping the big ship in existence, are in a sad state of perplexity, not knowing what is to become of their unproductive property. At the late annual meeting of the shareholders, the directors' report deplored the failure of the company to complete its contract with the new French cable company, the latter refusing to act up to the terms of the agreement, and the whole affair is now before the law courts for adjudication. As far as the future was concerned, the chairman tried to persuade the company that the prospects were encouraging as there were other cables to be laid and he was certain that their ship was the only one which could accomplish such an undertaking successfully. One hopeful proprietor suggested that the Leviathan should be converted into an immense floating hotel, but the plan was promptly voted down. The shareholders are certainly deserving of public sympathy.

Improvement in Turning and Planing Tools.

Of late years a new branch of trade has sprung up in providing tools for machinists. While members of every other trade and handicraft can go to dealers and buy tools to prosecute their business with, machinists have been compelled to leave their regular business and manufacture their own. There is no good reason why tools should not be made for them and used by them, at a great saving of time, labor, and expense, as well as for carpenters or masons. The Scientific American has frequently called attention to this subject, and a new and profitable field is open to inventors in this direction.



SHAW'S "PARAGON" TURNING TOOL.

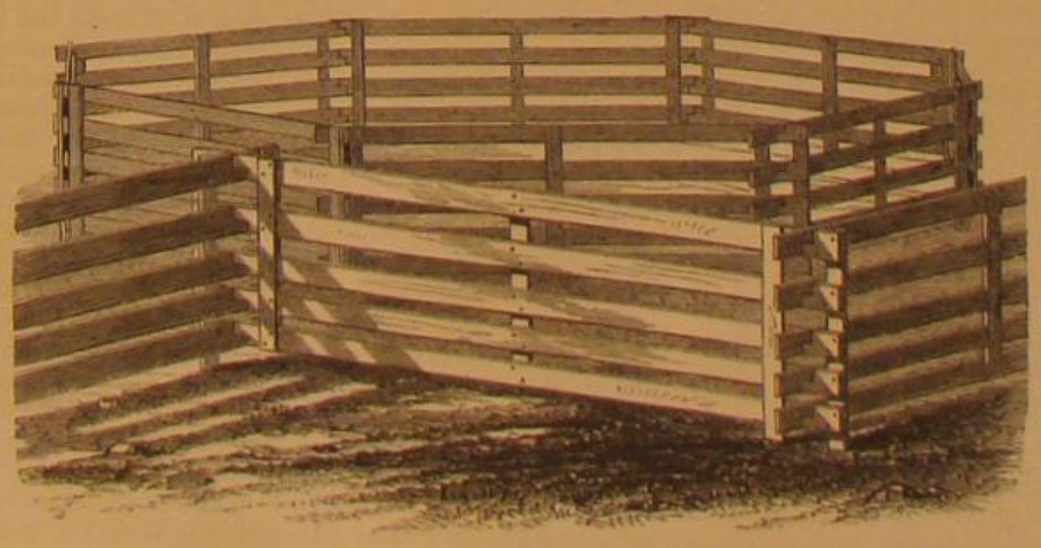
We illustrate herewith a turning tool, one of a class that has lately been introduced with considerable success.

All machinists know that in the ordinary lathe tool three fourths of the stock is wasted, or cannot be used because it is simply a holder, so to speak, for the cutting end. It is proposed to make a stock that shall last forever, and merely renew the cutting point as it is worn away. This involves a comparatively small expense, permits much better steel to be used in the cutter, saves the time and labor generally wasted in the blacksmith's shop, and, what is better still, reduces the routine of the shop to a more systematic course. The peculiarity of this tool consists in dispensing with all screws and clamps, and so constructing it that it tightens and adjusts itself to the work to be done. Externally it is precisely the same as an ordinary tool. There is nothing in the way of the work, and the cutter is raised, lowered, and held fast by the gib wedge, A. This detail has a projection on the face which engages with the slots in the cutter; when both are inserted in the stock, which is of solid steel, the pressure of the cut forces the tool down into its seat and holds it firmly without shake or jar. It is as solid as a solid tool. No hammer or wrench is required, and the cutter is never removed except to raise or renew it when worn out. They are made larger for heavy work. In appearance the tool is workmanlike, and we are assured by the manufacturers that they have given satisfaction where used.

This tool is the invention of Thomas Shaw, of Philadelphia, Pa. For further information address Philip S. Justice, 42 Cliff St., N. Y., or 14 North 5th, Philadelphia. [See advertisement on another page.]

Improvement in Portable Fences.

The advantages of fences which may be set up and taken down, removed from place to place, and adapted to inequalities, are so obvious that such temporary inclosures and guards are in quite extensive use. That seen in the engraving is simple, cheap and handy. It consists of horizontal slats or bars united by upright cross pieces, the horizontal bars having, near their ends, notches cut for the reception of the ends of alternate sections, the notches of one end of the sections being cut on the upper and those of the other on the lower edge of the slats. For a continuous fence the angles formed by the sections are no more than required for the necessary stability, while for pens of square or nearly circular form the fence forms a ready means of confining animals or stock, or of protecting young trees, etc. The engraving shows the sections arranged as a fence at varying angles, and also an octagonal pen for temporary purposes.



WILL'S PATENT WORM FENCE AND PEN.

The sections may be built by an ordinary mechanic or farmer, under shelter, during the winter, when outdoor work is inconvenient. They may be made of the cheapest stock, need no posts, and require no labor of digging, are sufficiently firm to withstand storm and wind, and are easily put up, being light and portable.

Patented through the Scientific American Patent Agency, January 14, 1868, by John Will, Bryan, Williams county, Ohio, whom address for additional particulars.

Glycerin.

The consumption of glycerin, owing to its many useful qualities, has of late years increased in such a manner that it is becoming no inconsiderable article of commerce and manufacture. Several large factories have been started in this country, and their product is fast driving out the imported article. Mr. Laist, of the firm of Hartmann, Laist & Co., in Cincinnati, Ohio, who have been engaged in this business for over five years, has patented through this office a process by which he obtains the glycerin perfectly pure, anhydrous, and white, equal in every respect to that of Price's, of London, whose make has been standard for the last ten years. The price of their glycerin is only about half of that manufactured by Price.

Their glycerin has been examined by eminent chemists and has been found to be perfectly pure and inodorous. The firm are now enlarging their factory so as to meet the demand and we are pleased to see them increasing the product of our manufactures by putting to use what had formerly been wasted.

COMPOUND BATHS FOR HARDENING STEEL.

From Milwaukee, Wis. we have received a letter in regard to tempering steel which takes exception to the views of our correspondent "P. Mc C., of N. J." and to our remarks, published on page 137 current volume, in relation to baths for hardening steel. He says: "your correspondent may be a practical man; I have seen many like him who object to compound baths. I have forged steel in New York for nineteen years, and my reputation as a tool maker for the marble trade was not bad. I used to temper in pure water and did not believe in compound baths of any kind. I took up forging mill picks and found that nineteen years' experience was of little value for tempering mill picks in pure water; to do good service in cracking French burr mill stones something better was needed. I found the basis of all baths should be carbonic acid. Those chemical compounds that infuse the most of it in a bath are the best, because iron and steel have the most attraction for it. My bath was patented through the Scientific American Patent Agency about a year ago, and I am now using it with success. I do not believe that baths of any kind will make bad steel good, but I have worked steel into good picks that had been rejected by a practical forger as unfit for mill picks; I forged it in the usual manner, but used my bath." W. G. E.

Cleaning Cloths Used by Bank-Note Engravers.

H. M. Baker, of New York city, has obtained the following patent: The nature of this invention consists in dissolving the gummy portion of the ink with coal tar, benzole, or coal tar naphtha, or with the refined coal-tar light oils, and pressing out the coloring matter with mechanical appliances while the cloths are immersed in either of the compounds above specified. The cloths are then removed and submitted to the action of steam in an appropriate vessel, which vessel may also contain water, with or without the addition of soap or alkalies. They then may be rinsed, pressed, and dried, and are ready for use again. The solution of gummy matter and the undissolved coloring matter may be placed together in a distillatory apparatus, and the benzole, naphtha, or light oils distilled off, which gives back the solvent and leaves the printers' ink in the retort. The ink may be removed and ground, and is ready for market or use again. The advantage of this invention is that it enables the engraver to cleanse his cloths without injury to the fiber, and at the same time to recover a large percentage of the expensive ink employed by him, which has heretofore been entirely wasted in the processes used for cleansing his cloths.

Near the site of ancient Nineveh a summer temperature of 140° F. has been experienced, and is the highest temperature authentically recorded.

The atmosphere absorbs nearly 40 per cent of the heat of the sun's rays.

Electric Marine Buoys.

A scientific man, M. Emile Duchemin, has been for several years engaged in experimenting on the ocean as an electric agent, and has recently arrived at results which may turn out to be important and which are certainly interesting. The object in view is the construction of a marine pile, which shall give a constant current of electricity as long as the elements last. He tried at first with copper and zinc, but the result was not satisfactory, the gas produced sometimes left a non conducting substance on the surface of the copper, and a polarizing action set in which threatened failure. Lately M. Duchemin has substituted a cylinder of retort charcoal for the copper, with a plate of zinc suspended in the interior, the whole being connected by a crosspiece of wood and buoyed by means of cork floats. Several of these piles were thrown into the basin at Fecamp, and the results are thus described by the inventor:—"At the extremity of two conducting wires I could produce sparks, and during two months this new electrical generator worked an electrical bell without cessation until a Norwegian vessel by accident destroyed the buoy."

Further experiments led M. Duchemin to the conclusion that by multiplying the number of piles he could increase not only the quantity but the tension of the electric current. This was an unexpected result, and in a certain degree in opposition to the experience of the laboratory; but, as M. Duchemin says, the sea is a basin differing from those used in laboratories; the immensity of its extent, the chemical composition of its water, its incessant motion, all point to the probability of new laws to be studied. The nature of the water of the ocean may exercise a great influence on our planet, and the study of this may possibly change our received ideas respecting the currents which affect the compass. Admitting that the vast basins of the sea are in contact with land containing metallic principles, electric currents may be thus formed which will explain the magnetic action of the earth on the needle.

M. Duchemin has succeeded in convincing the French Government that the destructive action of sea water on metals may be made to produce electrical currents for useful purposes, and experiments are now being carrfed on to test the subject at the cost of the Marine Department; experiments tried during the summer of 1866 gave promising results, and at the end of last September M. Duchemin was summoned to Cherbourg to assist the commission in its labors. An experiment has been made before the President of the Marine Council of Works, with three elements, each about the size of a man's hat plunged in sea water, at Paris, and a sufficient electricity was produced to keep a Ruhmkorff coil of 16in. in action, and produce sparks of two-fifths of an inch in length. At Cherbourg the currents of seven elements plunged in the sea, after having traversed more than a hundred miles of copper wire, made a needle deviate 8 deg.

The Cherbourg commission entered upon another kind of experiment to ascertain whether these marine piles would not protect iron from oxidation. When an iron plate, of which the surface had been cleaned, was placed in connection with the positive pole it soon became completely oxidized, but it remained unaffected when attached to the negative pole. Seven elements of 16in. in circumference sufficed to protect an iron plate having a superfices of several square yards for an entire year, and at the end of that period the elements themselves were in good working order. The experiments made tend to show that the zinc employed in his marine piles is capable of preserving from oxidation a surface of iron equal to eighteen times its own; but as the chemical effect depends on the number of pairs, M. Duchemin believes that a much higher result still is to be obtained, the commission having at present employed but a very small number of elements.

How (asks M. Duchemin) is the different action of the two poles on iron to be explained? The oxygen obtained by electrical action on water possesses energetic principles for oxidizing metals, the hydrogen produced in like manner possesses the contrary power, which, however, is not evinced by hydrogen prepared in the usual manner. A current of ordinary hydrogen passes through a weak solution of perchlorure of iron containing a small quantity of ferricyanide of potassium without producing any effect, while a current of hydrogen produced from sea water produces a deposit of Prussian blue.

A somewhat similar effect is observed (says M. Duchemin) in the perchlorure of iron pile invented by himself and used at M. Oudry's great galvano-plastic works at Passy; in this pile the nitric acid is replaced by liquid perchlorure of iron and the acidulated water by sea water. The advantage of this over the Bunsen pile is that it does not disengage hypoazotic gases which are injurious to gold and silver deposits.

Among the proposed applications of the marine pile is the preservation of the plates of ships lying in harbor, where (says M. Duchemin) they suffer infinitely more than at sea. Nothing, he says, is necessary for the preservation of the armor plates than to ensure communication between every part of the cuirass and the negative pole of a powerful pile placed in each basin.

The other applications to which the marine pile may possibly be adapted are:—The explosion of submarine mines and torpedoes, experiments with both having been made by the marine administration; the cleaning of ships' bottoms, which M. Duchemin proposed to effect by connecting one pole of a Ruhmkorff coil with the iron plating of a vessel and the other with the sea, which causes the molluscs to quit their hold; the transmission of instructions on board ship; the signalling the depth of water in ports and other places, such as beneath the keels of vessels; the transmission of electric telegrams from ship to ship during naval engagements; for night signals, with the aid of the coil, together with Geissler's tubes; for engraving plates in sea water by the means of cutting out as with acids; and, lastly, the possibility of using the marine pile not only for illumination of lighthouses and beacons but also on board ship.—*The Engineer.*

Deodorizing and Refining Saccharine Fluids.

William Clough, of Cincinnati, Ohio, has patented a process which consists in the use of soluble silica or the soluble silicate of soda or potassa as a refining agent, and finely ground barytes or other appropriate heavy powder, the latter being used to give gravity to the precipitate or coagulum produced by the former. In operating upon saccharine fluids which have been reduced to the density of sirup or molasses, they should be first diluted to the consistency of semi-sirup, say to 20° Baumé, or less. Molasses of the tropical cane may be treated at a greater density than the more viscid sirup of sorghum. With the latter I have found it best to dilute to about 16° Baumé. If the refining process is to be applied in the original operation of making sirup or sugar from the green juice, it may be applied at any state of concentration not much exceeding the density above named.

To the solution, either cane juice, beet juice, or dilute sirup, first add the barytes or other heavy powder, thoroughly stirring it into the fluid. The quantity to be used need not be definitely stated, as the powder is employed simply for the purpose of giving gravity to the precipitate which is produced by the silica, and causing it to subside. With barytes I usually add enough to produce a visible hue of white upon the liquid—a solution of considerable density, say of 16° or 18° Baumé, requiring about one tablespoonful to a gallon. If an earth or powder of less specific gravity is used, the quantity must be greater to produce a corresponding effect. With solutions of less density, less of the powder is required. A heavy powder, like barytes, causes the impurities or separated matter to subside into a small compass, and this should be preferred, unless, for other purposes, bone, coal dust, or some other powder should be employed. After adding the powder the fluid should be tested with litmus paper, and if free acid is indicated, this should be neutralized with lime or other alkaline agent.

The solution of silica or silicate is next to be added. It is better to have this agent prepared in a dilute state, say at a density of 5° or 10° Baumé, as in this form it is more conveniently mixed and incorporated with the fluid. The quantity of silica appropriate to be used varies considerably with different solutions. It is best to use no more than will suffice to refine thoroughly. I have found that with solutions of sixteen to eighteen degrees' density, one part of silicate of ten degrees' density to one hundred parts of the solution, answered well. Silicates of different manufactures differ considerably n their capacities, some being much more silicious. Sirups or solutions of less density require smaller proportions of silica. Very impure viscid sirups yield a dense precipitate, and refine quite clear with smaller proportions of silica than are required for comparatively pure sirups. As it is not practicable to give exact quantities or proportions adapted to all circumstances, the operator, when employing the process for the first time upon any particular kind of fluid or sirup, should test the same in a small way before proceeding with a large operation. For this purpose an ordinary test tube, or a thin, white glass vial, which will bear to be held in the flame of a lamp, will answer. Fill this with the prepared solution and boil it. A perfect coagulation should appear as the liquid comes to the boiling point. In a very few minutes the separated impurities should subside, leaving the fluid perfectly clear. If this occur, and if the impurities settle into a small, compact mass at the bottom, the proportions may be understood to be correct. But if the precipitate is without cohesion, and in settling leaves the solution somewhat turbid and impure, the quantity of silica was insufficient, and more must be employed; but the additional quantity may be very little to produce the desired effect. On the other hand, should the precipitate appear dense and settle sluggishly, forming a bulky sediment, it may be understood that an excess of silica is present, and the relative proportion must be reduced.

The solution having been treated for refining, as has been explained, is next to be brought to the boiling point, after which it should be removed from the fire into settling tanks, and allowed to remain quiet until the impurities subside, after which the clear liquor may be drawn off from above the sediment, and is then ready to be boiled down to a proper density for sugar or sirup. The silica or silicate may be added to the solution before it is neutralized with lime, if more convenient.

The Photographic Bath.—Mr. J. R. Johnson lately read a paper before the London Photographic Society in which he states that permanganate of potash may be used with success in treating old baths. This salt appears to have the property of oxidizing the reducing agent contained in the bath which produces fogging. A few drops of a 20-grain solution of pure permanganate of potash is to be added to the bath which changes it to purple, then turbid brown, but on filtration the bath is rendered clear, completely cured of fogging and yields vigorous pictures. This appears to be a most useful suggestion for photographers.

Glycerin Paper.—M. W. Brown, of West Farms, N. Y., has a recent patent for steeping paper in a mixture composed of 100 parts of glycerin and 10 parts of saleratus. The paper is used for wrapping tobacco, snuff, soap, etc.

Pouillet has made observations with a pyrheliometer from which he estimates that the amount of heat annually received by the earth from the sun would melt a crust of ice surrounding the earth 101 feet thick.

Business and Personal.

The charge for insertion under this head is one dollar a line.

For Improved Lathe Dogs and Machinists' Clamps, address, for Circular, C. W. Le Count, South Norwalk, Conn.

Brick Machine.—Lafler's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafler & Co., Albion, Orleans county, N. Y.

Manufacturers of thick Water-proof Paper send address or price list to Box 109, Black Hawk, Colorado Ter.

Mill-stone Dressing and Glaziers' Diamonds. Also, for all Mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Patent Engine Lathes and Upright Drills, Planer Centers, Lathe Chucks, Planer Chucks, and all kinds of Cutlery Machinery, address Thomas Iron Works, Worcester, Mass.

For sample of a neat little Self-lighting Pocket Repeating Cigar Lighter, with wholesale price, send 65c. to L. F. Standish, Springfield, Mass

Two Valuable Patents for sale—one for a Fertilizer, and the other for Harness Wardrobe. Address H. E. Pond, Franklin, Mass.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. Bartlett Machine and Needle Depot 569 Broadway, N. Y

Merriman's Patent Bolt Cutters—Best in Use. Address, for circulars, etc., H. B. Brown and Co., New Haven, Conn.

For all sizes of Tube for Steam, Gas, or Water, and the most improved Tools for Cutting off and screwing the same, address Camden Tool and Tube Works Co., Camden, N. J.

Waugh's Combined Circle and Square Shears for Tinners and Paper box Manufacturers. For circular address J. Waugh, Elmira, N. Y.

To Inventors.—I will furnish money to obtain and sell a patent on some useful invention if sufficient inducement are offered. Address J. K. Ross, Noblesville, Ind.

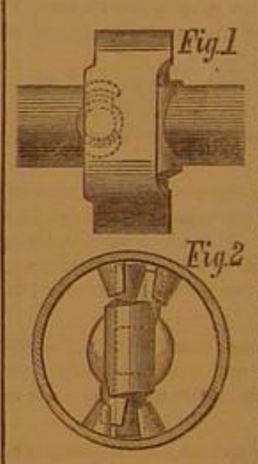
Agents wanted to introduce our flexible shoe brushes. Sample and terms sent on receipt of one dollar. Address Flexible Shoe-brush Co., Newark, N. J.

Will every inventor of improvements in Knitting Machines, please send their address to Dana Bickford, Boston, Mass.?

Manufacturers of improved machines for fluting zinc for Washboards, please address Eggleston & Green, Grand Rapids, Mich.

For Sale—one 8 and one 10-horse portable engine and boiler in perfect order. Address J. C. Beers, Tarr Farm, Venango county, Pa.

ZWIEBEL'S IMPROVED UNIVERSAL JOINT.



The "knuckles" or universal joints on thrashing and other machines for producing a rotary motion at an acute or obtuse angle from the driving power, are made of iron, cast or wrought, and some of them are dangerous because of projecting pins, and not durable because of the rigidity of the material of which they are constructed. This "knuckle" will last longer than one made entirely of iron; the wooden pins may be replaced by new ones when worn out; and the wear is actually less than on the iron joint. Fig. 1 shows a side perspective view, and Fig. 2 an end vertical section which sufficiently illustrate the construction and operation of the device. It was patented through the Scientific American Patent Agency Sept. 3d, 1867, by Anton Zwiebel, dealer in farm and agricultural implements and machines, Burlington, Wis., who will reply to all communications relative thereto.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The residents in and around West Hampton, Long Island, have been sorely perplexed of late concerning an extensive establishment just erected on their sea beach, of whose objects nothing can be learned. They may thank us for the supposition that the mysterious Algæ Chemical Works probably purpose to undertake the extraction of iodine, bromine, etc., from the seaweed so abundant on their coast. We are informed that this spot was selected for the location of their works, as the best result of tests applied along the coast from Montauk Point to the Florida Keys.

A locomotive built in Pittsburgh, designed for the use of an Ohio coal and iron company, weighs but five and a half tuns; has neither pitman nor connecting rods, the power being transmitted directly from the piston to the driving wheels. The gearing can be so set as to give, with a velocity of ninety strokes a minute, a speed of only three miles an hour—if that is any advantage.

The town of Newport, on the Maine Central railroad, possesses a very valuable water power. Lately, the town has exhibited a commendable spirit of enterprise in taking the initiatory steps toward gaining for itself a manufacturing importance, by voting to take stock to the amount of $10,000 in a cotton or woolen mill built on this water site, and to exempt the establishment (capital $40,000), from taxation for ten years.

The manufacture of cotton has been begun in Utah, as appears from an advertisement in a Salt Lake City paper, to the effect that the faithful "can now purchase the justly celebrated Desert Mill cotton yarn, manufactured at President Young's cotton factory."

The State of Arkansas proposes, by virtue of its mineral resources, to enter the mining field. In the three northeastern counties of Lawrence, Independence, and Randolph, sufficient quantities of zinc, copper, and lead have been found to warrant the organization of mining companies for the purpose of carrying on operations on an extensive scale. One company in the first-named county sunk a shaft but a few feet, and were rewarded with a lump of zinc weighing four thousand pounds.

Although "big strikes" are now much less common in California than in the earlier days of gold mining, yet the discovery, in 1867, of several remarkably large nuggets is recorded by the San Francisco *Commercial Herald*. In August, three lumps of nearly pure gold were picked up at You Bet, the united weight of which was 539 ounces, valued at $10,000. In February, a nugget of pure gold was found in Mariposa county, which weighed nearly four pounds. A gang of Chinamen working in the vicinity of Kanaka Flat, took out in the month of July a piece of gold weighing forty-five pounds, worth over $15,000. The next week another company of these people picked up, near the same place, a chispa weighing forty-one pounds. We have made no note of the discovery of *morceaux* of $1000 value or under, but the instances given are sufficient to show that these lucky strikes, though exceptional, are sufficiently common to encourage the unfortunate miner to hope for better things.

Commissioner J. Ross Browne estimates the yield of precious metal for 1867, in the State and Territories west of the Rocky Mountains, at $75,000,000. The entire product of the same section in precious metals, from 1848 to Jan. 1st, 1868, amounts to $1,165,000,000. Over 77 per cent of this yield was contributed by California alone. Placer mining is on the decline. Vein or quartz mining is progressing favorably. The proportion of the population actually engaged in mining has greatly diminished in the past few years, and does not now exceed fifty thousand. Agriculture, manufactures, and commerce are assuming the preponderance over the mining interests.

Track laying, which was suspended on the Kansas City branch of the Union Pacific Railroad, during the winter, is again resumed. By the first of June next the cars will be running to Fort Wallace, three hundred and eighty five miles west of Kansas city.

In order to approach the railway bridge over the Mississippi, connecting Dunleith with Dubuque, the Illinois Central railroad have found it necessary to undertake the boring of a tunnel 900 feet long, tarough solid rock. This formidable undertaking has been let to the Rock Island contractors, and they have already commenced operations.

In the city of Pittsburgh and its immediate vicinity, more than twenty million dollars are invested as capital in coal oil refineries and their appurenances. There are fifty-eight refineries in operation, with an estimated capacity of 27,000 barrels per week, or 1,404,000 barrels per year—equal to a product of over 63,000,000 gallons per year, while the entire export of oil in 1867 was but 3,000,000 gallons more.

An air line railroad from New Orleans to New York is one of the latest and most promising of railroad projects. The gap of communication now existing between Selma, Ala., and Dalton, Ga., is nearly finished, and anticipating its completion the president of the Selma and New Orleans road is having a route between those two points surveyed. So much interest is taken in the project that he reports a million acres of land will be easily obtained to form a basis of operations. The proposed line from New Orleans, with its direct connections through to New York, would shorten the distance between these cities by 170 miles.

The Green River works at Greenfield, Mass., is the oldest cutlery establishment in the United States, and one of the largest in the world. Giving employment to nearly 600 hands, the daily product average 84 gross of table cutlery, 120 dozen ivory do., and 250 dozen of miscellaneous goods. As raw material, over 600 tuns of steel; 30,000 pounds of brass, and 7,500 pounds of iron wire; 400,000 pounds of grindstones, and 44,000 pounds of emery, are annually consumed.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

VISE.—Mason Prentiss, Cambridge, N. Y.—This invention relates to a new and useful improvement in vises for holding either iron or wood work, and it consists in an arrangement whereby the back jaw of the vise is made adjustable, so that tapering or wedge-shaped pieces of iron or wood may be held between the two jaws.

LUBRICATING DEVICE.—Mathew Senior, Frankford, Pa.—This invention relates to a device for lubricating the feather of a shaft, which has a longitudinal as well as a rotating motion imparted to it for certain mechanical operations.

LAMP BURNER.—Samuel Shea and E. W. Gillman, Long Island City, N. Y. This invention relates to a new manner of hanging the arbor of the ratchet wheel in coal-oil lamp burners, and consists in hanging one end of the same in a sliding sleeve which can be turned so as to allow the ready removal and reinsertion of the said arbor.

BED BOTTOM.—Ezra Caswell, 3d, Lyons, N. Y.—This invention consists in the use of a clamp, which is secured to the end of the slat, and which has a slotted bar for receiving the ends of the rubber strap, by means of which the slat is suspended. Through the looped ends of the strap is fitted a bent rod, the ends of which are fitted over hooks that are secured to the side of the bedstead.

VENTILATOR AND WINDOW SCREEN.—John R. Wharry, Moundsville, W. Va.—This invention relates to an improved ventilator and window screen, and consists in a frame of wire netting fitting beneath the outer and upper sash.

SUPPOSITORIES.—Henry H. Seys, Oil City, Pa.—This invention relates to a new and improved method of treating certain diseases of the human body, and consists in the composition of a suppository which when introduced into the rectum shall act mechanically in returning hemorrhoidal tumors and prolapsed portions of the anus, and returning the extruding parts in place by pressure upon the blood vessels.

TANNING AND COLORING LEATHER.—Jonas Diehl, East Freedom, Pa.—This invention relates to an improvement in tanning and coloring leather, more especially sheep skins with the wool on, and which are used for mats and similar purposes.

MACHINE FOR CUTTING SAW TEETH.—James Morton, Philadelphia, Pa.—This invention relates to a new machine for cutting the teeth of saw blades, carry combs, or other metal plates, and consists in the use of two revolving circular dies, between which the article to be toothed is fed. The dies are provided with toothed peripheries, the teeth being shaped according to the pattern to be cut.

HORSE RAKE.—B. W. Davis, Fort Madison, Iowa.—This invention relates to a new device for connecting the shaft to the handle of the ordinary rotating horse rakes, whereby the same are connected in a more simple, convenient, and durable manner.

GANG PLOW.—Wm. Nelson, Cacherville, Cal.—This invention relates to an application and arrangement of the plow beams, whereby the plows may, with the greatest facility, be raised entirely out of the ground when necessary, as, for instance, in turning the machine at the ends of furrows, moving it from place to place, etc., and the plow at the same time rendered capable of being firmly secured in position, so as to plow at any required depth, and also adjusted at a greater or less distance apart, as circumstances may re-require.

INSECT DESTROYER.—Alexander McKenzie, Henry, Ill.—This invention relates to a useful improvement in the treatment of fruit trees, for the destruction of the vermin which prey upon and injure or destroy the trees, or the fruit thereon.

HARNESS TRACE.—Robert J. Steele, Jr., Rockingham, N. C.—This invention consists in constructing a trace entirely of iron, steel, and other suitable metal, and in such a manner as to supercede leather, or leather and chains combined, which have hitherto been exclusively used.

FUNNEL AND GRATER.—E. A. Goodes, Philadelphia, Pa.—This invention relates to the peculiar construction of a funnel, whereby it is adapted to various purposes, and consists in so forming and constructing the article by corrugating, serrating, and punching, that it is made applicable to a variety of uses.

ATTACHMENT FOR SEWING MACHINES.—C. H. Lockwood, Hawleyville, Ct.—This invention relates to an attachment for sewing machines, for the purpose of sewing hat tips to side linings, and consists of a clamp arranged in such a manner as to be capable of being rotated by the feed mechanism of the machine, and so constructed as to keep the lapped edges of the tip and side lining in contact, while, by the rotation of the clamp, the lapped edges are fed underneath the needle of the sewing machine each time the former rises above the tip and side lining.

HUBS, BOXES AND AXLES.—John W. Pollock, Cross Bridges, Tenn.—This invention relates to a new and improved method of constructing and combining the hubs, boxes and axles of wheeled vehicles, whereby the same are rendered more durable and convenient.

WASHING MACHINE.—Edmund Stair, Harrisonville, Mo.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, and which will do its work quickly and well without tearing or injuring the clothes.

BARK LEACH.—S. J. Patterson, Bridgeport, Conn.—This invention has for its object to furnish an improved leach for leaching bark and other substances which shall be simple in construction, easily operated and effective in operation.

PLATFORM RAKE.—Elias Ogden, Lynchburg, Va.—This invention has for its object to improve the construction of platform rakes for reapers so as to make them more convenient and effective in operation.

HAY GATHERER AND CONVEYOR.—John S. Coffman and Manasseh Greybill, Greenville, Ind.—This invention consists in constructing a machine by which hay in the field may be gathered and deposited on a platform and conveyed to the barn or other desired location.

RAILROAD FREIGHT CARS.—L. Savage, Ashtabula, Ohio.—This invention has for its object to so improve the construction of freight cars that the train need not be long detained in loading and unloading, that the necessity of side tracks and switches may be greatly lessened, and that the road can do a much greater amount of freighting business with the same amount of rolling stock than it can do when the cars are constructed in the ordinary manner.

HOLDER FOR PENS.—Isaac W Henderson, Leavenworth, Kansas.—This invention relates to a holder for pens, more particularly intended to be used for the fancy ruling of paper and other sheet material in the manufacture of blank books. This holder is constructed in such a manner that the several pens which it carries can be adjusted to any required distance apart and the center pen to rule a line that will be parallel to and equidistant from each of the outside lines ruled by a double or two single pens suitably inserted in the pen holder therefore.

CAR WHEEL.—S. B. Chapman, New York city.—This invention relates to a wheel for railway cars, and it consists in a novel and improved manner of constructing the wheel, whereby several advantages are obtained over the ordinary cast-iron wheel, to wit: the avoidance of breakage and the consequent accidents arising therefrom, an entire cast-iron wheel being very liable to crack; a diminution of the wear and tear of the rails and rolling stock, the latter not being subjected to the jars and concussions which they receive when on the ordinary cast-iron wheels; greater durability and economy, the length of time my improvement will last or run rendering them far less expensive than the ones now in use.

VEGETABLE MASHING AND CUTTING MACHINES.—Carl C. Vignal, New York city.—This invention relates to a new apparatus for mashing or cutting all sorts of vegetables or other suitable material and consists of a hollow conical grating or cutting roller mounted on a horizontal shaft with open large end, and of a concave shield set opposite the open end so that when the cone is revolved and the article to be cut or mashed held against its surface the detached particles will enter the cone through perforations in its shell and will either fall down on its lower inclined inner surface, or will be thrown against the shield and will by the same be conducted to the receptacle into which they fall directly from the cone.

CARD HOLDER.—W. Ineck Adams, New York city.—This invention relates to an improved holder for cards, labels, etc., and is more especially designed for use upon traveling trunks, boxes, and other similar cases. This holder consists of a frame that at one end is open so as to allow a card or label to be inserted therein where by means of a spring plate arranged within such frame and to the back of the card it is held and retained against accidental loss or escape the said plate being depressed when the card is to be removed.

STUMP EXTRACTOR.—Soloman S. Avis, Pennsgrove, N.J.—This invention is for the purpose of extracting stumps, and is more particularly adapted for the extraction of light stumpy growth of newly cleared land. It consists of a trestle horse, composed of a beam having legs which rest on and are affixed to pedestal planks, for the purpose of preventing the legs from sinking into the soil when the same is soft and yielding.

EXTENSION WARDROBE.—J. G. Roux, Crystal Springs, Miss.—This invention consists in so constructing a wardrobe that the two halves of the same, standing vertically, can be separated horizontally by turning a crank on its top, thus exposing uprights provided with hooks or pegs for hanging clothes upon. The object is to obtain a wardrobe easy and convenient of access, in which the articles placed in it can be exposed to view, and for selection, or closed for security, both operations being performed with facility. It is designed more particularly for merchants, though quite practicable and desirable for household uses.

AGITATING MOTION.—Samuel Thompson, Ballston Spa, N. Y.—This invention relates to the production of a certain violent agitating motion, applicable to a variety of purposes, as the screening of salt where the riddle or screen frequently becomes clogged or choked, and to which it is especially liable when the salt is green or damp.

MODE OF FORMING RAISED ORNAMENTS UPON WOOD.—J. B. Macduff, New York city.—This invention has for its object to furnish an improved, simple, and convenient mode, by means of which letters, scrolls, or other raised ornaments, may be formed upon wood.

GATE.—Wilbur S. Wandell, Battle Creek, Mich.—This invention relates to self opening gates, and consists in so hanging and weighting the same that it will swing upward when the gate is turned horizontal, or its latch pin is liberated.

SEED PLANTER.—Silvanus C. Wilder, Sardinia, Ohio.—This invention has for its object to furnish an improved planter, in which the dropping device shall be so constructed and arranged as to be easily operated, and so as to drop the seed promptly and accurately.

COMBINATION DOOR LOCK.—Hiram Norton, Delton, Wis.—This invention refers to an improved method of constructing combination locks for doors, drawers, etc., and consists of two or more independent latches, which are hung by a pivot pin at a middle point, and are operated by a very small key, these latches catch into two notches on the bolt, thus preventing the movement of the latter.

HARROW.—M W. Gunn, La Salle, Ill.—This invention has for its object to furnish a simple, cheap, and durable harrow, designed especially for harrowing or cultivating crops planted in hills and drills, but equally adapted to every kind of farm harrowing, which shall be so constructed that its forward end may be easily guided so as to straddle the hills or rows, and the forward and rear ends of which may be easily raised to clear it of rubbish, or to pass over obstructions. Patented Feb. 11, 1868.

ADJUSTABLE ROCKER FOR CHAIRS.—L. B. Yale, Bainbridge, N. Y.—This invention relates to a rocker for chairs, and it consists in constructing the rocker of metal, cast or wrought, and of angle form in its transverse section, with a series of holes in it near each end, to admit the rocker being secured to the chair legs further forward or backward as may be desired. The object of the invention is to obtain a chair rocker which will not only admit of being adjusted as stated, but which will also be light, strong, and durable.

COTTON BALE TIE.—J. L. Sheppard, Charleston, S. C.—The main feature in this invention consists in making the tie of a single piece of metal of such a shape that the operator can fasten the hoop by inserting the end of it at one side of the tie, and turning the latter partially round.

SPOOL AND THREAD REGULATOR AND DIVIDER ATTACHMENT FOR SEWING MACHINES.—Solomon Snyder, Harrisville, Pa.—The object of this invention is to simplify and render more perfect the spool holding and tension devices of sewing machines, by which any kind of thread, whether even or uneven and whether prepared for the sewing machine or not, can be used without difficulty.

MACHINE FOR DRESSING FLAX.—Wm. C. McBride, Somerville, N. J.—This invention consists in a novel arrangement and construction of the beaters, which are so made that they will thoroughly beat and dress that end of the flax which is exposed to their action.

BELTING.—Mrs. H. Lemaistre, Brussels, Belgium.—This invention relates to a new method of forming the ends of the leather straps which compose a belt for machinery, and also in a novel composition for cementing the straps.

FEED CUTTER.—Truman P. Allen, Gowanda, N. Y.—This invention has for its object to furnish an improved feed cutter, simple in construction and effective in operation, doing its work with a less expenditure of power for the amount of work done than other machines now in common use.

GRAIN AND GRASS HARVESTERS.—Lorenzo Wallace, Leavenworth, Kansas.—This invention relates to a new means employed for operating or driving the sickles of grain and grass harvesters, whereby the power is taken direct from the driving or supporting wheels of the machine, and a diminution of friction and consequent saving of power effected. The invention also relates to an improvement in the cutting devices of harvesters, whereby grass or grain may be cut with less power and greater facility than by the usual cutting device.

HORSE POWER SAWING MACHINE.—Henry Tarpley, Wesley, Ky.—This invention relates to an improvement in that class of sawing machines which are used principally for sawing down standing trees and sawing logs into cord wood, and which are driven by horse power. The invention consists in combining a horse power with the sawing machine in such a manner that a horse can be made to propel the machine from place to place where required, and, when the machine is at the desired spot for work, the horse made to drive the saw.

SEED PLANTER.—R. B. Wright, Vermilion, Ill.—This invention relates to an improvement on a seed planter granted to this inventor Feb. 26, 1867. The present invention consists in a new and improved manner of operating the seed slides, arrangement of driver's seat, wheels, and a chain step, whereby several advantages are obtained over the original patented machine.

VERMIFUGE.—John McKinsey, Millville, N. J.—This invention and discovery relates to a new composition or medicine designed to expel worms from the human system.

CAR TRUCK.—Joseph Bayzore, Freeport, Ill.—The object of this invention is to construct a truck and adapt or apply it to a car in such a manner that in the event of the breaking of a wheel or axle, the truck will be sustained in position and the car prevented from being thrown off the track, a contingency which almost invariably occurs when the axle or wheel of a truck breaks or gives way.

WHEAT AND COCKLE SEPARATOR.—W. T. Chaffee, Richmond, Va.—This invention has for its object to furnish an improved machine designed especially for separating wheat and other grain from cockle, partridge pea or berry, and other small seeds, and for separating seeds, and for separating the large full kernels for seed from the smaller kernels, which shall be simple in construction, easily operated, and effective in operation.

MINERAL WATER JARS AND BOTTLES.—A. D. Schnackenberg, Brooklyn, N. Y.—This invention relates to a new manner of constructing the head or stopper of a mineral water jar or bottle, of that class from which the liquid is discharged by the pressure of gas when a valve is opened, and the invention consists in arranging a straight pipe through which the liquid is filled in and discharged, so that its outer end is higher than its lower end, and in combining it with a valve stem in such a manner that the liquid can be filled in when the bottle is standing, and can be discharged by turning the bottle up and opening the valve. Thereby the use of the draft tube generally used in mineral water bottles is dispensed with, and the cost of the apparatus is considerably reduced.

LAMP BURNER.—E. B. Requa, South Bergen, N. J.—This invention relates to a lamp burner for burning coal oil or petroleum, and of that class in which a cylindrical draft chimney is used and a great portion of the wick tube exposed. The present invention consists in a peculiar construction of the cone or deflector with a perforated plate, whereby three very important results are obtained, namely, the supplying the base of the flame within the cone with a requisite amount of oxygen; the supplying the upper part of the flame above the cone with a requisite amount of oxygen; and the keeping of the wick tube in a cool state, so as to prevent a too rapid evaporation of the oil. These three conditions being attained, a brilliant illuminating flame is the result, and explosions effectually guarded against.

STUFFING HORSE COLLARS.—E. B. Miller, Greenville, Tenn.—This is an improved machine for stuffing the leather rim or roll of horse collars with straw, in which the invention consists in an improved feeding device, a new method of operating the machine, and a new method of holding and adjusting the collar, by which it can be more evenly filled than by hand.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

E. L., of N. J.—"What are the ingredients of the common brown or yellowish brown japan or varnish used on tea canisters and other articles of tin ware?" It is a lacquer made simply of japan and bronze powder.

A. C., M. D., of Wis., replies to the query of F. R., of N. Y., in No. 12, current volume, that he makes gunpowder for his own use of 1 part prussiate of potash, 1 part white sugar and 2 parts chloride of potash. Let the ingredients be separately reduced to a fine powder, and then mixed by the hand or in a mortar; or they may be moistened with water and granulated by passing the mixture through a sieve. He says: "I find it will throw shot or rifle ball twice as far into timber as the best powder found in the market, and it leaves very little sediment and does not foul the gun." The principal objection to the preparation and use of this powder is its danger in handling.

J. M. C., of Pa., says that if M. J. W., of N. Y., whose inquiry in regard to the transmission of power for long distances appeared on page 147, current volume, will cross his rope setting up a post at the intersection of the belt to divide the two parts he will find it to last two years instead of one. The faces of the post may be covered with some smooth, anti-friction material. H. A. W., of N. C., asks, "what is the objection to the old plan of a shaft with three cranks, each crank connected to a similar one on another shaft by a rope? It would require fifty per cent more rope, but this would be more than counterbalanced by the saving in the wear of the ropes, as they would nowhere come in close contact." This device is old but not always practicable as the tension of one rope over that of another necessitates frequent taking up. Probably nothing is better for transmitting power for long distances than a continuous shaft, which may be run under, as well as above ground.

E. R. S., of Tenn.—Will some of your correspondents inform your readers as to the proper method of drying or seasoning timber such as oak, ash, hickory, etc., to give it strength and durability; whether it should be stacked under shelter to let nature have its course or whether it should be steamed, boiled, or subjected to the heat of a kiln. Also the best time for cutting timber, looking to its durability, etc." Pianoforte makers who require perfectly seasoned wood, subject it to a kiln drying process.

S. G. T., of Ohio.—Piano cases and other specimens of highly finished wood are varnished and stoned repeatedly to produce the effect. Pumice stone and rotton stone are used and a flowing coat of the finest varnish finishes the process. . . For a tumbling box for cleaning malleable iron castings, use scraps of leather if a bright finish is desired.

G. W., of Ill.—You ought to place the results of your investigations before the scientific world; a repetition of your experiments by others would soon show how far you are correct or not. We cannot dispose of time sufficient to verify them, and therefore abstain from giving any opinion on the subject. The explanation of all the phenomena of electricity on some simple principle, like that of attraction, is what physicists have long sought, but mathematical difficulties are in the way which hitherto have not been overcome.

A. D., of Mo.—We confess that we are at a loss to understand the drift of your communication and to unravel the meaning of its somewhat obscure style. You speak about an hypothesis without propounding it and of a fact without stating it. If your intention is, as you say at the outset, to prove that the inclination of the earth's poles really belongs to its orbit, we can only say to you that the inclination of the poles is a fixed *fact* the existence of which is attested by many phenomena and observations; and facts cannot be *reasoned* out of existence. If you consider our present astronomy wrong, two ways of correcting it are open to you; you will either have to bring forward *observations* which directly contradict the results and consequences of its theory, or you will have to overhaul it *mathematically*, do away with gravitation and show up the incorrectness of the reasoning and of the demonstrations of the astronomers since Newton's time. Until you have accomplished this we advise you to reject as false every hypothesis which would lead you to conclusions at variance with established facts.

Improvement in Turbine Water Wheels.

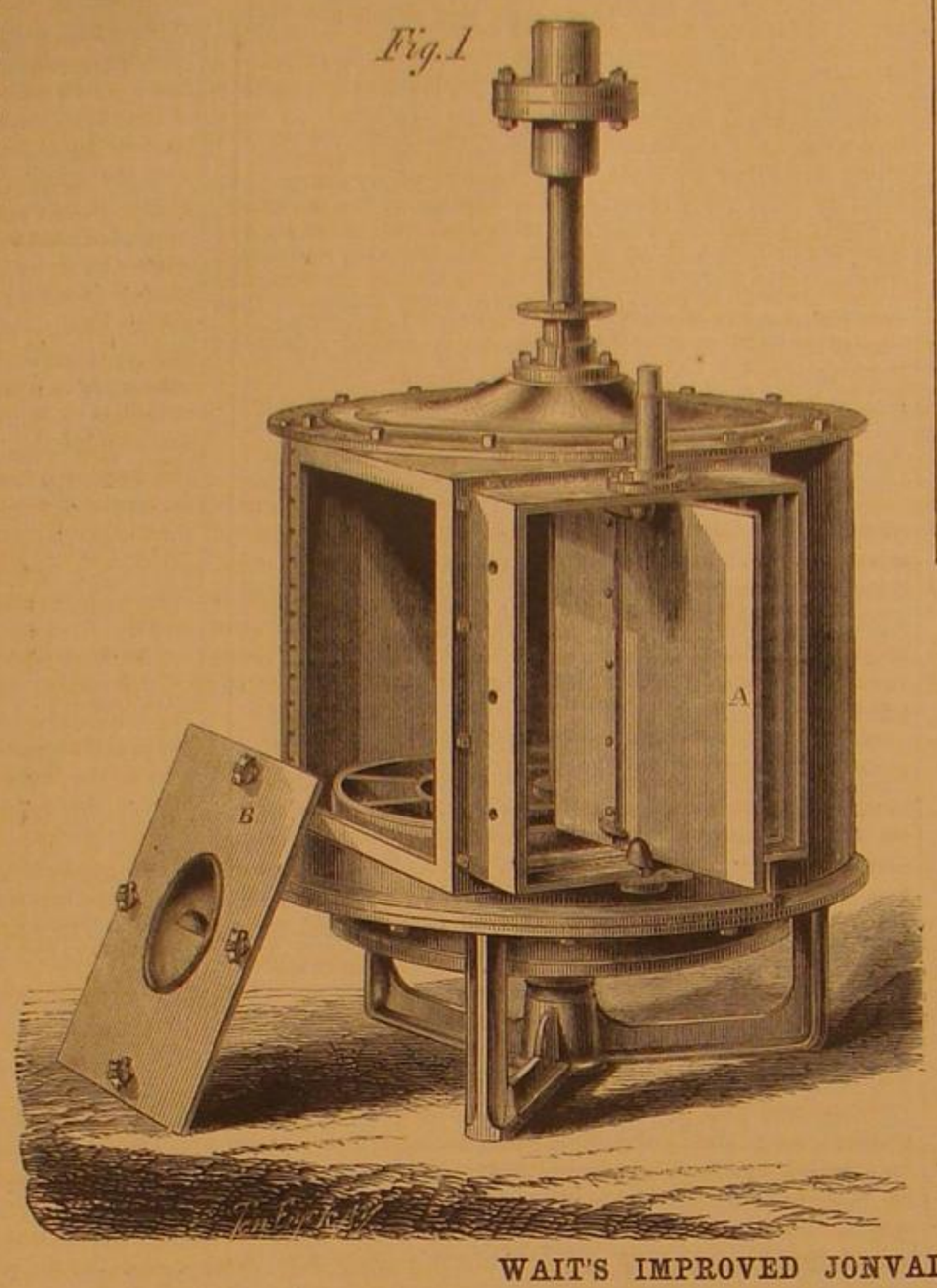
The Jonval turbine water wheel is too well known to millwrights and mechanics, generally, to need any description of its action or statement of its advantages. But still, practical men, understanding its obvious superiority, have been satisfied that it did not yield all the results of which the principle on which it is constructed was capable. This has led to a number of modifications and many improvements, one of which is shown in the accompanying engravings.

The wheel is double, or in two sections, the buckets of each being curved in opposite directions. The inventor says the peculiar form of bucket is one of the advantages he proposes to gain. The inside edge of the bucket falls in a radial line about three inches to the foot of its radial length—although he does not propose to be confined to that proportion—the fall diminishing in proportion up to a horizontal plane at the top. When the bucket is set in position in the wheel a line drawn from its lower end inclining three inches to the foot until it intersects a perpendicular line in the center of the wheel, and another line on the horizontal plane of the top of the bucket intersecting the center line, give a distance on the perpendicular line which, spaced off into ten equal parts, will show the points of intersection of a radial line drawn along the face of the bucket from each of these points which would intersect the perpendicular line. In other words the form of the bucket can be comprehended if the bucket be extended to the center of the wheel when it would terminate in a perpendicular with a twist of three inches in twelve. By this form it is believed that a portion of the centrifugal or tangential force of the water now wasted in other wheels is economized and utilized.

Another advantage of this device is a balanced water gate, A, forming two openings, requiring no packing and having no friction except in the bearings of the stem on which it swings. It will operate easily under pressure. Its peculiar construction is seen in the horizontal section, Fig. 2.

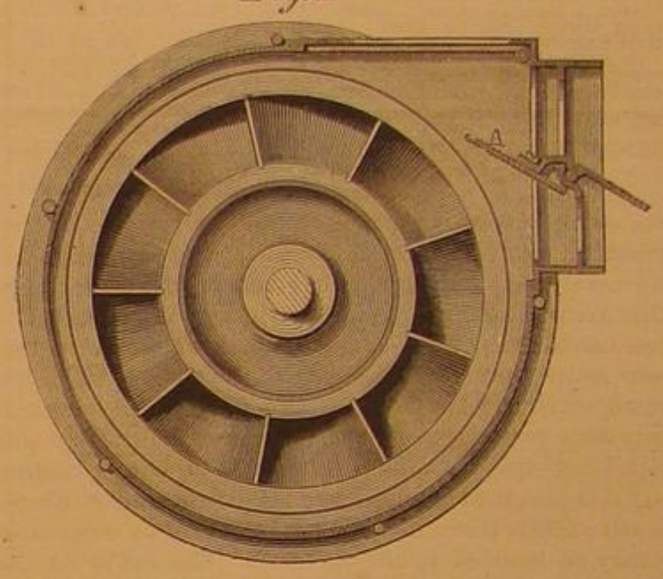
The inventor claims still another advantage in the form of the curb having a corner at right angles or tangent to its sides so that the entering water will gyrate with the wheel before striking the buckets. The man-hole plate, B, Fig. 1, may be either hinged or secured by buttons as seen. The concave portion of the shaft, which rests on the step may be made separate and screwed on to the shaft acting as a nut to hold the wheel. Application for a patent is pending through the Scientific American Patent Agency by P. H. Wait, who may be addressed at Sandy Hill, N. Y., for further information.

Fig. 1



WAIT'S IMPROVED JONVAL TURBINE.

Fig. 2



Improvement in Table Cutlery.

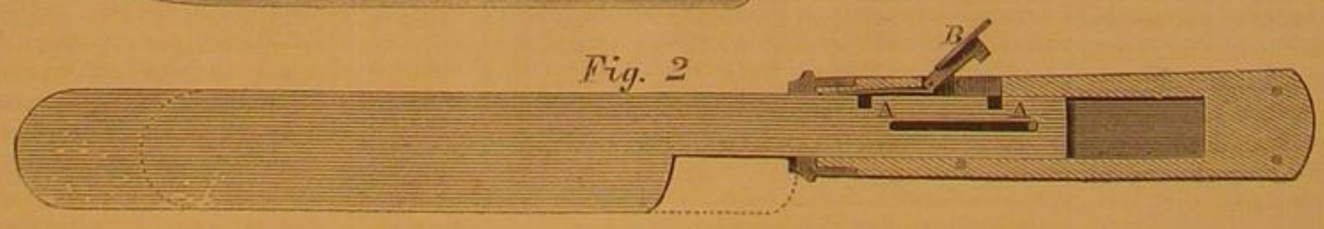
The design of the improvement shown in the engravings is to adapt a table knife to the tea and dinner service by extending its length, thus saving the expense of two sets. Also, to utilize either the blade or handle, should one of them be broken, as they are two distinct parts not rigidly secured together as usual. It has also other advantages which may be readily appreciated; one is the underhang of the blade below the handle, and the other the space between the handle and the edge of the blade when the latter is extended, making, a handier implement than the table knife in general use.

The tang of the blade is of uniform size the whole length, and slides in a recess in the handle, as seen in the sectional view Fig. 2. On the top of the tang, at proper distance apart, are two notches, A, into which, when the blade is either closed or extended, the spring catch, B, shuts, holding the blade firmly in the position desired. The top of the catch is an oval or shield-shaped plate, silvered, which may be ornamented by engraving or receive the initials of the owner. With this device the dinner knife may be made the carving knife, or the tea knife the dinner knife.

Patented through the Scientific American Patent Agency Dec. 17, 1867, by N. W. Caughy, Baltimore, Md., who may be addressed relative to the sale of rights, etc. [See advertisement on back page.]

Fig. 1

Fig. 2



CAUGHY'S EXTENSIBLE TABLE KNIFE.

Acid Phosphate of Lime.

The object of this invention is to obtain an acid phosphate of lime, which may be easily handled in a pulverulent form, and which may readily be obtained in liquid condition comparatively pure, when wanted. It consists in adding sulphuric acid to a solution of acid phosphate of lime in a solution of a salt of lime, the acid of which salt is volatile, by which the lime, in combination with the volatile acid, is combined with the sulphuric acid, and for the most part precipitated as hydrated sulphate of lime, and then driving off the volatile acid by heat, leaving behind acid phosphate of lime mixed with or feebly combined with the sulphate of lime, from which it may be separated in comparative purity by leaching.

The mode of manufacture is described by the inventor as follows:—"I dissolve to saturation common tribasic phosphate of lime, derived from bones or mineral phosphate of lime, in nitric acid of specific gravity 1.23, requiring two of nitric acid by weight to three of phosphate of lime, which gives a result of nitrate of lime and monobasic phosphate of lime, as expressed in the following formula: 3 Cal. Po_5+2 [Ho. no_5]=Cal. 2 Ho. Po_5+2 [Cal. no_5.] If the phosphate of lime contain impurities or the nitric acid be of other strength, a corresponding modification of the proportions must be made. To this solution I add two parts, by weight, of oil of vitriol, [Ho. So_3.] diluted with water to precipitate any sulphate of lead that may be present, and then siphoned off from the precipitate. This sulphuric acid combines with the lime of the the nitrate of lime, forming a precipitate of sulphate of lime, and leaving, besides a trace of the sulphate of of lime, monobasic phosphate of lime, and nitric acid in solution, thus: Cal. 2 Ho. Po_5+2 [Cal. no_5]+2 [Ho. So_3]+4 Ho=2 [Cal. So_3, 2 Ho.]+2 [Ho. no_5]+Cal. Ho. Po_5. I then drive off the nitric acid by gentle heat, adding toward the close a small quantity of water to facilitate the escape of the last traces of nitric acid. A current of warm air over the surface of the drying mass facilitates the removal of the water and volatile acid.

"I sometimes save the nitric acid by conducting the vapors into a suitable condenser. I sometimes add, after the volatile acid has all been expelled, a little lime solution, and dry off the water to correct any accidental excess of sulphuric acid, and to render the preparation more readily pulverulent, and more thoroughly non-hygroscopic. I sometimes replace a part or the whole of the nitric acid with hydrochloric acid.

"This preparation furnishes acid phosphate of lime in superior condition for medicinal and culinary purposes. Where the gypsum is not objectionable, the preparation may be employed as it is. Where the acid phosphate of lime alone is required, it may be separated by solution in water, and leaching. The mixture, being of definite composition, it may be weighed or measured as a powder, and then leached to get the acid phosphate of lime. When employed as a substitute for tartaric acid, in making bread, biscuit, etc., the proportion should be about two of the powder to one of bicarbonate of soda.

"The importance of phosphates to the animal economy, to be supplied through the food, has long been recognized. I have found the advantage to the health, of using the liquid monobasic acid phosphate, when employed in aid of digestion and assimilation, to be of the most marked character. Dyspepsia of certain forms is relieved by taking with the meals a teaspoonful of the liquid acid phosphate, of specific gravity 1.17, in a glass of water. It may be used as vinegar, when I dilute the acid of the above strength with five times its volume of water, for ordinary household consumption. It may be employed as an ingredient in beverages, taking the place of lemon juice, on long voyages, to prevent the ill effects arising from the too long use of salt provisions, by supplying the phosphates of which the meats have been deprived; or it may be used as an ingredient in producing an effervescing draft, or in the composition of sauces; or, when mixed with flour, as a substitute for hydrochloric acid, in the process of Thompson, for decomposing bicarbonate of soda, in making bread light without the use of ferment.

"The acid phosphate I employ is generally a compound of one atom of lime with one atom of phosphoric acid, with a small addition of free phosphoric acid, and is prepared as follows:—I add to tribasic phosphate of lime, sulphuric acid, in the proportions described in my patents for producing acid phosphate of lime, for use in preparing self-raising flour, being about fourteen hundred parts of burned bones to one thousand parts of oil of vitriol. The sulphuric acid withdraws a little more than two atoms of lime from the phosphate, leaving monobasic phosphate of lime and a small portion of free phosphoric acid in solution, but mixed with gypsum. The solution is separated from the gypsum by leaching. I take the liquor thus separated as long as it runs of a specific gravity that will average 1.17. I do not propose to limit myself to this strength, nor to these proportions, but it is convenient to have a constant strength, and I have found this strength and the above proportions convenient for production in a large way.

"The liquid may be kept in glass or stoneware. In this form it is ready for use, or to be diluted to fit it for use where less strength is desired. Diluted with twenty times its volume of water, it may be employed to remove tartar from teeth, without injury to the enamel. It operates both as a very weak acid, and specifically to destroy traces of food lodged in the interstices between the teeth.

"In suiting the acid phosphate of lime to the wants above alluded to, the constant specific gravity of the liquid will be a guide. The acid phosphate of lime may be substantially replaced by the corresponding compounds of magnesia and potassa of soda, produced by the usual well-known chemical methods."

The above improvements have been lately patented by Prof. E. N. Horsford, of Cambridge, Mass.

Natural Aniline.

Mons. Ziegler, of Muhlhouse, has subjected to a careful examination the red coloring matter which is secreted by a mollusc (*aplysia depilans*), generally known as the sea hare, which animal is not rarely found on certain coasts and is especially abundant on the coast of Portugal after heavy storms. The coloring matter has a peculiar odor and serves the animal as a defence against its enimies by rendering the water turbid and at the same time disagreeably odoriferous. A chemical examination disclosed the fact that the coloring matter is aniline with a slight admixture of other organic substances, and that it can be easily obtained in a state of purity; but as the pound would cost about 60 francs this new source of aniline is practically without any value. The most interesting part of the article is the plausible suggestion of Mons. Ziegler that the sea hare and not the murex, as now generally believed, is the animal from which the Phœnicians obtained their famous purple, and thus it is rendered probable that the priceless purple of Tyre, the only dye thought fit for the imperial vestments of Ancient Rome, is identical with the cheap coal-tar aniline of modern manufacture.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XVIII., No. 14....[NEW SERIES.].. *Twenty-third Year.*

NEW YORK, SATURDAY, APRIL 4, 1868.

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EXPLOSIVE OILS---KEROSENE AND ITS IMITATIONS---DANGEROUS COMPOUNDS.

For weeks past we have received a large number of communications complaining of the frauds practiced upon people by agents of what purported to be a non-explosive oil, cheaper than kerosene and giving a better light. While kerosene at first hands brings three, or three and a half dollars per barrel—or rather the crude petroleum at the wells—this manufactured compound is offered at two dollars per barrel or twenty cents per gallon. One of our correspondents says this so-called non-explosive oil is benzine of 71° gravity; another says, "it is composed of gasoline or naphtha mixed with common salt; this is the compound, but, I believe, in some cases rosemary oil is added to kill the smell. The salt is for the purpose of preventing the mixture from exploding. Do you think it will do it?" No, it will not. We have never made any test of this "non-explosive oil," but we are satisfied from the accounts published of its explosive properties and the accidents resulting therefrom, that it is a dangerous article to use for illuminating purposes. A slip cut from an exchange says: "Last week an agent of this oil, while trying to introduce it in the village of Warren, Pa., attempted to illustrate the impossibility of its exploding, by a practical test, but only succeeded in nearly blowing himself out of the window, and setting fire to the building in which he was. The oil is largely composed of benzine, and is an exceedingly dangerous article to use." A similar trial a few weeks ago in a hotel in Brooklyn, N. Y., resulted in severe injuries to one of the employés of the establishment. One claim made in favor of this "oil" (?) is that it is not greasy and will not soil any fabric. A singular recommendation for any oil. Such stuff is unfit to be peddled or used. Kerosene gives a better light than gas or any animal oil, and being cheap and handy is largely used; so much so as to have almost superseded whale oil and candles. It has become an article of general use, and, when properly manufactured, is deservedly popular. It is cheap enough, even when properly prepared, one would suppose, to prevent adulterations or imitations; yet we will venture to say no article so commonly used is furnished in so impure a state. Impure, or in its imitations, it is hardly less dangerous than gunpowder; yet, it can be made as innocuous as any animal or vegetable oil, so far as its explosiveness is concerned. Being a hydro-carbon it must always be more inflammable; but this is not necessarily an objection to it. The test of its quality we gave on page 180 current volume, a test so simple as to be readily made by any one. We reproduce it as given in the *Journal of Chemistry:*

Take a common quart bowl; fill it one-third full of boiling water; now add cold water a little at a time, until a thermometer placed in it indicates a temperature of 110 deg. Fah. A tablespoonful of the oil to be tested may be turned into the water, and stirred about with the thermometer. It will float on top, and it may be touched with a lighted match or bit of paper. If it ignites, or takes fire, the oil is dangerous; and the seller can be prosecuted under the United States law. It must not be used in the family. In this experiment, so simple that all can make it, an accurate thermometer should be used. The common thermometer in a japanned iron case, is usually sufficiently accurate. To test the the thermometer, bring water into the condition of active boiling; warm the thermometer gradually in the steam, and then plunge it into the water. If it indicates a fixed temperature of 212 deg., the instrument is a good one.

Dealers in kerosene, and especially those who buy at wholesale to sell at retail to families, should make this test, and not only reject that which does not come up to the mark, but enter complaint against the dealer who thus dares defy the law.

We are glad the press generally are awaking to the importance of this subject. We clip, from the *Journal of Applied Chemistry*, the following:

Certain parties in New York and elsewhere are attempting to impose upon the credulous public by offering recipes for the manufacture of illuminating compounds, the base of which is benzine or gasoline—the lighter products of the distillation of petroleum—mixed with certain chemicals. The averred object of the mixture is to render the fluid less volatile, or less liable to explode or ignite at a given temperature, but these pretended recipes are without exception, swindles, and do not give a compound posessing the qualities claimed.

Gasoline may be mixed with gum camphor, to give a clearer, lighter flame, and alum may be added to increase the specific gravity, but the liquid will not dissolve the salt in sufficient quantity to render it less dangerous than kerosene. Any one, therefore, who has paid the sum demanded for this secret, ($10 is the usual price), may thus have the satisfaction of knowing how little it is really worth, without subjecting himself to the risk of possibly fatal accidents by too implicit a reliance on these worthless recipes.

We think it is high time for something to be done by our legislators to insure more thoroughness in the business of refining coal oil of all kinds. The number of accidents daily reported from every section of the country by the use of improperly refined oil are truly appalling, and when to this large number we add the escapes, which are completely accidental, it will be seen that the danger to human life from this source alone is so great as to appeal more earnestly than ever before for decisive legislative action. Let it be a penal offense for anybody to sell any of the productions of coal oil for burning purposes unless they are known to be non-explosive, and let a law for the securing of that end be enacted at once.

PROPOSED REDUCTION OF PATENT FEES.

We observe with much pleasure that the Hon. W. Lawrence, of Ohio, has introduced a resolution in Congress instructing the Committee on Patents to inquire into the expediency of reducing the official fees. It appears that there is a large and constantly increasing surplus of funds, the accumulations of the moneys paid in by inventors, over and above the actual costs of carrying on the business of the Patent Office.

We hope the Committee will make thorough inquiry. If they do so, we have no doubt but they will be fully satisfied of the expediency of a reduction. We would call their attention, as a point of beginning, to the propriety of at once abolishing the fees for appeals. Prior to 1861, the patent fees were $30, without extra charges for appeals. In 1861, the fees were raised to $35, and $20 extra on appeal to the Commissioner. In 1866, another fee of $10 on appeal to the Examiners-in-chief was added.

The great majority of applicants for patents are poor, hard-working people, to whom the payment of these extra fees is a matter of the greatest difficulty.

We believe that there is no other department of the Government except the Patent Office where an extra fee is charged for a review by the chief to correct the errors or injustice of his subordinates. But at the Patent Office, no matter how obvious the error of the primary examiner, the applicant cannot open his mouth for redress without paying $10; nor can he get the Commissioner's attention to the matter without paying $20 more.

Mr. Lawrence, in the course of his remarks before Congress, presented the following statistics:

Table exhibiting the business of the Patent Office for twenty-nine years ending December 31, 1865.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837..	- -	- -	435	$29,289 08	$33,506 98
1838..	- -	- -	520	42,123 54	37,402 10
1839..	- -	- -	425	37,260 00	34,543 51
1840..	765	228	473	38,036 51	29,020 67
1841..	847	312	495	40,413 01	32,666 87
1842..	761	391	517	36,505 68	31,241 48
1843..	819	315	531	35,315 81	30,766 96
1844..	1,045	280	502	42,509 26	30,344 73
1845..	1,246	452	502	51,076 14	29,295 65
1846..	1,272	448	619	50,264 16	46,158 71
1847..	1,531	533	572	63,111 19	41,878 35
1848..	1,628	607	660	67,576 69	58,905 84
1849..	1,955	595	1,070	80,752 78	77,716 44
1850..	2,193	602	995	80,927 05	89,100 95
1851..	2,258	760	889	95,738 61	80,916 93
1852..	2,639	996	1,020	112,056 34	95,916 91
1853..	2,673	901	958	121,527 45	132,869 83
1854..	3,824	868	1,902	163,739 84	167,146 32
1855..	4,435	906	2,024	216,459 35	179,340 33
1856..	4,960	1,024	2,502	192,588 02	199,931 02
1857..	4,771	1,010	2,910	196,132 01	211,282 09
1858..	5,264	943	3,710	208,716 16	196,193 74
1859..	6,225	1,097	4,538	245,942 15	210,278 41
1860..	7,653	1,084	4,819	256,352 59	252,830 80
1861..	4,643	700	3,340	137,354 44	221,491 91
1862..	5,038	834	3,521	215,754 99	182,819 39
1863..	6,014	787	4,170	195,593 29	189,414 14
1864..	6,972	1,003	5,020	240,919 98	229,898 60
1865..	10,664	1,937	6,616	348,791 84	271,199 31

"It is here seen that the number of applications for patents received in 1865 exceeded, by nearly forty per cent, the number filed in any previous year, and the number of caveats filed exceeded those of any previous year by more than seventy-five per cent. The number of patents issued exceeded those issued in 1864, the highest previous year, by more than thirty per cent.

"The receipts into the patent fund exceed those of any former year by more than thirty-six per cent, while the expenditures were only increased a trifle over eight per cent, and a considerable surplus is left to the credit of the patent fund.

"I think it is manifest that the inventors of the country ought not to be taxed as heavily as they are now. In other words, the fees for procuring patents should be reduced."

THE BLOWPIPE---ITS USES.

A correspondent writing from Arkansas inquires about the construction and use of the blowpipe. We may perhaps furnish information to a number of our readers by a brief description of the implement and its application. The most simple and common form of the blowpipe is merely a tapering tube of metal from 8 to 12 inches long with a caliber varying from one quarter of an inch at the large end to a mere pin hole at the small end, which is usually curved or bent an inch or so from the end to nearly a right angle. Considerable practice is required to properly use this instrument, as a continuous blast should be kept up and yet the lungs not be exhausted of air. It is effected by breathing only through the nostrils and using the cheeks as bellows for propelling the air. No verbal directions can instruct the learner; the art is acquired only by practice. The blowpipe is an instrument of great value to jewelers for soldering work, and also for glass blowers and enamelers. But its importance to the mineralogical and analytical chemist cannot be overated, as it serves the purpose of a furnace for the cupellation and analysis of metals, ores, and other minerals. The blast is often given—where the work is continuous—by a bellows, or other blowing engine. In use, as by jewelers, the article to be fused or heated is laid on a piece of charcoal, and the point of the blowpipe, held by one hand, is placed in the flame of a lamp or a gas jet, while the other hand holds the charcoal with the article or piece of jewelry upon it. A cone of flame, yellow on its exterior surface but brightly blue within, is the result, the outer yellow flame possessing oxidizing properties, while the inner flame gives a most intense heat. It can be readily used for refining small specimens of the precious metals by cupellation. The cupel is, as its name denotes, a small cup or crucible, composed of burned powdered bones mixed into a paste with glue water and pressed into a mold. Its substance, in the fusion of gold or silver alloyed with lead or some other base metal, absorbs the baser metal and leaves the precious metal in the form of a button at the bottom. In repairing jewelry a piece of charcoal is the best receptacle for the article to be acted upon, not only for its lightness and facility of handling, but because it facilitates the process of fusion by its chemical action in extracting the oxygen of the metal.

The blowpipe is useful also for ascertaining the qualities of otherwise undetermined substances. They are melted with different fluxes as borax, carbonate of soda, etc upon a piece of fine platinum wire hooked at the end. By the reaction of the ingredients of the substance with the flux, the nature of the ingredients are determined by their colors.

Modifications of the blowpipe and automatic or self-acting blowpipes have been made, but the common hand blowpipe is still the favorite for light work and for its ease of manipulation. The oxyhydrogen blowpipe, the invention of Dr. Robert Hare of Philadelphia, is too well known in its construction and uses to require a description in this article.

THE DISTRIBUTION OF SODIUM IN NATURE AND THE VALUE OF ITS COMPOUNDS AS MANURE.

The belief hitherto prevailing among scientific men that potassium and sodium were generally associated with each other in the vegetable kingdom, has received a severe shock by a series of experiments lately undertaken by Eugene Peligot, a distinguished French *savant*, and on account of the importance of the results we purpose presenting a brief description of them.

The absence of sodium in the horse chestnut, the pea and colza had been demonstrated some time ago; Peligot analyzed the ashes of wheat, oats, potatoes, oak, of tobacco, mulberry, and peony leaves, of palma christi, kidney beans, marigold, pellitory, parsnips, etc.; and although he experimented with large quantities of material, he could discover no trace of sodium salts. Only a few plants of the class *chenopodiacea* formed an exception. Peligot explains these facts by assuming an indifference and even an antipathy on the part of plants to chloride of sodium on account of the stability of this compound and of the difficulty with which it enters into new combinations. Even the plants that grow on soil impregnated with salt, the marine plants and fungi, for example, seem to share this repugnance. It is certainly remarkable that kelp which is manufactured from plants living in a medium in which the soda salts predominate largely over those of potash, contain more of the latter than of the former. Peligot advises, therefore, not to employ rock salt in agriculture to a greater degree than is necessary to insure a certain humidity of the soil and to facilitate the solution of other fertilizers. He condemns the use of all manures which concontain a large amount of soda salts and approves the treatment of human excrements with water and reducing them to powder before their employment on the field. It is unnecessary to mention, that all that has been said refers only to the chloride and sulphate, and not to the phosphate and nitrate; for in the latter the acids and not the base form the useful principle.

Doubtless the reader will ask, how it is possible that the large number of chemists who mention soda in the analyses of vegetable ashes can all be in the wrong? Peligot replies with a show of truth that they have generally contented themselves with evidence of the presence of another base beside potash, and that they assumed this to be soda without further inquiry into its chemical character. According to his researches, it is generally a small amount of magnesia, the salts of which it is difficult to separate completely from those of the alkalies. He is convinced that magnesium is as necessary to the growth and development of plants as phosphorus and nitrogen, and that the presence of this element alone accounts for the utility of clays and marls as fertilizers on soil already calcareous.

The sugar beet is an interesting case in point. It is capable of assimilating very variable quantities of potash and soda. In the beginning of its cultivation the use of rock salt seems to be advantageous on account of the magnesium which it contains; after a lapse of time, however, the root deteriorates and the yield of sugar diminishes in the same proportion as the amount of sodium in the ashes increases.

Many of the facts here presented are novel, and, if true, of great practical value, and we may, therefore, expect in the

mmediate future full and comprehensive investigations of points which can only result in valuable additions to our knowledge and in useful hints to the men of practical science.

ADHESION OF LEATHER BELTS TO CAST IRON PULLEYS.

In the January and February numbers of the *Journal of the Franklin Institute* are two articles on the above subject which present some facts of value to mechanics and others who employ belts in the transmission of power. The facts given are the result of numerous experiments made by Mr. H. R. Towne, at the suggestion of Mr. Robert Briggs, and although begun and conducted without a knowledge of those made by Gen. Morin and M M. Poncelet and Prony, the results of which appear as a translation in Bennett's *Morin's Mechanics*, it adds to their value to know that the results of these independently conducted experiments are virtually the same. The fact that not only the butts in which the lacing holes are punched, but even the splices are the weakest portions of the belt will surprise many who regard the latter, when properly made, as the strongest parts. From the manner, however, in which the experiments were conducted it would seem useless to attempt a dissent from the results as presented.

The report says: The experiments were made with leather belts of three and six inches width and of the usual thickness —about $\frac{3}{32}$ths of an inch. The pulleys used were respectively of 12, 23$\frac{5}{8}$, and 41 inches diameter, and were in each case fast upon their shafts. They were the ordinary cast iron pulleys, turned on the face, and, having already been in use for some years, were fair representatives of the pulleys usually found in practice.

Experiments were made first with a perfectly new belt, then with one partially used and in the best working condition, and, finally, with an old one, which had been so long in use as to have deteriorated considerably, although not yet entirely worn out. The adhesion of the belts to the pulleys was not in any way influenced by the use of unguents or by wetting them—the new ones when used were just in the condition in which they were purchased—the others in the usual working condition of belts as found in machine shops and factories—that is, they had been well greased and were soft and pliable.

The manner in which the experiments were made was as follows:—The belt being suspended over the pulley, in the middle of its length, weights were attached to *one* side of the belt, and increased until the latter slipped freely over the pulley; the final, or *slipping* weight, was then recorded. Next, 5 lbs. were suspended on *each* side of the belt, and the additional weight required upon *one* side to produce slipping ascertained as before, and recorded. This operation was repeated with 10, 20, 30, 40, and 50 lbs., successively, suspended upon both sides of the belt. In the tables these weights, *plus* half the total weight of the belt, are given as the "equalizing weights" (T_2 in the formulæ), and the *additional* weight required upon one side to produce slipping, is given under the head of "unbalanced weights;" this latter, *plus* the equalizing weight, gives the total tension on the loaded side of the belt (T_1 in the formulæ).

The bolt, in slipping over the pulley, moved at the rate of about 200 feet per minute, and with a constant, rather than increasing, velocity; or, in other words, the final weight was such as to cause the belt to slip smoothly over the pulley, but not sufficient to entirely overcome the friction tending to keep the belt in a state of rest. In this case (*i. e.* with an excessive weight) the velocity of the belt would have approximated to that of a falling body, while in the experiments its velocity was much slower, and was nearly constant, the friction acting precisely as a brake. By being careful that the final weight was such as to produce about the same velocity of the slipping belt in all of the experiments, reliable results were obtained.

It became necessary to make use of a weight such as would produce the positive motion of the belt described above, as it was found impossible to obtain any uniformity in the results when the attempt was made to ascertain the minimum weight which would cause the belt to slip. With much smaller weights *some* slipping took place, but it was almost inappreciable, and could only be noticed after the weight had hung for some minutes, and was due very probably to the imperceptible jarring of the building. After essaying for some time to conduct the experiments in this way, and obtaining only conflicting and unsatisfactory results, the attempt was abandoned, and the experiments made as first described.

In this way, as may be seen, results were obtained which compare together very favorably, and which contain only such discrepancies as will always be manifest in experiments of the kind. It is only by making a great number of trials and averaging their results, that reliable data can be obtained.

The value of the co-efficient of friction which we deduce from our experiments, is the mean of no less than one hundred and sixty-eight distinct trials.

It will be noticed, however, that the co-efficient employed in the formulæ is but *six-tenths* of the full value of that deduced from the experiments, the latter being 0·5853 and the former 0·4229. This reduction was made, after careful consideration, to compensate for the excess of weight employed in the experiments over that which would just produce slipping of the belt, and may be regarded as safe and reliable in practice.

A note is made, over the record of each trial, as to the condition of the weather at the time of making it—whether dry, damp, or wet,—and it will be noticed that the adhesion of the belts to the pulleys was much affected by the amount of moisture in the atmosphere. It is to be regretted that this contingency was not provided for, and a careful record of the condition of the atmosphere kept by means of an hygrometer. The experiments indicate clearly, however, that the adhesion of the old and the partially used belts was much increased in damp weather, and that they were then in their maximum state of efficiency. With the new belts the indications are not so positive; but their efficiency seems to have been greatest when the atmosphere was in a dry condition.

Experiments were also made upon the tensile strength of belts, with the following results:—The weakest parts of an ordinary belt are the ends through which the lacing holes are punched, and the belt is usually weaker here than the lacing itself. The next weakest points are the *splices* of the several pieces of leather which compose the belt, and which are here perforated by the holes for the copper rivets. The strengths of the new and the partially used belts were found to be almost identical. The average of the trials is as follows:—

Three-inch belts broke through the lace holes with		629 lbs.
" " " "	rivet "	1146 lbs.
" " " "	solid part "	2025 lbs.

These give as the strength *per inch of width*:

When the rupture is through the lace holes		210 lbs.
" " " "	rivet "	382 lbs.
" " " "	solid part	675 lbs.

The thickness being $\frac{7}{32}$ inch (=219), we have as the tensile strengh of the leather 3086 lbs. per square inch.

From the above we see, that 200 lbs. per inch of width th is the ultimate resistance to tearing that we can expect from ordinary belts.

The experiments herein described are strikingly corroborative of those already on record, and this gives increased assurance of their reliability, and, although there is nothing novel either in them or in their results, it is hoped that they will prove of interest, and that an examination of them will lead to confidence in the formulæ which are based upon them.

PLATINUM AND PLATINIZING METALS.

The name of this, the heaviest and most infusible of metals, is derived originally from a Spanish word signifying *little silver*, although rarely does it resemble in color and luster that noble metal, its appearance usually being more like that of pewter. It is for the most part met with in alluvial districts associated with the débris of the earliest volcanic rocks. Our chief supplies are derived from the mines of Mexico and Brazil and of the Ural mountains. Platinum when pure is about as hard as copper; in ductility it rivals iron, and in tenacity it is inferior only to iron, cobalt, nickel, and perhaps copper. It resists the highest heat of the forge; is not attacked either by sulphur or mercury; it does not dissolve in any simple acid, and in aqua regia but very slowly. On account of these properties platinum is peculiarly adapted as a material for making chemical vessels. As it cannot be worked like ordinary metals, the Russians, who made coins of it, adopted the plan invented by the English chemist Wollaston, of submitting the "spongy platinum"—formed by precipitating a solution of platinum in aqua regia, by chloride of ammonium—to powerful pressure and repeated blows, also to the influence of a very high temperature, the fine particles of the metal after this process being made to cohere into a uniform solid mass. It is thus that chemists' crucibles and sulphuric acid stills are made. In the concentration of oil of vitriol some of the stills used weigh upward of 1,000 ounces. It has been found, however, that these vessels made after Wollaston's method after a time become so porous as to allow the acid to gradually transude, to prevent which it is necessary to gild their inner surfaces. The metal platinum is also used for the nipples of rifles and other fire-arms. "Spongy platinum," before referred to, whenever a jet of hydrogen gas is projected upon it, has the power of condensing the oxygen of the air in the pores of the metal, and the rapid union with the hydrogen causes the ignition of the latter, as is shown in the well known Dobereiner's hydrogen gas lamp.

These facts may be well know, but they serve to introduce a notice of something newer and less familiar, namely, a simple plan for covering other metals with a delicate film of platinum, so as to endow them with one of the leading virtues of this metal—its power to resist corrosion. The process is communicated by Prof. A. H. Church to the London *Chemist and Druggist*.

If a few grains of scraps of platinum are dissolved in aqua regia the resulting liquid contains a compound of the metal platinum with the metallic element chlorine. This compound is commonly called bichloride of platinum. Now dissolve 60 grains of this salt and 60 grains of pure honey; add to the above solution three quarters of an ounce of alcohol and one quarter ounce of ether. The objects to be platinized, which may be of iron, steel, copper, bronze or brass, are thoroughly cleansed by washing first in soda, then in water. When dried, they require heating to redness over a lamp, the article being carefully suspended so as not to touch the flame, and before being cooled, it is to be suddenly and entirely plunged beneath the surface of the platinizing liquid. One immersion for a single minute is usually sufficient, but the process may be repeated if necessary, care being taken to carefully wash and dry the pieces operated upon before reheating them.

The composition of the liquid may vary considerably in the proportion of honey and the bichloride, and still with good results. It may be used several times, but gradually loses all its platinum, the latter being supplanted by the iron or copper dissolved off the immersed objects. Watch chains, steels, sword handles, keys, and similar useful or ornamental objects are greatly improved in appearance by the platinizing process, and moreover are preserved from all chance of rusting. The color of the platinum film is of neutral grayish black, and often irridescent. Many artistic applications of the process will readily suggest themselves. Objects partially gilt or silvered will be only changed in those parts which show the original metal; in this way beautiful designs in gold on platinum or silver on platinum may be formed, the contrast in colors being exceedingly beautiful, while neither the gold nor silver are in the least degree affected.

Separating Fibers from Wood and other Substances.

Moore R. Fletcher, of Cambridgeport, Mass, has lately obtained a patent, as above:

"For making pulp for brown paper, or fiber for spinning, felting, matting, or other fibrous or textile fabrics not requiring bleaching, I take, of good unslaked lime, ten pounds, and slake it thoroughly, making a milk of lime, which is then mixed in about eight thousand gallons of water, or as much as will cover one tun of the vegetable matter contained in a wooden tank. Heat is then applied to the tank, and its contents, by steam, passed through pipes, or by means of a fire, in the ordinary manner, until the temperature of the said solution reaches to about 135° Fahrenheit. The heat is then checked, and the temperature of the solution is kept at the above degree of heat for from ten minutes to one hour, or more, according to the quality and condition of the material under treatment. The heat of the solution is then raised to 195° Fahrenheit, or even to the boiling point, and kept at that temperature until the fibrous matter in the tank is sufficiently treated, which may readily be determined by any skillful person upon testing a small sample in the manner well known to expert paper makers. The degree of temperature above named is not indispensable, for, where time is not important, excellent results may be obtained from a temperature of 65° to 70° Fahrenheit; but the time required increases as the temperature is diminished. The solution is then drawn off, and the fibrous vegetable matter in the tank is washed either with cold or warm water, but preferably in water at a temperature of about 125° Fahrenheit, or the fibrous vegetable matter may be removed from the tank, and rubbed, pounded, or crushed between rollers, or otherwise manipulated, to separate the fiber, and then washed in a pulping engine, or by other suitable means. Such of the fibrous vegetable matter as is intended for pulp for making brown paper may be put into a pulping engine and beaten carefully to preserve the length of the fiber, and subsequently made into paper in the ordinary manner. If the fibrous vegetable matter is to be made into white pulp, for making paper, or other fibrous or textile fabrics, soda-ash, or some of the salts of soda, may be used instead of lime in the same proportions, and subjected to the same treatment as above described.

"I have found that a bleach may be cheaply obtained by the use of two parts of soda-ash and one part of chloride of lime, some of the fibrous vegetable substances, such as wood, straw, and some of the grasses, being required to stand in the bleaching solution from four to sixteen hours; and to obtain a pure white, and retain the strength of fiber, it can be done by several solutions with alternate drainings.

"As different kinds of fibrous vegetable matter require a stronger or weaker solution, the above-named proportions may be varied to suit the circumstances of the case, and a longer or shorter period of time may also be required for softening and separating the albuminous, resinous, or nitrogenous matter."

Area of the States and Territories.

The following table, compiled at the Land Office, shows the order of the States and Territories, from the largest to the smallest:

States.	Square Miles.	*States.*	Square Miles.
Texas	274,356	New York	47,000
California	188,981	Pennsylvania	46,000
Nevada	112,090	Tennessee	45,600
Colorado	104,500	Louisiana	41,346
Oregon	93,274	Ohio	39,964
Minnesota	83,531	Virginia	38,352
Kansas	81,318	Kentucky	37,680
Nebraska	75,995	Maine	35,000
Missouri	65,350	South Carolina	34,000
Florida	59,268	Indiana	33,809
Georgia	58,000	West Virginia	25,000
Michigan	56,451	Maryland	11,124
Illinois	55,410	Vermont	10,212
Iowa	55,045	New Hampshire	9,280
Wisconsin	53,924	New Jersey	8,320
Arkansas	52,198	Massachusetts	7,800
Alabama	50,722	Connecticut	4,750
North Carolina	50,704	Delaware	2,120
Mississippi	47,156	Rhode Island	1,306

TERRITORIES.

Alliaska	577,390	Idaho	90,932
Utah	240,587	Utah	88,056
Montana	143,776	Washington	69,994
New Mexico	121,201	Indian Territory	68,991
Arizona	113,916	District of Columbia	19

The Havre Marine Exhibition will open on June 1st and be continued until Nov. 1st. The buildings are now so far advanced that preparations are being made for receiving and arranging the articles to be exhibited, which are divided into five groups and forty-two classes. Under these divisions will be ranged all kinds of implements and apparatus used in navigation and fishing, as well as the various arts and occupations relating to the sea in general. One of the principal curiosities of the exhibition will be a grand aquarium, one half larger than the one at the Paris Exposition, and presenting an imitation of Fingal's Cave, in Scotland. A pamphlet we have received relating to this exhibition, contains an appeal to American manufacturers, constructors, and inventors of every description of articles relating in any way to the sea, soliciting their coöperation. The New York agent is M. Victor Precht, No. 40 Broadway, who will furnish any additional information desired.

The heat which the earth receives from the sun does not penetrate more than from 50 to 100 feet. At Paris this stratum of invariable temperature is found at a depth of 86 feet

Our Apprentice System.

We have commented several times on the relations between master and apprentice in this country, and alluded to the rules of Trades' Unions on this subject. The following from the Brooklyn (N. Y.,) *Eagle* is so pertinent to the matter that we offer no apology for its reproduction :—

"A rule of the Trades' Unions has been brought into court in Morrisania, and the decision of the case will interest members of these organizations. A man named Dawson sued three members of the Bricklayers and Plasterers' Union for damages for having conspired to prevent his son from learning the bricklayer's trade, by refusing to work for their mutual employer until the boy was discharged. Some of the Trades' Unions have rules prescribing the number of apprentices that shall be taken, with other conditions, and they enforce this rule by refusing to work for bosses unless they comply with it. The suit was tried before a local judge and jury and a verdict for the plaintiff rendered, with a judgment for nominal damages—five dollars. The case is, however, to be carried to the Supreme Court to test the legality of trade combinations to effect the interests of third parties.

"While the rules of the Trades' Unions may be objectionable, being designed only to protect the journeymen from the competition of cheap boys' labor, the mechanic interest demands a revision of the American apprentice system, and stricter laws for its government. The old-fashioned custom of binding boys to their master for a term of years to learn a trade, and which used to insure a supply of competent workmen, has become obsolete. Boys are employed without formal agreements or legal obligations; they may work for one man till they pick up a little practice at the trade, when they go off somewhere else to turn this experience to account in higher wages. Employers have no interest in learning the boys anything, and the most they pick up is a superficial knowledge of their business, and they remain poor workmen all their lives. It is beginning to be a matter of general complaint in many callings that there are so few skilled mechanics,—men who thoroughly understand their business and can be entrusted with the better class of work. And it is humiliating to be told that we are dependent on emigration from Europe for most of the skilled mechanical labor we have, rigid apprentice laws being still in force in the old country, bearing their fruit in a crop of good mechanics. Instead of trying to remedy the evil by society rules which can not reach the root of it, and the enforcement of which can only be done by questionable means, the workingmen should apply to the Legislature to pass some more definite law regulating apprenticeship, holding minors bound by their agreements of service. It may be that the old apprentice law, which held a boy to service until he came of age, gave the master, to whom he was indentured, the right to inflict corporeal punishment, and the power to have the apprentice summarily arrested and sent to jail for disobedience is too harsh for this age; but we have gone a little too far in the opposite direction in removing all restraint from youth, destroying that discipline that is necessary to the future welfare of the rising generation."

Swinging the Circle with a Grape Vine.

The following absurd "improvement" in the culture of grape vines bears a recent seal of the Patent Office, the invention of George Perry, Georgetown, Conn.

In the ordinary modes of cultivating grape vines, it is customary to prune the vines each year, cutting off nearly all of the old wood, and thus confining each year's foliage to the new wood, which shoots from the parent stock, near to the root, during that year. The natural and inevitable result of this process is a destruction of the balance, intended and instituted by nature, existing between the roots and wood and foliage growth of the plant. The roots and foliage have each reciprocal functions to perform, both necessary to the perfect health of the plant, and if either be interfered with, it must result in the disarrangement of the other. The fruit of the vine adds nothing to its vigor, but is actually so much extracted therefrom, and it is consequently found that, in cases where the vine has been sacrificed to force the fruit in greater than natural quantity, the roots become relatively too large to be properly reacted upon by the existing quantity of foliage, and the vine becomes diseased, and ceases to bear, or the fruit fails to mature properly, and is subject to mildew, rot, etc. The above is a popular error. By my system of cultivation these evils are obviated by continually preserving new and fresh roots to the plant, constantly in perfect balance with the fruit and foliage, and aged and unhealthy roots are lopped off.

Beginning with a post, marked 1, for convenience, we will describe our mode of operation:

A vine is first set at each post, either in the spring or fall, as deemed best, and is trained to its post, and allowed to grow one year or more, one year being generally sufficient. Then a shallow trench is dug between the posts, around a circle, in which each vine is laid down from its post to the next, where it is trained for another season. The vine at post No. 1 is laid down and covered with soil to the post No. 2, the vine at post No. 2 being treated in the same manner, and trained to No. 3, and so on around the circle, when each vine will have been trained to a post three feet from its original root. They are allowed to grow in these positions another year or more, when the same operation is gone through with again, and then each vine will be found six feet away from its original root, and the portions covered with earth will be found supplied with new roots throughout the whole space of six feet, thereby greatly increasing the strength and vigor of the plant. After growing another year or more, the vines may be again laid down and trained to the next adjoining post, where the vine originally planted at post No. 1 will be found at post No. 4, and each one around the circle will be found growing at a distance of nine feet from the point at first set out. By this time, the portion laid down (at least nine feet) will have sufficient new roots to support the growing vines, and the original root may be severed at the post where it was set. Thus the growing vine will become free from the old original root, which may have become diseased or partially dead, and have, at all times, comparatively new and fresh roots, as three feet would be formed each season after "layering," and that part of the root which should be four years old or more removed, so that the vines and roots will, in one sense, be always young, more vigorous, and capable of producing fruit, and, at the same time, be better able to resist the attacks of insects, mildew, and rot, which are found to attack old vines more than young ones.

[We venture to say that the vine, properly cultivated in one position for four years, will give far better results than if trained and layered around a circle, as the above patentee suggests.—EDS.

Artificial Wine.

John F. Siebenmann, Milwaukee, Wis., has obtained a patent for the following queer mixture: Water, fifty gallons; raise the temperature of the room to 86° or 90° Fah., after which add the following ingredients:

	For ordinary quality.	For best quality.
White sugar	95 pounds.	150 pounds.
Pure tartaric acid	3 "	2¼ "
Tamarind	6 "	6 "
Raisins	6 "	12 "

The raisins should be severed from the stems, and cut or crushed. Boiling water should then be added until the temperature of the mass is raised from 81° to 90°. The mass should then be well mixed to dissolve the sugar and acid. When dissolved, add six pints of good beer yeast, for the ordinary quality, or eight and a quarter for the best quality, and mix thoroughly. If wine yeast can be procured, as it can be after it is once formed, it may be used instead, but double in quantity.

Care should be taken that the temperature does not rise above 90°, nor fall below 81°—86° being suited for the purpose. In about twelve hours the mass will be in fermentation, and at first it should be stirred up about once in twelve hours, but afterward once in twenty-four hours, until fermentation ceases, which will occur in from ten to fourteen days. When the fermentation is over, the wine is placed in casks and put into the cellar, where it still ferments for three or four weeks, after which it is ready to be drawn from the casks and purified. In order to give to the wine, especially the best quality, its "bouquet," the following ingredients are added to the mass in the tub, before the yeast is added: Fresh-dried elder flowers, 1 oz.; crushed nutmegs, ½ oz.; cut mace, ¼ oz.; Florentine iris root, ½ oz.; and one pod of vanilla, also cut. The color is imparted by the application of the sugar color, a process well known to those skilled in the art, after the second fermentation is completed and the wine is drawn off. In order to make red wine, fruits or berries are used which give a red color, such as cherries, whortleberries, elderberries, blackberries, etc. These are crushed and added to the mass when fermentation commences.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING MARCH 17, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

75,507.—CARD HOLDER.—W. Inck Adams, New York city.

I claim the removable spring back plate, D, when provided upon its sides, near one end, with the lugs, E, fitting into the inclined grooves, F, upon the under side of the frame, A, the free end of said plate pressing against the under side of the shoulder, a, as herein described, for the purpose specified.

75,508.—FEED CUTTER.—Truman P. Allen, Gowanda, N. Y.

I claim, 1st, Arranging the two knives, C and D, substantially as herein shown and described, so as to obtain a drawing stroke with each knife.

2d, Applying the power directly to the knives, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the knives, C and D, pivoted connecting bars, E, and branched operating lever, F, with each other, substantially as herein shown and described and for the purpose set forth.

75,509.—EXTRACTING SACCHARINE MATTER FROM MALT.—Wm. Anheuser, St. Louis, Mo.

I claim, 1st, The process of extracting the saccharine malt liquid from the malt by pressing.

2d, The process of pressing the malt refuse left after infusion, for the purpose of obtaining an additional quantity of saccharine juice.

75,510.—LANTERN.—Ellis S. Archer (assignor to Archer, Pat.coast & Co.), New York city.

I claim, 1st, The combination of the top piece or plate, E, constructed and formed as described, with the frame and side plates of a lantern, substantially as and for the purpose set forth.

2d, The passing of the spring through the side of the lamp, and soldering it upon the inside of said side, substantially as described.

3d, The forming the catch of the spring by punching and striking out a portion of the spring itself, substantially as and for the purpose set forth.

4th, The combination of the spring, O, constructed and attached as described, with the lamp and frame of a lantern, substantially as described and for the purpose set forth.

75,511.—SMOKE STACK FOR LOCOMOTIVE ENGINES.—Jearum Atkins, Washington, D. C.

I claim, 1st, Providing a series of conical or tapering tubes or passages, through which the products of combustion are made to pass on their way from the furnaces of steam generators, arranged substantially as shown and described.

2d, The combination of the divided exhaust nozzle and the tapering tubes or passages substantially as shown and described.

3d, The arrangement of blast tubes, M, with reference to the tubes or passages, J J J and F F, substantially as shown and described.

75,512.—STUMP EXTRACTOR.—S. S. Avis, Pennsgrove, N. J.

I claim, 1st, the trestle horse, A c c c c e e, and lever, B, substantially as shown and described, in combination with the chain, i, as and for the purpose set forth.

2d, The plates, b and d, substantially as shown and described, in combination with the lever, B, and trestle horse, as and for the purposes set forth.

3d, The pedestal planks, e, in combination with the trestle horse and lever B, substantially as and for the purpose shown and described.

75,513.—CAR TRUCK.—Joseph Baysore, Freeport, Ill.

I claim the arrangement and method of connection of the axles, A, of the truck to the car bed, K, through the medium of the straps, F, bars D, rollers L, and circle plate, J, arranged substantially in the manner as and for the purpose set forth.

Also the springs, C E, arranged and applied to the truck substantially in the manner as and for the purpose specified.

75,514.—HORSE RAKE.—Henry L. Beach, Montrose, Pa., assignor to Beach Wheel Horse Rake Manufacturing Company.

I claim, 1st, A shoe or foot constructed and operating substantially as described, for the purpose specified.

2d, Attaching the shoe or foot substantially as herein described, for the purpose specified.

75,515.—CHEESE VAT.—H. H. Bent, Antwerp, N. Y., assignor to himself and E. Sims.

I claim the box, L, provided with partition, R, and discharge pipes, S, in combination with the standard, P, vibrating bars, K H H, and the adjustable paddle or agitator, I, the several parts being constructed and operated substantially as and for the purpose herein fully set forth.

75,516.—GAS AND OTHER HEATERS.—John Q. Birkey, Philadelphia, Pa.

I claim, 1st, The receiver, D, for collecting the noxious vapors, deleterious gases, and other impurities arising the combustion of fuel, in combination with a pipe, tube, or outlet, for conducting the said gases and impurities to the vessel where the same are neutralized, substantially as set forth.

2d, Neutralizing or destroying the impurities arising from combustion in water or chemical agent, substantially as described.

75,517.—FARM GATE.—William Brown, Addison, Mich.

I claim, 1st, The levers, J, when constructed and operating for the purposes hereinbefore described.

2d, The combination of the above levers with the gate, A, the upright bars B C, the wheels, D, the horizontal bar, E, the double posts, F G H, the horizontal bar, described as being hung upon rods near the top of the posts, G H, the cranks, I, the rings or blocks, M N, the cords or chains, L, the posts and arms, O, the guides, p, and the latch, R, when constructed, arranged, and operating substantially as and for the purposes herein set forth.

75,518.—CAR BRAKE.—Wm. H. Burke, Brighton, Mass., assignor to himself and James E. Wilson, Springfield, Me.

I claim the combination and arrangement of the three shafts, F F I, their screws, H H, worm gears, G G, cams, E, and the bevel gears, L M, and vertical hand wheel shaft, N, arranged at either or each end of the carriage, and with respect to the brakes, D, substantially in manner as specified.

75,519.—BED BOTTOM.—Ezra Caswell, Lyons, N. Y.

I claim the bed bottom constructed as described, and consisting of the slats, C, frame, D, having slotted cross bar, f, plate, s, having hooks, B, link, F, elastic strap, E, wedge, g, and screw, e, all arranged and operating as described and for the purpose specified.

75,520.—GRAIN SEPARATOR.—W. T. Chaffee (assignor to himself and Samuel M. Drinker), Richmond, Va.

I claim, 1st, The combination of the perforated, sliding, triangular bars, B and C, with each other and with the frame, A, substantially as herein shown and described and for the purpose set forth.

2d, Connecting one of the triangular bars, as C, to the cross bars, a', of the frame, A, by the dovetailed bars, E and G, and hand screws, F, or by equivalent means, so that it may be moved back and forth or adjusted laterally, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the crank shaft, A, and pitmen, I, with the sliding triangular bars, B and C, with the frame, A, substantially as herein shown and described and for the purpose set forth.

75,521.—CAR WHEEL.—S. B. Chapman, New York city.

I claim a wheel for railway cars composed of the metal plates, A, E, wooden sections, C, and the elastic ring, A x, all being secured together by bolts, and used with or without rings, D D, substantially as herein shown and described.

75,522.—SHUTTLE FOR LOOMS.—Daniel G. Chase, Boston, Mass.

I claim the combination of the open slotted spindle head, c, coiled spring, b, and plate spring, e, with the shuttle, A, and stop pin, g, the whole being constructed and arranged for operation as herein shown and described.

75,523.—STEAM ENGINE GOVERNOR.—Daniel L. F. Chase, Boston, Mass.

I claim, 1st, The combination of the valve stem and sectoral rack or lever with the vibratory arm, k, pinion, h, and shaft, i, receiving motion directly from the driving shaft, o, substantially as and for the purposes shown and set forth.

2d, The combination of the valve stem, the sectoral rack or lever, and its actuating pinion and vibratory shaft of the gear, m n, shaft, o, and lever, v, link, z, and sleeve, s, substantially as and for the purposes herein shown and specified.

3d, The construction of the sectoral lever, d, as composed of the eccentric slot, e, with its enlargements a1 a2, and its toothed racks, f and g, essentially as before set forth and explained.

4th, The combination with the arch, l, of the vibrating arm or bracket, k the shaft, i, the gears, m and n, the bracket being pivoted to the arch as before explained.

75,524.—BAKE PAN.—Justus Chase, Jr., Watertown, N. Y.

I claim the bread pan consisting of the dome, D, and base A B, with suitable connecting devices, constructed as herein described and for the purposes set forth

75,525.—COVERING FOR SHAFT COUPLING.—Sidney E. Chase, Mendon, Mich.

I claim the construction of a coupling cover as hereinbefore described, and operating substantially as and for the purposes set forth.

75,526.—FERRY BRIDGE GUARD.—James A. Clarke, New York city.

I claim the self-acting draw, k, actuated by the fender, c, substantially as and for the purposes set forth.

75,527.—BEDSTEAD.—John C. Clime (assignor to himself and J. Moore Hendricks), Philadelphia, Pa.

I claim, 1st, The arrangement of the notched slats, A, coil springs, B, middle supporting bar, C, and adjustable head bars, D, when these several parts are constructed substantially as shown and described, for the purpose specified.

2d, The perforated hollow tube, F, in combination with the coil springs, B substantially as set forth.

75,528.—HAY RAKER AND LOADER.—John S. Coffman and Manassah Graybill, Greenville, Ind.

We claim, 1st, The loose teeth, F, and bar, G, in combination with the pivoted arm, H, rods, J J, jointed connecting bar, K, and lever, P', all arranged to operate as herein shown and described.

2d, The receiving platform, E, when adjusted upon the frame, D, by means of the cord, o, ratchet and pawl, and the crank, p, upon the rod, n, as herein described, for the purpose specified.

3d, The arrangement of the frame, D, burden wheel, A, caster wheels, B, adjustable apron, E, loose teeth, F, and their operating mechanism, the endless apron, C, and shaft, G, all operating as described, for the purpose specified.

75,529.—LAMP LIGHTING DEVICE.—Noah L. Cole, Norwich, Conn. Antedated Feb. 28, 1868.

I claim, 1st, The within described combination of devices for ejecting matches, consisting essentially of the revolving chambered cylinder, g, piston, e, catch spring, f draw pin, d, spring, b, cylinders, a and l, and handle, c, or their equivalents, arranged and operating substantially as described.

2d, The combination with the elements of the preceding clause, the igniting and holding spring, k, applied and operating substantially as described.

3d, The wrench, i, applied to a match ejecting instrument in the manner and for the purpose described.

75,530.—LOOM.—George Crompton, Worcester, Mass.

I claim in combination with angular lifter and depresser levers, working upon fulcra in the plane of the cloth-making line, horizontal rigid evener bars fixed to the slide rods and operating to even the jacks, substantially as described.

Also, in combination, horizontal rigid eveners, secured to slide rods, angular lifter and depresser levers, and the slotted jacks, substantially as described.

Also, the slotted angular lifter and depresser levers, working on stationary fulcra, combined substantially as described with the slide rods.

Also, angular lifter and depresser levers, vibrating on stationary but adjustable fulcra, and fixed by sliding or yielding connections to the actuating rods, substantially as described.

Also, in combination with the movable shuttle boxes and mechanism for supporting and for changing them, the stirrup, a, arranged substantially as described.

Also, in combination with the tappet lever and stirrup, constructed as described, the link, b, connecting the lever and stirrup, and arranged relatively thereto, substantially as described.

75,531.—VELOCIPEDE FOR LAND AND WATER.—William G. Crossley, Cambridge, England.

I claim, 1st, The velocipede in which the body is made so as to serve as a boat or car, as the same is used upon land or water, and constructed substantially as herein described.

2d, The combination of treadles, B, and levers, a b c, etc., for operating the shaft, arranged substantially in the manner shown.

75,532.—HORSE RAKE.—B. W. Davis, Fort Madison, Iowa.

I claim a band or stirrup, A, for connecting the shaft, B, to the handle, G, of any rotating horse rake, D, furnished with the slot or holes, a, substantially as shown and described and for the purposes set forth.

75,533.—SPIRIT LEVEL.—L. L. Davis, Springfield, Mass.

I claim, in combination with the screws, d d', having the conical points, e e', the studs, t t', placed in the ring, D, which has a reciprocating rotary motion, all constructed and arranged substantially as herein described and set forth.

75,534.—ADJUSTABLE SPIRIT LEVEL.—L. L. Davis, Springfield, Mass.

I claim, 1st, The adjustable bubble glass case, b, having the elastic adjusting ears, t t, and projection, o, when constructed and arranged substantially as described and for the purposes herein set forth.

2d, In an adjustable spirit level, the case, b, having the elastic adjusting ears, t t, and the projection, o, and operated or adjusted by means of the screws, f f, in combination with the plate, a, and pin, n, substantially as herein described and set forth.

75,535.—TANNING AND COLORING SHEEP SKIN.—Jonas Diehl, East Freedom, Pa.

I claim a tanning and coloring liquor, composed of the ingredients and mixed in the proportions about as specified, for tanning and coloring sheepskins, as set forth.

75,536.—MEDICAL COMPOUND.—Oscar G. Ditmars, New York city.

I claim the medicine herein described, called "The American Cough Balm."

75,537.—Medical Compound.—Oscar G. Ditmars, New York city.
I claim the medicine herein described, called "The American Dyspepsia Cure."

75,538.—Manufacture of Fluoride of Silicium.—Cyprien Marie Tessié Du Motay, Metz, France, and Edouard Karcher, Saarbruck, Prussia.
We claim the manufacture of fluoride of silicium, by reducing the oxygen of silica by means of carbon or carbonated compounds in presence of fluoride of calcium, substantially in the manner herein described.

75,539.—Churn.—George C. Fitch, Randolph, N. Y.
I claim the arrangement of the buckets, D D, provided with four elongated lips, as described and used upon the arms, C C, in the box, A, substantially as specified.

75,540.—Machine for Papering Pins.—Thaddeus Fowler, Seymour, assignor to the United States Pin Company, New Haven, Conn.
I claim, 1st, The pointed cut-offs, s, applied at the lower ends of the conductors, in combination with the stock bar, r, substantially as and for the purposes set forth.
2d, The grooved breast, c, and spring door, t, in combination with the rake K, substantially as and for the purposes set forth.

75,541.—Funnel and Grater.—E. A. Goodes (assignor to himself, E. L. Miller, and W. H. Morford), Philadelphia, Pa.
I claim, 1st, The corrugated rim, f, around the top of the funnel, and the serrated edge, e, of the nozzle, B, in combination with a funnel, substantially as and for the purposes described.
2d, The handle, C, with the perforations or grater, g, and the wing, h, with the serrated edge, in combination with a funnel, substantially as and for the purposes set forth.

75,542.—Brick Machine.—Wm. A. Graham, Carlisle, Pa., assignor to himself and Chs. Carr, Trenton, N. J.
I claim, 1st, The combination of the shafts, N R, knife, P, and rollers, n n, with the wheels, C C', when constructed and operating as specified.
2d, The rock shaft, I, with its upper and lower curved arms, L M, presser, O, and spring, m, when used with the wheel, C', as set forth.
3d, The combination of the solid faced wheel, C, brick mold wheel, C', plungers, i i, segment, K, rock shaft, I, with its arms, L M, shafts, N R, knife, P, cam, F, and belt, E, the various parts being constructed and operating substantially as and for the purposes set forth.

75,543.—Potato Digger.—A. Hadwen, Rochester, N. Y.
I claim the arrangement of the rotary screen, F, arm, A', pulley, S, in combination with the belt, T, substantially in the manner herein shown and described and for the purposes set forth.
2d, The arrangement of the scraper, D, eccentric cam, y, in combination with shovel plow, E, substantially in the manner and for the purposes herein shown and described.
3d, The arrangement of the latch, B, in combination with the sides, C, for the purposes herein shown and described.

75,544.—Spiral Gearing.—Uri Haskin, Jr., Pittsburgh, Pa.
I claim spiral toothed gearing, consisting of teeth which run around the periphery of the gear wheel and meet in an angle on a line midway from either edge of the wheel, constructed and arranged substantially as hereinbefore described.

75,545.—Shuttle Binder.—F. Haskins, Ware, Mass.
I claim the tapering supporting piece, A, in combination with the friction piece, B, screws, d and e, and nuts, b and f, the whole arranged and operating substantially as described.

75,546.—Pen Holder for Ruling Machine.—I. W. Henderson, Leavenworth, Kansas.
I claim, 1st, A holder for pens consisting of the two arms, B and C, hinged together, substantially as and for the purpose described.
2d, The set screw, I, in combination with the above, substantially as and for the purpose specified.
3d, The combination of the arms, B and C, each adapted to receive a pen or pens, and set screws, G L, substantially as and for the purpose described.

75,547.—Can for Putting up Alkali.—P. Hickey (assignor to himself and R. Porter), Philadelphia, Pa.
I claim setting the heads into alkali, paint, or other similar cans, by means of the flanges, 2, 3, 4, and a collar, D, inclircling the body, so that said heads may be permanently and tightly set into the body while full, and sitting in an upright position, substantially as described and for the purpose set forth.

75,548.—Horse Rake.—J. N. Hicks, Barre Center, N. Y.
I claim, 1st, The revolving wire toothed rake head, formed of the bar, A, and the teeth, B B, etc., in combination with the arms, C C, and the lever, G, substantially as shown and described and for the purpose set forth.
2d, The ratchet, K, and pawl, L, in combination with the lever, O, operating for the purpose and in the manner shown and described.
3d, The lever, G, in combination with the arms, C C, operating for the purpose and in the manner above shown and described.

75,549.—Privy.—Jas. Ingram, New York city.
I claim a sliding clearer, combined with a stationary grating in a privy vault or sink, for the purposes and substantially as set forth.

75,550.—Oyster Tongs.—J. Johnson, Brooklyn, N. Y.
I claim, 1st, The pair of toggle bars, g h, jointed to the ends of the tongs, d e, substantially as specified, so that the tongs will be closed by drawing up the joint between the bars, g h, or opened by drawing the joint between the bars d e, toward the said joint, between the bars, g h.
2d, In combination with the toggle bars, g h, and tongs, e d, as aforesaid, the pole or bar, m n, and the ropes or chains, k l, substantially as and for the purposes specified.

75,551.—Portable Fence.—Sebastian Keller, Elizabethtown, Pa.
I claim the mode of supporting portable fencing, as herein described.

75,552.—Adjustable Jaw for Vise.—Henry N. King, Adrian, Mich.
I claim the combination of the stationary jaw, A, the movable jaw, B, the plate, C, the bolt, D, the ball, E, the collar, F, the plate, G, the face plate, H, the adjustable stops, I, and projecting standard, when constructed, arranged and operating substantially as and for the purposes herein set forth.

75,553.—Furniture Drawers and Fasteners.—John Koch Brookline, Mass.
I claim the combination of the inclined plane or lever, k, the spring, e, and the bolt, H, made with hooks arranged to catch upon the drawers, as specified, such combination being arranged in manner and so as to operate with the drawers, as explained, and being what I term the primary, or bolting, or fastening mechanism.
Also, the combination of the bar, I, the spring, K, the notch, L, the knob, o, the ratchet, p, and the pawl, q, as arranged with a drawer and its case, substantially as set forth, such combination being what I term the auxiliary fastening mechanism.
Also, the arrangement of the primary and auxiliary fastening mechanism with the series of drawers and their case, all as described for the purposes set forth.

75,554.—Belting.—H. Lemaistre, Brussels, Belgium.
I claim, 1st, The manner herein shown and described of uniting pieces of leather for making belts by tapering their ends and leaving a lip, a, on every other end, as described, and uniting them by the means hereinafter described.
2d, Cutting the ends of leather straps, substantially in the manner described so that they can easily be united for belting, as set forth.

75,555.—Propagation and Treatment of House Plants.—William Lilley, Washington, D. C.
I claim propagating and treating house plants in the manner and by the means substantially as and for the purposes herein set forth.

75,556.—Window Sash.—Joseph Liness, Chicago, Ill. Antedated February 28, 1868.
I claim, 1st, Construction of a sash, with a filling of bars and mullions, with a removable outer section, I F, and a removable inner section, E D, so that one or both may be removed without disturbing the frame, substantially as specified.
2d, The cross bar or plate, H, when placed across the intersection of the bars and mullions on the inside, so as to be concealed when the sash is put together, substantially as shown.
3d, The method of securing the removable bars and mullions in the frame, by means of the strips, D, made with bevelled or coped ends, to fit over the corresponding bevel or molding of the bars and mullions, substantially as specified.

75,557.—Bottle Faucet.—William I. Luther (assignor to Luther & Brown), Rochester, N. Y.
I claim, 1st, An automatic faucet for champagne bottles, etc., in which the passage at the end of the screw self-closes in entering the cork, and self-opens when passed through the cork, substantially as herein set forth.
2d, The combination of the independent stop cock, d, with the automatic point, f, and screw, b, operating substantially as and for the purpose specified.
3d, The special construction and arrangement of the parts, consisting of the case, A, cock, d, screw, b, point, f, shank, g, cross head, h, and spring, k, operating as described and for the purpose set forth.

75,558.—Mode of Forming Raised Ornaments on Wood.—James B. Macduff, New York city.
I claim raising ornaments upon wood by means of the knife, A, and follower, B, operated as described, whereby the knife is forced into the wood and removed, and the follower, B, applied to compress the ornaments, which, after the blank is sawed off, are raised to the desired hight by steaming, as herein shown and described.

75,559.—Machine for Dressing Flax.—William C. McBride, Somerville, N. J.
I claim, 1st, The toothed wheels, I, in combination with the revolving disk, E', and feeding rope, F', all constructed, arranged, and operating as herein shown and described.
2d, The arrangement of the oblique finger above the carrying disk, E', and cord, F', for the purpose of depositing the upper end of the fiber upon the surface of the disk, substantially as set forth.
3d, The beaters, G G, constructed as described, having two opposite straight sides and two curved sides, convex in the center and concave at the edges, all arranged and operating as described for the purpose specified.
4th, Providing the straight sides of the beaters, G G, with oblique rounded teeth, e e, as herein described, for the purpose specified.
5th, The revolving comb wheels, f and f', arranged so as to straighten the fibers after they are discharged from the scutching chamber, substantially as and for the purpose herein shown and described.
6th, The toothed disk, J, when arranged as described, for the purpose of taking the dressed flax from the rope, F, and depositing the same upon the table, L, as set forth.

75,560.—Insect Destroyer.—Alexander McKenzie, Henry, Ill.
I claim the solution, composed substantially as herein described, and applied in combination with iron, substantially as and for the purposes specified.

75,561.—Vermifuge.—John McKinsey, Millville, N. J.
I claim a vermifuge or worm medicine, composed of the ingredients (and in about the proportions), named, or substantially as described.

75,562.—Clothes Pounder.—Bevel S. Morgan, Delhi, Iowa.
I claim the construction of the two pieces of wood, D D and E E, the hollowed surface of each of the two sections of the head, C C, forming the cavity, C, when closed, as and for the purpose specified.

75,563.—Cutting Saw Teeth.—James Morton, Philadelphia, Pa.
I claim a tooth-cutting machine, consisting of the two toothed revolving circular dies, D and E, geared together and moving in opposite directions, substantially as herein shown and described.

75,564.—Caster for Furniture.—Hezekiah Munroe, Fall River, Mass.
I claim the construction and arrangement in the case, E, of the friction rollers, c c, upon the vertical screws, a, and adapted to bear and revolve against the shank of the spindle, B, below the collar, d, and above the bottom plate, b, without contact with the top or bottom of the case, E, as herein described for the purpose specified.

75,565.—Lamp Burner.—George Neilson, Boston, Mass.
I claim, 1s,, The combination, with the wick tube, of a deflector, and an air-supply cylinder for supporting the same, when the said cylinder constitutes at the same time the rest or seat for the lamp chimney, as herein described.
2d, The combination, with the wick tube and elevated deflector, or a cylinder, forming at once the rest for the deflector and the lamp chimney, and supported upon a perforated air-distributing plate or diaphragm mounted upon the wick tube, substantially as herein described.
3d, The combination, with the wick tube and air-distributing plate or diaphragm mounted thereon, of the deflector and combined air-supply cylinder and chimney rest, when the latter is detachable and removable from the said diaphragm and wick tube, substantially as herein shown and described.
4th, The combination, with the air-supply cylinder, when constituting at the same time the chimney seat or rest, of springs for supporting the chimney in position, substantially as herein specified.
5th, The combination with the wick tube of the air distributor or diaphragm and the receptacle or cup formed in that part of the said diaphragm immediately surrounding the wick tube, as and for the purposes herein shown and set forth.

75,566.—Lamp Burner.—George Neilson, Boston, Mass.
I claim the combination with a lamp burner in which the base or chimney rest is combined with an elevated deflector, as herein specified, of a globe frame, adjustable upon or permanently united with the said chimney rest, substantially in the manner and for the purposes shown and set forth.

75,567.—Gang Plow.—William Nelson, Cacherville, Cal., assignor to himself, C. E. Moore, and A. J. Praster.
I claim, 1st, The attaching of the plow beams, N N, to the axle, A, by means of the boxes, L L, constructed substantially as shown, in combination with the frame, C, to which the draft-pole D, is attached, said frame being connected to the axle, A, as shown, and all arranged to operate in the manner substantially as and for the purpose set forth.
2d, The notched segment bar, G, in combination with the lever H, and arm J, connected by the chain, I, and attached respectively to the draft pole D, and the axle A, and all arranged to operate in the manner substantially as and for the purpose specified.
3d, The yokes or frames, O, provided with the screws, , and attached to the lower plates, b, of the boxes, L L, with the plow beams, N, passing through them, substantially as and for the purpose set forth.

75,568.—File.—Hiram B. Nickerson (assignor to himself and Stillman B. Allen) Boston, Mass.
I claim a rasp having the teeth of each range of teeth disposed obliquely to the edges of the rasp, and so that the cutting face of each tooth shall have its obliquity arranged in a direction opposite to or about at right angles with that of each of the teeth of the next adjacent range, the whole being substantially as exhibited in fig. 1, and as hereinbefore described.

75,569.—Door Lock.—Hiram Norton, Delton, Wis.
I claim the employment of two or more tumblers, a, having their center of movement at or near their middle points, and having their ends catching into notches, n n''', on the bolt, B, all substantially as and for the purpose shown and described.

75,570.—Harvester Rake.—Elias Ogden, Lynchburg, Va.
I claim the combination of the two crank wheels, B, two cranks, F H, staple or slotted arm, G, and L-shaped rake, E, with each other, substantially as herein shown and described, and for the purpose set forth.

75,571.—Apparatus for Leaching Bark and Other Materials.—S. J. Patterson, Bridgeport, Conn.
I claim, 1st, A horizontal cylindrical revolving leach, A, constructed with a removable screen or strainer, C, and with openings, a1 and a2, substantially as herein shown, and for the purpose set forth.
2d, The combination of the perforated hollow shaft, D, with the cylinder, A, substantially as herein shown and described, and for the purposes set forth.
3d, The combination of the supporting friction rollers, G, with the revolving cylindrical leach, A, substantially as herein shown and described, and for the purpose set forth.

75,572.—Musical Notation.—Philetus Phillips, Matawan, N. J.
I claim the combination of the ordinary staff on which music is printed, with bars, which separate the measures, intersecting small portions of the staff formed on the principle of the patent of May 27, 1856, as above described.

75,573—Mowing Machine.—J. W. Pierce, Millbury, Mass.
I claim the pivoted bent lever, L, finger bar, K, rod, M, lever, N, and irons, I, in combination with the lever, G, all operating as described, whereby the inner end of the finger bar is raised by the lever, G, and its outer end by the lever, L, the whole constructed and arranged in the manner and for the purpose set forth.

75,574.—Wagon Hub, Axle, and Box.—John W. Pollock, Cross Bridges, Tenn.
I claim, 1st, The combination of the hub, A, and the box, D, with each other, with the axle, C, substantially as shown and described, and for the purposes set forth.
2d, The combination of the box, D, with the axle, C, substantially as shown and described, and for the purposes set forth.

75,575.—Combined Seeding Machine and Cultivator.—O. M. Pond, Independence, Iowa.
I claim, 1st, The seed box, D, provided with an adjustable bottom, E F, and slide, G, in combination with the fluted feed roller, I, for the purpose and in the manner as set forth.
2d, The cultivators, O, adjusting bar, P, check bar, C', as constructed and arranged to operate in relation to the seed box, D, for the purpose substantially as described.

75,576.—Vise.—Mason Prentiss, Cambridge, N. Y.
I claim the improved vise herein described, its several parts being constructed and arranged substantially as set forth.

75,577.—Manufacture of Glass.—Daniel C. Ripley, Pittsburg, Pa.
I claim a glass or porcelain pressed top, for sirup or cream jugs or pitchers, substantially as described.

75,578.—Cultivator.—Eleazer B. Roberts, Rochester, N. Y.
I claim, 1st, The application to cultivators, of rotary weed cutters hung on a vertical shaft, and operating substantially in the manner herein shown and described, and for the purposes set forth.
2d, The application to cultivators of rotating hoes hung on a vertical shaft, and operating substantially in the manner herein shown and described, and for the purposes set forth.
3d, The arrangement of the arm, M, in combination with the rotary hoe, D, substantially in the manner and for the purposes herein shown and described.

75,579.—Extension Wardrobe.—J. G. Roux, Crystal Springs, Miss.
I claim, 1st, An extension wardrobe, constructed substantially as shown and described.
2d, The drums or boxes, A A', sliding horizontally, substantially as and for the purpose shown and described.
3d, The movable uprights, G G' G'', substantially as and for the purposes shown and described.
4th, The frames, B B', supported by a post, D, substantially as and for the purposes shown and described.
5th, The hollow post, D, substantially as and for the purpose shown and described.
6th, The vertical shaft, a, with its pinions, a a, in combination with a wardrobe, substantially as and for the purposes shown and described.
7th, The channels, H, in combination with the racks, r r, substantially as and for the purposes shown and described.
8th, The uprights, G G' G'', in combination with the notched feet, u u' u'', substantially as described, for the purposes specified.
9th, Connecting two parts, A A', of a wardrobe with racks, r r, substantially as and for the purposes shown and described.

75,580.—Device for Lasting Boots and Shoes.—Joseph G. Rust, Xenia, Ohio.
I claim the piston, D, and the lever H, and the click, L, in connection therewith, in combination with the piston, D, all arranged substantially in the manner as and for the purposes herein set forth.

75,581.—Railroad Freight Car.—L. Savage, Ashtabula, O.
I claim, 1st, The construction and arrangement of freight cars in two parts, the upper part or freight receptacle, B, being made separate and removable from the lower or running part, A, substantially as herein shown and described, and for the purpose set forth.
2d, The combination of the metallic grooves or channels, D, and friction wheels, E, with either or both the parts A and B of the car, and with the trestles or platform, C, for the purpose of diminishing the friction in moving the said part, B, substantially as herein shown and described.

75,582.—Vessel for Mineral Water.—A. D. Schnackenberg, Brooklyn, N. Y.
I claim a cap, C, for mineral water bottles, or jars, when provided with a valve, d, and upright or nearly upright tube, F, substantially as herein shown and described, so that the use of a draft tube is dispensed with, as set forth.

75,583.—Railroad Rail Fastening.—M. Seaman, Middleport, N. Y.
I claim the construction and arrangement of the intermediate section, B, provided with the head, b', resting upon the flanges, d d, of the rails, A A, its sides or ends, a a, projecting from the middle in opposite directions, one over the outer side of one of the rails, A, and the other over the inner side of the opposite rail, A, the point of connection of the ends of the rails, A, and intermediate rail, B, fitting into each other at an oblique or diagonal angle, when all are constructed and arranged as herein set forth, for the purpose set forth.

75,584.—Lubricating Device.—Mathew Senior, Frankford, Pa.
I claim lubricating the feather, D, upon the shaft, C, from each side of said feather, through the holes, e e, in the tubular journal, B, and the hole, f, in the hollow cap, g, as herein described for the purpose specified.

75,585.—Base-Burning Stove.—S. B. Sexton, Baltimore, Md.
I claim, 1st, The flaring or funnel-shaped chamber, H, constituting the magazine and intermediate outer wall of the stove, in combination with the contracted passage, J, substantially as and for the purpose described.
2d, The arrangement of the air-heating chamber, E, applied around the fire pot, D between the base and top of said pot, with a coal reservoir, which constitutes the single exposed outer intermediate wall of the stove, and is united to the fire pot by an inclined illumination ring, G, substantially as and for the purpose described.
3d, An upwardly-flying coal reservoir, exposed as described, provided with a supporting ring, G, having door or window openings through it, and arranged over a flaring fire chamber or pot, substantially as described.

75,586.—Surgical Suppository.—H. H. Seys, Oil City, Pa.
I claim, 1st, A suppository, which, while it acts in the rectum as a pessary and valve upon the blood vessels, shall impart the medicinal properties of which it is composed to the diseased vessels, substantially as described.
2d, A suppository composed of linseed meal or pulverized oil cake, or the two combined in proper proportions, or other similar oleaginous or mucilaginous vegetable material alone, or mixed with suitable anodyne and astringent medicines, formed into a conoidal-shaped mass, so that when introduced into the rectum it shall produce the effect as herein shown and described.

75,587.—Lamp.—Samuel Shea and E. W. Gillman, Long Island City, N. Y.
We claim, 1st, Providing a lamp burner with a removable ratchet and arbor, substantially as herein shown and described.
2d, The sleeve, E, when arranged around a burner, A, in which a hole, s, is provided, to allow the insertion and removal of the ratchet and arbor, substantially as herein shown and described.

75,588.—Portable Book Clamp.—Calvin W. Sherwood, Chicago, Ill.
I claim, 1st, A book grapple, consisting of the bars A and C, with the cord, E, and windlass, F, with the stops, a, all constructed and arranged to operate substantially as described.
2d, In combination with a grapple for holding the books, the box, B, constructed and arranged for use, substantially as herein described.

75,589.—Cider Press.—A. W. Shidler, South Bend, Ia.
I claim the tubes, G, and head, C, in combination with the perforated or open sides, A, bottom, B, and screw, D, arranged and operating in the manner and for the purpose substantially as set forth.

75,590.—Horse Collar.—J. H. Sperbeck, Warsaw, N. Y.
I claim the combination of the elongated ears, E D, with the hameless horse collar, as described, when constructed substantially as set forth.

75,591.—Mechanical Movement.—M. F. Spore, Preble, N. Y.
I claim, I, The arrangement of the escapement pallets upon a pivoted arm or lever, and employing the same thus arranged in combination with a clock mechanism, as a means for operating a pump, churn, or other similar machine, substantially as herein described.
2d, The arrangement of the shaft which carries the pinion and spur wheels which transmit the power of the clock movement to the crank shaft, upon the frame, A, and upon a hand lever, in such a manner that said wheels can be thrown out and in gear with the clock movement, substantially as described.
3d, The arrangement of the train of gearing herein described, hand-adjusting levers, pendulum, weight, and reciprocating slide, all substantially as and for the purpose set forth.

75,592.—Washing Machine.—Edmund Stair, Harrisonville, Mo.
I claim a washing machine consisting of the tub, A, corrugated washboard, C, grooved transversely at F, pivoted end pieces, D, connecting rod, d', notched connecting bars, E, and ribs, F, all constructed, arranged, and operating as set forth.

75,593.—Harness Trace.—Robert J. Steele, Jr., Rockingham, N. C.
I claim a harness trace, A B, made of flat bars of metal, coated or covered with any suitable material, the extremities of the trace being provided with links, a f, and the parts, A B, being coupled together by means of the hook, c, and eye, d, substantially as described, for the purpose specified.

75,594.—Fire Pot for Stoves.—David L. Stiles (assignor to Augusta P. Stiles), Rochester, N. Y.
I claim the combination, with a fire pot formed of a series of staves, of passages formed in said staves, which will allow air to pass directly through the wall of the fire pot from the base, as herein set forth.
Also, in combination with a fire pot made of a series of staves, and having air passages passing directly through the walls of the fire pot from the base, a series of perforations, slots or equivalent passages, opening through the whole interior of the fire pot to admit air to burn the gases, as herein set forth.

75,595.—Cattle Stall.—Stephen D. Stone, Warwick, R. I.
I claim placing the bar, A, or its equivalent, in the position with regard to the animal in the stall, substantially as herein described and for the purpose set forth.

75,596.—Brick Machine.—John Taggart, Jr., Roxbury, Mass., assignor to himself, Isaac Ames and Alfred G. Taggart, and Alfred G. Taggart, assignor to Sarah P. Taggart.
I claim the combination of the endless former, H, constructed substantially in manner as described, the top and bottom covering plates, y K, and one or two plates or reducers, I I, arranged in manner and so as to operate with it, as explained.
Also, a clay reservoir, A, as made with the plunger and semi-crescential clay-receiving recesses or chambers, V, arranged at its ends, and provided with discharging openings leading therefrom, as explained.
Also, the combination of the two plungers, F F, and their operative mechanism, with the clay reservoir, A, and its mechanism, for stirring and mixing the clay.
Also, the combination as well as arrangement of the endless former, H, constructed substantially as described, the platform, K, one or more reducers, I, the reservoir, A, and mechanism for mixing the clay therein, and mechanism for expelling it therefrom into the molds and pressing mechanism, substantially as described.
Also, the combination of the discharging roller, U, and its operate mechanism, with the platform, K, the endless former, and the reducer or reducers, I I, applied thereto, substantially in manner and so as to operate as described.

75,597.—Horse Power.—Henry Tarpley, Wesley, Ky.
I claim the combination of the endless platform horse power, C, with the cart, A, and the reciprocating saw, H, all arranged in such a manner that the horse power may be rendered available for propelling the machine along from place to place, and also for driving the saw, as set forth.

75,598.—Steam Engine Balance Slide Valve.—Waldemar Thilmany, Cleveland, Ohio.
I claim, 1st, The arrangement of the valve, J, plate, K, lugs, c, and passages, d d', with reference to the cylinder, A, substantially as specified.
2d, The pistons, A', as constructed and arranged in relation to the plate, K, substantially as set forth.

75,599.—Method of Hanging Sieves and Screens.—Sam'l Thompson, Ballston Spa, N. Y.
I claim suspending or supporting a frame, e, or tray, or box, or other vessel, by two or more pairs of diverging rods or chains, substantially as shown and described, or their equivalent thereof, for the purpose of producing in the said frame, tray, box or other vessel the peculiar compound agitating motion, as above set forth.

75,600.—Seed Planting Machine.—Frederick W. Tilton, Moline, Ill. Antedated March 7, 1868.
I claim the adjusting screw bolt, C, having a recess or groove, c3, as represented, in combination with the section or crown, D, fixed on the outer shaft, A; and section or crown, E, having an inward connection to the interior shaft, A', all arranged substantially in the manner and for the purposes herein set forth.

75,601.—Seed Sower.—Frederick W. Tilton, Bristol Station, Ill. Antedated March 7, 1868.
I claim in a said planting machine, so arranging the sleeve, E, as to perform the double function of carrying the seeding devices, and of supporting the weight of the machine, substantially as above set forth.

75,602.—Shoe Knife Guard.—G. G. Townsend, Rochester, N. Y.
I claim the skeleton guard, G, for shoemakers' trimming knives, consisting of the lip, g, shank, s, frame, f, and encircling bar, b, in combination with the binding screw, s, substantially in the manner and for the purposes herein set forth.

75,603.—Miner's Lamp.—George W. Tremble (assignor to himself, E. Hughes and Wesley Buckel), Bloomsburg, Pa.
I claim providing the tube or spout of a mining and furnace lamp with a feed device for the wick, substantially as described.

75,604.—Glass Mold.—David Turpie, Sandwich, Mass., assignor to "Boston and Sandwich Glass Company."
I claim a glass mold constructed and arranged to operate substantially as and for the purpose described.

75,605.—Vegetable Cutting and Mashing Machine.—Carl Vignal, New York city.
I claim the combination of the removable truncated cone, D, provided with the graters or cutters, c, the revolving curved gathering shield, E, reel, F, and hinged bearings, b, said cones and shield revolving upon the shaft, B, independently of each other, all constructed and arranged to operate as herein described for the purpose specified.

75,606.—Harvester.—Lorenzo Wallace, Leavenworth, Kansas.
I claim, 1st, The spokes, a b, in combination with the bent levers, I I', adjustable hand lever, H, connecting rods, J J, vibrating rod, K, connecting rod, L, and cutter bar, M, as herein described for the purpose specified.
2d, The attaching of the bent levers, I I', to the hand lever, H, arranged substantially as shown, and provided with a spring catch, g, for the purpose of rendering the cutter bar inoperative whenever desired.

75,607.—Gate.—Wilber S. Wandell, Battle Creek, Mich.
I claim the pins, m m', upon the spring, h, in combination with the weighted gate, A, and pin, n, whereby as the pin, m', is withdrawn by the spring, h, the gate is permitted to swing into a horizontal position upon the pins, m n, for the passage beneath it of hogs or sheep, as herein shown and described.

75,608.—Extracting Tannin from Bark.—Gardner Warren, Boxbury, Mass. Antedated March 6, 1868.
I claim, 1st, The method of treating bark for the purpose of obtaining its tanning or other qualities, by the three operations of steaming, soaking and squeezing the same, substantially as described.
2d, The method of preparing several qualities of extracts from the same bark, by preserving the products of the several successive pressings separate from each other, substantially as described.

75,609.—Clearer for Ring Spinning Machine.—Joseph W. Wattles, Canton, Mass.
I claim the combination of the rotary toothed ring cleaner with a ring and traveler and the ring rail.
Also, the rotary ring cleaner, G, as composed of the toothed wheel or series of teeth, and the shank or supporting rod thereof, when the same are for use, with a ring rail and its ring and traveler, as set forth.
Also, the arrangement of a ring cleaner, substantially as described, between two next adjacent rings, so as to serve as a means of cleaning both the travelers thereof.
Also, the application of a ring cleaner to the ring rail, so as to be movable vertically up to or near to the path of the ring during a descent of the ring rail, and be depressed below or away from such path during ascent of the rail, as set forth.

Also, the application to the ring rail of a traveler cleaner or toothed wheel or series of teeth, so as to be capable of being freely revolved, as well as of being raised and depressed relatively to the ring rail, and a ring and traveler thereof, in the manner and for the purpose specified.

75,610.—RING AND TRAVELER SPINNING MACHINE.—Joseph W. Wattles, Canton, Mass.

I claim the ring receiver constructed substantially as described, that is to say, not only with a shank to fit the rail socket, and with a bore eccentric, with the cylindrical outer surface of such shank, as described, but also so as to be capable of being sprung or contracted upon the shank of the ring by the screw inserted in the rail, and employed to confine the receiver in the socket of the rail, as set forth.

75,611.—SAD-IRON HOLDER.—Joseph Davis Westgate, San Francisco, Cal.

I claim a sad-iron holder, constructed with pockets for the thumb and fingers, and with an interlining of gypsum, or other similar non-conducting substance, in combination with a shield, B, having a similar interlining or covering, substantially as described.

75,612.—WINDOW NETTING.—John R. Wharry, Moundsville, W. Va.

I claim, 1st, The slotted netting frames, C, and slip hinges, e, in combination with any window casing, A, substantially as shown and described and for the purposes set forth.

2d, The hooks, d, and blinds, B, in combination with the netting frames, C, and staples, c2, substantially as shown and described and for the purposes set forth.

75,613.—SEED PLANTER.—Sylvanus C. Wilder, Sardinia, O.

I claim, 1st, The combination of the curved bar or stem, S, lever, T, spring, C, connecting bars, U, rock shaft and arms, V v1 v1, double jointed connecting rod, W, rock shaft and arms, X x1 x2, and treadle bar, Y, with each other and with the seed boxes, O, and slotted beam, A, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the lever, Z, sliding bar, A', and slide post or rest, B', with each other and with the treadle bar, Y, substantially as herein shown and described, and for the purpose set forth.

75,614.—DRIVING LINE.—L. D. Woodmansee, Dayton, O.

I claim, 1st, The check lines, b b, extending rearward, and forming loops, d d, for the hands of the driver, in combination with the lines, a a, in the manner and for the purpose described.

2d, The lines, a and b, constructed and connected in the manner described, in combination with the bit, A, for the purpose described.

75,615.—HAMMER.— Horace H. W. Wright (assignor to himself, James Morse, Richard S. Jenness and Albert Pickernell), South Boston, Mass.

I claim a reversible screw driver, with shoulders, secured by a spring in a socket in the end of a hammer handle, constructed and arranged substantially as described.

75,616.—SEED PLANTER.—R. B. Wright, Vermillion, Ill.

I claim, 1st, The connecting of the seed slides, h h, by a rod, j, which is attached to a rod, k, parallel with j, by links, l l, and the connecting of the rod k, to a swinging or pivoted yoke, K, which is actuated by the dropper, thro' the medium of a lever, L, all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

2d, The sliding or adjustable seats, M N, in combination with the two pairs of wheels, B B C C, all arranged substantially in the manner as and for the purpose specified.

3d, The connecting of the draft pole, I, to the frame, A, by a chain, f, in addition to the usual joint, e, for the purpose of limiting the upward tilting movement of the front part of the frame, substantially as set forth.

75,617.—ROCKER FOR CHAIR.—L. B Yale, Bainbridge, N. Y.

I claim, as a new article of manufacture, a metallic rocker, A, for chairs, when made angular in its transverse section, and provided with a series of holes, c, near each end, as described for the purpose specified.

75,618.—LOW WATER DETECTOR FOR STEAM GENERATOR.—William W. Bailey, New York city.

I claim, 1st, The tension valve opener, in combination with an expansive tube, fitted and operating substantially as and for the purposes set forth.

2d, The combination of an expansive tube with the tension valve opener and alarm whistle, substantially as set forth.

75,619.—PRINTERS' GALLEY.—W. G. Blymyer, Findley, O.

I claim the slot, B, and set screw, C, applied to a printers' galley, substantially as and for the purpose set forth.

75,620.—FEEDING NAIL PLATES.—F. E. Boyd, Boston, Mass.

I claim, 1st, The movable nipper rod, F, in combination with the rack bar, I, head, K, sliding block, M, and pawl, l, substantially as and for the purpose specified.

2d, The combination of the holder or barrel, D, provided with the projection or pin, and the wheel, B B' B, substantially as and for the purpose set forth.

3d, The tilting frame, A' A', in combination with the holder or barrel, D, rack bar, I, and wheel, B B' B, as and for the purpose specified.

75,621.—CHURN.—Eugene T. Brownfield, Smithfield, Pa.

I claim, 1st, The top, B, when provided with the funnels, J J J J, and shields, P P P P, substantially for the purpose set forth.

2d, Dasher, B, constructed with oblique slats, substantially as herein described.

3d, The dasher, B, in combination with axles, m and e, slide, k, and lever, c', the whole constructed and arranged substantially as specified.

75,622.—APPARATUS FOR TEMPERING CREAM PREPARATORY TO CHURNING.—Eugene T. Brownfield, Smithfield, Pa.

I claim the within-described process for tempering or souring cream or milk, when effected by devices constructed and arranged substantially as set forth.

75,623.—SUSPENSION EGG CARRIER.—Abner H. Bryant, Wilmington, Del.

I claim a suspension egg carrier, composed of cloth pouches for holding single eggs, suspended between meshes of cords or twine, laced through the sides of the wooden trays set in a wooden holder, constructed and arranged as set forth by the drawings.

75,624.—MACHINE FOR STRAPPING AND GRINDING CARDS.—William H. Chandler, North Scituate, R. I., assignor to himself, John Wheeler and Earl D. Barden.

I claim the combination of a slot, L, in the traveler, A, with a stud, K, belt, J J, and pulleys, I I', gear wheel, H, and worm, G, substantially as and for the purpose specified.

75,625.—FIXED AMMUNITION HOLDER FOR CARTRIDGE BOX.—John Webster Cochran, New York city.

I claim the cartridge holder, constructed with the series of separately-grooved sockets, a, formed and arranged in relation with each other, substantially as and for the purposes specified.

75,626.—FIXED AMMUNITION HOLDER FOR CARTRIDGE BOX.—John Webster Cochran, New York city.

I claim the plates, A* B*, recessed as described, in combination with the frame, A, substantially as and for the purpose specified.

75,627.—BREECH-LOADING FIRE-ARM.—J. Webster Cochran, New York city.

I claim, 1st, The external shield, I, in combination with the recoil bolt, constructed and operated as described substantially as and for the purpose specified.

2d, The firing pin, J, in combination, substantially as described, with the recoil bolt, F, and the hammer or striking device, whereby, when the recoil bolt is turned preparatory to opening the breech, the firing pin shall be turned or brought out of line or contact with the said hammer or device, substantially as and for the purpose specified.

3d, The head, d*, of the firing pin, arranged in relation with the recess, e*, and the hammer, substantially as and for the purpose specified.

4th, The arrangement of the head, d*, of the firing pin with reference to the recessed portion, i*, of the hammer, substantially as and for the purpose specified.

75,628.—REAMING TOOL.—Alexander Conklin, Hartford, Ct.

I claim the combination of the devices, A B C D, constructed and operating substantially as described, when used to form an expanding tool, as herein specified.

75,629.—WASHING MACHINE.—John Cooper, Dublin, Ind.

Antedated March 6, 1868.

I claim the shaft, D, having the beaters, E, hinged to it, as described, when constructed and arranged to operate substantially as set forth.

75,630.—LIFTING HOOK, GUARD, ETC., FOR STOVES.—H. Pelham Curtis, Washington, D. C.

I claim the combination of shield, hook, and handle, marked respectively, A B and C, substantially in the manner and for the purposes herein described.

75,631.—APPARATUS FOR HEATING FLATIRONS.—Albert Hallowell, Lowell, Mass.

I claim the combination as well as the arrangement of the valve, d, and its stem, e, with the flatiron stand, A, and the gas burner, B, applied thereto, substantially as specified.

Also, the combination and arrangement of the adjustable deflector, k, with the valve, d, its stem, e, the flatiron stand, and the burner, arranged as set forth.

Also, the combination and arrangement of the conical flame guide, p, with the adjustable deflector, k, the valve, d, its stem, e, and the burner, B, or the latter and the flatiron stand, A, arranged as represented.

75,632.—HARNESS.—Alexander Harroun, Jr., South Onondaga, N. Y. Antedated March 4, 1868.

I claim the rod, a, Fig. 1, or its equivalent, when employed substantially as and for the purpose set forth.

Also, the arms, c, when connected by a common joint, or its equivalent, when employed substantially as and for the purpose set forth.

Also, the combination of the clasp, f, and the arm, g, or their equivalent, when employed substantially as and for the purpose set forth.

Also, the clasp, n, Fig. 2, and the arms, o, in combination, or their equivalent, when employed substantially as and for the purpose set forth.

75,633.—MACHINE FOR GRINDING HARVESTER KNIVES.—Josiah Y. Hoagland, Auburn, N. Y.

I claim, 1st, Affixing the machine for grinding the knives or sections of a harvester upon the frame of an ordinary grindstone, so as to bring the said knives or sections to the face of the stone to be ground, substantially as above described.

2d, The grooved platform, C, in combination with the bottom piece, D, and the standard, E F G, substantially as and for the purpose above described.

3d, The combination of the three parts, E F and G, of the standard, constructed and arranged substantially as and for the purpose described.

4th, The combination of the three parts, E F and G, with the holder, H I, so as to form a universal joint, substantially as and for the purpose above described.

5th, Attaching a spring to the bottom piece, D, so as to draw the cutter bar from the stone, substantially as described.

6th, The combination of the spring, a, the chain, b, and the lever, J, substantially as and for the purpose described.

7th, The combination of the spring, a, the chain, b, and the treadle, c, substantially as and for the purpose described.

8th, Attaching a spring to the bottom piece, D, so as to draw the cutter bar to the stone, making thereby an automatic presser, substantially as and for the purpose described.

75,634.—COMPOSITION FOR ROOFING.—John H. Wood, Danville, N. Y.

I claim a roof prepared as specified, and covered with the compound made in the manner described.

75,635.—ROTARY BLOWER.—C. W. Isbell, New York city.

I claim the revolving shaft, C, having one of the vanes, B, rigidly attached and the others loose thereon, and supported in journals in the arms, E, of the stationary shafts, F, in combination with the drum, D, and cylinder, H, all arranged and operating substantially as and for the purposes set forth.

75,636.—FENCE AND TRELLIS POST.—James Lamont, Pittsburg, Pa.

I claim, 1st, The combination, with a metallic post, a, for fences, trellis work, etc., of a recessed base or step, c, and a series of blocks, d, through which the post, a, passes, with or without the pins, f, in the manner and for the purposes substantially as hereinbefore described.

2d, The combination with a metallic post or stake, furnished with supports, d e, a trellis work consisting of cross bars, b, with ends, c, projecting upward, substantially as and for the purposes above set forth.

75,637.—GUIDE FOR HAT LINING IN SEWING MACHINES.—C. H. Lockwood, Hawleyville, Conn.

I claim the oval plate, H, provided with the oval concentric rim, I, in combination with the bar, C, provided with the rollers, D D, and the slot, a, and pin, d, or their equivalents, to serve as a guide for the plate, H, all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

75,638.—MACHINE FOR STAMPING LETTERS.—J. C. W. Maas and Carl Fischer, Hamburg, Germany.

We claim, 1st, The roller, A, and holders, b, with their springs and cams, c, substantially as described.

2d, The cylinders, A and B, stamps, c, and yielding pressure device, f g, all substantially as described.

75,639.—FRUIT JAR.—A. D. McMaster, Rochester, N. Y.

I claim the cylindrical stopper, B, having its lower end annularly recessed and abruptly shouldered, and provided with an elastic gasket, c, in combination with an unshouldered but tapering-necked jar, provided with projections, d d, arranged with reference to the inclined lugs, f f, of the stopper, substantially in the manner and for the purposes set forth.

75,640.—HARVESTER.—Elijah W. Merrill, West Buxton, Me.

I claim the vibrating arm, d, in combination with and when set upon the swinging lever, x, together with the hand lever, f, and catch pawl, y, the head, a, and rod, c, when arranged as and for the purpose specified.

75,641.—MACHINE FOR STUFFING HORSE COLLARS.—E. B. Miller, Greeneville, Tenn.

I claim, 1st, The beds, Y Y, in the platform, B, when constructed and used in the manner and for the purpose specified.

2d, The fluted cylinder, N, substantially as and for the purpose set forth.

3d, Operating the cylinder, N, by means of the arms, shaft, R, crank, R', rod, U, dog, T, and ratchet wheel, S, in connection with the plunger, P, or traction rods, v v, when the several parts are constructed and combined substantially as and for the purpose described.

4th, The combination of the clamp, D, constructed and operating as shown and described, with the treadle, D, L, and connecting rod, L', in the manner and for the purpose shown.

5th, The swinging platform, B, having the clamp, C, rack, r, and the beds, Y Y, substantially as and for the purpose described.

6th, The weighted basket, M, provided with an eye, m, and connected with the plunger, P, substantially as and for the purpose set forth.

7th, The slotted arm or lever, T, when used in combination with the clamp, t, dog, T', and ratchet wheel, S, substantially as and for the purpose described.

75,642.—GATE.—Peter L. Miller, Mechanisburg, Pa.

I claim the combination of the bell cranks, F H, rods, G G' I J, and levers, D D', with the latch, A", all arranged and operating substantially as and for the purpose specified.

75,643.—SPRING WASHER AND SAFETY NUT.—Adrian V. B. Orr, Steeleville, Pa.

I claim the notched or ratchet nut, N, with its central bearing, n, in combination with the spring washer, W, the whole being constructed and operated as described and for the purpose set forth.

75,644.—FLUID METER.—John Powers and J. B. Van Deusen, New York city.

We claim, 1st, The double-acting cylinder, open at the ends, and made with a double partition near the middle, in combination with two pistons, connected by a rod and with the ports, 6 and 7, and valve, substantially as and for the purposes set forth.

2d, The arrangement of two or more cylinders, constructed as aforesaid, to operate upon one shaft, with two crank pins, at about ninety degrees to each other, to form a fluid meter, substantially as specified.

3d, The levers, w and v, connected to the valves, and operated from the shaft, r, by mechanism, substantially as specified, to move the valves in the manner set forth, in combination with the double-acting cylinders and their pistons, substantially as specified.

4th, A D or hollow valve, applied within the water space of the meter, and above the cylinder, in combination with an exhaust water way beneath the said valve, substantially as and for the purposes set forth.

5th, The trunk, l, extending across below the cylinders, t g, and connecting the water ways, k, with the delivery pipe, e', as and for the purposes specified.

6th, The case, s, formed with a receptacle for sediment below the operative parts, in combination with a cock or plug for the discharge of said sediment, substantially as set forth.

75,645.—COUPLING FOR SECTIONAL VESSELS.—Levi B. Raymond and William Hanley, Lockport, Ill.

We claim the combination of the coupling apparatus, consisting of the arm, c, pins, d, lever, i, and rings, e, with the hull of the sectional vessel, a a, when arranged and operating as and for the purposes set forth.

75,646.—BALANCE VALVE.—E. B. Requa, Jersey City, N. J.

I claim, 1st, The adjustable pitman, g, in combination with the working lever, F, shell, A, and valves, C C', constructed and operating as and for the purpose herein shown and described.

2d, The arrangement of the slotted hand lever, H, and thumb nut, K, with relation to the working lever, F, adjustable valve stems, and valves, C C', as herein described for the purpose specified.

75,647.—CULTIVATOR.—J. H. Reynerson, Pleasant Plains, Iowa.

I claim, 1st, The horizontal bar, I, vertical bars, H, rock shaft, K, having arms, f, arm, h, lever, L, and chain, g, in combination with the plow beams, F G, all arranged and operating as described, whereby the depression of the lever, K, raises the outer beams, G, through the medium of the arms, h f, and chain, g, and the inner beams, F, through the medium of the vertical bars, H, and horizontal bar, I, as and for the purpose herein set forth.

2d, The vertical bars, H, and horizontal bar, I, in combination with the plow beams, F G, and lever, L, as herein described for the purpose specified.

3d, The horizontal bars, H, attached to the inner beams, F, when the lower ends of said bars are provided with the projecting foot rests, d, arranged and operating as described for the purpose specified.

75,648.—MARINE PROPULSION.—Andrew J. Reynolds, Sturgis, Mich.

I claim, 1st, A propelling apparatus for vessels, acting upon the water in which the vessel floats, when driven by a water wheel of any suitable construction.

2d, The combination of the wheels, C C and D D, with the pivoted buckets, D', substantially as and for the purpose set forth.

75,649.—MANUFACTURE OF RUBBER TUBES AND MACHINERY Therefor.—John Robertson, Brooklyn, N. Y.

I claim, 1st, The rams, B B, having a compressing action, in common with each other, and hung so as to be capable of being swung out of line with their cylinders, substantially as and for the purpose or purposes herein set forth.

2d, The traveling core, H, in combination with the hollow core, F, and die, G, arranged for operation transversely, or thereabouts, to the axial line or lines of the gum compressing ram or rams, essentially as shown and described, and for the purposes specified.

75,650.—BUTTON FASTENING.—Max Rosenthal, Philadelphia, Pa.

I claim a button fastening formed of wire, bent and shaped as shown and described, and having the pointed end of the spiral turned upwards, for the purposes set forth.

75,651.—TEA AND COFFEE POT.—Michael Simons, Middletown, Conn.

I claim the construction of the sliding strainer with its round and convex center, E, to prevent the grounds from choking up the spout, as herein described and set forth.

75,652.—COMBINED SHOVEL AND TONGS.—H. C. Sisco, Indianapolis, Ind.

I claim the shovel and tongs, combined in one implement, provided with the spring, D, substantially as set forth.

75,653.—GAS METER.—A. W. Smith, Birmingham, Pa.

I claim, 1st, The construction of the wet gas meter, with the reservoir, E, the passages, G G G G, the double stopcock, H, with the bores, I I', and the cap, J, all arranged for the purpose and in the manner substantially as set forth and described.

2d, The manner of constructing the condensing well, A, the passage, B, and the cap, C, all arranged for the purpose substantially as set forth and described.

3d, The filler, K, constructed with the double stopcock, L, with the bores, N N', the extension tube, O, the swivel, M, the screw tube and plug, F, and the handle, Q, all arranged and operating in the manner and for the purposes substantially as set forth and described.

75,654.—THREAD TENSION MECHANISM FOR SEWING MACHINES.—Solomon Snyder, Harrisville, Pa.

I claim the tension apparatus above described, when its several parts are constructed and combined to operate substantially in the manner and for the purposes set forth.

75,655.—WATER METER.—E. Spencer (assignor to R. Westcott), Elizabeth, N. J.

I claim constructing the box containg the operation parts of the meter so as to form the heads of the cylinders and render the box itself water-tight, substantially as and for the purposes herein specified.

Also, the arrangement of the piston rods, g g, in the free guides, h h, in combination with connecting rods, i i, substantially as and for the purpose set forth.

75,656.—MANUFACTURE OF CRUSHED SUGAR.—C. Spreckels, San Francisco, Cal.

I claim the manufacture of the crushed sugar of commerce directly from the centrifugal machine, in the manner substantially as herein described.

75,657.—HAND ENGINE.—C. T. Ulmann, New York and M. Bockman, Brooklyn, N. Y.

We claim, 1st, The combination of handles, K, projections, I, levers, H, working beam, G, socket, E, and arms, L, when arranged as and for the purpose set forth.

2d, The main lever, E, when constructed as and for the purpose set forth.

3d, The combination of arms, D and C, and the triangular crank or quarter crook, B, when arranged as and for the purpose set forth.

75,658.—APPARATUS FOR RELIEF OF INVOLUNTARY Discharge of Urine.—J. S. Van Rensselaer, Albany, N. Y.

I claim the combination of the inclined bed, A, the India-rubber or other protecting covering, H, the tube, C, with its funnel, E, and the receiver, D, substantially as described, and for the purposes set forth in these specifications.

75,659.—CALENDAR.—A. S. Vose, Randolph, Vt.

I claim, 1st, The construction of the perpetual calendar, whereby it is adapted to be attached to and operated by any clock, by means of the hour hand and forked lever, substantially as described.

2d, The levers, s and J, combined with the plate, q, to set the month hand, e, from the last day of months of different lengths to the first day of the succeeding month, and to set the month of the year at the same time, substantially as described.

75,660.—PORTABLE BOOK CLAMP.—Wm. C. Watson Paterson, N. J.

I claim the drum or windlass, B, supported in suitable bearings at each end of the strip, A, provided with a ratchet wheel, c, and pawl, d, in combination with the strip, C, and cord, D, substantially as and for the purpose specified.

75,661.—PAPER FILE.—E. W. Woodruff and G. C. Green, Washington, D. C.

We claim, 1st, The clamp lever, D, provided with the lugs, F F G G, or their equivalents, combined with the base board, A, substantially as described so that no portion of said clamping device shall project below the lower surface of said base board when the apparatus is in operative condition.

2d, The clamp lever, D, or its equivalent, and the file board, E, combined and arranged so that the pressure derived from the elasticity of the paper shall always be applied to the upper end of said lever, substantially as set forth and to the effect described.

3d, Making the file board, E, or its equivlaent, separate from and independent of the clamping device for the purpose set forth.

4th, The side pieces, B B, in combination with the end and base boards and the clamping device of a paper file, substantially as set forth.

75,662.—DIE FOR MAKING HAMMERS.—Henry W. Bailey, (assignor to himself and wm. C. Bailey), Springfield, Mass.

I claim the combination of the punch, A, and die, B, herein described, when constructed and operating substantially as and for the purpose set forth.

75,663.—MACHINE FOR RIVETING HINGES.—H. D. Blake, (assignor to P. and F. Corbin), New Britain, Conn.

I claim a riveting tool, composed of a rod of metal, having V-shaped grooves crossing and radiating from its longitudinal axis across a face or end surface which is otherwise perpendicular to the axis of said rod, substantially as described.

Also, the riveting tool, set forth in the foregoing claim, in combination with mechanism for operating the same, arranged substantially as described.

75,664.—WINDOW FOR STOVE.—C. H. Buck, St. Louis, Mo.

I claim the combination of springs with glass plates which are applied to stove doors, substantially as described.

75,665.—COOKING STOVE.—G. Chilson, Boston, Mass.

I claim the arrangement of the water heater, the oven, and the jambs of the fireplace, the said jambs, under such arrangement, being between the oven and the heater, and the latter being at the jamb of the fireplace, as set forth.

Also, the combination and arrangement of the insulating air chamber and its door-opening, and the door or doors thereof, with the water heater, arranged in front of the fireplace in manner as explained.

75,666.—POWER ATTACHMENT TO SEWING MACHINES.—A. C. Crary, Utica, N. Y.

I claim the herein described mode of winding up the spring by the pressure of the operator on the seat.

75,667.—APPARATUS FOR OPERATING SEWING MACHINES.—A. C. Crary, Utica, N. Y.

I claim, 1st, The combination and arrangement of a series of springs and their connection for the purpose of propelling or operating sewing machines substantially as described.

2d, The application of motive power or force to the periphery or peripheries of concentric or coiled springs, or alternately to the peripheries of a series of springs, substantially as herein described, for the purpose of propelling or operating sewing machines, substantially as described.

3d, The mode or manner, substantially as herein described, of coiling or winding up concentric or coiled springs for the uses and purposes herein stated, by means of the treadle, or its equivalent, viz: the operator's rotating seat, the screw, the crank, and the lever.

4th, The mode, substantially as herein described, of constructing the operator's rotating seat and of its attachment, for the uses and purposes aforesaid.

75,668.—BRICK MACHINE.—R. Cutler, St. Louis, and G. C. Swallow, Columbia, Mo.

We claim the pug mill, B, when its bottom wings, b, are formed concavely on the bottom, and combined with a disk, C, and intermediate convex plate, as described and shown.

75,669.—CULTIVATOR TEETH.—J. D. De Turk, Exeter, Pa.

I claim the cap represented in figs. 1, 2, 3, and 4, intended to be fastened to the cultivator beam, into which the tooth is to be inserted, and fastened by the iron hinge bolt, a, figs. 1, 2, and 3, and the wooden pin or key at letter c, figs. 2 and 3, by the use of which the breaking of the tooth can be avoided.

75,670.—GLOBE VALVE.—F. Douglass, Norwich, Conn.

I claim, 1st, The arrangement of the flexible ring, C, to form a valve, when compressed between ring, A, and ring or valve, E, in such a manner as to expand ring, C, in diameter, to form a tight joint, substantially as specified.

2d, The arrangement of the metallic ring, A, with channels, i i, for the purpose herein specified.

75,671.—APPARATUS FOR LOWERING SHIPS' MASTS.—Geo. Dowling, Fair Haven, Conn.

I claim, 1st, The arrangement of the mast, A, upon the trunnions, a, and step, B, combined with a segmental track, C, and pawl, P, and toothed segment, d, so as to operate in the manner and for the purpose herein set forth.

2d, In combination with the above, the latch, f, arranged so as to lock the mast in an upright position, in the manner described.

75,672.—MUCILAGE BOTTLE.—Henry H. Ebaugh, Hereford, Md.

I claim a mucilage can or holder, with a fountain tube, B, in combination with a stoppered brush, constructed and operating substantially as and for the purposes herein specified.

75,673.—BROILER.—A. J. Gibson, Cincinnati, Ohio.

I claim the combination, in a broiling vessel, of non-perforated cones and corrugations, substantially as described.

75,674.—GRAIN PLATFORM FOR HARVESTERS.—A. E. Gleason, Newton, Mich.

I claim a reaping or mowing machine platform having perforations or interstices, in connection and combination with box compartments, F, provided with openings and doors, G and D, the whole constructed, attached, and supported substantially as and for the purpose herein specified.

75,675.—MACHINE FOR HEATING BOLTS.—A. B. Glover, Birmingham, Conn.

I claim, 1st, The combination of the cam, R, slide, O, and die, f, with the cam, T, auxiliary slide, U, screw-threaded follower, b, nuts, n n, all constructed and arranged as described.

2d, The supporting finger, b, in combination with the holding dies, F and E, when constructed and arranged so as to be presented and retire at the proper time, as and for the purpose set forth.

75,676.—MECHANICAL MOVEMENT.—Wm. F. Goodwin, East New York, N. Y.

I claim, 1st, The arrangement of two or more shafts in line with each other, one having a pivoted bearing in and operated by the other, substantially as described.

2d, The arrangement of the line shafts within the concentric internally cogged drum or case, substantially as described.

3d, The internally cogged drum, subdivided into separate compartments or provided with the bearing partitions for the line shafts, as described.

4th, The line shafts provided with spur wheels, or their equivalent, in combination with the internally cogged drum, substantially as described.

75,677.—HARVESTER.—William F. Goodwin, East New York, and A. M. Smith, Washington, D. C., assignors to William F. Goodwin.

We claim, 1st, The concentric arrangement of the multiplying gear relative to the crank shaft, or an extension of the axial line thereof, substantially as described.

2d, The location of the multiplying gear at the drooping end of the vibrating cutter frame and in line with the hinge connection of the cutting apparatus with said frame.

3d, The arrangement of the crank shaft upon the vibrating cutter frame in line with the shaft from which it receives its motion.

4th, The inclosing gear box or case having one or more central bearing partitions, D, for the purpose and substantially as described.

5th, The gear box or case provided with the two pivoted bearings at right angles to each other, substantially as described.

6th, The internally cogged drum or gear case arranged relative to and vibrating with the cutter frame, substantially as described.

7th, The cutter frame provided with the yoke to receive the gear box, or its equivalent, and with the case inclosing the bevel gears, substantially as described.

8th, The arrangement of the crank shaft and connecting rod, in the described relation to the two pivots, at right angles to each other, upon which the finger bar turns in accommodating itself to the surface of the ground over which it is drawn.

9th, The cap or case inclosing the outer end of the pitman, as described.

10th, The removable hooked tongue plate, adapted to be secured to or removed from the axle or sleeve, substantially as described.

75,678.—SAW MILL.—H. H. Gridley, Auburn, N. Y.

I claim, 1st, The combination of the lever, f, shaft, E, and its connecting links with the pivoted arm, B, carrying in a slot the adjustable box, with the friction shaft, d, and the adjustable stud of the tightening pulley, b, all constructed and operating substantially as described.

2d, The combination of the slide bar, r, with its springs, s, and the dogs, t, with the slide rack, l, substantially as and for the purpose described.

3d, The combination of the segment pinion, k, upon the end of the lever or arm of the automatic setting apparatus with the auxiliary rack under the sliding rack, l, substantially as and for the purposes described.

75,679.—MOP WRINGER.—James H. Gridley, Washington, D. C., assignor to S. F. Dickinson, New York city.

I claim, 1st, The combination of the pivoted boards or frames, C C1, with the connecting rod, D, in the manner and for the purposes set forth.

2d, In combination with the boards, C C1, rod, D, and spring, E, the rollers R R, substantially as and for the purpose specified.

3d, The above-described method of attaching the mop wringer to the tub, when in use, to prevent its slipping upon the tub, substantially as set forth.

75,680.—WASHING MACHINE.—F. W. Heins, New York city.

I claim as an improvement in washing machines, the body, A, whose bottom and ends are formed of a single sheet of metal, bent or stamped into continuous corrugations throughout its entire length, with the strengthen

ing board, c, and bars, d, which sustain the gudgeons, a, on which the body oscillates, substantially as and for the purpose described.

75,681.—MACHINE FOR SETTING AND DISTRIBUTING TYPE.—Wm. H. Houston, New York city.

I claim, 1st, The combination of the lifting plate, operated substantially as herein described, for lifting the types to be distributed, line by line, the galley on which the types to be distributed are placed, and on which they are advanced towards the lifting plate, the mechanism, or the equivalent thereof, by which the depressing mechanism is connected with the driving power so soon as a line of types has been delivered to the distributing mechanism, and disconnected so soon as another line is to be lifted, substantially as described.

2d, The projecting lip on the face of the lifting plate to draw down the leads, substantially as set forth, in combination with the sliding plate under the galley, substantially as described, to prevent the leads from dropping out before they are required to be delivered, as set forth.

3d, In combination with the projecting lip on the face of the lifting plate, the employment of a separate plate, which may be applied to or removed from the face of the lifting plate, and under the projecting lip, that the machine may be used for distributing either leaded or solid matter, substantially as described.

4th, The means herein described for separating the types of various thickness one by one from the line, and delivering them to be distributed, consisting of the combination of the channel way in which the line of types is moved, the check against which the foremost type of the line is moved, and which is caused to recede by intermittent motions, each of not greater range than the thickness of the thinnest type, and the reciprocating hammer, or its equivalent, which strikes a series of light blows against the foremost type, to feel when it can pass by the end of the channel-way, and finally moves far enough to deliver the type to the distributer, the said instruments being operated by the mechanisms described, or equivalents therefor, as set forth.

5th, The combs having a lateral reciprocating motion, substantially as described, in combination with the series of racks for the reception of the appropriate types, and the spring or self-adapting plungers and followers, which hold the types at each operation, whilst the combs are moved laterally, by means of which the types are shifted at each operation, and each type in turn presented to the several racks until it finds the one into which it can pass; the parts so claimed in combination being operated by the mechanical means herein described, or the equivalents thereof.

6th, The reciprocating comb plates, in combination with the clutch on the shaft from which the said motions are derived, the said combination being effected by the intermediate mechanism described, or the equivalent thereof, whereby the shaft is unclutched from the driving pulley and stopped, if by reason of any impediment the combs fail to complete their motion in either direction.

7th, In combination with the series of racks for receiving the types as distributed, and with apertures at their rear ends for their discharge into the case, the employment of a vibrating or reciprocating hammer to strike the types in case they should have a tendency to stick in the racks, substantially as described.

8th, The reciprocating plate, back of the apertures, in the racks through which the distributed types are delivered in the several compartments or channel-ways of the case, and which descends in front of the types after they have been pushed back to make room for the next types to be delivered, substantially as described, in combination with the clutch on the shaft from which the motions of the said plate are derived, whereby the said shaft will be unclutched from its driving pulley and stopped in case the said plate meets with any impediment, the said combination being effected by the mechanism hereinabove described, or any equivalent therefor.

9th, In the composing part of the machine herein described, the means, substantially as herein described, by which the keys when depressed merely indicate the type which is to be lifted from the case, in combination with the mechanism by which the types are lifted, substantially as described.

10th, The lifters for lifting the types from the case, substantially as described, in combination with the clutch on the shaft from which the lifters derive their motions, substantially as described, whereby the said shaft is unclutched from its driving pulley and stopped whenever any one of the lifters is stopped, so that it cannot complete its upward motion, the said combination being effected by the mechanism herein described, or by equivalent means.

11th, Giving a lifting motion to the plate which holds down the types in the case that are back of the foremost type in each channel-way, that they may not be drawn up by the type which is being lifted, substantially as described, the said motion being given to the said plate at the time of and to free the types when they are being advanced, as set forth.

12th, So constructing and arranging the self-adapting pressure plate, which constitutes one side of the passage in which the types are received from the case, and in which they are made to slide by the shuttles, that it shall vibrate on its longitudinal axis, substantially as and for the purpose described.

13th, The combination of the two reciprocating shuttles with the one channel-way or passage in which the types travel, substantially as described, the said shuttles being alternately lifted in their return motion, that the one which is returning may pass over or by the one which is advancing, as described.

14th, The means, substantially as herein described, by which the shaft which drives the composing mechanism is unclutched from its driving pulley, and stopped so soon as a line is completed, that the lines may not be overrun, as set forth.

15th, In combination with the shaft which drives the mechanism for transferring each line of type to the galley, the starting key and clutch, substantially as described, so that the operation of transferring each line is performed automatically, the operator being required simply to operate the said key.

75,682.—THILL STRAP.—Edward Howell (assignor to himself and P. C. Ford), Ashtabula, Ohio.

I claim the loop, C, connected with the spring, E, in combination with the pin, c, strap, A, and loops, a a, substantially as and for the purpose set forth.

75,683.—TIE STRAP.—Thomas S. Judson (assignor to himself and Henry A. Allen), Matteawan, N. Y.

I claim the combination with a hitching or halter strap, made of any ordinary or suitable material, of an elastic band or spring, applied to said strap, substantially in the manner and for the purposes herein shown and set forth.

75,684.—MACHINE FOR STRETCHING HAT BODY.—Peter Keefer (assignor to himself, William Levan, and Isaac W. Levan), Reading, Pa.

I claim the pivoted arms, l, to which a vertical reciprocating motion can be imparted, and which can be moved outwards by the action of the conical block, F, or its equivalent, in combination with the stationary pendent arms q, the said movable and stationary arms being arranged for joint action on a hat body, as and for the purpose herein set forth.

75,685.—COMBINED SWEAT BAND FASTENER AND SIZE MARK FOR HATS.—Thomas A. Lawrence, and John H. Murfey, New York city.

We claim, as an improved article of manufacture, a hat band fastener, A, provided with pointed projections, a a, and having the size of the hat stamped upon it, as described.

75,686.—HAY ELEVATOR.—Wm. Louden, Fairfield, Iowa.

I claim, 1st, The frame, B, provided with the slide, n, and pulley, g, in combination with the bar or track, A, and hoisting tackle, B, all arranged to operate substantially as set forth.

2d, The manner of supporting and sustaining the poles, H K, by means of a cord or rope, o, so that the poles composing the supporting frame, C, can be shifted without disarranging the position of the pulley, M, substantially as set forth.

3d, Passing the rope, J, which sustains the end of the bar, A, through the sheave, I, and securing it to one of the poles, as at T, substantially in the manner as and for the purpose set forth.

4th, The manner of adjusting two or more triangular pyramidal frames upon another frame, for transportation, wherein the base of one frame will extend into the space occupied by the frame adjacent, thus securing economy of space and rendering the apparatus compact, substantially as shown and set forth.

5th, The arrangement of the triple bolt, (fig. 4,) constructed substantially in the manner as and for the purpose set forth.

6th, The stop, S, constructed in the manner substantially as shown and described.

7th, The plate, P, when used in combination with a stop whose upper end has its corners rounded off, and has the rope passing through its center, all arranged substantially as shown and described.

8th, The arrangement of the trip-rod, m, with the latch, t, whereby when the former is pressed up, the latter will serve as its support, substantially as set forth.

75,687.—CENTRIFUGAL MACHINE FOR DRAINING SUGAR.—Alexander Mackey, New York city.

I claim, 1st, The guides, F F, and the wedge shaped pieces, T T, substantially as described.

2d, The perpendicular edge on lower or larger end of cone, substantially as described, for the purpose specified.

75,688.—CARRIAGE PERCH CONNECTION.—D A. Mathews, Geneva, N. Y., assignor to D. W. Baird.

I claim the T-piece, A, provided with screws and nuts, as described, and a fork or socket for the wooden perch, C; and, in combination with the T-piece above claimed, the brace, B, provided with an arm, K, and screw and nut, substantially as described, and for the purposes set forth.

Also, combining with the brace, B, the arms, I I, and ears or lugs, G G, substantially as shown and described, and for the purposes set forth; and, in combination with the T-piece, A, and brace, B, the brace, E, perforated for the bolt and screws, as described.

75,689.—CASE FOR HOLDING SYRINGE.—Morris Mattson, New York city.

I claim, as a new article of manufacture, a syringe-case, constructed substantially as described, with a removable tray, and having such tray recessed or cut away at or near one end, to allow the bulb of the syringe to pass up through the tray, and fitted at the other end with suitable rests or grooves to hold and keep separate from each other the several injecting tubes required.

75,690.—MANUFACTURE OF ARTIFICIAL LEATHER.—Harrison B. Meech, Fort Edward, N. Y.

I claim, 1st, as a new article of manufacture, leather made from fibrous substances as described.

2d, The application of gutta-percha, valatta, or balata, and other adhesive gums, and saccharine matter with pulp, for the manufacture of artificial leather, substantially as described.

3d, The method of applying the solutions of glue and other adhesive substances and saccharine matter to the sheets of pulp, as and for the purposes specified.

4th, The method of working, pressing, drying, and vulcanizing the leather, substantially as described.

5th, The use of oils, applied substantially as and for the purposes specified.

6th, The method of drying the leather, in combination with the oiling process, substantially as described.

7th, The use of sand or pulverized emery, in combination with the sheets of pulp, substantially as and for the purposes specified.

8th, The use of corrugated or grooved rolls, for the purpose of working the leather and rendering it soft and flexible, substantially as described.

9th, Forming the fibers of the pulp in the sheets into spirals, by the use of wire cloth, substantially as and for the purpose specified.

75,691.—BLEACHING PAPER STOCK.—S. T. Merrill, Beloit, Wis.

I claim the manipulation of paper stock (particularly wood and straw), in the bleaching fluids, without the use use of draining vats.

Also, the dessication of "stuff" and "half stuff," with rubber rolls, substantially as set forth.

75,692.—UMBRELLA.—Charles M. Minor, Bridgeport, and Henry S. Frost, Watertown, assignors to themselves, Augustus N. Woolson, and Anthony G. Davis, Watertown, Conn.

We claim, 1st, The construction of the loop upon the end of one of the parts of the rib, so as to receive and lock or brace the other part therein, substantially as set forth.

2d, The folding joint, consisting of the three parts, a b, and c, by means of the block i, two of the parts being jointed or pivoted, substantially as set forth.

75,693.—VAGINAL SYRINGE.—James A. Morrell, Chicago, Ill., assignor to himself and Isaac Simmons, Baltimore, Md.

I claim, 1st, A syringe, provided with an expansible air sack, susceptible of being introduced within the vagina, so as to expand against the interior walls of the passage, substantially in the manner and for the purposes specified.

2d, The combination of the reservoir, A, tube, B, and expansible sack, D, arranged so that the injected fluid may be withdrawn into the reservoir, substantially as specified and described.

3d, The combination of the tube, B, the sack, D, or its equivalent, the reservoir, A, and compressers, C, arranged to operate substantially in the manner set forth.

75,694.—UTERINE SUPPORTER.—James A. Morrell, Chicago, Ill., assignor to himself and Isaac Simmons, Baltimore, Md.

I claim, 1st, The combination of a pessary, A, tube, B, spring, C, tube, D, and rod, E, arranged and operating substantially as and for the purposes specified.

2d, Connecting the stem of a uterine supporter to the stem supporter, by a hinge or joint, so as to operate substantially as described.

3d, The combination of a pessary, A, and its stem, constructed substantially as described, with the jointed arm, F, and the elastic strap, H, arranged and operating in the manner and for the purposes specified.

75,695.—ABDOMINAL SUPPORTER.—James A. Morrell, Chicago, Ill., assignor to himself and Isaac Simmons, Baltimore, Md.

I claim, 1st, An abdominal supporter, having its front edges constructed in the curved form shown and described, for the purposes set forth.

2d, Providing an abdominal supporter with the front lower lacings, b b, or their equivalent, as and for the purposes described.

3d, An abdominal supporter, provided with the curved front edges, when constructed with the upper and lower front lacings, and the rear lacing, substantially as and for the purposes specified.

75,696.—RUDDER.—Thomas W. Murray, New York city.

I claim the shaft, A, formed with a crank upon its lower end, when used in combination with the rudder blade, C, to which it is connected at its outer edge by means of a pin or pivot, substantially as and for the purpose herein set forth.

75,697.—LAMP BURNER.—R. W. Park (assignor to C. W. Park), Philadelphia, Pa.

I claim, 1st, In combination with the dome of a coal oil lamp, two air tubes, channels, or orifices, arranged, in respect to the elongated slot of the dome, substantially as set forth.

2d, The combination of the perforated casing, A, plate, E, dome, D, and air tubes, a a, the whole being arranged substantially as described.

75,698.—THILL COUPLING.—George Pennoyer, N. Y. city.

I claim, 1st, The double solid cone, in combination with the clip, fig. 1.

2d, The solid conic caps, A A, in combination with the solid cones

3d, The screw bolt, in the position and for the purposes described.

4th, The capped joint in constructing a carriage coupling, as and for the purposes described.

75,699.—BRACE FOR BIT.—F. P. Pfleghar, New Haven, Conn.

I claim the arrangement of the saddle, C, upon the socket, A, and combined with the nut, B, so that the saddle, C, may be turned from the bit, and the whole constructed so as to operate in the manner herein set forth.

75,700.—PRODUCTION OF PLATES FOR PRINTING.—James Ramage and Thomas Nelson, Edinburgh, Scotland. Patented in England March 26, 1866.

We claim the combined process herein described, for the production of blocks and plates for printing, such combined process consisting in acting on a film of gelatine rendered sensitive by a chromatic salt, with light passed through a positive or negative of the design required, then wetting the gelatine surface, so as to cause it to swell in parts, then coating the swollen surface with an impervious skin, afterward taking a cast from the surface so obtained; and, lastly, stereotyping or electrotyping the mold so obtained, substantially as herein described.

75,701.—METHOD OF SUPPLYING CATTLE WITH FOOD AND WATER ON RAILWAY CARS.—William Reid, Granton, North Britain.

I claim a stationary or detachable tank or trough, arranged upon a railway car so as to both extend into and project beyond the outer side of the same, substantially as and for the purpose described.

75,702.—SHOE LACE.—Lewis Rice, Stockbridge, Mich.

I claim, as an article of manufacture, the shoe-lacing device as described, and for the purposes set forth.

75,703.—TWEER.—John W. Rogers, Decatur, Ill.

I claim, 1st, The upper portion, A, of the tweer, constructed as described, and having the blast openings arranged therein substantially as set forth.

2d, The pot-shaped under portion of the tweer, having the weighted valves, j, arranged upon it, as and for the purpose herein described and represented.

75,704.—BELT FASTENING.—Eugene Schmeltz, New York city, assignor to himself and Paul E. Fleury.

I claim the improved mode of lacing together belts or bands, etc., substantially as herein described, the same consisting in passing a lacing, cord or cords, or other lines, from one to the other of the contact faces to the belt or band, etc., where overlapped, or partially through the thickness of the same, substantially as specified.

75,705.—COTTON BALE TIE.—J. L. Sheppard, Charleston, S.C.

I claim the cotton bale tie above described, consisting of the ring, a a a' a', having the sides, a a, straight and parallel, and the sides, a' a', curved, the central opening being of such a form as to enable the hoop to be inserted over the ends, a' a', and turned so as to rest upon the sides, a a, when such ring is used in connection with an arm, B, between which and the nearest side, a, is an open recess, c, all the said parts being constructed and arranged substantially in the manner and for the purpose specified.

75,706.—CONSTRUCTION OF SHEET METAL TEA AND COFFEE POTS.—John H. Stone, Philadelphia, Pa.

I claim a sheet metal tea or coffee pot, having the lower end, C D, of its body, and the upper side of its base, A B, formed up, and connected together at their smaller ends, so as to produce the said bottom and base, with the recessed portion, E F, between them, as and for the purpose described.

Also in combination with the subject matter of the preceding claim, the strainer, G H I, constructed and applied substantially as described and set forth.

75,707.—CLOTHES WRINGER.—Wm. M. Storm, New York, city. Antedated March 10, 1868.

I claim constituting the roll or rolls of a series of inelastic annular disks, having an elastic bushing of india-rubber, or its equivalent, the whole mounted on a shaft or shafts and operating substantially in the manner and for the purpose described.

75,708.—WELL DRILL.—Henry M. Stow, San Francisco, Cal.

I claim in combination with a drill stock in two parts, as described, movable cutters, operated by wedge shaped tenons, to enlarge the hole formed by the drill, substantially as shown and described.

75,709.—MACHINE FOR GRINDING KNIVES OF HARVESTERS.—John A. Thompson (assignor to himself and L. W. Nye), Auburn, N. Y.

I claim, 1st, In combination with the movable base, F, pedestal, G, and tilting supporting bar, I, the elastic clamps, H H, with thumb screw and bolt, T, forming movable joints, for the purposes set forth.

2d, The connection of the supporting bar, I, by the toggle elbow joints, J J J, and bar, K.

3d, The hood guard, M, and the rotary guard, N, as and for the purposes specified.

4th, The thimble, O, and angular frame, E, all combined and operating in manner substantially as set forth and for the purposes specified.

75,710.—PROTECTOR FOR THE BODY.—Joseph W. Torrey (assignor to himself and John S. Johnston), Milford, Mass.

I claim the new article of manufacture described, to wit, a breast and back protector, consisting of a cloth bag or case lined or filled with paper, substantially as described.

75,711.—CARRIAGE THILL.—Jas. P. Tyson, Philadelphia, Pa.

I claim a tapering strip, C, of gum-elastic or its equivalent, secured at one end to the bar, B, and extending between the end of the latter and the coupling block, substantially as and for the purpose described.

75,712.—FAGOT FOR BEAMS.—George Walters and Thomas Shaffer, Phœnixville, Pa.

We claim a pile or fagot, for wrought iron beams or girders, consisting of a solid bar or bars, A, having a rib, a, gripped by and between bars, b and b', secured by transverse rivets to intervening bars, which are together less in thickness than the said rib, a, all as set forth, for the purpose specified.

75,713.—TIRE SETTING MACHINE.—Robert B. Wheatley, Grandview, Ind.

I claim the device of the screw bolt, u, passing through at rotating in the eyebolt, y, which, being firmly fastened to the crab, allows the wheel to be revolved in the water, with the crab for a support, during the process of cooling the tire, and so as to govern completely the dish of the wheel more readily than if the work were performed with the wheel and crab in the usual horizontal position, or if the wheel were left without any support whatever.

75,714.—PISTON.—Jerome Wheelock, Worcester, Mass.

I claim the ring A, when the same is provided with a wedge shaped cavity, and corresponding piece fitted into the same, in combination with the strap, C, and screws, d e, substantially as shown and described.

75,715.—COAL STOVE.—Charles Williams, Manchester, N. H.

I claim the combination of the flue plate, I, the flue, c, the case, A, the stand pipe, B, and the air and smoke box, C, with the rebated posts, E, the cap, D, the series of soapstone panels, F G H, and the lap plates, M, the whole constituting a stove, substantially as set forth.

75,716.—DENTAL FORCEPS.—Samuel Wolverton, Trenton, N. J., assignor to himself, George L. Taylor, and Lewis Parker, Jr.

I claim dental molar forceps, when provided with horn and crescent beak combined, substantially as described and for the purpose set forth.

75,717.—SPRINKLER.—W. R. Worden, New Haven, Conn.

I claim the arrangement of the plate, B, with its arms, b, upon the plate, A, with its perforations corresponding to the said arms, and combined with one or more operating rods, D, and return spring, a, the whole to operate in the manner substantially as set forth.

REISSUES.

2,897.—WASHING MACHINE.—Wm. M. Doty, New York city. Patented July 12, 1864.

I claim, 1st, The combination of the oscillating wash board and swinging brackets with a removable hand lever or levers, operating in the manner substantially as herein shown and described.

2d, The formation, in swinging brackets, to which the corrugated wash board is attached, of sockets, or the mechanical equivalents thereof, for the ready insertion and removal of the operating lever, substantially as and for the purposes herein shown and described.

3d, The combination with an oscillatory washboard and stationary washtub, of the means herein shown and described, or the mechanical equivalent thereof for rendering the said washboard stationary within the tub, at the pleasure of the operator.

2,898.—GLOBE VALVE.—Joseph J. French and Reuben A. McCauley, Baltimore, Md., assignees of Joseph J. French. Patented July 2, 1867.

We claim in a globe valve composed of the body, A, solid support, H, carrying at its apex the hollow screw, B, and lever, A', with plug to stuffing box, F, the parts all made and arranged substantially as shown and described.

2,899.—MACHINE FOR MITERING PRINTERS' RULE.—R. Hoe & Co. (assignees of Wm. McDonald), New York city. Patented July 3, 1855.

We claim the combination with a movable cutter, of a sector guide plate, a rule holding bed, and adjusting mechanism, constructed and operating substantially as described and for the purposes specified.

2,900.—CROSS HEAD FOR BLOWERS.—P. H. Roots and F. M. Roots, Connersville, Ind. Patented July 24, 1866.

We claim a piston constructed of cross heads, A, fastened to a shaft, B, in combination with wooden lags or pieces, C, which compose the covering of the piston, and are secured to the cross heads substantially as and for the purpose set forth.

DESIGNS.

2,951.—LAMP SHADE.—Charles Binzer, New York city.

2,952.—EXTERIOR OF THE BODY OF A SLEIGH.—Charles P. Kimball, Portland, Me.

2,953.—COOK STOVE.—John Martino, Jacob Beesley, and John Currie, Philadelphia, Pa., assignors to Orr, Painter & Co., Reading, Pa.

2,954.—HANDLE OF A FORK OR SPOON.—John Polhamus, New York city.

2,955, 2,956, and 2,957.—FLOOR OILCLOTH PATTERN.—Joseph Robley, Brooklyn, N. Y.

2,958.—PLATES OF A HOP STOVE.—Nicholas S. Vedder, Troy, N. Y., assignor to George Williamson & Co., Milwaukee, Wis.

2,959.—CLOCK CASE SASH.—E. N. Welch, Forestville, Conn.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., 37 *Park Row, N. Y.*

[ISSUED FOR WEEK ENDING TUESDAY, MARCH 10, 1868.]

11,505.—DOCUMENT FILE OR HOLDER.—Henry E. Woodbury, Washington, D. C. Dated August 8, 1854. Application for reissue received and filed March 3, 1868.

I claim the box or compartment document file, provided with a yielding platen constructed and operating substantially as herein described.

72,086.—FENCE POST.—Robert Ramsey, New Wilmington, Pa. Dated December 10, 1867. Application for reissue received and filed March 5, 1868.

I claim, 1st, The compensating features of the posts, whether effected by the formation of the gains or by keys, substantially as and for the purpose set forth.

2d, The combination of posts, P P' P'', when provided with square or dovetail gains, with sills, A A', and keys, c c c c, substantially as and for the purpose specified.

45,647.—PUMP.—William Shoupe, Saltsburg, Pa. Dated December 27, 1864. Antedated April 26, 1862. Application for reissue received and filed March 5, 1868.

I claim, 1st, The tube C, in artesian or deep wells, in combination with the seed bag, placed around and outside of it, so arranged, substantially as hereinbefore described, as to leave a free passage for and around the pump tube, while the space around the outer tube is closed by the seed bag, for the purpose hereinbefore set forth.

2d, The combination, with a pump tube, A, of the outer tube, C, with or without a valve or gate, D, and a seed bag, placed around and outside of the outer tube, substantially as hereinbefore described, for the purpose set forth.

3d, The gate, or valve, D, in the outer tube, C, for the purpose of admitting water into the pipe, C, from outside of the tube, above the seed bag, substantially as described.

71,893.—COMPOSITION OF MATTER FOR THE MANUFACTURE OF WATERPROOF PAPER AND OTHER ARTICLES.—R. O. Lowrey, Salem, N. Y. Dated December 10, 1867. Application for reissue received and March 2, 1868.

I claim, 1st, The use of salt, in combination with any of the salts of alumina, or similar astringent material for rendering a gelatinous compound or mixture, insoluble in water, substantially as described

2d, The use of salt, in combination with the salts of alumina, or similar astringent material for rendering soapy compounds or mixtures insoluble in water, substantially as and for the purposes set forth.

3d, The use of alum or any of the salts of alumina, for rendering a soapy compound insoluble in water, when said soapy compound has been previously incorporated with paper pulp or fiber, substantially as described.

4th, The use of glycerin, in combination with a gelatinous or soapy compound, when applied to fibrous materials, substantially as set forth.

5th, The new compound or composition of matter, produced by the treatment of fibrous material, substantially as herein described.

6th, The process herein described, of treating fibrous material for producing a new compound, substantially as described.

14,257.—REFINING IRON.—Christian Shunk, Philadelphia, Pa. Dated February 12, 1856. Reissue No. 1,686. Dated May 31, 1864. Reissue No. 2,118. Dated November 28, 1865. Application for reissue received and filed March 10, 1868.

I claim, 1st, The refining and converting molten crude iron from the ores or the remelted pig metal, by the employment and the application of air blast under pressure forced into a mass of molten iron, so that the oxygen of the air uniting with the carbon of the crude metal, and thereby decarbonizing and partially decarbonizing (owing to the time the blast is continued) and refining the same, prepared to mold into ingots or otherwise of iron and steel, suited for the hammer or the rolls; also into any form, and condition for the purpose of employing the said refined iron and steel (by air blast) in the "crucible process" to make cast steel.

2d, And the employment of manganese and common salt, in the manufacture of refined iron and steel, by the process of compressed air blast forced into molten crude iron, for the purpose of refining and decarbonizing the same, to mold into ingots or otherwise; or either of said ingredients employed separately in said process for the manufacture of iron or steel.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents,* 37 *Park Row, N. Y.*

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

217.—ROTARY, STEAM, AND OTHER ENGINES.—John M. Boorman, Scarborough, N. Y. Jan. 21, 1868.

296.—PAVEMENT.—Clarendon Williams and Thomas Stephens, New York city. Jan. 28, 1868.

319.—FURNACES OR OVENS FOR ROASTING ORES.—Riley P. Wilson, New York city. Jan. 29, 1868.

329.—WINDOW SUN BLINDS.—Jacob B. Moore, New York city. Jan. 30, 1868.

337.—STEAM ENGINE.—Edward N. Dickerson, New York city. Jan. 31, 1868.

357.—STEAM AND WATER VALVES, COCKS, AND FAUCETS.—Henry G. Morris, Philadelphia, Pa. Feb. 3, 1868.

377.—LEGGINGS OR GAITERS, ETC.—Wm. G. Rule, New York city. Feb. 5, 1868.

394.—MOWING AND REAPING MACHINES.—John D. Wilber, Mark D. Wilber, and Francis K. Stevens, Poughkeepsie, N. Y. Feb. 5, 1868.

353.—APPARATUS FOR MANUFACTURING, STORING, AND TRANSFERRING AERATED WATERS, ETC.—Gustavus D. Dows, Boston, Mass. Feb. 1, 1868.

371.—TREATMENT OF COMPRESSED OR EMBOSSED WOOD.—Samuel B. Henry, Bridgeport, Conn. Feb. 4, 1868.

446.—MACHINE FOR SCOURING AND CLEANING GRAIN.—Gardner E. Throop, Syracuse, N. Y. Feb. 10, 1868.

467.—APPARATUS FOR SAVING LIFE IN CASES OF SHIPWRECK.—John B Stoner, Leopold Mendelson, and Theodore Crommelin, New York city Feb. 11, 1868.

477.—REVOLVING STANDS FOR CULINARY PURPOSES.—Charles H. Hudson, New York city. Feb. 12, 1867.

478.—CARTRIDGE BOXES OR HOLDERS.—John W. Cochran, New York city. Feb. 12, 1868.

426.—MODE OF AND APPARATUS FOR EXTRACTING AND CONDENSING THE VOLATILE PORTIONS OF ORES.—Ferdinand Formhals, San Francisco, Cal. Feb. 13, 1868.

494.—WHIP HOLDER.—Daniel Talcott, New York city. Feb. 13, 1868.

496.—COMPOUND OF ANILINE COLORS.—Emil Zinnsmann, New York city Feb. 14, 1868.

519.—BREECH-LOADING FIRE-ARMS AND CARTRIDGES.—Benj. B. Hotchk New York. Feb. 17, 1868.

522.—LAMP BURNER.—Wm. Lincoln, Boston, Mass. Feb. 17 1868.

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SCIENTIFIC AMERICAN

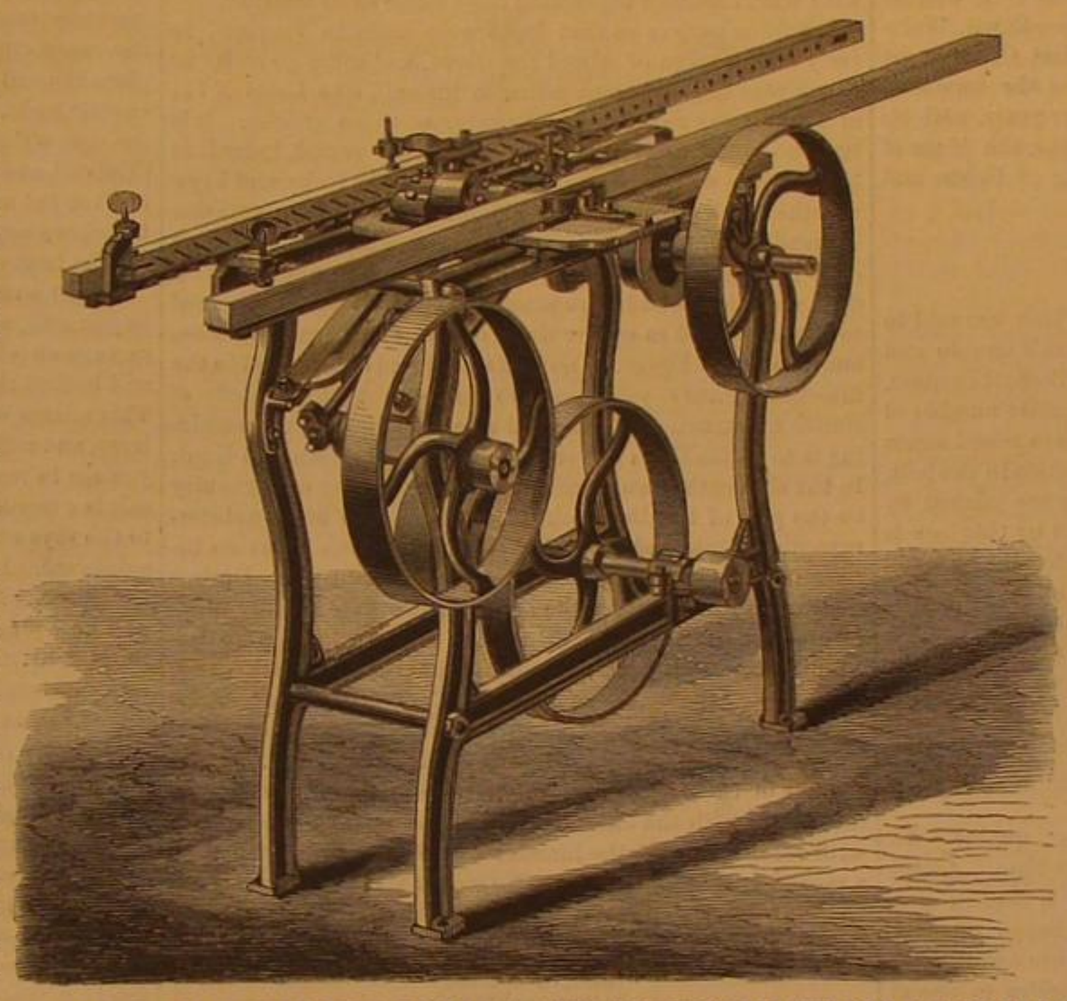
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XVIII.—No. 15. [NEW SERIES.] NEW YORK, APRIL 11, 1868. $3 per Annum [IN ADVANCE.]

Improved Combined Mortising and Boring Machine.

The use of reciprocating mortising machines for recessing the stiles of shades for the reception of the ends of slats is not uncommon. Upright and horizontal boring machines for those blinds in which the slats may be turned have also been extensively used. This machine, represented in the engraving—which was patented through the Scientific American Patent Agency some time ago—is entirely automatic in its operation, and either bores the round holes for the reception of the pivots of turning slats, or mortises the recesses for the reception of the ends of those slats designed to be permanently fixed at a certain angle. The latter are made on this machine by means similar to those used in boring a simple round hole, the tool being a reciprocatory or traversing burr or bit, which can be used on hard wood, knotty pine, and other obstinate descriptions of wood, where ordinary machine chisels fail. The machine is self-operating in all its parts, and all the workman has to do is to put in the stiles and set the machine in motion, when it does its work, and, having done it, stops.

As seen by the engraving, the machine is very simple in construction, made entirely of metal, easy of operation, and durable. Agents for its introduction throughout the United States are wanted. For particulars address Martin Buck, Lebanon, N. H.



PATENT MACHINE FOR BORING AND MORTISING STILES OF BLINDS.

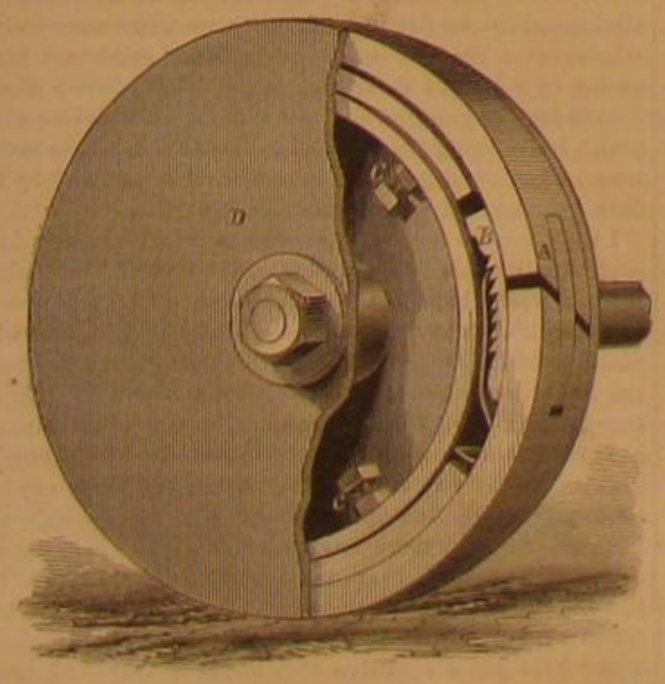
Sulphurized Paper.

Patented by Charles F. Crehore, of Newton Lower Falls, Mass.:—

The invention consists in subjecting the paper to the action of sulphur, preferably by immersing it in a bath of boiling or melted sulphur, the temperature of which is to be regulated by the required hardness of the finished material. The action of the sulphur has the effect of rendering the paper hard, semi-elastic, and water-proof, as well as compact in body, and with a susceptibility of high finish, if desired. Among the various instances of application of which the invention is susceptible, so far as the experiments made have proved it a success, a particular one is its use as press-paper for cloth printer's use, as well as for those of ordinary printing, the advantages of which will at once manifest themselves to persons skilled in the craft. For bookbinders' use the requisite amount of rigidity may be obtained with great reduction in bulk and weight, and, as a consequence, in cost, as compared with the material now in use.

ASKWITH'S IMPROVED PISTON PACKING.

One of the great difficulties met with by James Watt in his experiments with steam engines, was that of making a



movable obstacle to the expansive force of steam, impervious to the action of that subtile agent; in other words, to produce a piston which should be free in its action and at the same time fill the interior of the cylinder perfectly air and steam tight. In 1765 the best he could do was to employ several metallic glands or disks, holding rings of varnished canvas to bear against the interior surface of the cylinder.

Metallic packing, in which metal meets metal—unless separated by an infinitessimal quantity of water—is now the rule, and such packing has proved itself far superior to such makeshifts as those of which Mr. Watt was compelled to make use. Steam packing pistons and various spring and ring pistons have been brought to the attention of engineers, each claiming some peculiar advantage.

The one in the engraving is a single ring piston, the ring having across its cut a partition piece, A, pivoted at one end and shutting into a recess cut in the ring so as to prevent the passage of steam across the cut. The inner side of the ring has a piece, B, with ratchet teeth cut in it, with which teeth a fixed spring engages, acting as a catch or stay to hold the packing ring in place when expanded. The inner portion of the flange of the spider is furnished with set screws and check nuts, C, setting out against the ring. These are for keeping the ring in a central position and for expanding it when it becomes worn or loose. The packing or ring is not intended to fit closely between the flange of the spider and the follower, D, but to allow a small portion of steam to pass to the interior of the piston, and through minute holes in the projecting circle of the spider through which the set screws, C, pass, to the interior face of the ring. It will be seen that this packing ring makes, with the spider and follower, a combination piston, being steam-packed and also adjustable. The ring for a 16-inch cylinder is only seven eighths of an inch wide by five eighths thick. In ordinary self-setting packing rings, when the steam is shut off, the ring will contract, thus permitting the steam to blow through if the throttle is suddenly opened, as is frequently done on locomotives. The spring and ratchet in this piston are intended to overcome this difficulty.

Patented through the Scientific American Patent Agency March 5, 1867, by John Askwith, of Chicago, Ill., who may be addressed for rights, etc., at No. 694 South Canal street, Chicago.

Preserving Eggs.

"I take about 10 lbs. of unslaked lime and 8 lbs. of common salt and dissolve or mix them with twenty gallons of water. In this solution I place the fresh eggs to be preserved, and let them remain from ten to twenty days. I then dissolve, in a small quantity of water, the following substances, viz., one quarter pound of chloride of calcium; one half pound of liquid phosphoric acid; one pound chloride of lime (or bleaching powder); one half pound of nitrate of potash. This solution I add to the former containing the eggs. In this preparation the eggs should remain for about thirty days before they are taken out or ready to market.

"The chloride of calcium prevents the eggs from drying up, and any other deliquescent salt may be substituted for it, but I prefer the chloride of calcium. Nitrate of soda, or other soluble nitrate, may be used instead of nitrate of potash, and any equivalent chloride compound may be used instead of the bleaching powder." Patented by A. Van Camp, Washington, D. C.

Roofing Compound.

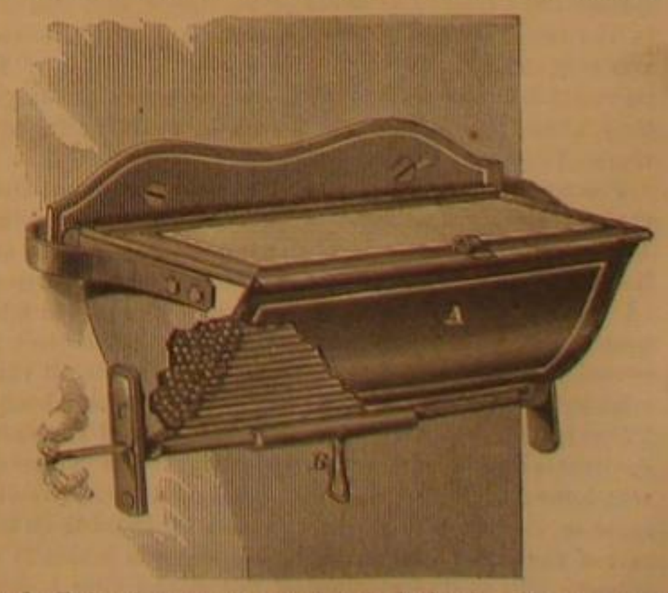
Here is another of the many tar compounds for roofing, recently patented by R. C. Graves, of Barnesville, Ohio. Take forty gallons of coal tar, thirty gallons pulverized slate, ten gallons pulverized clay, five pounds boiled rice, one pound glue, one pound terra de sienna, and one gallon linseed oil. I mix the coal tar, slate, and clay together. I then boil the rice and strain it through a fine sieve, and liquefy the glue by heat. I then add the rice, glue and terra de sienna to the linseed oil, and thoroughly incorporate the entire compound together. It is then ready for use, and may be applied with a brush or trowel. This makes a roofing compound impervious to water, unaffected by heat or cold, and, when it hardens, perfectly fire proof.

Dietetic Salt.

One of the great evils that owes its origin to the scientific enterprise of the present age, is that any promising scientific scheme, after being brought into prominent notice, becomes for the time being quite the fashion, and is then entirely forgotten, often, too, from mere caprice. We hope that this fate may still be averted from Dr. Lankester's ingenious scheme of supplying necessary, but frequently overlooked, articles of diet, by means of his dietetic salt. This compound is a proposed substitute for ordinary table salt, chloride of sodium being a notable constituent; but in addition to this, which is far from being the sole or even most important inorganic constituent of our food, we have phosphate of lime, chloride of potassium, sulphates of potash and soda, with smaller quantities of magnesian and iron salts. The argument for their use is very strong. Leaving out the large proportion of epidemics, almost all the common diseases are directly traceable by modern physicians to dietetic errors; and those that certainly are due in part to deficiency of inorganic food, form by no means a contemptible list. Scurvy is known to arise from a deficiency of the salts of potash. Scrofula and consumption, rickets, and softening of the bones, occur when the phosphates of lime and other bases are deficient. Anæmia, chlorosis, and a variety of nervous disorders, are the result of an absence of iron, and are at once cured by the use of this agent as a remedy. In such cases, the medical man is in the habit of prescribing medicines containing these agents; and there can, therefore, be no doubt that the habitual use of these substances in the food, in the same way as common salt is employed, would be a means of preventing the occurrence of a large number of diseases. The quantities of the saline ingredients employed, in addition to the common salt, are so calculated that they shall be supplied in the same proportion by its use, as they exist in the human blood, and are got rid of in the body. Dietetic salt is one of those simple but useful applications of science of which the value is at once perceived; it deserves to hold a prominent place in the rank of articles of food, and it is to be hoped that it will not be lost in the crowd of similar inventions.—*Chemical News.*

ROESLER'S IMPROVEMENT IN MATCH SAFES.

The inventor of this device intends to provide a match safe which will hold a certain amount of matches and which will, at the same time, deliver but one at a time, then igniting it



and offering it to the hand, already lighted. The match safe is a receptacle of tin or other metal secured to the wall, or any other upright, the plate which supports the safe holding the safe itself by side springs to allow for a vibrating motion to the article when operated, so as to aid the matches in settling to the bottom of the safe.

The safe, A, is a little more than twice the length of an ordinary round match, having a partition across it in the center, and a longitudinal opening at the bottom. Directly below this opening is a rod and slide, B, and at each end are springs

C, forming, where they meet, a circular hole with serrated teeth for igniting the match.

In operation, the slide, B, is moved quickly toward either end of the safe, carrying with it—or, rather pushing before it—a match, which is ignited as seen and left with most of its length protruding from the jaws of the springs ready for the hand. This device was patented Oct. 29, 1867, by Adolph Roesler, who may be addressed for rights, etc., at Warsaw, Hancock county, Ill.

ANCIENT LOCKS AND KEYS.

If the time-honored maxim, "Love laughs at locksmiths," has, like the Spanish proverb, "held good in every age and clime," the muscles of Cupid's chubby face must have been relaxed toward that particular class of craftsmen, for a period not far short of forty centuries. The Egyptian locksmith, as he fashioned his curious contrivance out of the world-renowned Damascus steel, was probably the first to excite the sly god's mirth. Next in order came the fabricator of the "doore fastenings of dyverse colors made of brass and ivory," of ancient Rome; followed by the maker of the still more elaborate *Serrure de Tabernacle* in the medieval age, immortalized in early Christian Missals. The locksmith of the Celestial Empire then began to make his "strange instruments having wooden slides," the architecture of which was peculiarly adapted to the Summer House, in which the fair heroine of the "willow pattern" was kept in durance vile. Then the locksmith began to flourish in England; and by the time of good Queen Bess, the operations of the craft were so fully established in the towns of Staffordshire—to wit, Wolverhampton, Willenhall, and Wednesbury, that Cupid must have indulged in peals of laughter worthy of the immortal Comus; and after all the enterprise of later years, with its levers and wards, "detectors," and master keys, the Muse of Love is still able to chant, even in the hearing of Hobbs and Chubb:

"My father he has locked the door,
My mother keeps the key,
But neither bolt nor bars can part
My own true love and me."

The Egyptian lock, the rude carvings of which are said to have embellished the walls of ancient Karnak's temple and the Herculaneum, is thus described by Mr. E. Beckett Denison, Q. C.: "In this lock, three pins fall into a similar number of cavities in the bolt, and so hold it fast; they are raised again by putting in the key through the large key-hole in the bolt, and raising it a little, so that the locking pins are pushed by the key out of the bolt. The security afforded by this lock is very small, as it is easy to find the places of the pins by pushing in a piece of wood covered with clay or tallow, on which the holes will leave their impress, and the depth can easily be ascertained by trial." These locks were first introduced into England by the merchants of Phœnicia, who gave them to the Cornish miners in exchange for tin. Strangely enough locks of similar construction, but evidently "home made," are still to be found on the doors of many of the peasantry in Cornwall and Devon.

The locks of ancient Greece and Rome are quaintly described by the philosophers and poets of the time. Aratus compares the constellation of Cassiopeia to a Roman key, "having a curved stem," and a handle "shaped like the south stars" of the group. Curved stems were common in the keys of that age, and the poet Ariston applies to one of those articles the epithet, "deeply bent." Eustathius says that these ancient keys resembled sickles, and were sometimes so large as to be carried on the shoulder, as reapers bears their sickles to the harvest field. This statement is confirmed by Callimachus in his *Hymn to Ceres*, where he represents the priestess of Nicippe carrying a key on her shoulders. Homer's allusion to the lock and key on the wardrobe of the fair Penelope, will probably be better known. The passage is thus rendered by Pope:

"A brazen key she held, the handle turned,
With steel and polish'd ivory adorned.
The bolt, obedient to the silken string,
Forsakes the staple as she pulls the ring;
The wards respondent to the key, turn round,
The bars fly back, the flying valves resound;
Loud as a bull, makes hill and valley ring,
So roared the lock when it released the spring."

Eustathius, a Greek commentator on Homer, who flourished in the twelfth century, says that the key here referred to was very ancient, and was known as the "serpent key," from its resemblance of form. It was in use before the siege of Troy, although some writers persist in ascribing its invention to Theodore of Samos.

The medieval locks were, perhaps, among the most elaborate and artistic specimens of those articles ever produced. Beads, scrolls, or floral wreaths, exquisitely graven in steel, lined the edges. Angel forms, similarly wrought, surmounted the escutcheon, like the twin guardians of the fairies' grotto in the pantomime; while the surface of the lock presented as great a variety of leaves and flowers, all chased with the utmost skill, as Eugene Rimmel's beautiful bouquet. These locks were mostly found on the doors of the ancient continental cathedrals, or on the doors of the magnificent cabinets for which the middle ages were so famous; and Mr. Fairholt assures us, that, in either case, the lock constituted no mean part of the profuse decoration of the door to which it was affixed. The skill of continental locksmiths, after a considerable slumber, was revived in the seventeenth century, in the person of M. Reignier, a French artisan, who acquired great fame as the maker of "letter locks," with which the couriers' dispatch boxes were secured. A Dutch writer, Von Euse, passing over the claims of his own countrymen, ascribes to M. Reignier the invention of the letter lock, which is, in reality of Dutch origin, and was made a century before this French Chubb saw the light. An allusion to it is made in Beaumont and Fletcher's play, "The Noble Gentleman," printed as early as the year 1615, which completely sets aside M. Reignier's claim to the invention:

"A cap case for your linen and your plate,
With a strange lock that opens with A. M. E. N.:"—

and Carew, in some verses written five years later, has this reference:

"As doeth a lock that goes
With letters, for till every one be known
The lock's as fast as though you had found none."

The latter quotation partly explains the construction of the letter lock, with which M. Reignier's name will always be connected as their most famous manufacturer. The letters of the alphabet were engraved on four parallel revolving rings, which by pre-arrangement on the part of the owner were made to spell a certain word, or number of words, before the lock could be opened. If even the owner chanced to forget the "open sesame" on which he had determined, like the luckless youth in the story of Ali Baba, the door would remain closed against him, till the magic watchword was recalled.

The ancient Chinese lock verifies one of the wise sayings of King Solomon—"Men have sought out many inventions. . . . . there is nothing new under the sun." The fact has lately been disclosed that locks, "having sliders and tumblers," have for centuries been made in China, on the identical principles of action which have been "re-invented" by English patentees at various periods during the last hundred years. Some of the very oldest locks made by Chinese workmen were constructed almost entirely of wood, and adorned with grotesque carvings of "Celestial scenes," such as those with which modern tea-caddies have made us so familiar.

Tradition assures us that locks were made in England as early as the reign of Alfred the Great, and some go so far as to say that the ingenious monarch himself, like Louis XVI., of France, was an amateur fabricator of those articles. It is true, no doubt, that even at so remote a period, ingenious blacksmiths were wont to construct clumsy locks and keys, together with other articles of domestic use, when occasion demanded; but lockmaking was not recognized as a distinct craft in England until the fourteenth century; and two hundred years followed before it assumed proportions at all equal to those attained in earlier times on the Continent, in China, and in ancient Egypt. The locks produced in England in the fifteenth century were massive and strong; but chiefly of simple construction. Almost the only specimen now remaining is to be found on the parish church of Snodland, in Kent. In the sixteenth century commenced the display of ingenuity on the part of English locksmiths which has been uninterruptedly maintained since that time, and which forms an interesting chapter in the Curiosities of Industry. During Queen Elizabeth's reign, the bows of keys were usually ornamented by the insertion of a cross, and the locks were frequently made of metal, sometimes imbedded in oak cases. Latch keys—the terror of Mistress Caudle—also came into use about this period. Locks were for the first time made with alarm bells and chimes during the same period.

Some of these bells rang so loudly in case of any unlawful tampering with the lock as to arouse the whole street. Bells with chimes warned the inmates and alarmed the burglar in a much more soothing way. No sooner was the skeleton key of the intruder applied to the lock than the latter began to chime such some plaintive air as—

"Home, sweet home,
Be it ever so humble,
There's no place like home:"

a sentiment with which the chagrined housebreaker would doubtless concur as he took his precipitate flight.—*The Ironmonger.*

Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., F.R.S.

Lecture VI.--Concluded.

I have had occasion to say to you once or twice in these lectures that no body in nature is absolutely cold. All bodies are more or less hot. Even ice itself is a hot body compared with solid carbonic acid. In fact, ice would be quite competent to make a mixture of solid carbonic acid and ether boil, it being hot in comparison. All bodies are warm, and all bodies are emitting rays of heat. Here is a platinum wire in front of the table, such as we have already operated upon. At the present time that platinum wire is emitting rays of heat of a perfectly definite character. If I connect this wire with our battery you will observe our old experiment. You see the wire is heated to redness; it emits rays of heat, and also, to some extent, rays of light. Before the electric current passes the wire emits rays of heat which are incompetent to excite vision; but when I raise the temperature of the wire thus, by sending the electric current through it, what becomes of its old rays of heat which it emitted in this invisible state? They still maintain themselves, and they become much stronger, but they are still obscure. We mix, with the luminous rays of that wire, the obscure radiation that issued from it before the current made it incandescent. If I go on shortening the wire, as in an experiment we made in an early portion of these lectures, we find it gets brighter and brighter, but the rays it emitted before it became red-hot at all are still mingled with the visible radiation. They exist, but they exist greatly intensified; so that the rays which issued from that wire before it became incandescent, are present, as well as the visible rays, but they are raised to a thousand times the intensity which they first possessed. They are still obscure, and have no power to excite vision, but they are, nevertheless, there with a thousand fold their first intensity. Now I must try to separate before you these luminous rays from the obscure rays; and I must endeavor to operate upon the obscure rays so as to show you some effects that they can produce. I think you will understand the process by which this can be done. I have here a small concave mirror, and this I will place behind the electric lamp. We shall have an image of the carbon points of the lamp produced in that way, and I will throw that image upon the screen. We have now thrown upon the screen an image of the carbon points, whence issues the electric light. If I take another mirror, and converge the rays by it, I can give you a larger image, which, perhaps, will be better seen. Here is now a large image of the carbon points produced in that way. The image is inverted. You see a considerable amount of light there, but Mr. Cottrell will now fill a vessel with an opaque liquid. The liquid which we use to obtain the opaque solution is called bisulphide of carbon: it is perfectly transparent; and here is the substance called iodine—very well known to many people. This bisulphide of carbon dissolves the iodine with great freedom, and the consequence is the production of this dark liquid, which is so wonderfully opaque that it would cut off the light of the sun at noonday. Strange to say, it is the quality and property of this wonderful substance to entirely cut away the luminous or visible rays upon which depend the colors you saw on the screen, whereas it allows all the rays of heat to pass through. The liquid is opaque to light, but perfectly transparent to radiant heat. Mr. Chapman will place a lens in front of the electric lamp; and thus we obtain this beautiful convergent beam or cone tracking its way through the dust of the room toward the thermo-electric pile, Mr. Chapman will, when I tell him, place the cell containing this opaque liquid in front of the electric light. That will cut off bodily all the light, but still the spot where the pile will be placed will remain very hot. [The cell and pile were then placed in position.] You see all light is cut away; but you observe that the needle at once marches away, thus proving that although the light is cut off, the heat rays are left behind.

I want now to try and make these heat rays more evident to you still, and for that purpose I have placed within this camera an electric lamp similar to what I have just used; and behind the electric lamp I have placed a silvered mirror. This mirror will reflect the rays of light from the electric lamp, and will cause them to issue through the window which you see in front. This window is formed of rock salt. Rock salt is exceedingly transparent to the rays of heat, and also to the rays of light; and it is for that reason that I use that substance. I now obtain a convergent beam from the electric lamp. You see a brilliant cone of rays. Mr. Cottrell will now place the opaque solution in front. There it is, cutting off all the light, so that you see nothing. But now I bring this piece of platinum opposite the dark liquid, and observe what occurs. The platinum is raised to a red heat, in perfectly dark air. If, instead of platinum, I take some dry paper, and hold it in the focus of the dark rays, you see I can ignite that paper. The paper is set on fire. This ignition is caused by the invisible rays of heat issuing from the electric lamp. I now take a thick piece of metal and hold it in the dark rays of heat: you see it is melted by the radiant heat, and drops down in liquid state. I will now burn a piece of zinc here. There, you see the zinc is actually set on fire in a place where there was perfect darkness. The air where this zinc is set on fire is perfectly unwarmed. Nothing would be easier than to ignite a cigar in this way in perfect darkness. For instance, here is one which I will ignite. You see it is instantly set alight in a place where there is absolutely no light. You might put your eye where that platinum was raised to red heat. I have cautiously approached my eye to that burning focus that you saw there, and allowed the rays bodily to enter the eye, and could neither see light nor feel heat. The retina was perfectly dead to those very powerful rays. Sometimes we obtain the combustion of magnesium by these rays. Here you see we have that beautiful metal set on fire in a place where there were no lights whatever—a space of utter darkness. I might set London on fire by means of these dark rays. I have here a glass jar containing oxygen gas, and into this jar I dip a piece of charcoal. I now bring the charcoal into the focus of the invisible rays of heat, and you see the charcoal is ignited by these dark rays, and burns brilliantly in this gas.

I want now to make one or two more experiments in connection with this subject. For this purpose I will take the same mirror which I have just used, and employ another camera which is at the end of the table. The mirror will be placed behind the light, and will reflect a beam of light along the table. Instead of allowing this beam to fall upon the audience, and annoying you, I will catch it upon another mirror just as I caught the ray of light by the mirror near the ceiling in an experiment early in the lecture. I dare say many of you see the intense reflection here. There is a focus which would burn your fingers most fearfully if you put them there. I dare say we shall be able to inflame paper at that focus. There you see the paper instantly set in a blaze; and this blaze is produced, not by the luminous rays, but by the dark ones. You might put a sensitive thermometer there and have no result. It is only when the heat falls upon this paper that the heat is produced. We can burn zinc here as I did in the dark rays. You see the zinc is set on fire and blazes up almost like a piece of paper. Here is a small vessel containing water, and I will place that in the focus of the rays. I now place another vessel of water in such a way that the light has to pass through it. This will intercept the dark rays which give the heat, though it does not sensibly interrupt the rays of light. At the present time the focus of rays falls upon the former vessel of water without any effect whatever

being produced upon it. I will now withdraw the vessel of water through which the beam passes before it reaches the mirror, and so allow the heat rays to pass, and you see the water in the vessel at the focus of the rays immediately begins to boil. After a time this water will be thrown into a state of violent ebullition. It is already boiling. This action is due not to the rays of light, but entirely to the dark, invisible rays of heat of which I have been speaking.

I make these experiments for the purpose of bringing home to your minds the fact that we owe all our rivers, all our glaciers, and all our snow, entirely, or almost entirely, to these dark rays. The luminous or bright rays of the sun fall upon the tropical ocean, and pierce it to great depths: they are not absorbed; but the non-luminous rays—the heat rays of the sun—strike upon the tropical ocean, and they are absorbed very near its surface. It was by the absorption of the dark rays that the water was boiled in the last experiment. These dark rays of the sun, which strike upon the tropical ocean, and are then absorbed, heat the surface of the ocean, and thus it is that all the moisture or evaporation is produced.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Kerosene Lamps.

MESSRS. EDITORS:—Kerosene may stand the usual test, so as not to produce any vapor under 110° F, which vapor, when mixed with air and ignited, would explode. In this respect it may be perfectly safe. But when by upsetting the lamp, or other accident, some oil is spilled, and particularly, when the oil covers the hot exterior parts of the lamp and of the burner, it easily catches fire. The heat of the fire forces a greater quantity of oil out of the lamp, which very soon is enveloped in flames. When this occurs, it is like a bombshell filled with Greek fire. The burner being firmly screwed on, there is not sufficient escape for the gas, which the heat of the flame must produce, and the consequence is, that the lamp must burst and scatter the burning oil in all directions.

As an example of this kind, I would state a little incident which will illustrate the manner in which most of the kerosene accidents occur. On the evening of October 23, 1867, on board of the Harlem steamer *Sylvan Stream*, a kerosene lamp fell from its bearing upon a seat, and soon was enveloped in flames from the cause as above represented. It was then thrown off the seat and rolled upon the floor enveloped in flames, leaving a track of burning kerosene behind. Here I threw a hat upon the lamp, pushed it further away from the fire, and by pressing the brim of the hat closely down on the floor, I succeeded in smothering the fire around the lamp, which I then carried away. At this time the lamp was covered and dripping with oil, which still continued sputtering through the burner. In seeing it in this condition, I had a rare chance to obtain some idea how such a lamp would explode.

Concerning the inflammability of kerosene, any person can easily satisfy himself by pouring a small quantity of the oil on a piece of board, and trying to ignite it with a match. I have tried in this manner kerosene from various dealers, and always found it inflammable. I believe any person, who uses such oil, should take note of this.

The present kerosene lamps seem to be rather unsafe. To meet this point I venture to suggest some improvements, viz: The lamp should be provided at one side with a little mouth for filling, and this should not be closed by a screw cap, but simply by a little cork, which would serve as a safety valve in case the oil should tend to explode from any cause whatever. In this cork should be inserted a small brass tube for admitting the air, which is to replace the oil in the lamp as it is consumed in burning. The present practice of admitting the air through the burner for this purpose, seems to be rather dangerous. For greater safety, the lamp should be of brass. It should be inclosed in a brass case, and the space between the lamp and this case filled with some non-conductor of heat, so that if any such accident should occur, as above stated, the heat of the flame would not affect the oil in the lamp. For some kinds of lamps this case could be made in the shape of a globe, a little flattened at the bottom, and with some lead or a plate of iron attached inside as ballast, so that if the lamp be accidentally upset or thrown out of its place, it would erect itself automatically.

For ordinary use in private families, kerosene may always remain the best and cheapest means for obtaining a fine light, but on railroads and steamboats it seems to be in the wrong place. For such purposes it is not necessary to remain dependent on candles; the finest light can be obtained by any other kind of lamp oil, which is perfectly safe, and not so inflammable as kerosene, or any other distilled oil. The red, dim light, and the disagreeable odor produced by an old-fashioned oil lamp, is due only to an imperfect combustion, and to a low temperature of the flame. This can be remedied by the addition of a glass chimney, and by a properly constructed burner, by which the temperature of the flame is raised to a higher degree, so that the minute particles of solid carbon (the soot) in the flame will glow at a white heat, and thus produce the fine, white light.

Astoria, L. I. J. G. KONVALINKA.

About Text Books for Mechanics.

MESSRS. EDITORS:—Did it ever occur to you that writers ostensibly for the improvement of mechanics seem to vie with each other as to which shall make their pretended instructions the most muddled and difficult of understanding? I am over forty years old, a practical mechanic since I was seventeen, and although I have bought, borrowed, and—stolen books on mechanical subjects ever since that time, all I know about mechanics I have gained by hard knocks, and not from professed teachers who write books for mechanics. Why is it that when the simple branch of geography, as taught in our schools, is brought down to the apprehension of the dullest or least developed intellect, and even the "dry" and abstruse study of grammar may be made interesting and attractive, the comparatively simple although wonderfully useful subject of mechanics cannot be treated by those who profess to be teachers of mechanics in a similar way? The only reason I can assign is the desire on the part of these self-called teachers to exhibit their erudition and show their pedagoguism. I am tired of their nonsense. I am tired of purchasing books, at big prices, pretending to give me and my brother mechanics information, when they are filled with mathematical signs, which we have never had an opportunity to learn and which are simply Greek to us.

We workers have no opportunities to study mathematics; we have all we can do to work our task, to keep body and soul together, and to do our duty to our employers and ourselves. It is certain that these signs and symbols may be superseded by plain English, and that they are not so in our mechanical works is a very sufficient reason why the works of these pretended instructors do not have a greater sale and circulation among our mechanics.

It is pleasant to know that the SCIENTIFIC AMERICAN is popular enough and that its managers are thoughtful enough to discard the pedantry that rules our text-book manufacturers, and give our mechanics—some of them illiterate—information shorn of this miserable nonsense, which few but the writers can understand. To you, Messrs. Editors, the mechanics are greatly indebted. Your clearly cut, concise, and lucid descriptions of machines and inventions, and your practical editorials are just what we mechanics need; and when we turn from the pages of the SCIENTIFIC to the pretentious volumes of mechanical writers we go from light into the fog.

Will you use your influence to induce those who pretend to write for mechanics to write so that the least learned can understand what they read? J. G. B.

Boston, Mass.

[We recognize the difficulty our correspondent so forcibly presents. There is too much truth in his complaints; and there is no sufficient reason why writers on mechanical and even scientific subjects should not use plain language, without the employment of so many mathematical signs and chemical symbols.—EDS.

Improved Form of Drift.

MESSRS. EDITORS:—I herewith send you a model of a drift of my invention which you may illustrate and describe in your paper for the benefit of the public. This model I made in twenty minutes.

I first make the steel blank square, straight or tapering, as desired, then with a half-round file I begin at one corner of the end and file a groove obliquely across one side of the blank, then turn the blank toward me and in like manner file

a like groove on the next side and so on, forming a thread. I then begin at the opposite corner from where I first began and proceed as before, when I have two threads or a double right-handed thread. I then, in like manner, file two left-handed grooves, taking care that they intersect the right-handed ones at the corners of the tool. The grooves should be filed under, making the threads a little hooked toward the end. When the grooves are finished as described, each side of the tool shows a series of triangles, the planes of which are then filed back, care being taken not to lessen the lower corners and the tool is ready to harden and temper.

The main object of this invention is to make a drift that will give a good cut at the corners. The teeth running spirally around the tool can be filed back without injury to the corners. The chips or cuttings will not clog, but will either follow the grooves around the tool or zig-zag up its sides. The grooves being spiral do not make a checked place around the tool and weaken it as is the case with the ordinary drift. For light and fine work its great strength and the ease with which it cuts, will make this tool highly prized by all machinists. AMOS SHEPARD.

New Britain, Conn.

The City Flower Gardens of Paris.

At the ball given recently at the Hotel de Ville, seven thousand white and rose camelia trees were employed to decorate the apartments, which trees were sent from the city gardens. There are now two million camelia plants in the camelia houses, which cover a superficies of forty-eight thousand meters, which space being found insufficient for the supply required, underground houses are being constructed, the excavations for that purpose extending over thirty thousand square meters of ground. Four head gardeners superintend this vast flower manufactory—a word not wrongly applied, inasmuch as by their wonderful application of heat in forcing houses, they obtain a plant of some inches in hight in as many days. The sixteen hundred thousand plants which adorned the squares, public gardens and parks of Paris last summer, have been replaced by evergreen shrubs of every variety, so that the Parc Monceaux, the Champs Elysees gardens, etc., appear so green and flourishing that one scarcely misses the magnificent glow of color which contributed so much to the beauty of Paris a few months ago. The City Conservatories just now possess a splendid specimen of the Java pitcher plant, each goblet of sugary water being of unusual size.—*The Ruralist.*

SKETCHES FROM THE PARIS EXHIBITION.

Number II.

TUNGSTEN AND ITS PRODUCTS.

As early as 1781 the German chemist Scheele, a worthy contemporary of the unfortunate Lavoisier, established the constitution of the mineral tungsten. He showed that this mineral, before considered as a tin ore, consisted of lime and a peculiar acid. Three years afterward the brothers Du Luyart recognized in the latter a new metal, which they called wolfram (from the mineral of the same name), or tungsten. Malaguti, Berzelius, and Riche investigated these ores; they discovered the process of separating the tungstic acid, a yellowish insoluble powder, from the tungstate of lime, a mineral found also in this country. In digesting this ore with muriatic acid, it is decomposed, chloride of lime being formed and tungstic acid separated.

Wolfram was considered for a long time an iron ore. It occurs generally in the primitive rocks associated with tin ore, topaz, fluor, and apatite. Many analyses were made before it was found that it consisted of a varying mixture of tungstate of iron and manganese; it met, however, no application until quite recently, when Oxland published a mode of preparation of the tungstate of soda of mechanical value He gave at the same time to this product an application, in employing it as a mordant in dyeing, instead of the tin preparation. In immersing woolen fabrics in a slightly acidulated and hot solution of tungstate of soda, they become mordantized; in exposing them afterwards to a decoction of Campeachy wood they are dyed violet, which color becomes perfectly black upon exposure to air. This application has to our knowledge been entirely forgotten, although the crude material is now a great deal less expensive than formerly.

Tungstic acid may also be obtained as a beautiful yellow powder, forming an excellent paint. When it is digested with dilute hydrochloric acid and metallic zinc, it is converted into a very handsome blue color, called blue carmine, and if both yellow and blue are mixed together, we obtain a green of different shades, which is not poisonous and is a perfect substitute for Paris green. In adding a solution of yellow prussiate of potassa to tungstate of soda, a brown precipitate with metallic luster is obtained, very similar to umbre, and if a solution of chloride of zinc is added to a tungsten salt, we get a color similar to carbonate of baryta. If, again, one equivalent of tungstic acid is added to one equivalent of melting tungstate of soda and the thus formed product carefully heated with tin scraps, we obtain a slag which, upon being treated with a mineral acid, leaves fine orange crystalline spangles. In exposing them to heat, they assume a steel-blue color; in heating the potassic tungstate, a violet product of copper luster, similar to sublimed indigo, is obtained. These compounds may be employed either for bronzing or in printing wall papers.

Menier was the only one who had a collection of all these preparations. Barnell exhibited the tungstate of soda in large quantities, and Knapp, from Strasbourg, excelled in beautiful bronzes. Russia also proved that she explores her deposits in the Hartz mountains.

The Chemical Action of Light.

Professor Roscoe, F.R.S., of Manchester, Eng., has devised some very curious and interesting lecture experiments illustrative of the action of the chemical rays upon certain descriptions of common matter, one of which is the following: A bulb of very thin glass, about the size of a hen's egg, he fills in the dark, or by the aid of a yellow light, with a mixture of pure hydrogen and chlorine gases, the gases being produced by the decomposition of hydrochloric acid by the voltaic current. The room being darkened the bulb thus prepared is placed in a four-sided lantern provided with red and blue glasses. Now having covered with a cloth all the sides of the lantern except the one fitted with red glass, the lecturer places a long-stoppered glass jar filled with nitric oxide and bisulphide of carbon vapor in front of the exposed side and on applying a burning match to its mouth a brilliant flash of pale blue light, rich in chemical rays, is the result. But as red glass absorbs such rays, none can get through to the glass bulb which is fixed in the lantern. A second jar of the mixed vapors is next fired in front of the lantern's side fitted with blue glass, and as the latter transmits the chemical rays, the union of the hydrogen and chlorine gases is the result and the bulb is burst in the explosion which follows.

The Hugon Gas Engine.

The advantage of this over other gas engines consists in the dispensing of electricity, with its accompanying complicated arrangement of batteries and other encumbrances. By a simple arrangement the illuminating gas from the street mains, as soon as turned on, enters the cylinder mixed in its passage with about nine times its bulk of common air, forming a very explosive mixture. In starting the engine all that is necessary is to light two ordinary jets of gas, which in turn light two others, these last inflame the explosive mixture in the cylinder, and being extinguished by the explosion, are relit by the two jets fixed outside the cylinder. At the moment of explosion a very fine spray of water falling on the piston—the heat being then 1,200°—becomes steam, thus reducing the heat and equalizing the pressure throughout the stroke, so that the engine lubricates itself by its own action. It is entirely automatic in its working; no smoke; no supply of fuel need be kept on hand, and it neither requires skill to start it nor any attention during its action. A three-horse engine attracted great attention at the Paris Exposition,

THE WHEEL QUESTION.

"How many revolutions on its own axis will a movable wheel make in rolling once around a fixed wheel of the same diameter?"

We continue to receive letters from the more distant parts of the country upon this subject, and the discussion seems almost endless. The Cadets at the U. S. Military Academy, West Point, N. Y., have of late been giving it some attention, and if we judge from the sketches sent us they have performed some very amusing practical experiments.

A few of the two-revolutionists have been candid enough to say that in the example we gave, Fig. 11, the movable wheel undoubtedly revolves but once on its own axis. But for the most part they maintain a dignified silence in respect to that example, and also in respect to the printing wheel, Fig. 17, and the rolling wheel Fig. 18. They continue to rely upon diagrams which perplex the eye, astronomical observations, etc. Their main support is in theorems and postulates like those of L. M., who complains very earnestly that we did him injustice in publishing his last communication. For the purpose of saving space we united two of his separate diagrams into one. Thus placed together he sees their absurdity, but insists that their correctness will be apparent if arranged as he intended, and thinks we ought to set him straight. We accordingly do so and herewith we republish his communication with the separate diagrams as furnished by him.

Messrs. Editors:—In the progress of this discussion it is increasingly manifest that the variance in the views of your correspondents arises, mainly, from the variant meanings we attach to one or more words and phrases. Under this impression I recently addressed to certain friends of mine a simple but very pertinent question, to which, aside from their characteristic courtesy, they failed to respond. I must, therefore, without their coveted aid, offer you some notions of my own.

I would ask of all who take an interest in the question to concur with me in simplifying it, by confining our attention to those points alone that are essential to a competent understanding and correct solution of it. This will exclude all side issues that would confuse or mislead.

The question is a simple one:—"How many revolutions on its own axis will a wheel make in rolling once around a fixed wheel of the same size?"

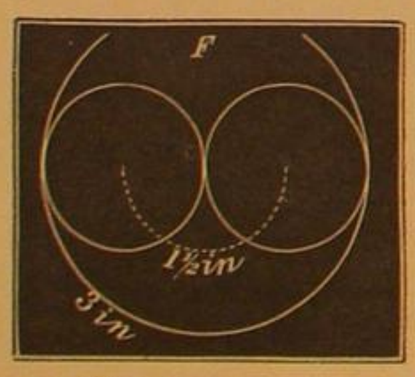
The machinery thus indicated consists of two wheels of same size, one of them fixed and the other free, the fixed wheel and all the movements of the other being restricted to one and the same plane. *This is all.* And we must refuse the introduction of lines, pins, axles, or anything else. They are not needed.

A. The axis, contemplated by the question, is located in the center of the wheel, and is a geometric or imaginary line, having length, without breadth or thickness. Therefore, to speak of a revolution of the axis itself is absurd.

B. A "revolution on its own axis" means such a movement of a rolling wheel as causes a right line drawn through its centre to point successively to every surrounding point in the plane of motion, and every particle of its mass to pass once on every side of its axis, no matter to what extent or in what direction the axis itself may move.

C. The distance traveled by a wheel is determined by, and is equivalent to, the length of the path of its axis, whether curved or rectilinear.

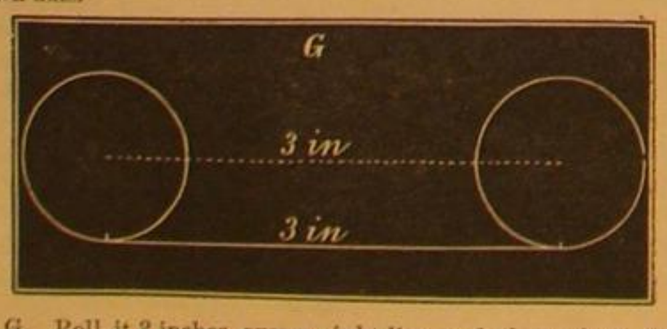
D. Roll a wheel over a right line of the length of its own circumference, and the path of its axis will be of the same length; but less if the line rolled over be concave, and greater if the line rolled over be convex, the extent of these differences being governed by the elements of the respective curves.



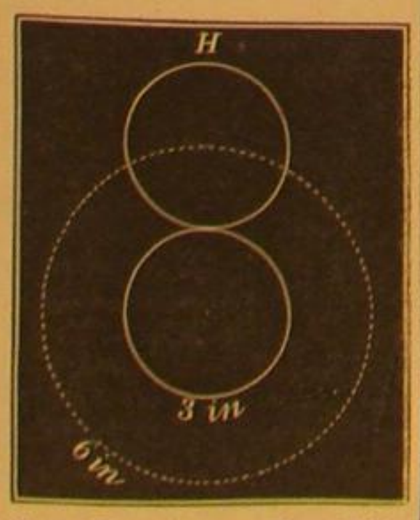
E. Divide the length of the path of the axis of a rolling wheel by the length of its circumference, and the quotient will be the number of revolutions made by the wheel around its own axis.

Examples. — Take a wheel one inch in diameter — its circumference three inches:

F. Roll it 3 inches over the concave surface of a curve of 2 inches diameter, and the path of the wheel's axis will be 1½ inches. Then 1½ divided by 3 equals ½ a revolution on its own axis.



G. Roll it 3 inches over a right line, and the path of the axis will be 3 inches. Then 3 divided by 3 equals 1 revolution on its axis.



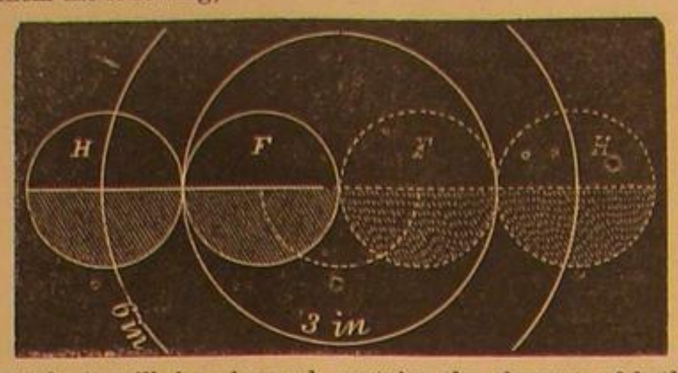
H. Roll it once around the convex surface of a wheel of same size, and the path of its axis will measure 6 inches. Then 6 divided by 3, equals 2 revolutions around its own axis.

This last example, I contend, furnishes the correct answer to the question at issue.

The foregoing paragraphs, marked A to E, are submitted merely as postulates. Should they be accepted as truths (and I have no doubt of their being such), the conclusive force of their application, in the examples F, G, and H, seems to me irresistible. I will gratefully welcome a frank exposition of anything erroneous in them, and will as frankly acknowledge it, if I cannot show the objection to be groundless. But I must be allowed to deprecate a naked assertion of dissent, unaccompanied by an explanatory why or wherefore. L. M.

Germantown, Phila.

In the previous publication of the above communication, we omitted the separate diagrams, F, H, and substituted for them the following,



which, it will be observed, contains the elements of both, namely, two wheels, F, H, of same diameter, rolling on a curved line of same length, one wheel being concave, the other convex. Two wheels, thus arranged and moved together, we stated would revolve the same number of times upon their own axes in rolling once over the curved path. But, according to the postulates of L. M., the wheel, H, makes twice as many revolutions as F, in rolling over the same path. This strikes us as absurd, whether illustrated in two separate diagrams or in one; and his whole communication, regarded as an effort to demonstrate that a movable wheel revolves twice on its own axis in rolling once around a fixed wheel of the same diameter, rather muddles than clears up the subject.

The Tallest Chimney.

The chimney at the Port Dundas Works, Glasgow, belonging to Mr. T. Townsend, says *Engineering*, is the tallest chimney and one of the highest masonry structures in existence. In Europe there are only two church steeples, those of the Strasburg Cathedral and of St. Stephen's Church, in Vienna, which, by a few feet, exceed the hight of this chimney, and the great Pyramid of Tizeh was—but is not at present—the only other human erection exceeding this great chimney in hight. The dimensions of Mr. Townsend's chimney are: total hight from foundation, 468 ft.; hight above ground, 454 ft.; outside diameter at the level of ground, 32 ft.; outside diameter at the top, 12 ft. 8 in.; thickness at ground level, 7 bricks; thickness at the top, 1½ bricks. From this it will be seen that the portion below ground, which contains not only the foundation proper, but also the flues, with their arches and coverings, occupies a depth of 14 ft. The flues are four in number, placed at right angles to each other, so as to form an equilateral cross in the plan; they are of rectangular section, about 7 ft. wide and 9 ft. high each, and arched both at the top and bottom. The foundation below these flues is built up from hard bricks, all placed on edge throughout several superposed layers up to the sides of the flues, which are arched and lined with firebricks. The masonry above the flues is built with the bricks laid flat in the usual way. The internal diameter at the base is 20 ft., and it gradually contracts toward the top to 10 ft. 4 in. diameter.

The outline of the whole structure is of extreme simplicity, viz., the form of a truncated cone, without any deviation, ornamentation, or addition. The "batter" is straight from the bottom to the top, and there is no "cap" or other protruding ornament at the top. The section is circular throughout. Before constructing this extraordinary piece of masonry, the plans and details of it were submitted to Prof. Rankine, for his advice and opinion respecting the safety and stability of the proposed structure. Prof. Rankine was at the time, as he is now, considered the first authority upon the stability of chimneys, and it is understood that few chimneys of more than ordinary size are built in this country without his being consulted on the subject, the calculation of the strains upon the different bed-joints or horizontal sections of a chimney being a subject of greater intricacy than may appear at first sight.

The Port Dundas chimney has, during its erection, undergone one of the most interesting and curious operations known in masonry practice, viz., the straightening by sawing the mortar joints. This operation has since been frequently resorted to in similar cases, and has always proved very successful. It is understood that Mr. Duncan Macfarlane, of Glasgow, who had obtained some experience in this kindof work in Lancashire, although with chimneys of moderate sizes only, suggested this operation to Mr. Townsend, after his chimney had been bent by a violent storm, which took place during the erection of the highest portion of this chimney. The mortar in the newly built portion of the work being still soft and plastic, the pressure of the wind caused a lateral deflection of the column, amounting to 7 ft. 9 in. from the vertical at the top. The whole structure was thereby endangered, and in order to restore its stability, it was necessary to bring it back to the vertical line. The operation of sawing, which was then resorted to, consists in attacking the mortar joints at the windward side, and to reduce their thickness, so as to compensate for the compression of the mortar joints at the opposite side, effected by the pressure of the wind. The sawing was done by first removing a portion of the brick work inside the chimney, forming a groove about 14 inches wide half around the interior surface of the chimney. Narrow holes were then cut out by means of chisels, the workmen standing upon the internal scaffolding, and working exclusively from the inside. A saw with a single handle—in reality an old carpenter's saw—was the instrument employed. It was passed through one of the holes cut out so as to work through a horizontal mortar joint, and it was then worked by hand, removing the mortar, as it proceeded through the joint through part of the half circle on the windward side. Generally two saws were simultaneously employed, working in opposite directions toward each other. The mortar joint operated upon was kept wet by a jet of water during the whole process, and the removed brickwork in the interior was replaced by fresh bricks as the sawing proceeded. As soon as the greater portion of any one mortar joint is sawn through, the effect produced upon the superincumbent mass causes the latter to settle, and a considerable pressure is thereby exerted upon the saw, making it difficult to withdraw. If the precaution is taken to commence sawing at the lowest joints, and proceed in succession to the higher cuts, this difficulty is considerably lessened. In the case of the Port Dundas chimney, sawing was commenced at the top, 128 feet below the chimney cope, and twelve cuts were made in unequal distances, varying from 12 ft. to 49 ft. Mr. Townsend, who conducted this operation personally, judging by the effects produced by each incision, selected the spot for the next cut, proceeding gradually downward until the last cut, 41 ft. from the ground, restored the whole chimney to a perfectly perpendicular position. The chimney after sawing stood more correctly perpendicular than it had been before the action of the storm, and it is now more correct in that respect than the majority of well-built chimneys of much smaller sizes. The operation of sawing occupied nine days, from the 21st September till 1st October, 1859, and the chimney has from that date remained in its perfect condition, requiring no further strengthenings or repairs. It is, independent of its size, one of the best specimens of substantial and well-made brickwork in existence.

Composition for Stuffing Leather.

Prepare in a suitable tank or kettle about eight gallons of alkaline solution, which may be strong lye, or a solution of potash, or other similar solution, with considerable heat applied to the bottom or sides of the tank or kettle, or by steam to the substance within. Then add to the alkaline solution about one gallon of fatty oil or grease, or from eight to ten pounds by weight, intending to add as much oil or grease as can be incorporated with the alkali. After these two ingredients have become considerably mixed or incorporated, add to the mixture from two to five pounds of common rosin, and stir or agitate the mixture while under the action of the heat till the whole is well united into a mass. Then add from one to five ounces of soda ash, and again stir or agitate the mass for a short time, when it will become thickened to the desired degree or consistency for use after cooling, or to be removed and put up in cans, jars, or cakes. Patented by John Haseltine, of Warren, N. H.

Editorial Summary.

Action of Water of Lead.—Professor Bötger inquiring into the cause of the action of distilled water on lead has found it to be due to the presence of carbonate of ammonia, and not, as is usually ascribed, to the air dissolved in the water. After having been boiled for a time, distilled water will not attack the lead until after a considerable exposure, when a reabsorbtion of ammonia and carbonic acid from the air, where they are always present, may be supposed to have taken place. Bötger has further found that the alloying of the lead with a small amount of tin protects the former from being acted upon, and this fact suggests the advantage of purposely introducing a little tin into the metal from which lead piping is to be manufactured.

Carbolic Acid for Burns or Scalds.—Dr. Wilson writes to the *Lancet* that he has recently used carbolic acid with marked benefit in the treatment of severe scalding. He recommends the mixing with thirty parts of the ordinary oil and lime water, one part of the acid. Linen rags saturated in the carbolic emulsion are to be spread on the scalded parts and kept moist by frequently smearing with a feather dipped in the liquid. Two advantages of this mode of treatment are, the exclusion of air, and the rapid healing by a natural restorative action without the formation of pus, thus preserving unmarred the personal appearance of the patient—a matter of no small importance to some people.

The fact has been satisfactorily demonstrated at the Shoeburyness trials, that a cannon ball will penetrate a target with much greater ease with a range of 200 yards than with a range of 70 yards. The supposed explanation for this fact is that the shot "wobbles" a little on leaving the gun, and requires time, and consequently space, to settle down to a steady whirl. The fact that the holes made at 70 yards are larger than those made at 200 yards, supports this hypothsis.

Gears without "Backlash."—For a number of mechanical purposes, a gear that may be made into a train of two or more, working without "backlash," is very desirable. Such a gear we believe to be possible, and the attention of our mechanics and inventors should be directed to this end. Slashed teeth gears are inefficient, and absorb much power by friction. Something better ought to be contrived.

The gross receipts in round numbers of the Paris Exhibition were twenty-nine million francs and the expenditures twenty-seven millions, leaving a profit of about $400,000, which is much better than was at one time expected. The building is now being taken down.

When a belt becomes slack do not twist or turn it, but "take it up" in a workmanlike manner. The belt is probably more valuable than the time required.

Notes on Recent Scientific Discoveries.

NEW ALLOYS.

Two new alloys of tin and lead are described by M. Plho. While containing less tin than is used in common pewter, they are said to possess most of the advantages of that useful alloy. They are not acted upon by vinegar, sour wine, or salt water. The first is made by melting 1 part of tin with 2·4 parts of lead. The lead is first melted and skimmed, then the tin is added, and the mixture is stirred continually with a wooden stick until it begins to cool, to prevent the lead from settling to the bottom. This mixture has the density of 9·64, and its melting point is 320 deg. Fahr. It may be rolled cold, and the plates do not crackle when bent. It takes a very good polish, and tarnishes but little on exposure. It will mark paper like lead, and is so soft that it may be scratched with the nail, but it will not foul a saw or file.

The second alloy is made by melting together in the same way 1 part of tin with 1·25 parts of lead. This alloy is less elastic and harder than the foregoing. It is rather brittle, less malleable than the former, and fills up a file. Neither of these alloys was acted on by boiling with acetic acid for half an hour, and standing in the acid for twenty-four hours longer, nor had salt water any action upon them; hence, they may be useful for some kinds of utensils.

STAINING WOOD.

Dr. Stolzel adds another to the many recipes already given for staining wood of a brown color. He first of all paints over the wood with a solution made by boiling one part of catechu (cutch or gambir) with thirty parts of water and a little soda. This is allowed to dry in the air, and then the wood is painted over with another solution made of one part of bichromate of potash and thirty parts of water. By little differences in the mode of treatment, and by varying the strength of the solutions, various shades of color may be given with these materials, which will be permanent, and tend to preserve the wood.

PRESERVING WOOD.

We have recently seen notices of the extended use of alkaline silicates in Germany for the preservation of building materials, both stone and wood. The latter application may be noticed here with the remark that such a fire as that which recently occurred at Charing-cross Station could not have happened if the woodwork had been protected by the means noticed. The cost is but small, and the immunity it gives from fire is complete. According to the expired, and almost forgotten, patent of De Wylde, the woodwork is first saturated with a very dilute solution of silicate of potash, as nearly neutral as possible, and when this has dried, one or two coats of a stronger solution are given. When lives are lost by fire almost daily, it seems strange that such means of protecting wooden staircases and flooring should be neglected.

ZINC CEMENT.

We have before mentioned Soret's cement, which is formed by making oxide of zinc into a paste with a solution of chloride of zinc. This paste quickly sets into a hard mass, which may be applied for stopping teeth and a variety of useful purposes. Dr. Tollens gives a cheaper form of the same cement, which may be used for stopping cracks in metallic apparatus, and cementing glass, crockery-ware, and other materials. He mixes equal weights of commercial zinc white and very fine sand, and makes the mixture into a paste with a solution of chloride of zinc having the density 1·26. The mixture sets rapidly, but allows plenty of time for its application. As it resists the action of most agents, it will be very useful in the chemist's laboratory.—*Mechanics' Magazine.*

Preserving Dead Bodies.

Profs. Chas. A. Seely and Chas. J. Eames, of New York city, have obtained a patent for the impregnation of dead bodies with carbolic acid, which is said to be superior to the old Egyptian method.

"We apply the antiseptic liquid to the surface of the body, and also, when deemed advisable, we inject it into the stomach and intestinal canal. For the external application we take a solution of the acid in water, or other convenient solvent, and wash the body with it, by means of a sponge or cloth, and when the first washing has been finished, we repeat it one or more times; or, when convenient, we immerse the body in a weak solution of the acid for a short time; or we saturate cloths with a solution of the acid, and then wrap or wind the body in the cloths so saturated, and allow them to remain on the body. The body thus brought in contact with the liquid absorbs it by degrees, and the decomposition of the body is arrested or prevented.

"We have found that in many cases, and especially in cold weather, the external application of the antiseptic is sufficient to prevent change within a few days. But when it is desirable to keep the body for a long time, we inject a small quantity of the antiseptic into the cavities of the chest and the abdomen. We make the injection by the use of a syringe, and at the natural external openings to the cavities. The amount of liquid to be injected should be at least a few ounces, and we find no objection to the use of such a quantity as will distend the cavities. In addition to the applications of the antiseptic, as above described, we sometimes find it useful to place cotton, wool, lint, or cloth, saturated with the acid, in the nostrils and in the ears.

"Our process, when carried out, as above described, is entirely efficient for the preservation of a body during the ordinary interval between death and burial. But, when the process is used as an embalming process, or when there are no objections to making incisions into the body, we prefer to inject the acid into the arteries and veins, or, in addition to the ordinary external and internal application of the acid, we inject some of the acid through an opening of the skull into the substance of the brain.

"For a further security against decomposition of the body, and especially when the cloths saturated with liquid are not kept permanently about the body, we place at the bottom or sides of the coffin sheets of felt or cloth, or similar fibrous material, which has been saturated or dampened with the antiseptic liquid.

"In combination with carbolic acid, we have used bisulphite of lime and bisulphite of soda, and a solution of sulphurous or acetic acid with advantage. But we are satisfied that carbolic acid is the most active and useful agent for our purpose, and that any addition to it is not essential to success. We have found the use of a mixture of carbolic acid with saw-dust, or other inert granular matter, often advisable in the bottom of the coffin."

(From the British Journal of Photography.)

Contribution to the History of Photography.

There are none who will not read with pleasure the following communication by the late lamented M. Claudet, which contains much historical matter of great interest. It is the substance of a letter addressed by M. Claudet to Mr. P. Le Neve Foster, Secretary to the Society of Arts, in reply to a congratulatory letter on the occasion of M. Claudet's receiving a high and well-merited honor:—

MY DEAR FOSTER.—Immediately on the discovery of Daguerre, I went to Paris, saw him, and bought from him the first license to work out his process under the patent he had taken in England. I came back brought all the specimens I could procure—made by his pupils, for he was attending once a week at the *Conservatoire des Artes et Metiers*—to instruct all the adepts and give them the information they wanted to master the process. I sent to the Royal Society's soirees the best specimens, after having submitted a collection of them to the Queen, who kept the best of them.

At that time, and without any authority from the patentee, the Polytechnic Institution took up the subject as an advantageous one to give lectures upon; and Mr. Goddard, a chemist in the employment of the Institution, explained every day the process to visitors, illustrating it by taking Daguerreotype pictures of a white bust before the audience.

Then, without a license, and in defiance of the patentee, Mr. Beard, having bought an American invention by which, substituting a large concave mirror for the object glass of Daguerre, found it was possible to operate upon a very small plate placed in the focus of the mirror, with a greater rapidity than by Daguerre's plan. Beard was allowed by the Polytechnic Institution to erect on the top of the building a glass room, and he began to take portraits by the said American photographic process. He intentionally dropped, the name "Daguerreotype." You recollect the success and popularity of the process.

In the mean time, wishing to work out my license, I treated with the proprieters of the Adelaide Gallery, and I erected on the top of the building a glass room and all that was necessary; but I could not use the patented mirror, so that I was obliged to do the best I could with Daguerre's slow object glass. I went on so during 1840.

Early in 1841 I communicated to the Royal Society my discovery that chloride of iodine and chloride of bromine added to the preparation of Daguerre (iodide of silver) was capable of rendering the original process one hundred times more sensitive, and from that moment I obtained instantaneous Daguerreotype pictures—as much so as with the present process of photography. My discovery made a great sensation in France, and every one took up the process, for which I had not taken out a patent.

But I must not omit to state that Goddard had made some experiments on the application of bromine, and that before my paper was read at the Royal Society, it appears he had sent to the Royal Society a sealed paper in which he had described the accelerative property of bromine. I believe that it was so; but my discovery was the only one (being published and public) by which the photographic world could practice a very quick process; and, in publishing it to the Royal Society, I gave all the information and directions necessary to practice it.

Not long after Beard had taken up the American photographic process, Daguerre instructed his agent in London to find a buyer for his English patent. By my license he was bound to give me the option of refusal. My partner not understanding the future of photography, would not consent to our buying the whole patent for £800, which was the price asked by Daguerre. I was obliged to decline the offer; and Daguerre's agent having made known to Beard the terms of the purchase of the patent, the latter wide-awake speculator was too glad to accept the offer, particularly, thinking that in buying the patent he could withdraw my license. This gave rise to a very long and expensive action in Chancery, which was at last decided in my favor, and Beard had to pay the whole expense.

During the year after Beard had bought the patent, he sold licenses to all country towns to the amount of £36,000!! This I know as certain from Johnson, who was interested with Beard, having sold him part of his patent for the concave mirror, of which Johnson was the inventor. I have told you more than you probably wanted, but I could not help giving you the whole story. A. CLAUDET.

Card-Board for Printing.

"I take a log of wood of any suitable description, and cut it by machinery into thin sheets or laminæ, in a well-known manner, after which they may be bleached or not, as desired. I then paste two of these sheets together, the direction of the grain of the upper sheet crossing that of the lower sheet, and submit them to heavy pressure by passing them between rolls, thus destroying the rigidity and condensing the fibers and closely uniting the two sheet together so as to avoid any liability of bending, twisting, or breaking the strip, and leaving its upper and lower surface with a smooth, hard finish, suitable to print upon. The strip may now be cut up into cards of the required size. If a highly-polished or artificial surface is required, it is simply necessary to apply an enamel of the required color, in a manner similar to that put on to ordinary cardboard. Cards made as above described, ready to be printed upon, may be furnished at about one eighth the cost of those made from the materials heretofore used for the same purpose." Patent of Abbot R. Davis, of East Cambridge, Mass.

The Imitations of Luxuries and their Deleterious Effects.

He who does not see his coffee ground from the bean or berry, may be almost positive that he is drinking from year to year a surrogate in liquid form. In England, as a rule, the grocers sell only ground coffee; therefore one is not surprised to see in the pantries of the housekeeper, in the windows of the victualler, or in the apartment of the single mechanic, where a spirit lamp does the cooking, packages bearing inscriptions and vignettes on handsomely prepared envelopes of the article; but the lord drinks chiccory in his "Finest Mocha Coffee," as well as the humbler citizen in his "Fine Java Coffee" or the plain mechanic in his "Delicious Family Coffee." If only the chiccory were genuine, the damage would be considerable, though much less than it now is. Chiccory is now prepared, to our certain knowledge, of oak bark, of old coffee grounds, of finely sifted coal ashes, or else with the sawdust falling from mahogany and walnut woods, as well as with iron black and ground horse leathers; these are a few of the elegantly prepared articles sold under the name of "coffee."

German coffee very often consists of roasted barley grounds, or rather malt, after it has been exhausted at the breweries. In the same form with the coffee in England, is the sugar purchased in Germany, viz., finely ground, but "Heaven save the mark!" such sugar! In over ninety per cent of all the shops, the sugar, or some grades of it, is falsified and poisonous. The articles used are sugar of milk, starch, sand, plaster of Paris, etc. An inferior article of beet sugar is also used to impart the sweetness necessary to the materials used for imitating loaf sugar, and the latter has been known to be prepared of acetate of lead, sulphuric acid, old paper, wool, flax, and even common rags, ground up, and impregnated with white sugar: and thus has elegant lump sugar been established by chemists as a more ingenious than genuine article of food. The so-called "pulverized sugar" is often impregnated with dried and ground mushrooms, or even ground butterflies of the miller and moth species, and, in fact, *anything white.*

Wine is a cheering balm to the human heart, but what is wine? The manufacture of wine is no simple process—oh, no! it has become an industry with thousands of "recipes and formulas." In England, wines are prepared of mangel wurzel, plums and raspberries; and rose leaves and rain water assist in the preparation of expensive, and therefore fine "Madeira."

Wine is now made in Germany, for exportation, which contains not one drop of grape juice. The potato has supplanted the fruit of the vine. The sirup (?) or strength of the potato is distilled, and by the assistance of other materials, color, consistency, and smell are imparted, to form a liquor rivaling the choicest vintages. Such a wine can of course have no tartaric acid in its composition, cream of tartar is added in quantities sufficient to produce all the flavor of the genuine article. This, of course, must be done in the manufacture of clarets, other red wines, and champagnes. Wines called "champagnes" are, to our certain knowledge, prepared of honey, chalk, pigeon dung, and even worse materials, and then drank by admiring *bon vivants*, at extravagant prices.

The world at large is flooded with advertisements of quack doctors, who profess to cure anything and everything; and more medicine is taken into the system which is in itself pernicious, than even the proportion of adulterated articles of diet sold by the grocer. In many cases these so-called medicines are composed of filthy and injurious ingredients, which even in health are poisonous, and in sickness worse than useless. This is particularly the case among the middle and lower classes of Europe, who, from ignorance and poverty, readily fall into the snare laid for them by these unscrupulous scoundrels.

With all this before us, we are led to the reflection that the attention bestowed by governments to the food and health of their respective populations, are altogether in the wrong direction. Strict inquiries are instituted, and strict penalties await the unfortunates who in weight or measure fall below the standard established by government. Infringement of trade marks on nostrums, etc., are protected, but when did any government think of establishing any supervision over the *quality* of the food sold to its subjects, for which they are required to pay the price of the genuine article, receiving poison therefor, which destroys health and shortens life, and rapidly enriches the unprincipled manufacturer? Chemical analyses and investigations should be instituted in all such instances, and the health and life of the people should be protected by the government.—*Journal of Chemistry.*

Cancer Salve.

Mr. G. W. C. Gamble, of Millersburg, Iowa, has lately obtained a patent for a salve which he says will cure cancer, made as follows:—

Take ashes of red oak bark, the bark being either in a green or dry state, in quantity, twenty pounds; the ashes of

the root known as "bitter sweet," with its bark either green or dry, five pounds; also, of green poke root mashed fine, five pounds. In preparing the compound, take a wooden vessel of suitable size, with perforations at the bottom, being such as is used to run off common ash lye. Into this vessel put about five pounds of the ashes of red oak bark and of bitter sweet, whem mixed in the proportions above mentioned; then add five pounds of the mashed poke root, with the remaining portion of the ashes of red oak and bitter sweet. To this mixture add sufficient water to moisten it without dripping. Let the mixture stand twenty-four hours. Then run it off by adding water until the strength of the ashes is exhausted. The extract will now be put in a metal vessel and boiled to the consistency of salve. Put in bottles with ground glass stoppers, and it is ready for use.

Fabric for the Manufacture of Hats, Caps, etc.

Treflé Garceau and Edward de la Granja, of Boston, Mass., have obtained a patent as follows: "We dissolve india-rubber in ether, and melt paraffine by the application of heat until both are in a condition which admits of their being kneaded with paper pulp into one homogeneous compound. We then take from two to twenty parts of the dissolved india-rubber, from one to five parts of parafline, and one hundred parts of paper pulp, and thoroughly mix them by kneading or heating, until the whole mass assumes a uniform consistency and becomes homogeneous in character. In the manufacture of the articles above enumerated, the composition which we have described may be used either alone or in conjunction with some textile fabric, such as stiff muslin, long lawn, cotton or linen cloth, etc., etc. If used in connection with the cloth, it may be spread or rolled upon the cloth by means of an ordinary roller, rolling press, or machine, and may be prepared in this manner in slabs or smooth boards, of any desired dimensions. Having thus prepared the material, we next proceed to color it as the fancy may suggest. It will receive the most delicate shades and tints, as well as the most brilliant colors, and may be beautifully embellished with designs of fruits, flowers, leaves, insects, etc. From the material thus fully prepared, we manufacture hats, caps, and bonnets by compressing it to the proper shape in molds constructed in different fashions, so as to imitate silks, woolens, plaited straw, or any other material usually employed in the manufacture of such articles. Neckties, ribbons, etc., may be made from it in a similar way, cutting and stamping them out with dies so constructed that when the articles are finished they are a perfect imitation of silks, woolens, liner, or any other material used in the manufacture of these and similar articles."

Tinning the Interior of Lead Pipes.

It is well known that lead pipe is injurious to water, particularly in certain localities. To avoid this, the interior of the pipe has been tinned during the process of manufacture, either by pouring through it melted tin, or by dipping said pipe in a bath of tin, and allowing the melted metal to run through the tube. In all cases where the coating of tin is not perfect, the exposed surface of lead is much more likely to oxidize than it would be if portions of the lead were not covered; hence the coating of the interior of lead pipe with melted tin has been unreliable and not generally practised. The nature of the said invention consists in a mode of applying to the interior of the lead pipe a flux that will protect the lead from oxidation, and insure a perfect coating of tin when the tin is poured through said pipe, or the pipe dipped into the bath of tin. After the lead pipe has been made, place the same in a vertical or nearly vertical position, and pass down through the same a strong cord, to which a weight is attached to draw the cord through the pipe, and at or near the other end of the cord, a sponge, or piece of other porous elastic material, is attached, of a size to fill the pipe, and of any desired length, say six inches, more or less. The flux employed is either grease or muriate of zinc, but any other flux may be used. The sponge or porous wad being saturated with this flux, is drawn through the pipe, and by its length insures the covering of the entire surface of the inside of said pipe with the flux, so that the melted tin, subsequently applied, will be sure to adhere to all parts with uniformity and firmness. Patented by Peter Naylor, of New York city.

The occasional cleaning of files in the machine shop by means of oil, heat, and the card will save dollars to the owner and annoyance to the worker.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

There seems to be some secret connected with the manufacture of large glass plates, which is known only in certain establishments in France. To make plates of such enormous size as these works send out, free from cloudy spots, perfectly transparent and homogeneous throughout, is an operation which is the result of expert manipulation, as well as the addition of ingredients not commonly known to the trade. A single plate of glass just imported from France is 20 feet long by 16 feet, 8 inches wide. Its use is not as a window, but to represent under a strong light a frozen lake in one of the scenes of a popular spectacular play of the day.

The chemical establishments of Philadelphia represent a capital of two and a half millions of dollars, and manufacture much the largest proportions of the best chemicals used in the United States. Some idea of their extent and importance may be derived from the fact that they consume 4,400 tuns of sulphur, 1,000,000 lbs. of saltpeter, 5,000 tuns of salt, and produce daily of sulphuric acid 150,000 lbs., or over 45,000,000 lbs. every year; of alum, 20,000 lbs. daily; of muriatic acid, 20,000 lbs.; of nitric acid, 10,000 lbs.; of copperas, 15,000 lbs. daily; of nitrate of silver, 150,000 ounces annually, and additionally thereto, a long list of medicinal preparations.

The railway rolling stock of Great Britain, if ranged in line, would be headed by about 50 miles of locomotives and tenders, about 100 miles of carriages, and 850 miles of freight, gravel, cattle and miscellaneous cars. On the British railroads last year, the amount expended upon locomotive power was 27·93 per cent of the working expenditure. For maintenance of way and works the expense was 18 43 per cent of the working expenditure; for repairs on cars, 8·18 per cent. The total expenditure under all heads was 49 per cent.

In the corresponding column on page 166, current volume, we spoke of the broad-gage extension scheme to Chicago of the Erie railroad. The Atlantic and Great Western broad gage, which intersects the Erie at Salamanca, N. Y., was to be tapped at Akron, Ohio, and a new line was to be built between this point and Toledo, a distance of seventy-eight miles. An extra rail along the Michigan Southern and Northern Indiana road would complete the broad-gage through to Chicago. Steel rails were to be used in constructing the new portion of the line, and according to one statement, the building contract was already let out. To pay the pressing indebtedness of the Erie company, and the cost of the new section, $8,000,000 worth of stock was issued, and this furnishes the bone of contention in the present existing railroad war, the real object of the anti-Erie party being to prevent the building of the Akron-Toledo connection.

It is appears from the report to the Massachusetts Legislature of the Hoosac tunnel commissioners, that had a railway been laid for only eight miles up Deerfield river, to a vast lumber region at that point, the saving in the cost of lumber and supplies thus made would have paid the whole cost of the road. The progress in boring last year, with the Burleigh machine, was highly satisfactory. By the aid of nitro-glycerin, one hundred and fifty feet may now be accomplished every month. On the whole, the commissioners have confidence in the future rapid progress of this "great bore of the Commonwealth;" and the Chief Engineer having examined the Mount Cenis tunnel, asserts that the machinery employed on the Hoosac is superior to that used in the European works.

Anthracite iron was first used in this country about the year 1837. Last year the production of the whole country was 784,783 tuns, the State of Pennsylvania alone producing 586,584 net tuns. The production of raw coal and coke pig iron last year was 318,647 tuns, sustaining the average steady gain in this branch of industry exhibited for the past fourteen years. In New England, the expansion of the charcoal pig iron manufacture, for a number of years, has been prevented by the scarcity of timber, and many furnaces, owing to this cause, had been abandoned. In New York, a falling off, as compared with 1854, of about 8,000 tuns, is noted for last year; the make steadily declining until that year, but since then regularly advancing. In Pennsylvania, the number of charcoal furnaces reached its maximum—170—in 1847, since which time the number annually abandoned have largely exceeded those erected. But little charcoal pig is now made in Pennsylvania west of the mountains. In the later-settled States, Ohio, Missouri, Michigan, this industry is still active. The total quantity of pig iron made in the United States last year, was for anthracite, 784,783 tuns; raw bituminous and coke, 318,647 tuns; for charcoal iron, 344,341; total, 1,447,771 tuns.

In crossing the mountains in Pennsylvania, the highest elevation overcome by a locomotive railroad in a single rise, is on the Delaware, Lackawanna, and Western company's line, from the Delaware river, where it is 288 feet above tide level, to Pokono summit, at an elevation of 1,969 feet, making the altitude surmounted 1,681 feet. Scranton City is 839 feet above tide, and 1,249 feet below the summit on the Delaware and Hudson Canal company's railroad. The summit on the two Lehigh companies' road, near Wilkes Barre, is 1,630 feet above sea level; the latter place is at an altitude of 527 feet; the difference of elevation is 1,103 feet, which is accomplished on a grade of 96 feet per mile.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Apparatus for Warming and Ventilating Buildings.—James Whitehill, Frederick, Md.—This invention consists, first, in an improved attachment to be used in connection with the furnace patented Nov. 8th, 1859; and, secondly, in so connecting the hot and cold air flues, and employing a fan in combination with them, that the building can be quickly emptied of its cold air while being filled with warm air, and that the supply of cold and warm air can be so adjusted that the temperature of the building can be perfectly regulated and controlled at all times.

Invalid Bedstead.—W. W. Rowles and A. J. Russell, Baltimore, Md.—This invention is an apparatus which may be attached to any bedstead, and by means of which a sick person may be gently raised and removed from the bed and returned to it again, without being caused any pain, when it is necessary that the bed should be made, or the clothes changed.

Lock.—S. W. Drowne, Norwich, Conn.—This invention relates to latch locks more particularly, and consists principally in a novel arrangement of the latch-bolt and locking mechanism, whereby the latch-bolt can be so locked that it cannot be operated by the handle or knob-spindle, but yet it is free to play when the door is closed.

Napkin Ring and Salt Cup.—George Pine, Trenton, N. J.—This invention relates to a new napkin ring or holder, which is combined with a salt cup in such a manner that each person at table can have his or her own salt cup, thereby doing away with the necessity of taking salt from a common salt-cellar.

Meal and Chop Dryer and Cooler.—H. H. Bingham and J. C. Hunt, Terre Haute, Ind.—This invention relates to a new device for drying and cooling meal and chop, and consists in the use of an inclined polygonal reel, which is open at both ends, and into the higher end of which the meal or chop, as it comes from the mill, is fed.

Lampblack Apparatus.—Mahlon Matlack, Bridesburgh, Pa.—This invention relates to a new machine for producing lampblack from suitable material, and consists in the construction and arrangement of the furnace and of the detaining devices, by which the lampblack is separated from the gases, and of the roof of the structure, all parts being so arranged that the operation of the apparatus will be complete, that no lampblack will be allowed to escape with the gases, that no explosive gases can accumulate in any portion of the apparatus, and that the fire cannot reach any combustible portion of the apparatus.

Weeding Tool.—Nelson Webster, Plainfield, N. J.—This invention consists chiefly in combining a hoe with a rake in such a manner that when the hoe is pushed forward through the weeds the teeth of the rake will separate and sever the weeds, so that they will be made thoroughly innoctious.

Piston Packing.—Julius King, Hoboken, N. J.—This invention relates to a new piston packing, of that class in which metallic packing rings are used, and consists in the use of packing rings which are arranged around the piston, but which are not cut. Each ring is connected with the piston by means of a screw-bolt, or other equivalent device, by which the ring may be drawn toward the piston.

Weeding Machine.—Nicolaus and Charles Carstens, New York city.—This invention relates to a new machine for removing and destroying weeds from walks and other places, and consists in the application of a revolving rake in rear of the weeding tool, for the purpose of throwing around and separating the weeds that were cut off by the tool, and to deposit them upon the ground or into a box, so that they cannot grow again.

Carriage Hub.—Jno. W. Miner and David P. Ward, New Bedford, Mass.—This invention relates to a new and improved method of constructing hubs for the wheels of carriages, whereby the spokes are more easily and more firmly secured to the same, and the spokes are less liable to be injured by the jar, and, also, one or more spokes may at any time be removed and replaced without cutting the tire.

Hair Picking Machine.—Ph. Wisdom, New York city.—This invention relates to a new machine for picking hair from hair ropes. The horse hair to be used for upholstering and other purpose is twisted into a rope, so that it will become curled, which rope may, if desired, be turned into a coil, so as to increase the curls in the hair. The hair has then to be picked from the ropes, so as to become perfectly separated and ready for the market. To pick the hair from such hair ropes is the object of this invention.

Furniture Edge.—Franz Hütwohl, New York city.—This invention relates to a new mode of arranging the edges of upholstered furniture seats and backs, and consists in forming as an independent article of manufacture a stuffed roll of horse hair, moss, or other suitable material, covered with canvas, which is arranged with its threads diagonally across the roll, so that the latter can be bent into all curves or corners that may have to be formed on the seat or back of the furniture.

Oil Injector.—John Nation, Portland, Oregon.—This invention consists in admitting oil or tallow into a proper receptacle, and in applying steam to force the oil or tallow into the steam cylinder chest, or steam cylinder.

Wood Molding Machine.—James J. Russ, Worcester, Mass.—This invention consists it so hanging a frame in which are arranged the feed rollers of the molding machine to the supporting framework of the machine, that such frame can be raised or lowered at pleasure, according as may be necessary for properly adjusting the feed rollers for action upon the "stuff," and also in so constructing such frame case as to permit the feed rollers to yield in case there should be variations in the thickness of the "stuff" passing under the same. Second, in hanging the spindle of the side cutter heads to and in a vertical frame of suitable shape, arranged to be moved up and down, and also laterally, for adjusting the cutter-head fraction, and at its upper end provided with the box or bearing of the said spindle, whereby while the side cutter-head is susceptible of adjustment for action upon the stuff, the bearing of the box is always upon the spindle, in lieu of, at different points of the same, as with the arrangement of the parts heretofore employed, which produces an uneven wear. Third, in forming the bed to the machine the surface or molder cutter-head acts with a series of slots or openings, extending in the direction of the movement of the stuff, having bridge bars, so as to allow the cutters to act upon the edges of the stuff, without danger of striking the bed, and thus being injured. Fourth, in hanging the bar carrying the presser shoe, that is arranged for pressing upon the stuff just in advance of the point of action therein by the molding cutter-head, in such manner to the frame work of the machine that through such frame it can be adjusted in hight for a more perfect action of its presser shoe upon the stuff, and to yield should there be any variations in the thickness of the stuff passing through the machine. Fifth, in a novel constructed clamp for holding the press-block, that is located for action upon the stuff, after having been cut by the molding cutter. Sixth, in the arrangement in connection with the pulley drums, of the spindle to the side cutter-heads of a loose pulley, by means of which the two cutter-heads can be driven with one belt, and both made to turn in the same direction. Seventh, providing the springs in the bed plate through which the side cutter-heads are arranged to move in a lateral or transverse direction, with a bridge plate or plates, susceptible of adjustment independent of the cutter-heads, whereby an adjustable support to the stuff is given, as it passes over the line of such openings.

Rudders.—H. H. Pember, New York city.—This invention relates to a mode of hanging rudders to vessels, whereby a rudder may be unshipped and shipped with far greater facility than hitherto, so much so as to admit of a rudder, in case of being damaged and rendered unserviceable at sea, being unshipped and drawn directly up through the rudder post upon deck, without the trouble and danger of lowering a boat and making chain or rope connections with a view of drawing the rudder up at the outer side of the vessel. Besides this advantage the invention admits of the rudder being unshipped without being lowered, the necessity of which requires the vessel to be in deep water in order that the rudder stem may be drawn down and out from the rudder post; and hence when a vessel lying in port requires to have its rudder unshipped for repairs, it is very often necessary to draw off into deep water in order to accomplish that end.

Machine for Boring Post Holes.—James K. Miller, New York city.—This invention relates to a machine for boring holes in the earth to receive posts, more especially fence posts. The invention consists in a novel means for rotating the borer and elevating the same, and in a means employed for adjusting the machine in a horizontal position on uneven or inclined ground so as to insure the holes being bored vertically into the earth.

Hanging Balanced Window Sashes and Roller Window Blinds or Shades.—Thomas Bullivant, London, England.—This invention relates to a mode of hanging balanced window sashes, whereby the latter may be taken from the window frame with the greatest facility for the purpose of cleaning, glazing, painting, etc., and the sashes also fitted in the window frame without any difficulty whatever. The invention also relates to a mode of hanging and arranging the blind, or shade in the window frame, whereby the former, when raised or not in use, is protected from dust or dirt.

Stovepipe.—Aaron Colton, Sycamore, Ill.—This invention consists in counterpoising or balancing a damper for stovepipes in such a manner that the damper will be self-regulating—closing as the draft of the stove increases and opening as the draft diminishes so as to insure a steady or uniform combustion of the fuel at all times.

Corn Planter.—R. S. Edwards, Savannah, Mo.—This invention consists in a seed-distributing apparatus and in the general construction of the machine, whereby the seed may be dropped with certainty and evenly in check rows, and the machine readily manipulated and all the working parts put under the complete control of the driver or operator.

Casting Plowshare.—Jonathan Hunton, Hackensack, N. J.—This invention is designed to admit of casting, with a chilled mold, those plowshares which are provided with a leg or projection to fit into a staple or socket on the moldboard, and which are also provided with a pendant land side projection having an oblique position relatively with the upper surface of the share. Shares of this kind have hitherto been cast in sand molds for the reason that they could not be drawn from cast-iron ones, and consequently the advantage of a chill has hitherto been lost in casting them.

Writing Pen.—Robert Hirst, Hudson, N. Y.—This invention relates to an attachment for writing pens for the purpose of retaining or holding a larger quantity of ink than can be retained by the ordinary simple pen.

Cultivator.—Benjamin Anyan, Fitchville, Ohio.—This invention relates to a cultivator for cultivating plants grown in hills or drills, and it consists in a novel construction of the same, whereby the device may be applied to the front axle of any ordinary farm wagon.

Grain and Grass Harvester.—D. H. Thayer, Ludlowville, N. Y.—This invention relates to a means employed for forming a connection between the wheels of a grain and grass harvester and axle. The invention is designed as an improvement over the ordinary pawl and ratchet now generally used to cause the wheels to turn the axle and answer as a shaft to drive the sickle when the machine is drawn forward, and admit of the wheels turning loosely independent of the axle when the machine is backed, so that the sickle will be inoperative under a retrograde movement of the machine.

Water Wheel.—I. M. Thompson, Edinburgh, Ind.—This invention relates to a water wheel of that class which are fitted or placed on a vertical shaft and rotate in a horizontal plane. The invention consists in combining two wheels in one and providing each with a series of gates arranged in such a manner that both sets of gates may be operated, opened and closed, simultaneously by a single manipulation on the part of the operator, all being constructed and arranged in such a manner that a large percentage of the power of the water is obtained.

Cultivator and Gang Plow.—Isaac B. Mahon, Dunkirk, Ohio.—This invention relates to a cultivator and gang plow and is an improvement on a cultivator patented Sept. 17, 1867. The object of the present invention is to render the previous patented invention susceptible of being adapted as a gang plow and to economize in the construction of the machine generally and to render it more strong and durable.

Refining Glycerin.—Otto Laist, Cincinnati, Ohio.—This invention relates to a new and improved method of refining glycerin whereby it is rendered inodorous and colorless and with less time and expense than by methods heretofore used. The process consists in distilling the crude glycerin in a retort or still in which is placed any suitable fatty body as animal or vegetable oils or any oleaginous acids as margic or stearic acids and the like.

Hay Fork or Harpoon.—J. W. Summers, Sandy Hill, N. Y.—This invention consists of a simple and effective arrangement of parts which produce a cheap and effective hay fork.

Pocket Knife.—John Mosley, New Haven, Conn.—This invention relates to certain improvements in pocket knives, whereby the same are made exceedingly strong and durable. It consists in forming the handle of the knife in one piece and forming the springs with a recess to fit upon a projection in the bottom of the handle thus dispensing with the rivets heretofore required to hold the springs and handle together. The handle may be cast in one or two pieces, and thus formed and fitted with the springs and blades, constitute a strong and durable knife, capable of withstanding the severest usage without becoming loose.

HANDLES FOR AWLS, ETC.—D. R. Wight, Sturbridge, Mass.—This invention relates to a new improvement in the construction of handles for awls, and other similar tools.

STEAM ENGINE VALVE.—W. R. Thomas, and Thomas Evans, Catasauqua, Pa.—This invention consists in operating two piston valves on one rod, in a cylindrical steam chest by arms on the piston rod of the engine.

STAVE SAWING MACHINE.—William R. Bishop, and Oriel D. Bishop, Harrison, Wis.—This invention relates to a machine for sawing staves for barrels and other articles of a similar construction.

APPARATUS FOR REGULATING THE POSITION AND MOVEMENT OF THE ARMS OF VIOLIN PLAYERS.—Edward Mullenhauer, New York city.—This invention relates to a device for attaching to the person of a violin player for the purpose of regulating the position and movement of the arms when playing on that instrument.

CURTAIN CORD FASTENING.—Thomas Curley, Troy, N. Y.—This invention has for its object to furnish a more simple, cheap, and convenient fastening for window shades or curtains, than has hitherto been in use.

SHOE KNIFE.—N. M. Ray, Ellsworth, Me.—This invention consists in securing to the end of the knife blade a detachable cap, or guard, whereby the upper leather of a boot or shoe is secured from injury in the process of paring the sole.

FIRE-CRACKER PISTOL.—J. W. Bailey, New Orleans, La.—This invention relates to a device for applying the present popular breech-loading principle to the explosion of fire-crackers, whereby the accidents which not unfrequently happen from such explosions are avoided.

GANG PLOW.—John L. Keasor, Laconia, N. H.—This invention has for its object to furnish an improved gang plow, simple in construction, easy of adjustment, and which at the same time will be held securely and loosely when at work.

TELEGRAPH INSULATOR.—J. L. Finn, Elyria, Ohio.—This invention consists of an improved telegraph insulator and lightning arrester, and its objects are to provide a more effectual mode of insulating telegraph wires, and to collect and arrest the free electricity pervading the wires, and convey it harmlessly into the ground.

IRON HEATER.—S. W. Smith, Addison, Vt.—This invention consists in combining and arranging circular plates of such form as to leave a chamber between them for the flat irons, and so that while the irons are heating they are excluded from the atmosphere, and no part but the handles exposed.

WATER HEATER.—John Marshall, Hartland, Mich.—The object of this invention is to provide simple and efficient means for heating water or other liquids, in wooden vessels, for washing clothes or other purposes, and it consists in producing a circulation of water between the tub, barrel, or other vessel, and an annular heater by a divided tube.

AIR BRAKE FOR CARS.—Auguste De Bergue, Paris, France.—The object of this invention is to arrest the motion of railway cars by the resistance offered to the steam pistons by compressed air, or the friction of ordinary brakes actuated by compressed air. The invention consists in providing an adit or air passage for admitting air to the piston when the latter is in motion, whereby the air is drawn into the cylinder at each stroke of the piston, and forced into a reservoir where its accumulating tension finally absorbs the momentum of the train by acting against the pistons at each stroke of the latter.

INSTRUMENT FOR MEASURING DISTANCE.—George Achelis and Hermann Poppenhusen, New York city.—This invention is designed for the use of artists and students of nature and art, to enable them to transfer to a drawing approximate proportions and distances of objects in a landscape with greater accuracy than is possible with the unaided observation of the eye.

SADDLE AND HARNESS.—H. M. La Rue, Andersonville, Ind.—This invention relates to an improvement in saddles and harnesses, and consists in having a small drum or ratchet to which the crupper or other strap is fastened.

MEAT BROILER.—Lewis Holmes, Keene, N. H.—This invention relates to a new and improved method of constructing broilers for the broiling of meat, whereby the same is more quickly done, without the escaping of unpleasant odors into the room.

CHURN.—Henry C. Bell, Heyworth, Ill.—This invention has for its object to furnish an improved churn, simple in construction, easily operated, and which will develop all the butter that may be in the milk in a very short time.

BROOM HANDLE LATHE.—Edwin Williams, Rowlesburgh, W. Va.—This invention has for its object to improve the construction of Peter Prescott's broom-handle lathe, patented Oct. 8, 1861, so as to make it more satisfactory and effective in operation.

LAP JOINT FOR BELTING.—Henry Underwood, New York city.—The object of this invention is to furnish an improved lap joint by the use of which a belt of nearly uniform thickness and strength may be produced, and at the same time the amount of stock used may be economized.

SEWING MACHINE.—Dr. W. St. G. Elliott, Morristown, N. J.—The improvements in sewing machines embraced in this invention principally consist, first, in so arranging a feed mechanism and applying it to the sewing machine in proper position to act upon the cloth or other material being sewed, that such feed can be readily brought into position for feeding the cloth or other material to be sewed in any direction or along any line desired, and without requiring the machine to be stopped. Second, in so arranging a frame or carriage for the shuttle or under thread carrier that it can be slid across the plane of movement of the needle, whereby it can be adapted in position for any of the under thread carriers.

CULTIVATOR AND SEEDER.—Lewis Bishop Talladega, Ala.—This invention consists in the adaptation of springs to the wheels of cultivators, whereby the inequalities of the soil will be passed over with facility, and other devices tending to perform in a more perfect manner the operations of seeding, planting, and chopping out cotton stalks.

BREAD MAKING MACHINE.—Marcus A. Jones, Frankfort, Ky.—This invention consists of a pair of rollers operating within a tray which covers a chest of sliding bottoms, the successive withdrawal of which accomplishes the manipulation of the dough and leaves it in the pans ready for the oven.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

B. F. W., of Tenn.—The specimen which you sent to this office is not an "ore," as you think, but a variety of clay very strongly impregnated with the red (hydrated) oxide of iron. The other chemical components are chiefly silica and alumina. Though useless as an ore this substance is perhaps applicable as a coloring material.

W. A. E. R., of Ohio.—"Does the sun's light reach the earth's atmosphere in one beam?" The sun's light consists of rays which are emitted from its surface in all directions. A number of these rays which, to all intents and purposes, are parallel, is called a beam. If they are so far apart that they cease to be practically parallel we cannot speak of them as being in one beam. You will perceive that the term "beam" is therefore to a certain degree conventional and does not denote a fixed number of rays.

S. M. W., of N. Y.—The cocoa nut oil or cocoa butter is extracted from the kernels of the cocoanut. The natives of Ceylon and Madagascar gain it either directly by pressure or by boiling the kernels in water and skimming the oil off as it rises to the surface. In Europe heat and pressure are likewise resorted to, and the consistency of the oil—which is a mixture of a fluid and a solid fat—varies as these elements in its production.

A. J. F., of Vt.—We suppose that the best process for converting cast iron into steel in your instance is that of "case hardening," which consists in heating the articles to a bright red heat and then sprinkling them with finely powdered ferrocyanide of potash or soda. We are not aware of any difficulty in the way of converting cast iron into steel because the former has been chilled before the operation.

F. B., of Pa.—The only purification to which plumbago is usually subjected is pulverization and washing with water to separate it from its grosser and heavier impurities. We are not aware of any particular machines having been devised for this process.

J. H. C., of N. Y., propounds the old question: "Why is it that earth taken from a hole with pick and bar will not fill it when returned, when slightly tamped?" One reason is that the tamping, however "slight" it may appear to the observer, may still be sufficient to render the earth more compact than it was before excavation. Beside this, it is well known that the ground is always moist on account of the water which circulates through it; when a portion of it is removed and exposed to the atmosphere this water evaporates and causes a shrinkage of the original volume.

E. J., of Rockville.—Load stones are never used now-a-days for the production of magnets; electro-magnetism is now generally used for this purpose. The bar to be magnetized is armed with a piece of soft iron on each end and placed for a short time into the interior of an electro-magnetic helix, wound up on pasteboard, while an electric current passes through it at the same time. The details of this and of other processes for making magnets, can be found in any larger treatise on electricity. As regards the prices you had better address yourself directly to some firm dealing in these articles.

E. O. McC.—"Why do drills become magnetized?" We are unable to say. It is well known that the drills used in an upright boring machine acquire the property of magnetic attraction sooner than those used on a horizontal lathe. Fire irons, as tongs, shovels, pokers, etc., also acquire the property in time. The reason why, is yet among other inexplicable mysteries.

J. S. W., of N. C.—"The best way of keeping furs and undressed hides during the summer months?" Carbolic acid preparations are probably the best. A company in this city manufacture an article expressly for this purpose.

Inquirer.—"Please explain how it is that the radical of ammonia can be an element." We are not aware that this radical has ever been considered an element by any chemist.

W. C. P., of Pa.—"How much does a bar of railroad iron expand during the heat of summer, and how far apart should the rails be laid to allow for contraction and expansion by the differing temperature of the atmosphere?" One mile of rail will expand or contract between the temperatures of 4° Fah. and 100° Fah., 67 inches, according to Silliman. From this datum our correspondent can easily calculate the expansion of a single rail of 18 feet length. For more specific information he had better apply to some section contractor, as the condition of the road—whether passing through forests and deep cuts, or over exposed plains—materially alters the circumstances.

G. S., of ——.—See page 183 of current volume in the answer to "J. F. G., of Ohio," for a reply to your question as to the preparation of canvas for painting. Read the paper weekly and it will save you the trouble of repeating such inquiries.

L. G. G., of N. C., wants some information as to the injurious effects of burning oak instead of pine wood in a stove. He is told oak is destructive to the iron. All, or nearly all, woods yield an acid by destructive distillation or slow combustion; oak and other hard woods more than pine. This acid is injurious to iron, corroding it rapidly, especially if the wood be green. If well seasoned and the stove has a good draft no difficulty need be apprehended.

W. D. H., of La., asks how to restore linseed and nut oils after they have become thick and gummy. Perhaps some of our correspondents can answer.

W. H. G., of Pa., desires to know the melting point of the composition known as Babbitt metal. We cannot tell, but it may be melted like lead in an ordinary iron ladle over an open fire. He asks also if there is a better anti-friction metal. There is, and it is known as the "Star Metal," and manufactured by the Star Metal Co., 35 Liberty street, New York city. "What substance beside oil is used as a lubricant?" The stern post bearings of propellers are lubricated with water; soapy water or water in which soda has been dissolved is often used in machine shops.

G. A. C., of Mass.—"Is there a metal or metallic composition which contracts by heat? What metal expands the least and what the most?" We know of no combination of metals which contract by heat. A composition of lead, 9; antimony, 2; bismuth, 1, expands in cooling. Platinum is the least expansive of the metals and zinc the most.

J. S., of Conn., answers the question of "F. S. B.," on page 183, current volume: "What proportion of water should be used in mixing plaster of paris so that no shrinkage results in setting." He says: Any proportion will prevent shrinkage, as it invariably swells or expands in setting. Different qualities of plaster expand in differing degrees. T. H. C., of Mass., also replies. He says that plaster expands while setting and for some time after. If "F. S. B.," will use lime water to mix his plaster he will not be troubled either with expansion or shrinkage. Sulphate of potash will have the same effect used in the proportion of about half an ounce to a quart of water. It makes it set quicker, but somewhat weakens it.

F. R., of N. Y., whose question in regard to white gunpowder appeared in No. 12, current volume, is answered by a correspondent who says that it is composed of chlorate of potash, 49 parts; ferro-cyanide of potassium, 28 parts; refined sugar, good quality, 23 parts. They should be pulverized and kept separate, and are mixed by sifting the ingredients together. It may be grained like common gunpowder, but the process is always attended with danger. Its explosive force is about five times that of common gunpowder. Its transportation or handling is dangerous.

A. F. T., of Wis.—In reply to your query on page 183, current volume, in relation to indellible pencil marks, W. C. D. of D. C., says: Wet the paper on which pencil marks have been made with milk or saliva and when dry they cannot be removed with rubber.

J. F., of Pa., desires to know how to melt a fragment of flint glass. Put the fragment (small), on a ring or loop made of iron, or, better, of platinum wire, and direct upon it the flame of a spirit lamp or gas burner by means of the blowpipe.

E. M. T., of Ky.—"What is the best mode for producing the electrical light?" Sending a powerful current of electricity through two carbon poles as arranged in electrical lamps, the best of which are those of French construction. You will find full information on the subject of inquiry in every treatise on Physics, which is not of the most elementary kind.

An anonymous correspondent inquires: "After a very cold snap, one in the deep woods will hear the frequent cracking of trees. This is observable only after the weather has begun to moderate and before it reaches the thawing point. Why is this?" The cause is the contraction and subsequent re-expansion of the interior of the trees caused by the changes of temperature. "When I open the door on a cold frosty morning, the steam of the room is suddenly condensed and appears as fog rushing in from the door. Explain the reason." Hot air can take up more moisture than cold air if it is saturated with steam and cooled off by the admission of air from without, part of the water which was held in suspension is precipitated and appears as fog.

M. G., of Mich.—A party is manufacturing light flat barrel hoops. It is desirable to have them less liable to split in driving. Is there any cheap substance suitable for the purpose." We suppose that hoops (wooden), steamed before driving or kept underwater, will preserve their toughness.

H. O. R., of Idaho.—"Why does a cup of tea retain its heat better than coffee? What are their boiling points, respectively?" We are not aware of the truth of your statement. The boiling point of a solution or extract, like tea or coffee, varies with the amount dissolved. The material of the cups affects the rapidity with which their contents cool off; tin cups retain the heat longer than those of porcelain.

G. S. C., of N. J., asks how the wheels of railroad cars act on curves, the wheels, as is well known, being rigidly secured to their axles. To prevent the wheel that runs on the inner rail from slipping too much the faces or treads of the wheels are made slightly convex, the larger diameter being nearest the rim or flange and the rails being made convex on their face.

G. A., of Pa.—"What is the meaning of upward in giving numbers; for instance, 'four hundred and upward,' or, 'upward of four hundred?'" Both mean the same; upward, more, or above four hundred. Such grammatical questions are somewhat out of place in our columns but we admit the queries and give the answer once for all.

W. A. H., of Tenn.—If your "gum" or rubber belt slips on the pulley it should be lightly moistened on the side next the pulley with boiled linseed oil—animal oil will not answer. If one application does not do the business, repeat. Very likely your belt is too slack. It is not economy of power, as you think, to run a loose belt. Would you hitch your oxen or horses to a plow the traces of which alternately contracted and expanded? The flap of your favorite loose belt is the same thing. Do your duty by your belts and they will return you a proportionate amount of service.

B. F. S., of Vt.—"Is there a cement that will mend a marble gravestone which is broken?" Yes; plaster of paris mixed with water to the consistence of cream.

Business and Personal.

The charge for insertion under this head is one dollar a line.

There are now in actual operation eight thousand of Ashcroft's Low-Water Detectors. John Ashcroft, 50 John st., New York.

Henry Carey Baird, Industrial Publisher, 406 Walnut st., Philadelphia, has just issued a new and much enlarged descriptive Catalogue of Practical and Scientific Books, 56 pages, 8vo, now the largest list of this character, comprising only the Publications of any one house in either the United States or Great Britain. It will be sent free of postage to any one who will favor him with his address. Every reader of the Scientific American is invited to send for it.

Coal-oil Works, revolving retorts and refinery, lately erected, for sale. Address, on the premises, John White, Darlington, Beaver Co., Pa., or C. G. Waterbury, 116 Wall st., New York.

$2,500 will buy one-half interest in a business that will pay fifteen thousand dollars a year. Address Steam Mill, Belair, Ga.

Agents wanted. Sample 35c. Smith, Shepard & Co., P. O. Box 867, Waterbury, Conn.

Two Valuable Patents for sale—one for a Fertilizer, and the other for Harness Wardrobe. Address H. E. Pond, Franklin, Mass.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. Bartlett Machine and Needle Depot 569 Broadway, N. Y

Mill-stone Dressing and Glaziers' Diamonds. Also, for all Mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Patent Engine Lathes and Upright Drills, Planer Centers, Lathe Chucks, Planer Chucks, and all kinds of Cutlery Machinery address Thomas Iron Works, Worcester, Mass.

Dutton & Maguire Tube Wells.—Patented in 1865. Illustrated in Scientific American of Aug. 17th, 1867. Unsurpassed by any other well. Works in any place, and where all others have failed. The subscribers are prepared to sell Town, County, and State Rights, or to furnish wells ready to put down, with printed instructions for putting down. Township Rights from $15 to $30, according to size, population, etc. Single wells supplied at a small advance on cost of material. Model furnished to parties purchasing County or State Rights. Send for a circular. Address all communications to Dutton & Maguire, Port Jervis, N. Y.

Incrustations of Boilers removed and prevented by Winans' Boiler Powder. (11 Wall st., N. Y.), 12 years in use, no injury, no foaming.

To insure the safety of your steam boilers, property, and life, apply Ashcroft's Low-water detector. John Ashcroft, 50 John st., N. Y.

Parties having patents of established value for sale, not patented in Europe, will please address D. Miles, 35 Water street, Boston, Mass.

The patent ribbed surface shingle is being universally adopted. Machines, with full rights to make and sell this valuable improvement, can be rented or leased, per agreement. Full particulars, with sample, sent free. Address F. A. Luckenbach, sole assignee, Philadelphia, Pa.

Don't fool away your time trying to get a cork out of a bottle with a string, when Waterman's patent cork extractor is so cheap. It takes a cork out in an instant. Private families, doctors, apothecaries, beer establishments, and barrooms is where they are in demand. Send 60c. for sample. State Rights for sale. Cork screw and spring all combined. Direct to Wm. G. Waterman, Middletown, Conn., Box 1388.

Portable Picket Fence.—Persons desiring to sell or manufacture a new and practical invention in Fences, are referred to the advertisement of H. A. Stewart in another column.

NEW PUBLICATIONS.

THE PRACTICAL STAIR BUILDER. By C. Edward Loth, Troy, N. Y. A. J. Bicknell, publisher, 282 River street, Troy.

This treatise is a very handsome large quarto volume of over 150 pages, illustrated with thirty original plates, and adapted not only to architects stair builders, and carpenters, but to students of Geometry. Being the production of a practical man it is less burdened with abstruse problems which are Greek to the uninitiated, than many text books professing to teach. We cordially commend it to the learner and the practical workman.

THE MODERN PRACTICE OF PHOTOGRAPHY is the title of a little book by R. W. Thomas. Published by H. C. Baird, Philadelphia, Pa. Price 75 cents.

ATLANTIC MONTHLY—April. Ticknor & Field, Boston. $4 a year; single numbers 35c. May be had at all the periodical stores.

THE NEW ECLECTIC.—The fourth (April) number of this new magazine is just out. Turnbull & Murdoch, publishers, Baltimore. Price $4 per annum; specimen copies 25c.

PUBLIC SPIRIT.—The publisher, Le Grand Benedict, 37 Park Row, New York, calls his publication a monthly magazine for the million. The cover is very red, and its contents are very good, and we hope he will get his million of subscribers. It may be had of all news dealers for 25 cents a number.

THE BROADWAY MAGAZINE for March, published by Routledge, at 416 Broome street, contains a number of interesting articles, among them one by George Augustus Sala, an Englishman and former correspondent of the *London Times*, who describes, somewhat ironically, the "pleasures and pains" of "Trotting and Sleighing in New York."

WANZER'S HARVESTER PITMAN CONNECTION.

The fact that the velocity of the knives of a harvester necessary to accomplish the best results is governed by the nature of the work and the speed of the team has been made a matter of importance by the improvements in harvesters within the few past years, which enable them to be used where there are obstructions and on uneven ground. As the wear of the machine in a given time is greater with every increase in the speed of the moving parts, various attempts have been made by which each farmer might adapt the vibratory motion of his cutters to suit all circumstances. The device herewith illustrated furnishes a cheap but efficient means for varying the stroke and velocity of the cutters.

Fig. 2

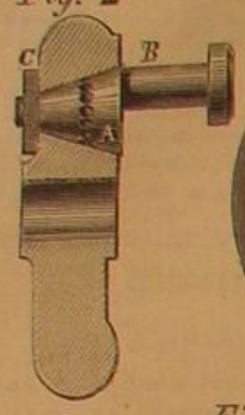


Fig. 1

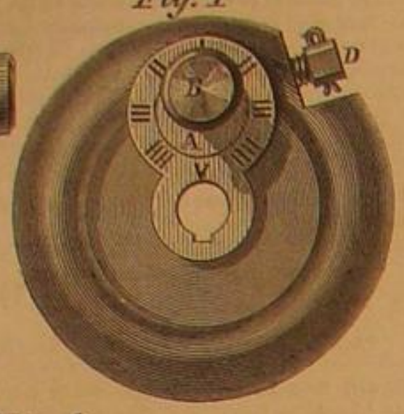
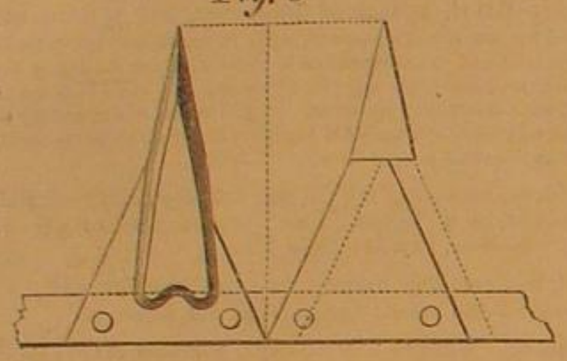


Fig. 3



The part, A, or shank of the wrist pin, B, which enters the wheel, is tapered as shown in Fig. 2, the wrist being placed near the periphery or eccentric to the center of the shank. The projection of the shank on the back of the wheel is square, having a square washer, C, by which the wrist pin and shank can be turned toward or from the center of the wheel, making the stroke shorter or longer, marks on a dial seen in Fig. 1, showing the relative positions of crank pin and center of wheel.

In the conical shank, A, are a series of holes which receive the point of a set screw, D, and serve to hold the wrist pin in place. Fig. 3 shows the position of the knives at the end of the stroke, when it is shortest its length being supposed to be three inches. By moving the knives to the other side of the guard finger, or half an inch further each way from the central dotted line, the length of stroke becomes four inches or is varied in the ratio of three to four. With this device a set of knives can be used a greater length of time than by the ordinary plan and their value will be lessened only by their becoming shortor. The method of fastening the pin may be varied, if desired, but is found that the one herewith illustrated possesses advantages. The conical form of the wrist pin shank secures a perfectly tight bearing. For reaping the stroke may be made shorter than the length of the knife section. thus securing a strong, steady motion of the sickle.

Patented through the Scientific American Patent Agency July 2, 1867, and reissued Nov. 12, 1867, which covers the use of a tapered wrist pin with eccentric projection and an improved plan for connecting the pitman to the cutter bar. For further information address Hiram L. Wanzer, Lanesville, Conn.

Friction Cigar.

Patented by Charles Quartley, of Baltimore, Md. Tobacco, eight pounds; saltpeter, twelve pounds; charcoal, one pound. These ingredients I mix with sufficient dissolved shellac to make a mass of the consistency of stiff paste. When the cigars or cigarettes have been finished in the usual manner, I take them, one at a time, and apply a portion of the above composition evenly over the end of the cigar with a small knife or any other convenient instrument, or they may be dipped into the composition, a number of them at once. The cigars are then laid aside for a short time, and, as soon as the composition becomes hard enough, a small portion of any of the ordinary match compositions, of which phosphorus is usually the main ingredient, is placed in the center of the first composition. After this composition has burned out, it leaves a live coal on the end of the cigar, which usually continues in this condition for some time, so that the smoker need not immediately "draw" on it. This coal lights the cigar in a perfectly even and regular manner, so that the cigar does not burn on one side, as is usually the case, when lighted in the ordinary way with matches, etc.

Smelting and Desulphurizing Iron Ore.

Alexander Hamar, of New York city, has patented the following:—

"I propose to desulphurize the ore by mixing hydrogen with it through the medium of the blast. A heated chamber is filled with coarse iron filings, and with charcoal in lumps about the size of a cherry, in the proportion of about two thirds iron filings and one third charcoal. Steam is injected into this chamber, and is partially deoxidized by passing through the iron filings and charcoal, after which it passes through a coil of highly heated pipes, contained in a heating chamber warmed by gases. In passing through the heated pipes the steam is still further deoxidized by the absorption of its oxygen by the pipes. It is then conducted to the lower part of the furnace, whence the pipe divides into branches, corresponding in number with the tweers, into which I introduce the deoxidized steam. The steam thus deoxidized is nearly pure hydrogen. A blast of hot air is thrown in through the pipes, in the usual way, and, after mingling with the deoxidized steam, passes into the furnace and mingles with the charge, thus producing a high degree of heat. The hydrogen of the steam also combines with the sulphur contained in the fuel as well as with that of the ore, to form sulphureted hydrogen, which escapes with the other volatile products of combustion. I thus desulphurize the metal and economize fuel. My invention may readily be adapted for use in either a cupola or a puddling furnace. When used in a puddling furnace, I supply independent jets of hydrogen over the iron and over the fuel, to desulphurize them separately, and convey away the products of combustion of each, by separate channels."

GREGORY & MELOTTE'S PATENT ADJUSTABLE CLUTCH.

The ordinary mode of attaching the sling pulley for hoisting hay, brick, stone, etc., involves more or less of danger to the operator. For instance, in raising hay from the wagon to the mow some one must climb to a beam or rafter and secure the hoisting pulley, at imminent risk of falling. Generally he must bore a hole in the beam and screw in the shank of a hook on which to hang the hoisting pulley. All this dangerous work can be done by any person standing on the floor by means of the simple contrivance illustrated in the engraving accompanying this article. A brief description will suffice to give a proper idea of the invention, which was patented by G. W. Gregory, Aug. 14, 1866, reissued Oct. 22, 1867, and by G. D. Melotte Oct. 29, 1867, the two patentees having combined their patents.

The grapple or tongs, A, is similar in plan to the tongs used by ice men for handling blocks of ice and by builders in hoisting blocks of marble and other stone. The construction of the grapple is readily seen in the engraving. In elevating the device, a stick is introduced between the points of the tongs to keep the jaws open and when it is lifted by means of the pole, B, having a socket, C, on its end, engaging with the tang, D, of the tongs, the contact of the beam throws out the stick, and the jaws engage with the side or top of the

beam by the withdrawal of the hoisting pole, B, and the weight of the tongs. It is evident that the greater the weight which the tongs support, the firmer the adhesion of its jaws to the beam.

When it is desirable to remove the gripe from one point to another, or to take it down entirely, the staff or pole, B, with the socket, C, is applied to the end, E, of the link that sustains the pulley, F, raising the link until in strikes the two arms of A, opening them and disengaging the jaws of the tongs. Only one pole is required for both the operations; that of attaching and that of detaching the tongs, and both these movements may be accomplished by almost any person.

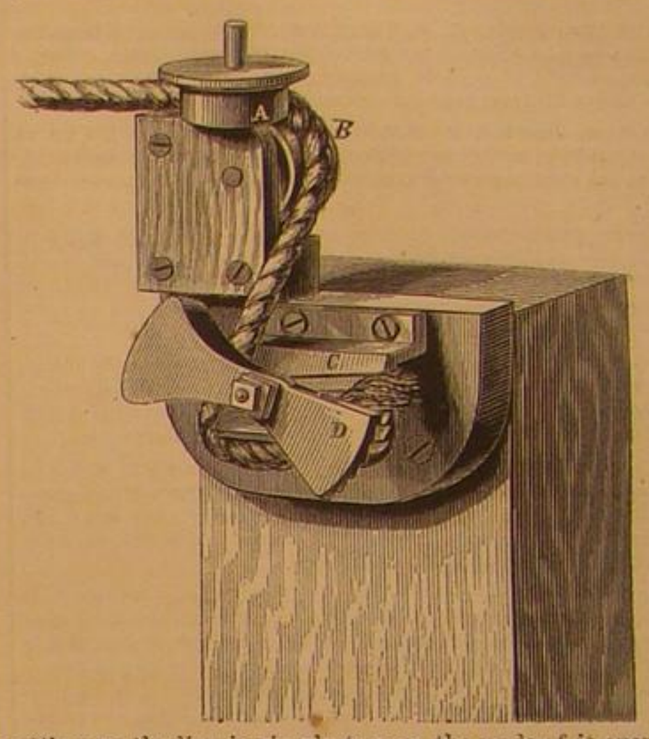
The device is designed for use in hoisting either ice, hay, stone, brick, mortar, or anything, and is useful in depositing hay, ice, or stone, or lifting building materials to place; useful for butchers and handy about saw-mills. It can be made by any ordinary blacksmith and cannot easily get out of repair.

The patent issued to G. W. Gregory is the first one taken out for clutch or adjustable pulley support, to be operated by use of poles, and his patent covers the device of elevating the clutch by means of a pole.

For information in regard to town, county, and state rights, or for the purchase of a clutch, address G. W. Gregory & Co., Watertown, Jefferson county, N. Y.

RIORDAN'S CLOTHES LINE HOLDER.

The object of the little article shown in the engraving is to overcome the trouble of putting up and taking down a common clothes-line, which is usually fastened by knots, the tying and untying of which is a matter often so annoying that the line is left up and exposed to all weathers. With this clothes-line holder once set up, no further trouble can possibly be experienced in this matter, as all that is to be done in



putting up the line is simply to pass the ends of it over the pulleys, A and B, one of which is vertical and the other horizontal so that the rope may run easily. The end is then pulled downward, until the line is brought to a proper tension, when it is introduced between the catching jaws, C D, by pressing it laterally to the left. The jaw, D, swings loosely on its pivot, and when the line is brought against it and pulled downward it swings, and thus admits the line, which is now let go, and as the outer end of D is weighted, it immediately presses up against the line and prevents it from running backward. The two jaws are made with a slope in contrary directions, and both are corrugated to assist in holding the line. When it is desired to take down the line all that is to be done is to pull the end downward and sideways to the right, thus withdrawing it from between the jaws and letting it run back over the pulleys.

It will be seen that not only does it afford the easiest means of putting up and taking down the line, but also that the line can be tightened to any required degree, thus dispensing with unsightly center props, and the holder may be set at any hight from the ground, and can be operated with one hand with equal facility at whatever hight.

The working parts are of cast iron, mounted on a block of wood, E, for facility in setting up, and are very little larger than the engraving. For further information address the patentee, P. Riordan, Arsenal, Washington, D. C.

Patented through the Scientific American Patent Agency, Dec. 31, 1867.

Composition for Removing Ink and Colors from Printed Paper.

Recently patented by Joseph A. Veazie, of Boston, Mass.

A saponaceous composition is first made by dissolving twelve pounds of potash, in boiling water. To this add fourteen pounds of rendered tallow. Boil three hours; then pour it into a suitable vessel, and add, while cooling, twenty five gallons of soft water, the water to be added gradually and the mass constantly stirred until cooled, in which state it is of a brownish color, and of the consistency of stiff jelly. The paper to be cleansed is placed in an open or closed vessel, with sufficient soft water to cover it. When the mass has boiled thirty minutes, and is boiling, add for every hundred gallons of water, five gallons of the saponaceous composition above described, stirring and beating the paper as much as possible, so as to reduce it to pulp. The ink and coloring matter will soon begin to rise in a scum at the top of the water, which should be allowed to flow off through a spout or faucet fixed for the purpose. As soon as the ink or coloring matter ceases to rise the water must be drawn off from near the bottom of the vessel, clean boiling water being at the same time allowed to enter at the top, the passage of the water through the pulp serving to thoroughly rinse it. After boiling and stirring for a few minutes the pulp may be removed, when it will be found in a clean and white state, suitable to be again used in the manufacture of white paper. In all cases the pulp should be finally beaten and washed in clean water.

Action of Naphthaline on Insects.—M. Eugène Pelouze has found that naphthaline prevents plants from being attacked by insects. Its effect is not to kill either the one or the other, but a very small quantity is sufficient to effectually drive the insects from the plant, and he believes that in this substance florists and agriculturists will find a very serviceable friend.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street.
☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents for the SCIENTIFIC AMERICAN.
☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XVIII., No. 15....[NEW SERIES]..*Twenty-third Year.*

NEW YORK, SATURDAY, APRIL 11, 1868.

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UTILIZATION OF WASTE.

The man who first used the word "waste" as a designation for the residues that accumulate in many industrial processes, would probably have bethought himself of some more appropriate appellation if he had been able to foresee the many and various uses to which they are now applied, and the importance which they have attained in the community. Let us cite a few examples.

The refuse ore which formerly used to obstruct the entrance to some German mines, to the great annoyance and disgust of the workmen, who considered themselves haunted by evil spirits, have become highly valuable since it was discovered that they contain metals so important as nickel and cobalt. The liquor which the manufacturers of soap formerly allowed to run off as useless, is the only source from which we derive the all-important glycerin. The sulphuric acid which used to poison the atmosphere and to destroy vegetation in the neighborhood of the works devoted to the roasting of sulphurets, is now carefully saved and converted into sulphuric acid. The "soda waste," which was permitted to accumulate in mountains in the respective factories, is now made to yield quite a number of useful products, such as sulphur, hyposulphite of soda, and others. We might continue to almost any length the enumeration of such articles, that are manufactured out of materials which were formerly rejected as useless, and the utilization of which has always enriched the fortunate discoverer, by lessening the cost of the principal article, and thus enabling him to drive competitors who were without this advantage out of the market.

What we want to impress upon the minds of our readers, and of all those concerned, is the certainty that in many instances still, products, solid, liquid, and gaseous, are wasted, permitted to escape with the atmosphere, to fill the sewers, or to decay out of doors, which would yield a rich reward to the man who would turn them to serve some useful purpose. The greatest success must be his who can, at the lowest price, make the most of any given article. Nothing ought to be thought too insignificant for consideration. Let us remember the example of Lafitte, who, by picking up a pin before the office of a banker who had rejected his services, laid the foundation for a fortune of millions. Who knows but what even the carbonic gas which we are now glad enough to get rid of by our chimneys, may hereafter be conveniently rendered useful in the economy of our households. We would, therefore, advise all manufacturers to let nothing leave their premises without examination and investigation; if you are unable to deal with the subject yourselves, consult some scientific expert with regard to it. Mines of gold, more reliable and more easily worked than those of California, may be nearer home than you imagine.

WROUGHT-IRON FENCES---SETTING IRON FENCE POSTS.

The first iron fence we ever saw was set up between fifty and sixty years ago. It was entirely of wrought iron and cost much labor and money. For many years only wrought iron was used in the construction of fences, railings, balustrades, etc., at least in this country; and even now a neater, lighter, less costly, and more durable fence can be made of wrought iron than of cast iron. The latter may be made in more elaborate forms, but the fragile character of cast iron as compared with wrought iron makes the latter preferable in this climate. A very neat wrought-iron fence may be built by any blacksmith with but little forging. The lower and upper rails may be of flat bar iron three-eighths by one and a quarter inches, or heavier if desired. These should be drilled or punched with holes at equal distances apart, from two to four inches. Then take round iron and bend it in the form of an arch, either gothic or semi-circular, and pass the ends through the top and bottom rails, riveting the ends in the lower rail or furnishing each end with a nut.

When the sizes of the round iron vary and the arches are made concentric the effect is very fine. For instance; let the holes in the rails be made four inches apart and there be three arches; the outer one may be made of half-inch round iron, the span of the arch being twenty inches. The next may be made of seven-sixteenths or three-eighths iron, with a span of sixteen inches, and the inner arch of three-eighths or quarter inch iron with a span of four inches. The fence will be very neat and elegant. The arches may be bent cold and the holes may be drilled on a common foot lathe, so that the fence may be made and put up by any one without the aid of steam or water power. The posts are merely uprights of iron similar to the rails, and they are fastened into stone pedestals in the usual way, the fence being strengthened by diagonal braces at proper intervals.

Iron fences are usually set on stone foundations, although some have iron bases, which, when the posts are secured to the bases by bolts, appears to be fully equal if not superior to fences resting on stone foundations. Melted lead is commonly used to fasten the iron to the stone, and, so far as our experience and observation extend, is better than anything else. Brimstone cannot be tamped, and it is unhandy to use, as it cannot be remelted without becoming viscid and refusing to run freely. Beside, it will absorb moisture, and combining with the iron it deteriorates the latter rapidly. Nor is lead entirely harmless in contact with iron; atmospheric air or water will oxidize the iron. The only protection is a coat of paint to exclude all moisture.

A cheap, durable and effective cement for securing wrought and cast-iron work to stone would prove a fortune to its inventor.

POPULARIZE SCIENCE

The necessity of a knowledge of scientific principles for the workingman cannot be insisted upon too often and too urgently, for it is this knowledge alone which makes him really the master, instead of the slave, of the implements of his profession. But although this principle is now so universally recognized that it would be a mere waste of time to expatiate upon it at greater length, it is an undeniable fact that almost nothing is being done to put it into practice. The artisans and mechanics of Europe are in this respect, infinitely more favored than those of our own country, and if it is claimed as an offset, that the latter, as a class, are superior in intelligence to their continental brethren, it should be remembered that this is only one reason more for furnishing them the opportunities which shall enable them to maintain and perpetuate this superiority. In this large and wealthy metropolis there is only a single institution—the Cooper Institute—which reaches the classes alluded to and, excellent as it is, it can only accommodate those that live within a given distance from it, while a half dozen of similar institutions, scattered throughout the whole city, would hardly be adequate to supply the instruction which the masses are craving. But it must always be borne in mind that there is a class of men of mature age, who have outgrown the school-room, who cannot bind themselves to a regular attendance and who after the fatigue of a day's hard labor find it impossible to listen to lectures with enjoyment and substantial profit; and yet it is just there men to whom such knowledge is most necessary and indispensible. No one who has seen the "*Conservatoire des Arts et Metiers*" or similar institutions in Paris and the crowds of intelligent mechanics and artisans surging through these galleries during the hours set apart for the reception of the public, can fail to be struck with their immense utility, and if an American, with the void which in this respect exists in our own country. A museum is what is wanted, a collection of instruments and machines from the most simple to the most complicated, representing every variety of trade and manufacture, exhibiting all the latest improvements and open to the free inspection of all from morning till midnight. Lectures might be delivered at this establishment to explain the articles on exhibition, at a time which would render them convenient and agreeable to those who are expected to attend them. Of course, a long time would elapse before such an undertaking could be completed, but if a determined effort be made, it must succeed; and some of our wealthy philanthropists could perhaps be interested in the scheme by the consideration that such an establishment would do more toward dethroning King Whiskey, and improving the moral tone of the community than all other enterprises together which seek to improve men without offering them some attractive and useful way of spending their idle hours.

ALUMINUM BRONZE---ITS PROPERTIES AND USES.

The metal aluminum has certainly found its most useful application in the alloy known as aluminum bronze, a name perhaps somewhat inappropriately given, inasmuch as the term bronze has always been applied to compositions of copper, tin, and zinc. The alloy we propose to describe is composed of copper and aluminum in the proportion of 90 parts by weight of the former and 10 parts of the latter, or, when estimated by bulk, of 60 parts of the copper and 40 of aluminum. The color of the bronze closely resembles that of 18-carat gold, but is far superior in beauty to any gilding. Morin believes it to be a perfect chemical combination, as it exhibits, unlike the gun metal, a most complete homogeneousness, its preparation being also attended by a great development of heat, not seen in the manufacture of most other alloys. The specific gravity of this bronze is 7·7. It is malleable and ductile, may be forged cold as well as hot, but is not susceptible to rolling; it may, however, be drawn into tubes It is extremely tough and fibrous, which is proved by the fact that when drawn into wire it supports a weight more than three times that of the iron used for suspension bridges, and as to its elasticity, it is stated by Prof. Tresca that "the coefficient of elasticity of the aluminum bronze, the cast metal, is half that of the best wrought iron. This coefficient is double that of brass, and four times that of gun metal, under the same conditions."

Aluminum bronze, when exposed to the air, tarnishes less quickly than either silver, brass, or common bronze; and less of course, than iron or steel. The contact of fatty matters or the juice of fruits do not result in the production of any soluble metallic salt, which highly recommends it for various articles for table use. Prolonged contact of strong vinegar will undoubtedly exert some action, but then it must be remembered that even silver, under similar conditions, is also attacked.

The uses to which aluminum bronze is applicable are various. We have seen spoons, forks, knives, candlesticks, locks knobs, door handles, window fastenings, harness trimmings, and pistols, made from it; also objects of art, such as busts, statuettes, vases, and groups. In France aluminum bronze is used for the works of watches, as also watch chains and ornaments for ladies. The cost of these articles is less than that of the best plated ware, and the additional expense of replating is avoided. Its application to machinery would have been greater were its cost less, but for certain parts, such as journals of engines, lathe head boxes, pinions and running gear, it has proved itself superior to all other metals.

We have already referred in these columns to the fact that Hulot, director of the Imperial postage stamp manufactory in Paris, uses it in the construction of a punching machine. It is well known that the best edges of tempered steel become very quickly blunted by paper. This is even more the case when the paper is coated with a solution of gum arabic and then dried, as in the instance of postage stamp sheets. The sheets are punched by a machine the upper part (head) of which moves vertically and is armed with 300 needles of tempered steel, sharpened in a right angle. At every blow of the machine, they pass through holes in the lower fixed piece which correspond with the needles and perforate five sheets at every blow. Hulot now substitutes this piece by aluminum bronze. Each machine makes daily 120,000 blows or 180,000,000 perforations, and it has been found that a cushion of the mentioned bronze was unaffected after some months use, while one of zinc bronze is useless after one day's work.

The time may not be far distant when it will become possible to construct the screws of steamers of this metal, of which the great strength and toughness will be considered more than equivalents for the increased cost. Yet even this latter may not be an objection, for aluminum bronze screws might be made for about one half the weight of those now in use.

ON FORGING, HARDENING, AND TEMPERING MILL PICKS.

Mr. Isaac B. Hymer, of Indiana says that his experience as a builder of French burr mills, and as a miller, for many years, has convinced him that the plan he has adopted and followed in forging and tempering mill picks, is excellent. He says:

In the first place, get double refined cast steel made expressly for mill picks. Be careful in drawing out the pick not to heat the steel higher than a cherry red. Use an anvil and hammer with smooth faces. When finishing the pick do not strike it on the edge, but hammer the pick on the flat side, striking light and often, until the steel is quite dark, letting the blows fall so as to close the pores of the steel. If the last blows strike the edge of the steel, the pick will fly and "spawl" off. When a dozen picks are ready to temper, get two gallons of rain water, from which the chill should be taken if in winter, by dipping a hot iron in it, add two pounds of salt, which dissolve, and your bath is complete. Heat your picks gradually from the center, and let the heat run to the point, and when it is a dark cherry red, dip the point of the pick vertically into the bath and hold it still, not moving it about to find a cool place. When the heat has left the part immersed, take it out and cool the balance of the pick in ordinary water used in the shop. This process should be repeated on the other end of the pick. When taken out of the tempering bath the pick will look silvery white. The use of the salt is to clean the scale from the steel and make it tough. With the edge made by this process the pick will cut clean, clear, and fine, such a cut as millers need for "cracking."

The whole secret is in the heating and hammering. If not hammered enough the steel will spawl off, and if heated too hot it will crumble.

DYNAMITE OR GIANT POWDER.—Prof. Nobel, of Hamburg, not entirely content with his former discovery, nitro-glycerin, has brought out another explosive, to which he has given the above name. Instead of being an oily liquid, liable to leak from the vessel in which it is confined, and produce a spontaneously inflammable mixture with rags, shavings, and other packing material, this powder resembles snuff in appearance, and in a loose, non-compressed condition, does not explode, but burns slowly with but little smoke, the latter an invaluable property in working closed mines or tunnels. A detonating cap is required to explode it. Late California papers contain accounts of the prodigious power of this powder, as shown in some experiments tried in that state. They recommend it highly as being vastly more explosive, and requiring much less drilling or preparation of the rock, than gunpowder.

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING MARCH 24, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

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75,718.—Corn Cultivator.—W. R. Adams, Independence, Mo.

I claim, 1st, The semi-circular shaped plate, a, substantially as described and for the purposes set forth.

2d, The cross-piece, D, as described, and for the purpose set forth.

3d, The adjustable slides, E, substantially as described and for the purpose set forth.

4th, The combination of these three plows, the plate, a, the cross-piece, D, and the slide, E, substantially as described and for the purpose set forth.

75,719.—Parlor Coal Sifter.—Sylvester Albee, Providence, R. I.

I claim the radial arms, B C, in combination with the sieve, a b c d f, and movable stop, K, substantially as described and for the purpose set forth.

75,720.—Mowing Machine.—Wm. Allen, Worcester, Mass., assignor to Ames Plow Company.

I claim constructing the hub, I, with a lip or flange, u, to project over and cover the edge of the axle, substantially as shown and described.

Also, constructing the face plate, w, with a lip or flange, x, to cover and protect the adjacent edge or corner of the hub, substantially as shown and described.

Also, combining with the crank bearing, p, an auxiliary bearing, o', secured to the frame, a, by flanges p' q' r', substantially as set forth.

75,721.—Liquid Meter.—Richard H. Atwell, Baltimore, Md.

Antedated March 7, 1868.

I claim, 1st, The arrangement within a measuring chamber, B, of the oscillating piston, E, and diaphragm or partition, C, with a reversible valve, automatically operated by the same mechanism that moves the piston, substantially as and for the purpose set forth.

2d, The oscillating arm, L L1, and springs, L2 L3, in combination with the latch, J, and spring, K, or their equivalents, substantially as and for the purpose specified.

3d, The valve F, having separate chambers, F2 F3, in combination with the receiving and discharging chambers, G1 G2, substantially as and for the purpose described.

75,722.—Buckle.—Wm. Babin, New York city.

I claim the double buckle herein described, having the tongues and buckle frame, together with the eyes or means of fastening the buckle to the back of the garment, arranged with reference to each other, substantially as described, so as to provide for tucking away the loose end of one of the straps under the buckle, when the buckle is fastened to the back of the garment, substantially as described.

Also, the loop, g, in combination with a double buckle, constructed in other respects in the manner and for the purposes herein described.

Also, the double buckle, having one frame and two opposite tongues, the eye-holes or fastening devices at the middle of each side of the buckle frame, substantially as described.

75,723.—Variable Exhaust for Non-condensing Engine.—James H. Baker, Saratoga Springs, N. Y.

I claim the arrangement of the lever, G, bolt, F, disk valve, D, chamber, A, and pipe, B, substantially as herein described.

75,724.—Machine for Making Butt Hinge.—Henry D. Blake (assignor to P. and F. Corbin), New Britain, Conn.

I claim the jaws, c c', arranged upon the stock, h, and actuated by cam, d', through the stock, h', arm, k, plate, m, or their equivalents, to feed the wire, y, into the holding and cutting die, r, substantially as and for the purpose described.

Also, in combination with the above, the screw, x, or its equivalent, for fixing the extent of the backward motion of the stock, h, whereby the length of the wires being cut is regulated.

Also, the combination of the cams, e t', lever, t, shear, e, for cutting the wire at each successive revolution of the shaft, b, and all constructed and arranged substantially as described.

75,725.—Apparatus for Supplying Water to Grindstone.—Ferdinand Blauss, New York city.

I claim the separation of the water trough of a grindstone from the grindstone, so that the lower part of the stone does not remain immersed in water or exposed to the action of moisture of water when the stone is in a state of rest, and furnishing water from the water trough to the upper surface of the stone by means of a pump, or its mechanical equivalent, worked by the revolution of the stone.

Also, the supply of water to the upper surface by means of streams from the ends of the distributor, all substantially in the manner and for the purpose herein described.

75,726.—Name Plate for Coffins, etc.—George Brabrook (assignor to Reed and Barton), Taunton, Mass.

I claim the arrangement of the name plate, the spring, and the picture frame, the whole being substantially as set forth.

75,727.—Reclining Chair.—H. B. Braman, Boston, Mass.

I claim, 1st, The combination of the slotted adjusting bar, E, with the rod, F, and elastic washer, substantially as and for the purpose specified.

2d, In combination with the above, the device, b d, constructed as described, for connecting together the portions of the movable frame, as and for the purpose set forth.

75,728.—Machine for Making Excelsior.—George Brooks and Samuel Clement, Detroit, Mich.

We claim the arrangement of the wheel, A, shaft, B, the spurs, C, and plane irons, D, in their proper openings in the rim of the wheel, the braces, E and G, and the lever, H, when combined and operated substantially as and for the purposes herein set forth.

75,729.—Liniment for Horses and Other Animals.—Wm. Christman, Philadelphia, Pa.

I claim the above combination in the proportions specified.

75,730.—Brick Kiln.—Samuel H. Clapp, Malden, Mass.

I claim the brick kiln, A, provided with the flues, M M', dampers, N N' and H, and the openings, K K', and L, combined and arranged as set forth and described.

75,731.—Lamp.—Hezekiah M. Clark, Cleveland, Ohio.

I claim, 1st, The corrugations, c, in combination with the perforated tube, B, and flange, C, substantially as and for the purpose set forth.

2d, The grooved flange, D, in combination with the tube, B, and globe, substantially as and for the purpose set forth.

75,732.—Medical Compound.—Horace Clark (assignor to Dwight L. Clark), Northampton, Mass.

I claim the above explained composition, as composed of the constituents hereinbefore mentioned, such being for the purposes or purposes as set forth.

75,733.—Saw.—Wm. Clemson, Middletown, N. Y.

I claim, 1st, The saw tooth, A, when constructed with a sidewise bend, forming a spring to hold it in the slot of the saw plate, substantially in the manner and for the purpose described.

2d, The saw teeth, A A, when constructed with a twist alternately in opposite directions, for the purpose of giving a set to the tooth, and an additional security in holding the tooth in the slot in the saw plate, in the manner set forth.

3d, The saw tooth, A, when constructed with a sidewise bend and a twist, substantially as described.

4th, The saw tooth, A, when constructed with a sidewise bend, a twist, and having its sides on lines dissimilar to the lines on the edges of the slots in the saw plate, substantially as described.

75,734.—Saw.—Wm. Clemson, Middletown, N. Y.

I claim the curbed tooth, b, when constructed thinner than the saw plate, slightly bent sidewise and twisted, in combination with the recess in the saw plate, when said recess is constructed substantially as described.

75,735.—Sheave.—James L. Collins and Henry C. Burgie, Chicago, Ill.

We claim in the manufacture of sheaves the formation of a rabbet or flange, s, in or upon that part of the sheave in which the soft metal is applied, substantially as and for the purposes set forth.

75,736.—Wood Turning Lathe.—Matthew F. Connet, Ladazo, Ind., assignor to himself, T. G. Maiden and Wm. C. Hendricks.

I claim, 1st, The two vibrating frames, G H, employed respectively to hold the pattern and material to be operated in or nearly in the same plane with with the axis of the cutters, and vibrate them at equal distances from the centers of points of vibration of the frames, so as to produce a fac simile of the pattern, substantially as described.

2d, Retaining the stuff, E, from the back rest and cutters, by means of the conical enlargements, I I, formed upon the end of the pattern, F, substantially as set forth.

3d, The adjustable arm or rest, O4, in combination with the yielding stock, O2, and back rest, O, all arranged and operating substantially as described and represented.

75,737.—Uterine Abdominal Supporter.—Walter Crocker, Meadville, Pa.

I claim the band, A A, and pad, D, in combination with the pads, E E, and the straps, F F and m m, when the same are constructed and arranged as described, for the purposes set forth.

75,738.—Car Coupling.—Rolan Daily, Canal Township, Pa.

I claim a car coupling composed of the pin, S, lever, R, spring catches and operating devices connected therewith, for locking the arm, B, all arranged in a draw head, combined and operated as described for the purposes set forth.

75,739.—Boiler Furnace.—Alfred De Pindray, Paris, France.

I claim, 1st, A furnace so constructed that the walls surround the boiler and leave spaces in manner substantially as specified, and having the fire box disposed between vertical walls of said furnace, and of the relative dimensions, and in manner substantially as shown and described.

2d, The inclined concave wall, K, connecting the floor of the ash pit with the floor of the flue at the rear end of the ash pit, substantially as set forth and described.

75,740.—Watch Key.—R. H. Dilley, Regnier's Mills, Ohio.

I claim the improved watch key, consisting of the hollow case, provided with the hinged door, A, and springs, E and D, when constructed as and for the purpose described.

75,741.—Railroad Switch.—G. L. Dulaney and J. A. Kaufman, Mechanicsburg, Pa.

We claim, 1st, The gravitating weight, a2, with its jointed connecting rod and fulcrum, in combination with the switch rails, a a, in the manner and for the purpose herein described.

2d, The combination of the inclined levers, B2 B3, with the rods, o o, in the manner and for the purpose herein described.

3d, The combination and arrangement of the weights, o3, bolts, D1, and switch rails, a a, in the manner and for the purpose herein described.

75,742.—Salve.—Theodore Enszlin, Newburg, N. Y.

I claim the combination of the materials contained in the composition of matter herein described.

75,743.—Electric Commutators.—Leroy B. Firman, Chicago, Ill.

I claim a commutating wheel composed of two plates, circular or annular, one of a conducting and the other of a non-conducting material, L D, when and kept in contact with each other, in the manner and for the purposes specified and described.

75,744.—Medicine Bottle.—Wm. H. Flinn (assignor to himself and Albert H. Saunders), Nashua, N. H.

I claim the combination of the administering vessel or cup, B, and its induction tube, D, provided with the opening and sealed at bottom, as described, with the cork or stopper of a bottle, the whole being arranged so as to operate substantially as and for the purpose specified.

75,745.—Medicine Bottle.—Wm. H. Flinn (assignor to himself and Albert H. Saunders), Nashua, N. H.

I claim the arrangement of the cup with the stopper, so that when the latter is within the neck of the bottle the cup will extend into the bottle, as specified.

75,746.—Dash Board for Carriage.—Wm. Franklin and T. M. Smith, East Randolph, N. Y.

We claim the grooved frame, B, with its plates, A A, and connecting pieces, B B, when constructed substantially as specified.

75,747.—Pump.—Robert Gilliland and R. H. Armstrong, Hudson, Mich.

We claim the arrangement of the water chamber, E, upon the top of section, B, for causing a cold water packing, which is formed by the operation of the pump, and constitutes a double acting force and suction pump, without placing the working parts under water, as set forth.

75,748.—Heating Stove and Furnace.—Wm. C. Googins, Portland, Me. Antedated March 18, 1868.

I claim the combination and arrangement of the tube, a, air chambers, f, doors, g, semi-circular tipping grates, c, and ash pit, h, in a heating furnace, substantially as and for the purpose set forth.

75,749.—Corn Planter.—Henry P. Gregg, Cincinnati, O.

I claim, 1st, The manner of adjusting the cups, c and d, in their depth, by reversing them, for the purpose described.

2d, The narrow chute or ante-chamber, b, for the purpose of pre-arranging the grains before entering the cup, as specified.

3d, The combination of the movable, reversible measuring cup with a stationary tube, when attached to a hoe, for the purpose herein set forth.

75,750.—Curtain Fixture.—W. D. Gridley, New Britain, Ct.

I claim a curtain friction bracket, consisting of the socket case, f, friction pads, h i, sprink, k, knob, n, substantially as described.

75,751.—Billiard Cue.—Heber C. Griffin, Franklin, N. H., assignor to himself, Geo. W. Griffin and John N. Howe.

I claim the billiard cue, A, composed of two separate jaws, C and D, and tip, E, and socket, B, constructed and arranged substantially as and for the purpose described.

75,752.—Wind Wheel.—Earl J. Hall, Indianapolis, Ind.

I claim, 1st, The fans or wings, B, having their surfaces in straight lines, excepting at their inner ends, which are provided with the short curves, b', for the purpose described.

2d, The governor, D, wheel d3, and chain, c', when combined and arranged substantially as described.

75,753.—Device for Oiling Fast and Loose Pulleys.—Wm. Hamilton, Chicopee, Mass.

I claim, 1st, The sleeve, B, with hollow cylinder, c, constructed as shown, and arranged upon the shaft, C, substantially in the manner and for the purpose described.

2d, In combination with the sleeve, B, the shaft, C, formed as shown, with the taper and projection, j, substantially as set forth.

3d, The tongue, K, when connected with a dripping trough, i, for the purpose and in the manner shown.

75,754.—Low Water Detector.—Joseph Harrison, Jr., Philadelphia, Pa.

I claim a tube, B, communicating at one end with a steam boiler, and closed at the opposite end, in combination with the water supply pipe, F, and the disk, i, of glass or any equivalent to the same, the whole being constructed and operating substantially as and for the purpose herein set forth.

75,755.—Caster for Sewing Machines.—Richmond Hathaway, Chicopee, Mass.

I claim the arrangement of the levers, C and C', with casters and connecting rod, E, combined with the hand lever, B, and treadle, A, with cam, K, substantially as and for the purpose shown.

75,756.—Farm Gate.—Henry A. Henderson, Avoca, assignor to himself and Charles M. Gray, Whitestown, N. Y.

I claim a farm gate having the guide board, D, slot, E4, rolls, B1 and B8, and the notches, E6 and E7, and the hook, B2, in combination, for the uses and purposes mentioned.

75,757.—Trace Fastener.—Levi Herr, West Lampeter, Pa.

I claim the shallow box, A, with its spring bolt trigger, B 8 B b, screw or flange attachment, D, in combination with the trace plate, E, arranged and operating substantially in the manner and for the purpose specified.

75,758.—Mode of Securing Checks, Drafts, etc., from Fraud.—James Hester, Knoxville, Ill.

I claim, 1st, The method of attaching and using upon checks, drafts, and such like papers, concealed private marks and instructions, substantially as described, and represented by example, O, on specimen No. 1.

2d, The method of making, folding, and fastening concealed private marks, instructions, and signatures, upon stubs or blank ends of checks, drafts, etc., substantially in the manner and for the purposes as herein described, and as shown by example, T S, on specimen No. 2.

75,759.—Wire Fence Key.—S. B. Hewett, Jr., Eagle Grove, Iowa.

I claim, 1st, The combination of the wheel, A, provided with flanges, as shown, and a slot, D, with the removable pins, C, or their equivalent, arranged and operating as and for the purposes herein set forth.

2d, In combination with the above, the arrangement of the jaws or lips, E, as and for the purposes specified.

75,760.—Hat Conformator.—Benj. Hogan, Albany, N. Y.

I claim 1st, The pressing rim, B, spring, C, and holding catches, d d, combined and arranged substantially as and for the purpose specified.

2d, In combination with the measuring fingers or arms of a hat conformator, the ring or band, B, or equivalent device, for securing the said arms in fixed position, substantially as described.

3d, In combination with a hat conformator, an indicator, or equivalent registering device, upon which is indicated the size to which the measuring arms are distended, substantially as described.

4th, The cord or chain, m, fingers, F, and indicator, H, arranged and operating as described.

75,761.—Machine for Hulling Grain.—Abijah Hubbell, Sharon, Conn., assignor to himself, E. P. H. Capron, Springfield, Ohio, and Geo. V. Capron, Sharon, Conn.

I claim the construction and arrangement upon the straps, f, of the bearings, Kf for the shaft, B, and the adjusting screws, j, for trimming the stone, as herein set forth, for the purpose specified.

75,762.—Washing Machine.—Wm. C. Hunter, Newport, Ky.

I claim the rollers, I and K, the vibrating finger bar, D, having the cross head, E, and fingers, E' E', the cylindrical box, B, pin, C, and connecting rod, G, and lever, H, when the same are constructed and arranged substantially as herein described and for the purpose specified.

75,763.—Machine for Preparing Peat.—Chas. W. Inglis, Paterson, N. J.

I claim, 1st, The reciprocating crowder, D, scraper, B, and passage, M, arranged relatively to the mill, A a B b, or its equivalent, substantially in manner and so as to operate as herein set forth.

2d, The cutter, I, passage, M, reciprocating crowder, D, and mill, A B, combined and arranged as herein represented and described.

75,764.—Street Railway Scraper.—J. W. A. Jones, Memphis, Tenn.

I claim the combination of the springs, B B, levers, H H and G G, in connection with the fulcra, h and g, the hinge, F, and the upright shaft, C, all constructed and arranged as described and for the purpose specified.

75,765.—Water Wheel.—Jacob O. Joyce, Dayton, Ohio.

I claim the annular concave plates, 1, 2, and 3, having the buckets, k l, arranged between them, so that the upper ones, k, will alternate in position with the lower ones, l, the plates and the buckets gradually diminishing in depth from the top downward, so as to give the wheel a cylindrical exterior and a conical interior, all constructed as described, and arranged in connection with the register case, E, and gate of chute cylinder, H, substantially as specified.

75,766.—Mode of Producing an Extra Surface on Papier Mache.—Edward S. Judge, Baltimore, Md.

I claim, 1st, The application of lead and oil to the surface of the mold to prevent the adhesion of my surface coating to the mold.

2d, The admixture of ground lead in the plaster of Paris or composition of the mold is made.

3d, The obtaining of an extra surface on papier-mache by coating the mold before the impression of the papier-mache therein, with the aforesaid composition, or any other substantially the same, and which will produce the intended effect.

75,767.—Torpedo Toy Gun.—Eben W. Keyes, Boston, Mass.

I claim, 1st, Attaching to one end of the rod, D, a cup for holding the torpedo, and to the other end a knob or ring for pulling back the rod, operated by a spring, substantially as described and for the purpose set forth.

2d, Combining with the above the pin, L, and hook, K, substantially as described and for the purpose set forth.

75,768.—Device for Fastening Shoes.—Nicolaus Kirchner, Philadelphia, Pa.

I claim a fastening for shoes and gaiters consisting of the springy lever, B, and plate, C, constructed and combined together substantially as described, and operating, when applied to the shoe or gaiter, as a lever for drawing the closing parts together, and as a spring catch for fastening them in that position, as described.

75,769.—Pile for Girder Irons.—Andrew Kloman, Pittsburg, Pa.

I claim making up a pile or fagot to be rolled into girder beams, of top and bottom pieces, a a', connected together by plates, b and c, in any desirable number, the plates, b, entering grooves in the lower and upper faces of the top and bottom pieces respectively, and alternating with plates, c, substantially in the manner and for the purposes hereinbefore set forth.

75,770.—Making Piles for Girder Beams.—Andrew Kloman, Pittsburg, Pa.

I claim grooving those parts of a pile or fagot for making girder beams which, when rolled, are to form the web of the beam, so as to secure an aperture, b, along through the heart of the pile or fagot, substantially as and for the purposes hereinbefore set forth.

75,771.—Burglar Alarm.—Christian Knisely, Chicago, Ill.

I claim, 1st, Combining the spring, b, and hammer, c, constructed in a single piece, with the stationary pistol barrel, d, all arranged as described.

2d, Combining the piston, g, hammer and spring, c, substantially in the manner shown.

3d, Adjusting the piston, g, by means of the thumb nut, i, substantially as shown.

4th, In a burglar alarm, the combination of the pistol barrel, d, hammer, c, spring, b, piston, g, spring, e, and thumb piece, i, all arranged and constructed as described.

75,772.—Churn.—William Lamb, Rochelle, Ill.

I claim the adjustable clamp, K, in combination with the wheel, H, and clasp, L, the several parts being constructed and operating substantially as set forth.

75,773.—Harvester.—Israel Lancaster, Baltimore, Md.

I claim in combination with a flexible knife bar between the point of attachment to the reciprocating lever and the first knife section, a rigid attachment of the knife bar to the end of the reciprocating lever, forming a joint immovable in any direction.

75,774.—Harvester.—Israel Lancaster, Baltimore, Md.

I claim the method of holding the reciprocating lever, D D, up to its work, by means of nuts screwing on the driving wheel shaft, substantially as described.

75,775.—Signaling Apparatus.—Samuel S. Laws, New York city.

I claim, 1st, A series of wheels thus alternately moved and held in check, in combination with contrivances for giving either an advance or a retrograde movement, according to circumstances, substantially in the manner and for the purpose above set forth.

2d, In a reporting and signaling apparatus, the series of disks and wheels as above shown, in combination with the coils, O O', the armatures, E E', and the levrs, L L', constructed, arranged, and operating in the manner above set forth.

3d, In a reporting and signaling apparatus, intended specially to report the rise and fall of gold, stocks, etc., the use of disks operated substantially as above shown, and so arranged as to present integers representing tens, hundreds, etc., as well as fractions varying by eighths, when the whole are so disposed, either in rows or in any other prearranged order, as to communicate at a glance the changes in the stock market, substantially in the manner above described.

75,776.—Medical Compound.—Elliott A. Lowdermill, Grand Junction, Tenn.

I claim the compound fluid composed of alcohol, honey, spirits of turpentine, gum camphor, alum, and blue vitriol, in the proportions herein specified and for the use and purpose described.

75,777.—Animal Trap.—C. C. Lyman Edenboro, Pa.

I claim, 1st, The revolving wings or platforms, B, and levers, F, pulley, C, cord, C', and weight, E, arranged in the manner and for the purpose substantially as described.

2d, The wings, B, with pivoted levers, F, in combination with the spring catch, H, and catch, G, arranged as and for the purpose substantially set forth.

75,778.—Night Chair.—James Macferran, Philadelphia, Pa.

I claim, 1st, The double slide, F F', combined and arranged with the pot and chair, substantially as and for the purpose above set forth.

2d, The combination and arrangement of the cover, H, with the seat, G, and arms, I I, substantially as described, and for the purpose specified.

3d, The combination of the clasps, J and J', with the cover, B, and arms, I I substantially as and for the purposes set forth.

75,779.—Heel Seat for Boots and Shoes.—Geo. I. Mason (assignor to himself and Wm. M. Scott), Lewiston, Ill. Antedated March 10, 1868.

I claim a heel seat with sole attached, for the purpose specified, and consisting of the crescent form with sole attached, as and for the purpose specified.

75,780.—Wooden Pavement.—Hugh McDougall (assignor to himself, Robert Stuart, and Coll McDougall), Chicago, Ill.

I claim the guide, A, when provided with fingers, a a, or open space for the admission of gravel, substantially as specified.

75,781.—Machine for Bending Tires.—Jacob Naylor, Hedgesville, W. Va.

I claim a former, A, provided with flanges, b b, and adjustable stirrups for holding the bar, B, all constructed, arranged, and combined as described.

75,782.—Punching Machine.—Franklin Nelson, Wyandotte, Mich.

I claim, 1st, The pendulum levers, D and E, working upon fulcra, K and P, operated by lever, F, when secured to sliding blocks, I, by the trunnions, T, in combination with the plates, O, trunnions, N, and operating substantially as herein set forth.

2d, The combination of all the above-described parts, when used in connection with the punch, J, and die, L, and any proper frame, A, and any suitable levers, F G, and H, arranged and operating substantially as and for the purposes herein described.

75,783.—Excavator or Shovel.—W. T. Nichols, Rutland, Vt.

I claim, 1st, A combined cart box and scraper or shovel, in combination with the front self-acting end boards, and the self-fastening rear end door, substantially as set forth and described.

2d, The connecting or draft frame, C, together with the combination of the foot lever, G, the hand lever, H, and the slotted tongue, U, substantially as set forth and described.

3d, The application of the draft to the box, A, at the rear of and below the axle by fastening the ends of the frame, C, to said box, and the change of draft from the rear to the front of said box, A, by the use of the bail, E, and the slotted tongue, U, substantially as set forth and described.

4th, The drop and hoist levers, D D, pivoted in front of the axle, for the purposes and substantially as set forth and described.

5th, A self-loading cart, constructed of the parts lettered from A to V, respectively, in the manner and for the purposes herein set forth and described.

75,784.—Boot-Crimping Screw.—B. S. Norris, Ripley, O.

I claim the jaws, A and B, provided with the screw, D, when combined and arranged to operate in conjunction with the screw, E, and nut, F, substantially as described, and for the purposes set forth.

75,785.—Wood-boring Machine.—J. Null, Quincy, Pa.

I claim the frame, F, moved by the shaft, G, cog wheels, H, crank, I, wheel, K, and weight, L, and the movable frame, M, controlled by the spring, N, when constructed and arranged to operate substantially in the manner and for the purposes as set forth.

75,786.—Horse Rake.—Oscar Paddock, Watertown, N. Y.

I claim, 1st, a hay fork, in which the center rod and claws are combined with the sheath, in such manner that the claws, when projected, shall bear with a lateral pressure against the sheath, or against shoulders or bearings formed therein, so as to relieve the center rod from upward pressure or strain, substantially as and for the purposes set forth.

2d, The combination of the center rod and its pivoted claws, notched, or provided with inclined shoulders, as herein described, with the sheath, and correspondingly shaped bearings formed in the same, for the reception of said shoulders, substantially as and for the purposes shown and set forth.

3d, The combination with the center rod and claws, of the spring, "locking bolt," and lever, and rope or its equivalent, attached to both center rod and lever, under the arrangement and for operation as herein described.

4th, In a hay fork in which the claws and center rod are combined with the sheath, as described, the method of raising the center or elevating rod and retracting the claws by means of a spring or springs combined with the said rod, substantially in the manner herein shown and described.

5th, The combination with the center rod, of the sheath, its handle, and a locking mechanism for the said rod, attached to and arranged within the said handle, substantially as herein shown and described.

75,787.—Egg Beater.—William H. Pierce, Bangor, Me.

I claim an egg beater, constructed of a cone of coiled wire, left free to move vertically as a spring, substantially in manner as described and shown.

75,788.—Shutter Fastening.—John A. Pipo, and William Walbaum, Hoboken, N. J.

We claim, 1st, The combination, in a blind lock or fastener, of the catch, B, and spring detent, F, substantially as and to the effect set forth.

2d, The combination, in a blind lock or fastener, of the catch, B, detent, F, and key, G, substantially as set forth.

3d, The combination of the catch, B, detent, F, and staple, K, substantially as herein set forth.

4th, The combination of the catch, B, detent, F, staple, K, and pin, I, or its equivalent, substantially as hereinabove set forth.

75,789.—Odometer.—William H. Prescott, and Whitcomb Judson, Galesburg, Ill. Antedated March 9, 1868.

We claim, 1st, Imparting motion to the gearing by means of an eccentric on the end of the actuating shaft, operating a slide with a pawl, substantially in the manner and for the purpose as herein described.

2d, Providing a stationary dial plate with two sets of figures and two hands, a mile hand and a multiplier, operated substantially in the manner and for the purpose as herein described.

3d, The construction of the ratchet wheel, C, with pinion, e, the stationary and movable wheels, c and d, the loose hub, D, with tooth, g, and ratchet wheel, E, as arranged and operated, substantially in the manner and for the purposes as herein described.

75,790.—Hay Raker and Loader.—A. J. Preston, Guilford, N. Y.

I claim, 1st, The combination of a fork, having a vibrating and reciprocating motion, with a hay rake and a clearer, substantially as described.

2d, So arranging and supporting a hay fork, which vibrates about a horiz

zontal axis, that this fork shall remove the hay, gathered by a rake, from this rake, and, after the delivery of its load upon a wagon, it shall rise over and arrange itself in rear of the load which was gathered upon the rake during said delivery movement, substantially as described.

3d, The arrangement of the rake teeth upon arms projecting from beam, a, in combination with means which will cause the fork to rise over the load, gathered upon the rake during the delivery movement of the fork, substantially as and for the purposes described.

4th, Providing a frame, carrying hay raking and loading devices, with a pole, P1, and two steadying arms, R R, the latter carrying on their front end rollers, g2, for the purpose and in the manner substantially as described.

75,791.—COOKING STOVE.—Louis T. Pyott, Philadelphia, Pa.

I claim, 1st, The combined furnace and truck, A, mounted upon boxed or encased wheels, B B, as described, and for the purpose specified.

2d, In combination with the foregoing, the V-shaped rails, extending from the rear of the stove to the front of the hearth, as and for purposes explained.

3d, The automatic division plate or damper, D d, operated by the motion of the furnace, as and for the purposes described.

4th, The detaining plate, E, in combination with the shifting furnace, A, in the manner described.

75,792.—GATE.—W. Willshire Riley, Columbus, Ohio.

I claim swinging or revolving the gate between two posts, by means of two pivoted arms and balance weights, as shown and described.

75,793.—SHINGLE MACHINE.—Adam G. Ritz, Elizabethtown, Ind., assignor to himself, John B. Carter, and William Lindley.

I claim the springs or strips, r, operated by set screws, g, and arranged radially across the annular groove, S, beneath wheel, B, in combination with crank levers, n, for adjusting the platforms, m, substantially as described, and for the purpose set forth.

75,794.—PRESERVING SKINS OF ANIMALS.—Louis S. Robbins, New York city.

I claim the process herein described for preserving the skins of animals from the destructive influence of the atmosphere and the attacks of every species of insects, the same consisting in saturating the skins with vapors of carbolic acid, obtained from the oil of coal tar, wood tar, bitumen, or other similar substances, substantially as herein described.

75,795.—PROCESS OF OILING, PRESERVING, AND STRENGTHENING LEATHER.—Louis S. Robbins, New York city.

I claim the process for saturating skins or leather with oleaginous vapors and compounds, before, after, and during the operation of currying the same, substantially as herein described.

Also, the application of the same process of treatment to all such articles manufactured from leather as may require the use of oils, either to render them impervious to moisture, or to increase their flexibility, strength, and durability.

75,796.—MOP HEAD.—W. A. Robinson, Grand Rapids, Mich.

I claim, 1st, The combination of the arms, d d, the socket, a, and teeth, l, and the mode thus provided for attaching and holding the bows, c c, substantially as and for the purpose described.

2d, The arrangement and combination of the socket, a, head, b, bows, c c, braces, h h, with the arms, d d, links, e e, and teeth, f, substantially as and for the purpose intended.

75,797.—HARVESTER.—Clement Russell, and William K. Miller, Masillon, Ohio.

We claim, 1st, The construction and arrangement by which the platform and dropper are made interchangeable for hand raking or mechanical dropping, under the control of the driver, substantially as described.

2d, Making the end board, S, in two parts, so that the after part can be removed with or when the platform is removed, to adapt the machine for the application of the dropper, substantially as described.

3d, The combination of the pulley, 2, pulley lever 3, holder, 4, and rubber spring, 5, or its equivalent, for taking up the slack in the reel chain, when said spring pulley is arranged on the slack side of the chain, and is used in connection with a fixed pulley, 1, substantially as and for the purpose described.

75,798.—FEEDING MECHANISM FOR CARDING ENGINE.—Thomas Sampson, Wanskuk, R. I., assignor to George S. Harwood, and George H. Quincy.

I claim, in a machine, such as described, the application and use of a revolving snarl, mounted in the front of the machine, at or near the point where the silver is delivered to the traversing guide, substantially as and for the purposes herein shown and set forth.

75,799.—SMOKING PIPE.—Frederic Saunders, N. Y. city.

I claim the use of a tube and hood placed in the bowl, or a tube or tubes placed in a separate chamber or chambers, or their equivalents, in pipes for smoking, for the purpose specified.

75,800.—HORSE HAY FORK.—William Scholl, Marion Township, Pa.

I claim the curved lever, D, bent and pivoted at its upper end, and provided with a projection, e, for securing the metal loop, E, when used in combination with the tines, A B, and pulley, C, with their cords, all constructed, arranged, and operating as set forth.

75,801.—HARVESTER RAKE.—Wm. H. Seymour, and Aaron Palmer, Brockport, N. Y.

We claim, 1st, The rake arm mounted in the swinging end of the rake frame or crane, and provided with a slot or perforation, substantially as and for the purpose described.

2d, The swinging rake frame or crane, in combination with the angular rod or rock shaft and rake arm, substantially as described.

3d, The angular rod or shaft, in combination with the rake arm, operating as described.

4th, Operating the bent arm or rock shaft to raise and depress the rake, by means of the crank and pitman, substantially as described.

5th, The eccentric slotted crank arm, or its equivalent, whereby the speed of the rake is varied, as described.

6th, The stopping lever and spring, in combination with the rake gearing on standard, H, substantially as described.

75,802.—SAD IRON HEATER, NURSE LAMP, AND FOOT WARMER.—Eleazer Small, Dennisport, Mass.

I claim the box, A, perforated as set forth, and provided with the lamp, D, the movable partition, G, and the sliding cover, C, when the several parts are arranged and constructed as and for the purpose set forth.

75,803.—MODE OF ATTACHING TRACES TO WHIFFLETREES.—Samuel Smith, Plainview, Minn.

I claim the combination of the ferrule, B, with its projections, x x x x, and the ring, C, with its enlargement, f, all constructed and used substantially as set forth.

75,804.—BEEHIVE.—M. S. Snow, Forestville, N. Y.

I claim the miller box, R, provided with perforated diaphragm, r, and aperture, W, arranged with the opening, F, and wire cloth, q, substantially in the manner and for the purpose set forth.

75,805.—MACHINE FOR CUTTING TOBACCO.—L. W. W. Spencer, New York city.

I claim, 1st, The feed rolls, 11 12, conducting case, M, and cutters, d d, combined as and for the purpose herein set forth.

2d, The contracted mouth piece, B', adjacent to the cutter, d, arranged as represented relatively to the passage, M, and rolls, 11 12, as and for the purpose as herein set forth.

3d, The diverging sides, B B, of the feed box, as and for the purpose herein specified.

4th, The plates, m, constructed and arranged relatively to the feed box, B B, and feeding devices, 11 12, as and for the purposes herein set forth.

5th, The grinding surface, E, arranged and operated relatively to the cutters, substantially as represented, so as to sharpen the knives and cutters, d d, while they are in operation, substantially as and for the purpose herein set forth.

6th, The application of steam to the cutters, d d, or their equivalents, previous to each cut, by conducting the steam from a boiler, or the like, into the casing through or past which the cutters revolve, substantially as and for the purpose herein set forth.

75,806.—HAIR DRESSING COMPOUND.—Frederick Stearns, Detroit, Mich.

I claim the combination of cocoa nut fat, castor oil, and alcohol, with any appropriate perfumes, substantially in the proportions named and for the purposes described.

75,807.—MANUFACTURE OF ENAMELED CLOTH.—Edgar M. Stevens, Chelsea, Mass., assignor to himself and W. N. Ely (Trustee), Stratford, Conn.

I claim the compound rubber enamel cloth, substantially as described.

75,808.—POWER HAMMER.—Andrew Strube, Frederick, Md.

I claim, 1st, The arrangement of the treadle, E, and lever, F, with the bars, G G, socket, L, and adjustable frame, D, as and for the purpose set forth.

2d, The arrangement of the lever, I, spring, J, and movable cross bar, Z, with the carriage head, as above described and for the purposes set forth.

2d, The turning head, S, fig. 4, with the cutters, M M, and feed screws, in combination with the carriage head, o o, as above described and for the purposes set forth.

75,809.—MODE FOR REMOVING TIN FROM SHEET METAL.—D. E. Sturdevant and B. H. Harmon, Clifton Springs, N. Y.

We claim, 1st, The process, herein described, of removing tin coatings from sheet metal by the combined use of hot air and steam acting upon the mass in a closed retort, substantially as herein set forth.

2d, The special combination and arrangement of the apparatus for producing the result, the same consisting of the retort, A, grate, C, hot-air pipes, D E, and water receptacle, G, the whole operating in the manner and for the purpose herein set forth.

75,810.—HAY ELEVATOR.—James B. Summerill, Penn's Grove, N. J.

I claim, 1st, The hoisting frame, A, constructed and arranged as and for the purpose described.

2d, The tripping catch, C, constructed as described.

3d, The combination, substantially as described, of the hoisting frame, A, the suspension frame, B, and the tripping catch, for the purpose set forth.

4th, The traversing frame, H, arranged and operating substantially as described.

5th, The combination, as described, with the traversing frame and supporting beam, of the locking dog, I, for the purpose set forth.

6th, The combination, substantially as described, of the hoisting block and traversing frame, with the locking catches, G, for the purpose specified.

7th, The combination, with the traversing frame and catches, G', of the spring guides, N, on the beam, for the purpose set forth.

8th, The combination, with the locking dog, I, of the lifter, I', arranged to be operated by the ascent of the block, as described.

9th, The combination, substantially as described, of the hoisting block and traversing frame, with a rope connecting the two, and so arranged as to lift the block vertically and lock it in the traversing frame, and then to unlock the frame and traverse it horizontally to the place of discharge, by a continuous pull on the same rope.

10th, The tripping rope, arranged so as to dump the hoisting frame, and then to retract the traversing frame by a continuous pull, in the manner described.

75,811.—ROTARY PUMP.—Joseph A. Talpy, Somerville, assignor to himself and Mellen Bray, Boston, Mass.

I claim, 1st, The combination, with the cylinder of a rotary pump, of the eccentric piston ring, its actuating cam or eccentric, and the valve and valve arm, for regulating the admission and discharge of the fluid into and from the said cylinder, in the manner and for the purposes herein shown and set forth.

2d, The combination, with the pump cylinder and eccentric piston ring, of the valve and arm for holding the same in position, and the orifices or pipes for the induction and eduction of the fluid, arranged and operating substantially as herein shown and described.

3d, The construction and arrangement, within the pump case and cylinder, of the hinged valve and valve arm, substantially as shown and described.

75,812.—RUNNER FOR WHEELED VEHICLE.—Bjarne Thompson, Chicago, Ill.

I claim, 1st, The hinged stirrups, D, and bolts, x, in combination with a detachable runner, having in it a groove or recess fitted to the wheel, substantially as specified.

2d, The guide, C, to prevent the side slipping off the runner when operated by the direct action of the lever, I j, substantially as specified.

75,813.—WOOD BORING MACHINE.—James B. Thorp, Warrensville, Ohio.

I claim the eccentric bush, E, carrying the shaft of the auger, so constructed and arranged that it can be revolved within the nut, F, and clamped in any desired position, substantially in the manner and for the purpose set forth.

75,814.—SPRING CHAIN.—Henry Turner (assignor to himself and Mellen Bray), Boston, Mass.

I claim, 1st, The combination, in a spring, such as described, of the bifurcated or forked link, B, and its slotted head, with the link, A, and its slotted head, under the arrangement and for operation as herein described, so that the end of each link shall pass through and be capable of sliding in the head of the other link, as and for the purposes set forth.

2d, The combination, with the sliding links and their slotted or perforated heads, arranged as described, of the rubber cylinder or other elastic body, mounted upon said links, and interposed between their heads, as and for the purposes herein shown and specified.

3d, The combination of two or more springs, such as described, in the manner herein shown and set forth so as to form an elastic and extensible chain.

75,815.—INSULATOR FOR TELEGRAPH.—Cromwell Fleetwood Varley, New York city.

I claim, 1st, The method, substantially as described, of preventing the metallic pins of insulators for telegraphic wires from rusting, and the vulcanite covering from being defective and being injured, by coating the said metal pins with zinc, and then with tin, or an alloy of tin, preparatory to and in combination with the outer covering of vulcanite, as set forth.

2d, As an improvement on the well-known mode of securing the metallic pins, covered with vulcanite, with the insulating cups, by means of cement, and as a means of excluding moisture and preventing the evil effects therefrom, filling the pores and interstices with paraffine wax, applied substantially as herein described.

3d, Covering pieces of wire with vulcanite, for insertion at the points of support, substantially as described.

75,816.—DRILL.—Franz Vester, Newark, N. J.

I claim the spring cutter, B, the stay post, E, and guide plate, C, when used in combination with an ordinary drill or auger, A, substantially as and for the purposes described and set forth.

75,817.—STEAM BOILER FURNACE.—Robert L. Walker, Globe Village, Mass.

I claim the combination and arrangement of one or both the auxiliary steam generators with a furnace and boiler, substantially in manner and so as to operate therewith as described.

Also, the combination and arrangement of the heating chamber, E, with each of the auxiliary generators, and the furnace or furnace and boiler, arranged and combined substantially as described.

Also, the combination of the water grate with the auxiliary generator or generators, the furnace and boiler, arranged and combined substantially as described.

75,818.—CAR STARTING AND STOPPING APPARATUS.—John B. Waring, New York city.

I claim, 1st, The pawl, H, spring, I, and series of detents, b, arranged to operate in combination with a wheel, previously turned the reverse to the axle, substantially as and for the purpose herein set forth.

2d, The turning part, P, arranged relatively to the wheel, G2, pawl, H, and series of detents, b, substantially as herein set forth.

3d, Disconnecting the pawl, H, from the series of detents, b, by means of the cam-like projection, j, arranged to operate substantially as and for the purpose herein set forth.

75,819.—PUMP.—Stillman White, Providence, assignor to himself and Christopher Dexter, East Providence, R. I.

I claim a pumping apparatus, consisting of a central force pump, and two or more lift or suction pumps, the area of the first being quite equal to the area of both or all the others, and so arranged that power applied to the main or central piston rod is communicated by means of a cross head to both or all the other piston rods, so that the power of forcing the main or central piston downward is fully compensated or balanced in its ascent, substantially as shown and described.

75,820.—BED BOTTOM.—John D. Wilkinson, Plattsburg, N. Y.

I claim the arrangement of the clamp, C, and spring, F, with the cord, E, pulleys, D, and slats, H, substantially in the manner and for the purpose specified.

75,821.—CURTAIN FIXTURE.—Alfred Young, Philadelphia, Pa.

I claim the springs, g g, fastened to the frame of the window and bearing upon the curtain in such manner that the curtain will be tightly and evenly strained.

75,822.—TURNING LATHE.—Fredrik Zibell, St. Louis, Mo.

I claim, 1st, The combination of the nut, I, screw, A, and cutters, H H, with the carriage head, as above described and for the purposes set forth.

75,823.—LEATHER SPLITTING MACHINE.—John H. Abbott, Malden, and Jeremiah A. Marden, Boston, Mass., assignors to John H. Abbott and Charles E. Abbott.

We claim, 1st, Operating the knife of a leather splitting machine by levers driven by cams, substantially in the manner set forth.

2d, The clamp, H, constructed and operating as described, to hold the end of the knife and assist the adjustment of its tension, as specified.

3d, The combination and arrangement of the cams, D D', levers, E E', clamp, H, and knife, J' in the manner and for the purpose described.

75,824.—INSTRUMENT FOR MEASURING DISTANCES.—George Achells, Westchester, Pa., and Hermann Poppenhausen, New York city.

We claim the instrument for measuring approximately the relative size and proportion of objects seen in a landscape, constructed and operating substantially as and for the purposes described.

75,825.—CORN PLANTER.—D. S. Ames (assignor to himself and John F. Persing), Laclede, Mo.

I claim the legs, A A', and the hopper, C, when combined with the dropping slide, D, and otherwise arranged, as herein described and set forth.

75,826.—CULTIVATOR.—Benjamin Anyan, Fitchville, Ohio.

I claim, 1st, The supplemental hounds, b b, with the draft pole, G, attached, and both said parts attached to the hounds proper, D D, as shown, when said parts are applied to or used in connection with the front running gear of an ordinary farm wagon, for the purpose specified.

2d, The attaching of the standards, I I, of the front shovels, H, to the supplemental hounds, b b, and the attaching of the standards, K, of the rear shovels, J J', to the bars, L L, connected to the hounds proper, D D, substantially as and for the purpose set forth.

75,827.—CALIPER.—Jearum Atkins, Washington, D. C.

I claim the within described arrangement for fastening and clamping calipers, of the combined rivet and screw, A, with its nut, G, and washer, F, substantially as described.

75,828.—PROCESS FOR PRESERVING COFFEE.—B. T. Babbitt, New York city.

I claim the process of preparing coffee for use by boiling or cooking the same in olive oil, butter, or equivalent oleaginous or unctuous material, substantially as herein set forth.

75,829.—COFFEE ROASTER.—B. T. Babbitt, New York city.

I claim the thermometer, arranged in the tubular journal of the rotating air-tight vessel or cylinder, substantially as and for the purpose specified.

75,830.—GRATE.—J. L. Babbitt, Glen Cove, N. Y., assignor to the Fuel-saving Furnace Co., New York city.

I claim, 1st, An inclined grate in which the bars are so suspended and supported as that they are restrained from sliding or slipping downwards in direction of their length, while they are free to move upward in such direction, substantially as specified.

2d, The inclined bars, A, suspended and supported for motion or action as described, when formed with the chips, x, that, in addition to their effecting the suspension of the bars, also serve as guiding surfaces for transverse adjustment of the latter along their supports, essentially as shown and described.

75,831.—TOY PISTOL.—J. W. Bailey, New Orleans, La.

I claim the stock, A, the barrel, B, the piece, C, and the pin, I, constructed, arranged, and combined substantially as described for the purposes set forth.

75,832.—SULKY PLOW AND HARROW.—C. N. Bakewell, Normal, Ill.

I claim, 1st, Broadly attaching the same draft to both the plow beams and carriage, by divided tugs, in such manner that each draft is independent of the other, as herein specified.

2d, The combination of the frame, A, supported upon wheels, B, driver's seat, E, and lever, F, and chains, G and H, for suspending adjustably, a plow or harrow, substantially in the manner set forth.

3d, The combination of the chains, G and H, for suspending the plow or harrow, and lateral chains, H', attached to the frame, substantially as and for the purpose set forth.

75,833.—BOILER ALARM GAGE.—Thaddeus C. Banks, Wallingford, Conn.

I claim the inverted siphon and three-way cock, in combination with the expansion tube, B, and an alarm, substantially as and for the purposes set forth.

75,834.—SAW MILL.—A. P. Barlow, Claremont, N. H.

I claim, 1st, The pivoted frame, d, in combination with the adjustable uprights, e, roller, a', and clamp screw or bar, f, constructed and operating substantially as described.

2d, In combination with the above device, the adjusting screw with its controlling nuts, follower, c', and slide bolts, f1, surrounded by coiled springs, all constructed and arranged to operate as described.

3d, The upright shaft, j, friction plate, k, pivoted box, m, revolving plate, l, shaft, h, and its box, with plates, spring, and temper screw, in combination with pivoted lever, r, and slotted lever, r', all arranged to operate in the manner substantially as described.

4th, The catches or trips, x x', on the carriage, in combination with the lever, w, and springs, levers, and shaft, j, all operating in the manner as described.

75,835.—MODE OF LUBRICATING THE SLIDES OF MULEY-SAW MILLS.—A. P. Barlow, Claremont, N. H.

I claim, 1st, The guides, g, chambered and perforated, as shown at e and d, in combination with the lubricating box, a, constructed and operating substantially as described.

2d, The guides, g, and perforated muley head, in combination with the lubricating box, a, all constructed as herein described, for the purposes set forth.

75,836.—HORSE RAKE.—A. T. Barnes (assignor to Tiffin Agricultural Works), Tiffin, Ohio.

I claim the adjusting braces, having their front ends secured to the lower sides of the draw bars, D, and their rear ends extending through the standards, C, with screw nuts upon these rear ends for tightening up the parts at will, substantially as described.

75,837.—MEDICAL PREPARATION.—T. A. Barry and B. A. Patten, San Francisco, Cal.

We claim a tonic made of the ingredients herein enumerated, mixed and compounded together in about the proportions herein described.

75,838.—DOOR LOCK.—F. H. Bartholomew, New York city.

I claim the combination of the revolving toothed disk with the sliding tumbler and spring catch, all operating as herein shown and described.

75,839.—CHARGER FOR POWDER FLASKS.—H. C. Bascom, La Crosse, Wis. Antedated March 16, 1868.

I claim the combination of the inner tube, A, provided with the spiral slot, a, the outer, tube, B, provided with the longitudinal slot, b, and the screw pin, H, passing through both slots, all constructed and operating as described whereby the pressure upon the mouth piece, C, pushes forward the tube, B, in a longitudinal direction, and partially rotates the inner tube, A, causing the perforations in the ends, D, of said tubes to register for discharging the powder, as herein shown and described.

75,840.—APPARATUS FOR WORKING WAGON TONGUES.—A. J. Beach, Linden, Mich.

I claim the construction of an apparatus, for the purpose described, combining the slotted bar, C, bolt and hand nut, D, the standard transverse bar, E, the upright rods, F, the nuts, G, the gage bar, H, the lever, I, the hand nut K, the set screws, L, the cam, M, the set screws, N, the bolt, P, and hand nut R, with the bench or truss, A, or their equivalents, when arranged and operating substantially as and for the purposes described.

75,841.—SLIDING SEAT FOR CARRIAGES.—S. N. Beecher (assignor to himself and C. W. Miles), Milford, Conn.

I claim the arrangement of the spring, d, upon one end of the double seat, in combination with the catch or pivot, a, upon the other end of the double seat, so as to operate to permit the folding of the seat, as set forth.

75,842.—CHURN.—H. C. Bell, Heyworth, Ill.

I claim the combination of the tubular dasher shaft, H, two or more curved funnels, I, and the vertical partition boards, J and K, with each other and with the body, A, of the churn, substantially as herein shown and described, and for the purpose set forth.

75,843.—SEEDING ATTACHMENT TO HOES.—E. L. Bergstresser, Hublesburg, Pa.

I claim, 1st, The adjustable vibrating disk, E, applied to and used in connection with the hoe, substantially as described.

2d, The stationary disks, B B', or their equivalent, and vibrating perforated disk, E, arranged and operating substantially as described.

3d, The disks, B B' and E, hopper, C, and seed tube, G, in combination with the hoe, A A', arranged and operating as described.

75,844.—GRAIN DRYER.—H. H. Bingham, and J. C. Hunt, Terre Haute, Ind.

We claim, 1st, The polygonal inclined reel, C, in combination with the furnace or heating cylinder, A, the same being provided with a draft-hole or holes, f, near its lower end, with a chimney, E, and with a tube, F, for the escape of moisture from the meal, as set forth.

2d, Making the shaft, B, on which the reel, C, is hung, of two pieces which are connected by a coupling, h, so that the reel can be easily removed, as set forth.

3d, Providing the reel, C, with flange, d, at its upper open end, as set forth.

4th, The cooler, K, when provided with zigzag canvas or porous sides, J, substantially as and for the purpose herein shown and described.

5th, The cooler, K, when provided with zigzag sides, j, false revolving bottom, l, stationary bottom, k, and sweepers, q, as set forth.

6th, The cooler, K, when provided with zigzag porous sides, in combination with the fan, H, inclined stationary cylinder or furnace, A, and inclined revolving polygonal reel, C, all made and operating substantially as and for the purpose herein shown and described.

75,845.—CULTIVATOR AND SEEDER.—Lewis Bishop, Talladega, Ala.

I claim, 1st, The employment of the spring, S, as constructed, or other equivalent device, for obtaining in cultivators or seeders, of whatever kind or construction, a vertically yielding tension, substantially as and for the purpose herein shown and described.

2d, The plates, m, operated substantially as and for the purpose herein shown and described.

3d, The hopper or trough, O', with its agitator, l, substantially as and for the purposes shown and described.

4th, The star wheel, J, or other equivalent device for lifting the agitator, l, substantially as and for the purpose herein shown and described.

75,846.—MACHINE FOR SAWING STAVES.—W. R. Bishop and O. D. Bishop, Harrison, Wis.

We claim the combination of the apron, E, with the bent shaft, F, whereby the block, from which the staves are cut, is depressed to bear against the teeth of the saw, P, to cut a stave of uniform thickness, constructed and operated as herein shown and described.

75,847.—ATTACHING DOOR KNOBS TO SPINDLES.—Wm. Boch, Newtown, N. Y.

I claim the metallic socket, B, constructed with split sides, c, for the entrance of the wedges, C, so arranged that its interior socket formation remains the same, while its sides are forced outward by driving in the socket to form a rigid connection between it and the knob, substantially as shown and described for the purpose set forth.

75,848.—MACHINE FOR MEASURING CLOTH.—W. F. Boggs (assignor to himself and John T. Bennett), Petersburg, Ill.

I claim, 1st, The drum, F, cord, I, and drum, I', when combined with the pivoted clock frame, E, in the manner described, and for the purpose of reversing the same, as set forth.

2d, The combination and arrangement of the pivoted clock frame, E, its tipping bar, e', and the adjusting bar, d, as and for the purpose set forth.

3d, The friction roller, D', and its spring frame, d d', in combination with the measuring roller, D', as shown and described.

4th, The roller, G, its screw bearing, g, friction pulley, g1, cord, g2, and weight, W, when combined and operated as herein described and set forth.

75,849.—SECRET BED.—C. F. Bowers, Boston, Mass.

I claim the combination with a book case or other upright piece of furniture of a bed frame having folding rails, and flanges for supporting the bed, said bed being made in sections, and so as to cross the joints in the rails, and the rails and bed being folded and arranged together within the bottom of a case, a, when the bed is not in use, substantially as set forth.

Also, combining with the upper part of the case, a, the sliding mirror, substantially as set forth.

75,850.—CORN AND SEED PLANTER.—E. C. Brown, Crawfordville, Ind.

I claim, 1st, The two arms, B and B', and the spring, Q, when the same are constructed, combined, and used in manner and form as aforesaid.

2d, The combination of the said B and B' and Q, with the said lever, A A, and the said sliding bottom, R R, for the purpose and in the manner substantially as set forth.

3d, The whole combination, herein set forth, when the same is constructed, combined, and used, in its several parts, substantially as set forth.

75,851.—GUIDE FOR CORN AND SEED PLANTERS.—E. C. Brown, Crawfordsville, Ind.

I claim the index and guide-staff, hereinbefore described, when the same is constructed in manner and form in its several parts, and used for the purpose and in the way substantially as set forth.

75,852.—SASH STOP.—R. E. Buchanan, Carrollton, Ill.

I claim the lock, c, of segmental form, provided with thee axle, c3, and knob C', operating solely as a handle, the middle part of the rim of which lock is smooth, while the end parts are serrated, and all three parts of which rim are at such distances from the center of motion of the lock as to form a double-acting fastener, substantially as described.

75,853.—METHOD OF HANGING WINDOW SASHES.—Thomas Bullivant, London, England.

I claim the method of attachment of the weight cords, D, to the sashes, through the medium of the adjustable plates, G, constructed, arranged, and applied in the manner shown, so as to admit of being adjusted to serve as guides for the sashes, and also to admit of the sashes being readily removed from the window frame when desired.

75,854.—LOCK FOR DRAWERS, ETC.—A. G. Burton, Rochester, N. Y.

I claim the combination with the key guide, D, of the shielding barrel, C, of larger diameter, closed by the head, e, and so arranged as to leave ample space between the body of the guide and the barrel, for the operation of the wings, g h, or their equivalent, substantially as and for the purposes set forth.

2d, So arranging the key, E, with relation to the arm, e, and shoulder, b, that when the said arm relieves the said shoulder to act upon the bolt, the key will come opposite, or nearly opposite, the pivot, m, where it can have the least action upon the tumblers, as herein set forth.

3d, The wing, g, and the lodge, i, when employed, in combination with the key guide, D, and key, E, to prevent its withdrawal when the lock is unlocked as herein set forth.

75,855.—COMPOSITION PAVEMENT FOR STREETS.—J. W. Byrnes, Washington, D. C.

I claim concrete compounded from the ingredients named, and used in combination with stone in the construction of pavements, substantially as set forth.

75,856.—CORSET CLASP.—W. B. Cargill, New Haven, Conn.

I claim the herein described corset clasp trimming, consisting of the plate, provided with the button, composed of the two parts, C and D, in the manner substantially as herein set forth.

75,857.—COMBINED WEATHER STRIP AND DOOR ALARM.—G. W. Carpender, Jarvis, Ind.

I claim the plates, C and g, cam, D, rod, E, plate, F, cam, G, spring, K, clapper, J, and bell, H, all constructed, arranged, and operating in the manner described, whereby an alarm is given by the weather strip, as set forth.

75,858.—WEEDING MACHINE.—Nicolaus Carstens and Chas. Carstens, New York city.

We claim, 1st, Arranging a revolving rake in rear of the cutter of a weeding machine, substantially as and for the purpose herein shown and described.

2d, Pivoting the cutter of a weeding machine to the frame so that it can swing freely on the pivots, substantially as herein shown and described.

75,859.—WASHING MACHINE.—John F. Chambers, Calistoga, Cal.

I claim the combination of the toothed beaters or rubbers, E E, with the

yielding corrugated metallic bottom, C C, constructed and operating substantially as described.

75,860.—CURTAIN FIXTURE.—James Chase, Rochester, N. Y.

I claim connecting the end of the curtain roller with a swinging lever, C, so as to be thrown out bodily, and combining therewith the ratchet wheel, E, and detent, D, in such a manner that the weight of the roller and curtain themselves serve to re-engage the parts when thus thrown out, substantially as herein set forth.

Also, adapting the bearing, B, and lever, C, without fitting, by means of the extension, c, with slot, d, and shoulder, f, of the former, and the bit, I, and bearing, k, of the latter, the whole arranged and operating in the manner and for the purpose herein set forth.

Also, the scroll flange, p p', of bearing, B', arranged as described, and operating in the manner and for the purpose set forth.

75,861.—MANUFACTURE OF WHITING AND PARIS WHITE.—W. W. Chipman, Brooklyn, N. Y., assignor to himself and W. D. Gookin, New York city.

I claim the within-described process of manufacturing Paris white and whiting from limestone, by the three several steps of burning, slaking, and recarbonizing, substantially as and for the purposes herein set forth.

75,862.—BLIND HINGE.—C. B. Clark, Buffalo, N. Y. Antedated Oct. 18, 1867.

I claim a self-locking blind butt, when provided with flange, n, recess, o, stop, l, and abutting portion, m, constructed, arranged, and operating substantially in the manner and for the purposes set forth.

75,863.—DAMPER FOR STOVEPIPE.—Aaron Colton, Sycamore, Ill.

I claim the damper, constructed as described, consisting of the right angular shaft, C, passing transversely through the stovepipe, A, and secured to the under side of the damper, B, the arms, a a', of said shaft, upon each side of the stovepipe, being notched to receive the weight, D, as herein described for the purpose specified.

75,864.—HAMES FASTENER.—E. A. Cooper, Lancaster, N. Y.

I claim, 1st, The two hook bars, B B, one or both provided with rack teeth, in combination with a guiding sleeve, C, and operating pinion, d, substantially as set forth.

2d, The pawl, and their ratchet wheel in combination therewith, operating substantially in the manner and for the purpose set forth.

75,865.—MILL STEP.—Christopher Corbit, Christiana, Pa.

I claim placing around the toe of a spindle a series of wedge-shaped followers, C C C C, constructed with boxes, B B, screws, a a a a, movable piece, G, steel plate, D, and operating as described, in combination with the recess, e e, in the plate, A A, all arranged for the purpose herein specified.

75,866.—CAR COUPLING.—S. H. Cowles, Oakville, Conn.

I claim the slotted metal guide, C, placed within the mouth of the draw-head, A, as specified, and used in combination with the pivoted hook, B, the front of which is beveled from top to bottom, all constructed and operating as set forth.

75,867.—HARROW.—Isaac Crum, West Chester, Ohio.

I claim the combination of the harrow, B, with the sled, H, and the adjusting mechanism, I d G, or its equivalent, arranged and operating substantially as and for the purpose described.

75,868.—MARINE STEAM GOVERNOR.—John B. Cullen (assignor to himself and John P. Cheston), Philadelphia, Pa., assignors to themselves and John A. Fulton.

I claim a propeller shaft arranged within a vessel as set forth, in combination with a steam cylinder and piston, and with the devices described, or equivalent devices, whereby the movements of the shaft are communicated to a valve regulating the passage of steam to the engine, all substantially as specified.

75,869.—CURTAIN FIXTURE.—Thomas Curley, Troy, N. Y.

I claim, 1st, The ratchet, B, the pawl, E, and the arm, C, either with or without a loose pulley, D, arranged substantially as described for the purposes set forth.

2d, In combination with the above, the plate A, for the purpose described.

75,870.—BRACE FOR BIT.—Chas. M. Daboll (assignor to the Wilson Manufacturing Company), New London, Conn.

I claim, 1st, The jaws, C, constructed as described, having a semicircular base inclining outward, and provided with the T-shaped shank, fitting without pivots in the T-slot of the stock, A, as herein described, for the purpose specified.

2d, The jaws, C, constructed as described, in combination with the screw nut, B, when the inner inclined surface of such nut bears equally at all points around the inclined circumference of the jaws C, provided with the T-shanks, as herein described, for the purpose specified.

3d, The stock, A, when provided with the T-slot adapted to receive the T-shank of the jaws, C, in combination with the nut, B, whose screw thread is above the jaws, as herein described, for the purpose specified.

75,871.—GANG PLOW.—Geo. J. Dahl, Stockton, Cal.

I claim, 1st, A plow standard constructed substantially as shown and described.

2d, The orifices, n n, of the offset, m, as and for the purpose set forth.

3d, The tenon hooks, n' n' of the adjustable land side, m', as and for the purpose set forth.

4th, The head piece, h, of the standard, D, constructed as described, and made with the central opening, i, as and for the purpose set forth.

5th, The adjustable land side, m', in combination with the standard, D, arranged in the manner described.

6th, The scraper, e, in combination with the caster wheel, d, as and for the purpose set forth.

7th, A series of plows constructed and operating as set forth, in connection with a frame of the kind described.

75,872.—LATHE CHUCK.—F. Davison, Richmond, Va.

I claim the combination of the pivoted shell, provided with holding jaws, the slotted disk or face plate, and the tightening screw, substantially as and for the purpose specified.

75,873.—BRAKE FOR LOCOMOTIVES.—Auguste De Bergue, Paris, France.

I claim, 1st, The combination of the external air adit, B, and reservoir, E, with the motive cylinder and piston of a locomotive, substantially as described and specified.

2d, The combination of the rod, N, with the motive cylinder, whereby to introduce a jet of steam to lubricate the interior surface of the cylinder while steam is shut off, and while air is in the cylinder, substantially as herein shown and described.

3d, The combination of the external air adit, B, with the exhaust pipes, funnel, and cylinder of a locomotive, substantially as described and specified.

4th, The arrangement of the air reservoir, E, substantially as shown and described, with the motive cylinders of a locomotive, whereby to receive and retain the compressed air, as set forth.

5th, The escape valve, H, substantially as shown and described, in combination with the air reservoir, E, and motive cylinders of a locomotive, whereby to permit the escape of air, as set forth.

6th, The exit valve, I, when combined with the air reservoir E, and motive cylinders of a locomotive, substantially as shown and described.

7th, The arrangement of the valve D, substantially as shown and described, with pipes, l and F, and opening, n, whereby the motive cylinders of a locomotive are rendered available in compressing the air, as set forth.

8th, The arrangement of the pipe, n, with relation to the air reservoir, E, supplementary air cylinder and piston, o, friction brakes, q, and arm, p, substantially as herein described and specified.

75,874.—STEAM CARRIAGE.—Zadoc P. Dreder ick and Isaac Grass, Newark, N. J.

We claim, 1st, The combination of the crank, E, connecting rods, F, bell crank levers, G' G', and rods, H H, the said parts being arranged to produce an alternately stepping motion, substantially as described.

2d, The combination of the rods, G' G' and H H, with the rods, L L and M M, and foot pieces, I I, substantially as described.

3d, The combination of the rods, H H and Q Q', substantially as and for the purpose set forth.

4th, The foot piece, I, pivoted to the rods, H, centrally, and at the heel to the rod, M, when said rods are so actuated as to cause an oscillating motion of the foot, substantially as and for the purpose set forth.

5th, The combination of the lever, N, rods, P and Q, with the rods, G' and H, substantially as and for the purpose set forth.

6th, The arrangement of the circular support, U, to the machines, and the cords, S, and tiller, T, substantially as set forth.

75,875.—TIPPING UMBRELLA FRAME.—John M. Doubleday, Montclair, N. J.

I claim the covering or overlaying, with metals or other substances, the ends of ribs employed in umbrella or parasol frames, substantially as and for the purposes set forth.

75,876.—TOY RAILROAD AND CAR.—Beriah Douglas, Appleton, Wis.

I claim the invention of placing the axles of this hand running car within and through the box or body, so as to drop the floor down very near to the rails, for the reasons above specified.

Also the invention of turning up the ends of car rails, essentially in the manner and for the purposes mentioned.

Also the invention of the hand supports, and ropes or rods as combined with the rails, essentially and as the best means for running the car by the hands of the riders for pleasant and healthful exercise.

75,877.—BAG FASTENER.—F. H. Drake, Kenosha, Wis.

I claim a bag fastener consisting of the strap, D, and buckle, B, united, and secured to the bag by means of the metal plate, A, or its equivalent, substantially as described.

75,878.—RAILROAD CAR VENTILATOR.—Isaac Dripps, Fort Wayne, Ind.

I claim, 1st, The combination of the wings, E, of a butterfly valve, the bifurcated bell crank lever, H, and segment, L, arranged to operate substantially as and for the purposes described.

2d, The combination of the tapering tubular hood, B, pipe, A, and the regulating valve placed in the latter, arranged to operate substantially in the manner and for the purpose set forth.

75,879.—LOCKING KNOB LATCH.—Simeon W. Drowne, Norwich, Conn.

I claim the combination of the latch bolt, B, spring, F, sleeve, K, pins, I, connecting bar, L, tumblers, N, with projections, P and R, and knob key, R, all constructed and operating as described for the purpose specified.

75,880.—CLAMP FOR DOOR AND SASH.—Elijah F. Dunaway, Cincinnati, Ohio.

I claim, 1st, The construction of the stops, a, and operating in the manner as herein described, for the purpose specified.

2d, The combination of the oscillating bars, A', the sliding bar, C, cam levers, B, rods, s', springs, S, and rack bars, D, as herein described, for the purpose specified.

3d, The rack bars, D, in combination with the carriage, O, and sliding bars C, as herein described, for the purpose specified.

4th, The clamping of the sash or doors upon the carriage, O, by means of the stops, a' s', mounted upon it, and bar, G, having stop, F, and working in slot, o, and operated by cam lever, N, in the manner and for the purposes substantially as above set forth and described.

75,881.—FURNACE.—Wright Duryea, Glen Cove, N. Y., and Wm. Ennis, Hudson, N. Y.

We claim, 1st, In a furnace of the character described, and composed of a basket grate, A, with feed openings for the fuel down either side, and reflector, B, the combination of a chamber, C, supplied with air from the exterior, and communicating with the fireplace by openings or perforations, b, made in or through the reflector, substantially as specified.

2d, The combination of the close fuel chambers, D D, with the basket grate A, with which they are in communication, by openings, c, and separated from each other by an intervening space or chamber, C, essentially as shown and described.

75,882.—MACHINE FOR FELLING TREES.—A. Edwards, New Haven, Conn.

I claim the vibrating cutter head, J, provided with spur cutters, d d, and the cutters, i i, and operating so that each of the cutters, i i, cuts from the path marked by the spur cutter, d, previously moved in an opposite direction by the oscillation of the pivoted lever, H, substantially as specified.

75,883.—CORN PLANTER.—R. S. Edwards, Savannah, Mo.

I claim, 1st, Constructing the frame of the machine of two parts, A B, connected by a bolt, a, in connection with the arm, E, on part, B, provided with the pendent pin, c, to fit in the plate, C, of the part, A, all arranged substantially as and for the purpose set forth.

2d, The seed distributing device consisting of the two valves, f f', in the spouts, L, of the seed box, K, arranged as shown, and operated by the levers, M, and the cams or wipers, h, from the front axle, H, substantially as shown and described.

3d, The adjustable horizontal bar, O, connected with the lever, R, and provided with the notched arms, Q, in combination with the lugs or projections, e, on the flanges, l, of the wheels, G G, all arranged substantially as and for the purpose specified.

75,884.—SEWING MACHINE.—W. St. George Elliott, M. D., Morristown, N. J.

I claim the curved arm, F, having the presser, J, pivoted lever, L, having feed foot, K, and arm, M, adjustable bent lever, N, and spring, P, in combination with the sliding sleeve, G, needle bar, I, and collar, O, all constructed and arranged to operate as herein shown and described.

75,885.—TOY PISTOL.—Wm. H. Emory, Ashburnham, Mass.

Antedated March 16, 1868.

I claim the combination of the spring, C, with the slotted barrel, B, and the trigger and lock, F, the parts being arranged substantially as and for the purpose herein described.

75,886.—ACOUSTIC TELEGRAPHING.—Lancelot H. Everitt, New Orleans, La.

I claim an acoustic battery for telegraphing, a machine which creates and modulates sounds, that, when arranged and sounded under specific symbolic formulæ, they are made to represent and express all the letters of the English alphabet and all Arabic notations, and when thus evoked into existence the machine reflects these sounds and transmits them through naked wire, buried in the land or water, to their destination, where they impart their various interpretations with such distinctness and order to the auditor who receives them, as to become the most important and efficient commissioners of intelligence.

Also the mode of eliciting two different tones of sound from the air, by means of the chorda tympani, the malleus, the key, the incus, the stapes; of reflecting them from the polished phonic fossa; of conducting them to the acoustic messenger through the nipple of the incus, and transmitting them through non-insulated wire to the cochlea, vestibule, and auricular, which delivers them to the auditor with precision and regularity.

Also this mode of associating these two modulated tones, and arranging them under five different orders of sound, expressive of letters and notations, as herein described, and this method of using similar and dissimilar silent intervals of time in separating and combining sounds, thus giving force and decided character to the symbolic formula of a letter or notation when echoed from the phonic fossa and transmitted through naked wire to the end of the auricula.

Also this mode of creating and regulating these two primary orders of sound, and other orders evolved from them, systematically, by means of a diatonic staff and two bars attached thereto, and signalizing different sounds by red and blue colored disks, which represent two very dissimilar tones that are convertible into intelligent symbols, as herein described, or by any other means substantially the same, and which will produce the intended effect.

75,887.—PACKING TOBACCO.—M. Falk, New York city.

I claim a packing of cut smoking tobacco, the envelope of which is a cloth bag, provided with a flap, a, and a suitable fastening, b, substantially as shown and described.

75,888.—WEFT STOP MOTION FOR LOOMS.—Joseph C. Fifield, Lowell, Mass., assignor to W. N. Ely, Stratford, Ct.

I claim, 1st, The weft stop motion mechanism, constructed, arranged and operating, as to its several parts, in the manner and by the means described, in combination with the lay, as set forth.

2d, The finger device constructed and arranged in the manner and operated by the means described.

3d, The combination with the lay of parts, L, n, m and m', when constructed and arranged as and for the purposes set forth.

75,889.—TELEGRAPH INSULATOR.—J. L. Finn, Elyria, Ohio.

I claim, 1st, The combination and arrangement of the bell-shaped shell, A, forked shank, C, the adjustable toothed conductor, D, and conducting wire, B, substantially as described for the purpose specified.

2d, Securing the shank, a, to the bearer, X, by means of the tangential pins T, passing through a groove in the side of the said shank, substantially as described for the purpose specified.

75,890.—MACHINE FOR STUFFING LEATHER.—Ferdinand Fischer, Cambridge, Mass.

I claim combining with the stuffing wheel a flat steam heated box, i, placed in juxtaposition with and parallel to the inner surface of one of the heads of the wheel, and arranged to receive and discharge steam, substantially as set forth.

Also, connecting this box, i, with the opposite hollow journal and its steam pipe, f, by a pipe, k, arranged substantially as set forth.

Also, placing a box, i, against each head, a, connecting the two by the pipe k, substantially as set forth.

Also, combining with one or both of the heaters, i, a waste pipe or waste pipes, m, substantially as shown and described.

75,891.—WOOD BORING MACHINE.—Harvey Fleming, Vienna, N. J.

I claim with the stationary auger, C, the carriages, D and E, moving laterally and horizontally, the carriage, E, being movable simultaneously with and also independently of the carriage, D, all constructed and arranged to operate substantially in the manner and for the purposes as set forth.

75,892.—WATCH CASE CUTTER.—John Fortenbach, Jacob Fortenbach and Joseph Fortenbach, Carlstadt, N. J.

We claim, 1st, The improved machine for cutting the hinge recesses in watch cases, made and operating substantially as herein shown and described.

2d, The up and down adjustable sliding turret, D, when combined with the lever, d, up and down adjustable block, E, and clamping plate, F, all made and operating substantially as herein shown and described.

3d, The block, E, for supporting the covers or centers of watch cases, when formed for the said object, substantially as herein shown and described.

4th, The up and down adjustable sliding turret, when carrying the cover or center of the watch case, in combination with the longitudinally adjustable rotary cutters, by which the hinge recesses are cut into the covers or centers, substantially as herein shown and described.

75,893.—MACHINE FOR MAKING CARRIAGE AXLES.—Benj. W. Foster (assignor to Franklin L. Sheldon and Charles L. Sheldon), Auburn, N. Y.

I claim, 1st, The combination of the shaping rollers which form the journal and taper the bar of an axle, with the dies which form the collar by lengthwise pressure of the bar, substantially as described.

2d, A pair of rolls for acting simultaneously on opposite surfaces of a bar of metal, having dies, a b c, arranged in relation one to the other and to the rolls, substantially as herein set forth.

3d, In combination with the die rolls claimed in the above second clause, the cutting edge, d, as described.

4th, In combination with the die rolls claimed in the above second clause a pair of rolls arranged perpendicularly thereto, and for joint action therewith, substantially as described.

5th, In combination with a pair of die rollers the devices herein described, for accommodating dies of greater or less thickness, substantially as set forth.

6th, Mounting one set of rolls upon vertical shafts, which revolve in bearing upon sleeves on the other shaft, substantially as and for the purpose described.

7th, In combination with die 2, and socket, 4, or their equivalents, the pointed screw, 13, as and for the purposes set forth.

8th, The improved machine as a whole, constructed and operating substantially as set forth.

75,894.—STUMP EXTRACTOR.—C. E. Galligan, Paw Paw, Mich.

I claim the combination and arrangement of the runners or bearings, A A, the standards, B B, etc., the cross beam, C, the hooked rods, D D, the lever, T, provided with the slotted openings, I I, the double sheaves, E E, the ropes F F, the double blocks, H H, the links, K K, the pins, a' a', etc, and the grub hooks, O O, all arranged substantially as described, and for the purpose designed.

75,895.—GANG PLOW.—Wm. S. Gatlin and Benj. R. Hubbard, Green Top, Mo.

We claim, 1st, The construction and arrangement of the draw bars, b, the links, C, the levers, C1, and the racks, C2, with reference to the frame, A', and the plow beams, B,

2d, The device, D, D1, D2, D3, and d, for lifting the plows up out of the ground, substantially as described and set forth.

75,896.—MANUFACTURE OF WASH BOWL.—John Gilbert and Peter M. Sofield, Newark, N. J.

We claim the circumferential rebate, a', around the base, a, substantially as shown and described, for forming the connection between the base and the upper part, c, of the vessel, as set forth.

75,897.—BLOCK FOR CUTTING AND SHAPING BRIMS OF HATS.—F. R. Going (assignor to himself and D. Wilcox), Boston, Mass.

I claim, 1st, The recess, H H', formed immediately around the band block and between the crown block and cutter guide, E, substantially as described and for the purpose set forth.

2d, The cutting edge, a b c d, of the guide E, against which the shoulder of the cutting gage, K, rests, in the operation of cutting the curl, in combination with the hat block, substantially as described and for the purpose set forth.

75,898.—COATING METAL.—John D. Gruneberg and Samuel H. Gilbert, Spring Mills, N. J.

We claim the within mode of coating or plating hard metals, substantially as described.

75,899.—PORTABLE UPRIGHT FLUE BRAZER.—W. Grunert and G. E. Bingham (assignor to themselves and O. L. Packard), Milwaukee, Wis.

We claim the furnace, C, capable of vertical adjustment, for adapting the heat to the seams of pipes or flues, when brazing in an upright position, substantially as herein represented.

75,900.—SPRING BOTTOM FOR BOOTS AND SHOES.—Charles S. Hale and Oliver C. Hubbell, Cleveland, Ohio.

We claim, 1st, In combination with a spring, the plates, A D, and boot or shoe, substantially as and for the purpose described.

2d, In combination with the above, the elastic heel, B, as and for the purpose set forth.

75,901.—PLOW.—Wm. E. Hardin, Bowling Green, Mo.

I claim, 1st, The lifter, D d1 D1 D2, when constructed and operated as described and set forth.

2d, The adjustable axle, A' s, when constructed and employed in the manner shown and described.

75,902.—ABDOMINAL AND UTERINE SUPPORTER.—Mrs. Eliza J. Harding, St. Louis, Mo.

I claim the pads, A A', and the bands, a a1, when constructed and employed as herein shown and for the purpose set forth.

75,903.—HINGE FOR SHEET METAL BOX.—Charles J. Hauck, Williamsburg, N. Y.

I claim the wire, b, with its curved ends passing through holes in the rim of the box, or cover, and fastened thereto by solder, in combination with the sheet metal loop, a, having its shanks passing through the rim of the box or cover, and fastened thereto by solder, as shown and described.

75,904.—OIL CAN.—Charles J. Hauck, Williamsburg, N. Y.

I claim the arrangement of the gage or stop, E, in combination with the vent tube, D, and spout, C, of a hermetically closed can, A, substantially as and for the purpose described.

75,905.—HORSERAKE.—Horace R. Hawkins, Akron, O.

I claim, 1st, The combination with the rake head, F, and bar, O, of the teeth J, loops, 4, and springs, 5, arranged for joint operation, substantially as set forth.

2d, The combination with the rake head, F, and the peculiarly constructed teeth, J, of the bars, O, and, n, links or loops, 4, and springs, 5, substantially as and for the purposes set forth.

3d, The combination with the rake head of teeth held to the head by springs or their mechanical equivalents, under the arrangement described, whereby the said teeth will be supported, so that when their lower ends are raised by coming in contact with obstructions, their upper ends will partially revolve about the head, substantially as set forth.

75,906.—CARDING MACHINE.—Joseph Haythorn and Joseph Martin, Thompsonville, Conn.

We claim imparting a reciprocating motion to the workers or strippers of a carding machine, substantially in the manner and for the purpose herein shown and set forth.

75,907.—EXTENSION AND STEP LADDER.—S. E. Hewes, Albany, N. Y.

I claim the step, C, in combination with the ladder, substantially as shown and described.

75,908.—CARRIAGE AND SLEIGH TOP.—D. K. Hickok, Merrisville, Vt.

I claim the circular flanged plate, J, with its angular divisions, M, clips, L, and slide, G, in combination with the several parts of a carriage and sleigh top, constructed as described.

75,909.—PEN.—Robert Hirst, Hudson, N. Y.

I claim the flap, B, when pivoted at its widest end to the concave side of the pen, A, corresponding in shape to the outer part of said pen, A, and held thereto when in use by atmospheric pressure, as herein described for the purpose specified.

75,910.—CAR VENTILATOR.—Robert Hitchcock, Springfield, Mass.

I claim, 1st, In a car ventilator, the combination of the deflector, A, deflector, D, and vent, F, arranged in an outside case, substantially as shown.

2d, The arrangement of alternately reversed ventilators, 1, 2, 3, 4, etc., producing alternately exhaust and supply, as the car moves in either direction, respectively.

75,911.—CULTIVATOR.—Christopher Hoagland, Delavan, Ill.

I claim, 1st, The combination of the jointed plow standards, C C', plates, d, links, K, scrapers, r, and connecting links, l k, as herein described for the purpose specified.

2d, The links, l k, or other equivalent device for connecting the front and rear standards for the purpose of operating the latter simultaneously with the former, substantially as shown and described.

3d, The plates, d, with their bolts, f, or other equivalent device, for forming a hinge between the standards, C C', and plows, P P', substantially as shown and described.

4th, The spring catch, O, or its equivalent, for holding the standards forward, substantially as and for the purpose shown and described.

5th, The rod, L, for vibrating the standards, C, laterally, substantially as shown and described.

6th, The arms, N, for operating the rod, L, substantially as shown and described.

7th, The rod, I, with its bend, J, or other equivalent device, substantially as and for the purposes shown and described.

8th, The laterally vibrating standards, C, in combination with the rod, L, and bend, J, substantially as and for the purposes shown and described.

9th, The plow cleaner, r, or other equivalent device, attached and working substantially as shown and described.

75,912.—APPARATUS FOR CRUSHING AND PULVERIZING STONES AND OTHER HARD SUBSTANCES.—Frederic E. Hoffmann, Berlin Prussia.

I claim, 1st, The combination of the rake or scraper, j, carriage, D, crusher, B, bed, C, and the pneumatic apparatus, constructed and operating substantially as and for the purpose described.

2d, The lips or flanges, m n, extending over the surfaces of the crusher, B, and bed, C, substantially as and for the purpose described.

75,913.—ICE CRUSHER.—John W. Hollingsworth and Horatio D. Weaver, Mount Vernon, Ind.

We claim the sliding cup, C, in combination with plunger, D, constructed and arranged substantially in the manner set forth.

75,914.—MEAT BROILER.—Lewis Holmes, Keene, N. H.

I claim a broiler for broiling meat, and for all the purposes for which broilers are used, composed of the parts, A and B, hinged together, the whole rotating within the bend of a coil, C, and operated by a handle, D, substantially as shown and described, and for the purposes set forth.

75,915.—MARINE PAINT.—Gilman Hook, West Harwich, Mass.

I claim the combination of white lead and boiled linseed oil with dissolved caoutchouc, or gutta percha, in the production of a paint, substantially as herein described.

75,916.—CARRIAGE BOW SETTER.—Henry C. Hoover, Green Castle, Pa.

I claim, 1st, The sliding boards, E E, as and for the purpose set forth.

2d, The slotted holders, d d, in combination with sliding boards, E E, substantially as described.

3d, The block, C C, in combination with boards, E E, substantially in the manner specified.

4th, The gage bars, D D, substantially as set forth.

5th, The combination of sliding blocks, C C, boards, E E, holders, d d, and bars, D D, all arranged as described.

75,917.—OYSTER KNIFE.—G. W. Huffnagle, New Hope, Pa.

I claim the knife composed of the handle, A, cross bar, C, and blade, B, when constructed in the manner and for the purpose substantially as herein set forth.

75,918.—FAUCET.—George R. Huntley, Taunton, Mass.

I claim in combination with the barrel and plug, the eccentric ring, d, vent, g, pin, e, and stops, f f, all constructed and arranged to operate substantially in the manner as and for the purpose specified.

75,919.—MODE OF CASTING PLOWSHARES.—Jonathan Hunton (assignor to himself and L. Freeland), Hackensack, N. J.

I claim the employment or use, with the chill plate, A, for casting plowshares, of the removable or detachable parts, B D, either or both, arranged substantially as and for the purpose set forth.

75,920.—FURNITURE EDGE.—Franz Hutwohl, New York city.

I claim as a new article of manufacture a stuffed furniture edge, A, the covering canvas, b, of which has its threads arranged diagonally across the surface of the roll, A, substantially as herein shown and described.

75,921.—DRESS TRIMMING.—G. A. Johnson, Oxford, Conn.

I claim the dress ornament, formed in two parts, covered as described and secured together by the disk, C, as set forth.

75,922.—BREADMAKING MACHINE.—Marcus A. Jones, Frankfort, Ky.

I claim the combination of the rollers, a a, sliding bottoms, A and G, and collar frame, D, all substantially as shown and described and for the purpose set forth.

75,923.—SASH AND DOOR BUTTON.—Morton Judd, New Haven, Conn.

I claim, 1st, The socket, b, with the flange, i, and rim, o, in combination with the fastener or button, a, having a circular recess setting over the rim, o, as and for the purposes set forth.

2d, The helical spring, x, in a cavity in the socket, b, in combination with the button, a, and rim, o, as and for the purposes set forth.

3d, The plate, f, with its stops, g and h, in combination with the button, a and socket, b, as and for the purposes specified.

75,924.—FASTENING WEARING APPAREL, SHOES, ETC.—Roswell Judson and Wm. H. Lynch, Matteawan, N. Y.

I claim as a new article of manufacture the herein described garment fastener, the same consisting of a series of solid, double-jawed slides, provided with perforations, c c, and combined with a ribbon or band, which is applied and held to the said slides in the manner and for the purposes herein shown and specified.

75,925.—GANG PLOW.—John L. Keasor, Laconia, N. H.

I claim, 1st, The combination of the vertical standards, M, eye bolts or keepers, n', vertical bars, N, horizontal bars, O, and keepers, R S, with each other, with the plows, G or H, and with the longitudinal bars, F, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the shaft, U, arranged as shown and described, the cams, V, chains, T, and horizontal bars, F, all constructed and operating as described, whereby the plows, G H, are raised and lowered.

3d, The construction, combination and arrangement of the adjustable lever, W, with the shaft, U, for the purpose of operating said shaft, substantially as herein shown and described.

4th, The combination of the draft chains, I, with the bolster, E, and forward ends of the plow beams, g' or h', substantially as herein shown and described.

5th, The combination of the chains, J, with the forward ends of the plow beams, g' or h', and with the longitudinal bars, E, substantially as herein shown and described.

75,926.—BED BOTTOM.—Andrew W. Kendrick, Xenia, Ohio

I claim, 1st, The arrangement of outer frames, B C B' C', and inner and adjustable frame, b c b' c', racks, L L, and pawls or levers, K, in combination with the series of slats, F, supported transversely on the helical springs, E, resting upon the ledges, B B' and b b', of the outer and inner frames respectively, substantially as set forth.

2d, In the described combination, the graduated or decreasing series of helical springs, E, with the stationary and adjustable frames, B C B' C', and b c b' c', respectively.

75,927.—PISTON PACKING.—Julius King, Hoboken, N. J.

I claim a piston packing, composed of four or more uncut rings, B B, each secured to the piston by means of a screw, C, or its equivalent, and all made and operating substantially in the manner herein shown and described, the rings having either perfectly concentric or irregular inner edges, as set forth.

75,928.—FUR COLLAR.—William King, New York city.

I claim the combination of the spring, A, and the springs or stays, B B, or their equivalents, with a lady's fur collar, in the manner and for the purpose hereinbefore set forth.

75,929.—MANUFACTURE OF GLYCERIN.—Otto Laist, Cincinnati, Ohio.

I claim, 1st, The employment of any oleaginous substances, fat, or fatty acids, in the refinement or rectification of glycerin, substantially as and for the purposes set forth.

2d, The employment of a jet of superheated steam, introduced into a glycerin retort or still, substantially as and for the purposes set forth.

75,930.—SADDLE AND HARNESS.—R. M. La Rue, Andersonville, Ind.

I claim the drum, B, constructed as described, its front end receiving the ferret, and its rear end slotted for the passage of the strap of the harness, when the latter is wound within the drum upon the shaft of the ratchet, C, and thumb screw, D, as herein described for the purpose specified.

75,931.—GARTER.—Joseph A. Latham, New Haven, Conn.

I claim the herein-described garter, constructed with the spring, a, and provided with three or more cushions or pads, C, with spaces between them upon the inside of the band, as an improved article of manufacture.

75,932.—LAMP SHADE.—N. F. Leete, Middletown, Conn.

I claim the combination and arrangement of the ring, A, with one or more sockets, a, so as to receive the arm, B, the said arm having attached thereto the arms, C C, pivoting the shade, D, so that the said shade may be turned to a different inclination on the pivots, d, and to different positions to the right or left in the sockets, a, as and for the purpose herein set forth.

75,933.—LATHE CARRIAGE.—George W. Lewin, Worcester, Mass.

I claim the arrangement of the endless screws, c c, rack and pinion of the posts, F F, with the plattorm, E, as and for the purpose described.

75,934.—CASK LABEL.—Edward A. Locke, Boston, Mass.

I claim the metal ring, with its flange and groove, for receiving an indentifying disk or plate to be applied to a cask, substantially as set forth.

Also, forming the disk, k, with the slits, o, substantially as and for the purpose set forth.

75,935.—PRINTERS' GALLEY.—H. E. Long, Plymouth, Ind., assignor to W. A. Long and George B. Lindsey.

I claim the slotted jaw, B, used in combination with the galley, which has one edge grooved, and with the pins, C C, substantially as and for the purpose herein set forth.

75,936.—COMBINED BROADCAST SEEDER, CULTIVATOR, AND ROLLER.—James P. Long, Osage, Iowa.

I claim, 1st, The combination of the ears, b6, angular flanges, b, and annular flanges, b1, for securing the staves of the rollers, as described.

2d, The combination of the open bearing, Q, with the detachable caps, P, to facilitate the removal of the rollers, B B', substantially as explained.

3d, The scrapers, S, constructed with sloping backs, s, and down-turned edges, s', and fastened under tapering blocks, U, attached to the under side of the rear of the frame, substantially as and for the purposes set forth.

4th, Constructing the conducting tubes, L, with flanges, l, for attaching them beneath the frame, and permitting their ready removal, as explained.

5th, The T-headed scatterers, L' l', when made separately from the tubes, L, and attached in connection therewith but capable of independent removal, substantially as described.

75,937.—OIL CUP.—Thomas Carr Longton, Trenton, N. J.

I claim the oil cup with an adjustable nozzle, having a spiral spring beneath it, all substantially as shown and described.

75,938.—MACHINE FOR WINDING BUTTONHOLE TWIST, ETC.—John Lovatt, Tarrytown, N. Y.

I claim, 1st, The adjustable flier and holder, constructed and arranged to operate substantially as described.

2d, The parter, L2, or its equivalent, combined and arranged with the flier, substantially as and for the purpose specified.

75,939.—APPARATUS FOR FILLING RAILROAD TANKS WITH WATER.—Samuel Love, Indianapolis, Ind.

I claim the device herein described, when the same is constructed in its several parts and operated in the way and for the purpose substantially as set forth.

75,940.—TUMBLER BRUSH.—Henry Lumbard (assignor to himself, George E. Gerts and John Schmidt), Chicago, Ill.

I claim the perforated block, A, provided with longitudinal bore, B, and tongued cap, C, said block secured to the handle, E, by means of the tongue, F, substantially as herein set forth and specified, when said block and said handle are made in separate pieces.

75,941.—CULTIVATOR AND GANG PLOW.—Isaac B. Mahon, Dunkirk, Ohio.

I claim, 1st, Constructing the frame, A, of a single bar, bent so as to form three sides of a quadrangle, and braced by the bars, F, applied to the frame and axle, substantially in the manner as and for the purpose set forth.

2d, The construction of the plow beams, K K', arranged with and applied to the main frame, A, to operate in the manner as and for the purpose herein set forth.

3d, The bar, W, applied to the beams, K K', substantially as and for the purpose specified.

4th, The oblique draft or brace rods, Y Y', applied to the carriage and to the plow beams, substantially in the manner as and for the purpose set forth.

5th, The beam, O, attached to the draft pole, and connected with the plow beams, in the manner substantially as and for the purpose herein set forth.

75,942.—BOILER.—John Marshall, Hartland, Mich.

I claim, 1st, The divided circulation tube, K (whether the parts, m and m', are of equal length or not), as a connection between a water or liquid heater and a water or liquid-containing vessel, B, substantially as described for the purposes set forth.

2d, In combination with the divided tube, K, the heater, A, constructed and arranged substantially as described for the purpose specified.

75,943.—APPARATUS FOR THE MANUFACTURE OF LAMPBLACK.—Mahlon Matlock, Bridesburg (Philadelphia), Pa.

I claim, 1st, Suspending the slates or sheets, which form the roof of a lamp black apparatus, from the wooden beams, C C, of the same, substantially as and for the purpose herein shown and described.

2d, Making the crown of the furnace low above the pan, H, and gradually or suddenly raising it at some distance from the pan, as set forth.

3d, Providing the bed, G, which supports the pan, H, with a gas channel, f, substantially as and for the purpose herein shown and described.

4th, The inclined plate, j, arranged across the opening to the dead-air chamber, E, of a lamp black apparatus, substantially as and for the purpose herein shown and described.

5th, The perforated damper, I, when provided with a plate, l, above the perforation, as specified.

6th, The combination, with the dead-air chamber, E, having the damper, I, of the horizontal flue, J, having the alternate up-and-down shelves, m, as set forth.

7th, The arrangement of the fan, L, or its equivalent, by which the gas is forced into a porous veseel or bag in which the lamp black is detained, as set forth.

75,944.—CULINARY STEAMER.—William S. McNeil (assignor to Thomas H. White and Warren Johnson), Springfield, Mass.

I claim, 1st, A culinary steamer, consisting of the case, A, having the pan, K, at the bottom, and valve at the top, with pipe, I, the vessels containing the food being arranged one above the other so that they can be removed through the door, substantially as described.

2e, The cloth packing, N, arranged upon the roller, O, substantially as and for the purpose shown.

75,945.—HAND STAMP.—Charles Merriam and Curtis O. Luce (assignors to themselves and Julius E. Higgins), Brandon, Vt.

We claim, 1st, The double type wheel, A A', constructed and operating in combination with the cam, m, types, t t t, pinion, p, and spring catch, s, substantially as set forth.

2d, The cam, m, in combination with the return cam, e, when used for the purpose described.

3d, The arrangement and combination of the type wheels, A A', type wheel, M, cap, C, and case, E, constructed and arranged substantially as and for the purpose set forth.

75,946.—PULLEY FOR HOISTING APPARATUS.—D. L. Miller, Madison, N. J. Antedated March 20, 1868.

I claim the pulley block, provided with the pulleys, a a f, and having a loop, d, pivoted to it, containing a pulley, e, all being arranged and operating as described for the purpose specified.

75,947.—POST HOLE BORER.—James K. Miller, N. Y. city.

I claim, 1st, The weighted shaft, H, provided with rack teeth, f, one side, and the borer, K, serrated at its lower end, in connection with the wheel, J, placed loosely on the shaft, and the driving wheels, G G, on the shafts, E E, one or more of the latter being used.

2d, The pinion, M, on the adjustable shaft, L, in combination with the rack shaft, f, on shaft, H, all arranged substantially as and for the purpose set forth.

75,948.—CARRIAGE HUB.—John W. Minor and David P. Ward, New Bedford, Mass.

We claim the collar, A', provided with a series of pins upon its face, entering through the elastic disk, e, and with the tenons formed in the spokes, when said collar is adapted to slide upon the spindle, A, as herein described for the purpose specified.

75,949.—SAD IRON HANDLE.—T. S Minniss, Meadville, Pa.

I claim the handle, in two parts, hinged as described, constructed and operated as and for the purpose set forth.

75,950.—APPARATUS FOR REGULATING THE POSITION AND MOVEMENTS OF THE ARMS OF VIOLIN PLAYERS.—Edward Mollenhaur (assignor to Theodore Ritter), New York city.

I claim an apparatus for regulating the position and movement of the arms of violin players, constructed and operating substantially as herein described.

75,951.—APPLE PARER.—James F. Monroe and Edwin P. Monroe, Fitchburg, Mass.

We claim, in combination with the rotary wheel, f, and with the cutter arm actuated to effect the forward movement of the paring knife (substantially as set forth), the incline or cam, m, and finger, k, arranged to operate substantially as described.

75,952.—VALVE FOR WATER PIPE.—G. R. Moore, Lyons, Iowa.

I claim the solid head, A, valve stem, B, valve, F, packing, G, removable guide, E, spring, H, and pipe connection, C, all constructed and arranged as herein shown and described.

75,953.—ICE CARRIAGE.—H. C. Moore (assignor to himself and F. H. Derby), Springfield, Mass.

I claim, 1st, The arrangement of the toothed wheel, B, and the gear wheel, O, operated by lever, D, in combination with the hand wheel, F, with pinion, G, and the rack, H, upon the pivoted axle, O, substantially as shown and for the purpose set forth.

2d, The brake, consisting of the vertical rod, M, and spring, L, constructed and arranged as described.

75,954.—BARREL TRUCK.—A. F. Morey, Greenbush, Ill.

I claim, 1st, The slides, C, in combination with the truck frame, containing holes, P P P, constructed substantially as described and arranged and for the purpose set forth.

2d, The hooks, V V and W W, constructed as described, and in combination with the slides, C C, and truck frame, A A, constructed substantially as described and for the purpose set forth.

75,955.—POCKET KNIFE.—John Moseley, New Haven, Conn.

I claim the spring, i, inserted in a knife handle having its back cast with one or both of its sides, when said spring is provided at its back with a recess adapted to fit without rivets over a projection cast in the back of the handle, as herein described for the purpose specified.

75,956.—HORSE HAY FORK.—P. A. Mowers, Cleversburg, Pa.

I claim the pair of grasping prongs, B C, operated in unison by means of cogged segments, b c, in combination with a lever to open or close them, substantially as and for the purposes explained.

75,957.—MODE OF PRINTING AND EMBOSSING CLOTH.—Lewis Murr (assignor to Joseph Metz and Bernard Metz), Philadelphia, Pa.

I claim the printing and embossing of cloth or other fabric at one operation by the employment of an engraved plate, applied directly to such fabric, and a heated plate, applied to the engraved plate, substantially as and for the purpose set forth.

75,958.—STEAM ENGINE LUBRICATOR.—John Nation (assignor to himself and Absalom B. Hallock), Portland, Oregon.

I claim, 1st, The valve, Dx, having corrugations, b, the slotted seat, E, construc'ed and arranged to operate as herein described.

2d, The arrangement of the oil cup, A, with the cocks, B D, cylinder, C, steam pipe, G, cock, c, corrugated valve, Dx, upper seat, H, and slotted lower seat, E, as herein described.

75,959.—LAMP BURNER.—Hiram K. Needham (assignor to himself and Richard E. Hearn), Titusville, Pa.

I claim the described arrangement and combination of the wick tubes, c c, base plate, d, and diaphragm, e, the latter extending upward and connecting the edges of the wick tubes so as to form separate and distinct internal and external air passages, f and b, as shown, and the whole so constructed that it may be applied to an ordinary lamp collar, substantially as and for the purposes set forth.

75,960.—LAMP BURNER.—George Neilson, Boston, Mass.

I claim, 1st, The combination, in a burner such as described, of the air-supply cylinder, with a deflector hinged to the said cylinder, substantially as and for the purposes herein shown and set forth.

2d, The combination, with the chimney rest and wick tube, of an air-supply cylinder, detachable or removable from its seat, and a deflector hinged to the air-supply cylinder, substantially as and for the purposes herein shown and set forth.

3d, The combination, in a burner such as described, of a chimney rest, air-supply cylinder and deflector, when the said parts are capable of being removed from and adjusted to the burner bodily and together, substantially as and for the purposes shown and specified.

4th, The combination, with the base and wick of a lamp burner, of a chimney rest, air-supply cylinder, and deflector, when the same are detachable from the said base and wick tube, and from one another, substantially in the manner and for the purposes shown and described.

5th, The combination, with the air-supply cylinder, of chimney supporting springs, attached to and projecting from said cylinder, substantially as herein shown and described.

75,961.—DIE FOR STAMPING TINWARE.—Joseph Neuberger and Peter J. Illig, Buffalo, N. Y.

We claim, 1st, The primary or "coaxing" die, A, when constructed and used for the purpose and substantially as herein described.

2d, The secondary or finishing die, B, having a shoulder, b', for the purpose and substantially as herein set forth.

3d, The secondary or finishing die, B, having a shoulder, b', in combination with the primary or "coaxing" die, A, for the purposes and substantially as herein described.

75,962.—DEVICE FOR FASTENING SHOE STRINGS.—Simon B. Parker, Springfield, Mass.

I claim a movable binding and locking lever, C, for the purpose of fastening shoe-strings, and preventing the same from untying,

75,963.—CHURN DASHER.—Benjamin M. Parks, St. Louis, Mo.

I claim the handle, A, when combined with the two dashers, B B', and the valve, C, as described and shown.

75,964.—HANGING RUDDERS.—Henry H. Pember, N. Y. city.

I claim the collar, G, in connection with the flange, l, on cap, h, of rudder post, Cx, and the rod, F, attached to the keel, all arranged substantially in the manner as and for the purpose set forth.

75,965.—SAUSAGE FILLER.—John G. Perry, Kingston, R. I.

I claim constructing a sausage filler with a screw and nut, the nut being divided into two parts, substantially as herein described and for the purposes set forth.

75,966.—SAUSAGE FILLER.—J. G. Perry, South Kingston, R. I.

I claim one or more of the followers, o o, in combination with the screw, C, all working within the case, substantially as described and for the purpose set forth.

75,967.—PERMUTATION LOCK.—Oliver E. Pillard (assignor to Frederick H. North), New Britain, Conn.

I claim the stud, 4, on the bolt, in combination with the dog, e, for raising and holding up said dog and its arm clear of tumblers when the bolt is projected.

75,968.—NAPKIN RING AND SALT CUP COMBINED.—George Pine (assignor to himself and E. S. Cook), Trenton, N. J.

I claim a salt cup and napkin ring or holder combined, substantially as herein shown and described.

75,969.—AUTOMATIC FEEDER AND CUT-OFF FOR CISTERNS.—Stephen H. Plumb, Davenport, Iowa.

I claim, 1st, The water buckets, G G', attached to the valves, b, substantially as and for the purpose specified.

2d, The tilting lids, f, of the buckets, formed substantially as described, and for the purpose set forth.

3d, The buoy or float, H, so connected with the lid, f, as to change the position of said lid, when the water reaches a certain hight, substantially as and for the purpose set forth.

75,970.—BELT CLASP.—T. W. Porter, Boston, Mass.

I claim, 1st, A belt clasp, consisting of a plurality of fingers, a, each with a separate bar, b, and an eye, with the rod, A, inserted therein, substantially as described and shown.

2d, As a new article of manufacture, the fingers, a, when constructed with the bar, b, and eye for rod, A, when constructed substantially in the manner as and for the purposes specified.

75,971.—SLEIGH.—T. W. Porter, Boston, Mass., assignor to himself and Charles L. Marston.

I claim, 1st, The shaft hanger, constructed with wrought iron stays and malleable iron center, substantially as described and shown in figs. 1 and 2.

2d, The tip socket, B, formed separate from the center, A, and to revolve thereon, substantially as and for the purposes specified.

3d, The hollow pivot, d, formed upon socket, B, substantially as and for the purposes specified.

4th, The incline disk, b, in combination with the center, A, and socket, B, substantially as and for the purposes specified.

5th, The tip, C, formed with a recess for the shaft, D, and to receive the wrought iron strap, e, at the lower bolt hole, substantially in manner as described and shown.

6th, The foot rail, constructed with brackets, combined with insertable foot bars, substantially in manner as and for the purposes specified.

7th, The coupling, C, when constructed with the recess for standard, B, the ears, f f, and the lip, g, substantially as described and shown.

8th, Combining with the wrought iron stay or brace, d, the socketed malleable iron strap or foot, C, substantially as described and shown in figs. 5 and 6.

9th, The dash rail, B, formed to extend below the dash board, A, substantially as described, and for the purposes specified.

75,972.—EXPRESS WAGON.—T. W. Porter, Boston, Mass., assignor to himself and Charles L. Marston.

I claim, 1st, The rocker and axle plates, a and h, formed of malleable and white iron, substantially in manner as described and shown.

2d, The removable disk, or die, d, in combination with the rocker plate and king bolt, substantially as and for the purposes specified.

3d, The combination of packing, g, cap, f, and king bolt, e, substantially as described and shown.

4th, The lugs, J J, formed upon the axle and rocker plates, by which, in combination with wrought iron straps, k k, to secure the plates to the axle and rocker.

5th, The tube plate, n, substantially as and for the purposes specified.

6th, The pivots, l l, or their equivalents, formed upon the axle plate, for the purposes specified.

7th, The pin, m, or its equivalent, formed upon the axle plate, for the purposes specified.

8th, The coupling, o, substantially as described and shown.

9th, The combination of coupling, o, strap, P, bolt, t, and strap, s, substantially as and for the purposes specified.

10th, The metallic corrugated or cellular tail board, frame, F, substantially as described and shown.

11th, The strap eyes, b b b, formed upon the frame, F, substantially in manner as described and shown.

12th, The chain eyes, f, formed upon the frame, F, substantially in manner as and for the purposes specified.

13th, The skid rackets, c, formed upon the frame, F, substantially in manner as described and shown.

14th, The tail board adjusting device, consisting of chains, k', ratchet drums, l', pawls, o', and the hand wheel, m', or its equivalent, all arranged to operate in manner substantially as described and shown.

75,973.—CARRIAGE.—T. W. Porter, and H. K. Porter, Boston, Mass., assignors to themselves and Charles L. Marston.

We claim, 1st, A spring shackle, formed with the bed plate, A, and the three-sided link, B, united by the wrought iron rivet, a, substantially as described, and shown in figs. 1 and 2.

2d, The stud, c, or its equivalent, formed upon the bed plate, substantially as described and shown in fig. 2.

3d, The sides, d d, of link, B, formed to extend beyond the bar, e, and cover the spring eye, substantially as and for the purposes specified.

4th, The rim, a, formed upon bar end, B, for the reception of the hanging iron, substantially as described and shown in figs. 3 and 4.

5th, The socket, B, formed to receive the hanging iron, a, and the bar, A, figs. 5 and 6, substantially as and for the purposes specified.

6th, The hollow metallic hanging bar, A, substantially as described, and shown in figs. 7 and 8.

7th, The rims, a a, formed upon the metallic hanging bar, A, substantially as described and shown in figs. 7 and 8.

8th, Combining the malleable iron yoke, A, with the wrought iron stay, d, substantially as described and shown in fig. 9.

9th, The hollow metallic head block, A, substantially as described and shown in figs. 10 and 11.

10th, The perch couplings, a, formed upon the head block, A, substantially as described and shown in figs. 10 and 11.

11th, Forming the arms, a a, of the pole crab hollow, substantially as described and shown in fig 13.

12th, Forming the pole strap studs, b b, hollow, substantially as described and shown in figs. 12 and 13.

75,974.—WINDOW SHADE.—T. E. Purdy, Brooklyn, N. Y.

I claim the window shade, or window shade material, made as described viz., with the woven fabric in its original color, exposed to form the figure in imitation of lace or embroidery, the groundwork being printed.

75,975.—SHOE KNIFE.—N. M. Ray, Ellsworth, Me.

I claim, in combination with a shoe knife, the detachable cap, A, when attached to the knife by a hook, at one end of a slot, and fastened by friction at the other end of the slot, substantially as shown and described, for the purposes specified.

75,976.—BELT CLASP.—John Reading, Samuel Alfred Reading, George Edward Reading, and Frederick Francis Reading, Birmingham, England.

We claim, 1st, The dress fastening or clasp, consisting of a bolt or bolts, B', operating within a case, B, or its equivalent, and provided with a catch or catches, i, and a spring or springs, b, each or all in combination with a catch or catches, e, or the equivalent thereof, and all constructed and operating substantially as and for the purpose shown and described.

2d, The slot, r, in combination with the case, B, and spring, b, of a belt clasp or other fastening for dress appendages, for the purpose of holding and providing a point of resistance to the said spring, b, and also serving as a stop to the pin, i, of the bolt, all substantially as shown and described, and for the purpose specified.

3d, The slotted bolt, B', of a dress fastening, having a tongue, s, or its equivalent, for the better holding of the spring, b, all substantially as shown and described, and for the purpose specified.

4th, Forming the bolt, B', of a dress clasp or fastening with projections, i, and a tongue, s, or their equivalents, all substantially as shown and described, and for the purpose specified.

5th, The case, B, made substantially as shown and described, for the purpose of serving as a guide for the longitudinal movement of the bolt, B', and for holding the same against the lateral traction of the belt when the same is on the wearer, and also for assisting in catching and holding the catches, e e, all as set forth.

6th, The spring tongues, l, in combination with the bolts, B', for the purpose of actuating the latter when the formation and employment of the case B, render the thumb bit m, more or less inadmissable, all as set forth.

75,977.—RAILWAY RAIL JOINT.—Samuel J. Reeves, Philadelphia, Pa.

I claim a rail joint, consisting of the ribbed bar, B, and clamping bars, D, and D', adapted to each other and to the rails, substantially as set forth, for the purpose specified.

75,978.—LAMP BURNER.—E. B. Requa, South Bergen, N. J.

I claim, 1st, The perforated cup-shaped plate, B, provided with an under concave surface, d, through which the wick tube, c, passes loosely, substantially as and for the purpose specified.

2d, The lower rim, A, with the wick tube, c, attached, in connection with the perforated cup-shaped plate, B, and cone or deflector, C, all arranged substantially in the manner as and for the purpose specified.

75,979.—RAILWAY SNOW PLOW.—Elisha Robbins, Worcester, Mass.

I claim the combination of the tunneller, A, and the auger or borer, C, arranged as set forth.

Also, the combination of the tunneller, A, the auger or borer, C, and one or more deflectors, e e, arranged so as to discharge the snow laterally from the auger, as specified.

Also, the combination and arrangement of the auxiliary deflector or deflectors, l l, of the top of the tunneller with the said tunneller, the rotary auger, and the other deflector or deflectors, e e, arranged as specified.

Also, the combination and arrangement of the anti-friction tube, D, with the auger, C, the tunneller, and one or more deflectors, arranged in the rear of the said tube.

Also, the combination of one or more supporting wheels, g, with the auger tube, D, the tunneller, and one or more deflectors, e, as specified, such rollers being for supporting the tube while in revolution.

75,980.—PROCESS OF CLEANING WOOL, ETC.—Louis S. Robbins, New York city.

I claim the process herein described for removing the alkaline, oily, and gummy substances from wool, by the use of the light vapors obtained from petroleum, naphtha, and other similar substances or compounds, substantially as described.

Also, The process of saturating wool, preparatory to its being manufactured, by the application of oleaginous vapors, substantially as herein described.

75,981.—CAR STARTER.—Leonhard Rodenhausen, Philadelphia, Pa.

I claim the catch, E, attached directly to the tongue or draw bar, D, and employed in combination with a ratchet wheel secured to the center of the axle, all arranged and constructed to operate as herein described and represented.

75,982.—CAR SEAT.—Charles Rowland, Washington, D. C.

I claim the head rest, consisting of the frame, C, provided with the sheet of rubber, or other flexible material, and arranged to slide within the back of the seat, and be protruded from either side thereof, substantially as shown and described.

75,983.—INVALID BEDSTEAD.—W. W. Rowles and A. J. Russell, Baltimore, Md.

We claim, 1st, The supplementary bedstead, C C1 C2, when used in combination with the bedstead, A A, substantially as and for the purposes specified.

2d, The laterally sliding frame, composed of the end pieces, G G, and vertically adjustable side pieces, I, supported upon the sliding standards, E E, and the posts, D D, running upon trucks, c c, substantially as and for the purpose specified.

3d, In combination with a laterally-sliding frame, as above described, a roller, I, for the purpose of holding and adjusting one side of the supporting sheet, J, substantially as described.

4th, The sheet, J, having one serrated edge looped, as shown at j j, n n, substantially as and for the purposes set forth.

5th, The forked lever, O, having the hook, o, substantially as and for the purposes shown.

75,984.—WOOD-PLANING MACHINE.—James J. Russ, Worcester, Mass.

I claim, 1st, The adjustable frame, G, bearing the feed rollers, and provided with the bars, M N, in combination with the spring, O, substantially as described for the purpose specified.

2, The frame, V2, for the spindle, U2, constructed as described, having the box-bearing, W2, and the socket-bearing, a2, and arranged to operate in connection with the box, B3, substantially as described for the purpose specified.

3d, The bar carrying the presser shoe to the machine, when arranged in a frame applied to the machine, for adjustment thereon, and for its own adjustment through a spring, whether both be combined in one or used separately, substantially as and for the purposes described.

4th, The clamp or holder for the presser-block, provided with a spring arranged for operating, substantially as and for the purpose described.

5th, The bridge-plates or slides, D3, for the openings, C3, in bed-plates to the machine, in combination with the sliding box, B3, substantially as and for the purpose described.

75,985.—DEVICE FOR SOLDERING TIN CANS.—Wm. Serviss, Sidney, Ohio.

I claim, 1st, The holder, composed of the shell, A, furnished with the annular lip, a, substantially as and for the purpose herein set forth.

2d, The combination, with the holder, constructed as described, of the knob, C, substantially as and for the purpose specified.

75,986.—CARBONIZING AND HARDENING IRON AND STEEL.—Francis E. Sessions, Worcester, Mass., assignor to himself and Samuel H. Knox.

I claim the process above described for carbonizing and hardening iron and steel.

75,987.—MOLD-BOARD FOR PLOWS.—Josiah Seymour, Coventry, N. Y.

I claim the forming of a mold-board for plows, either single or reversible, in such a manner that the lines bounding the vertical sections of said mold-boards shall be straight, substantially as herein described and set forth.

75,988.—DOUBLE SHOVEL PLOW.—M. R. Shalters and Samuel Ray, Alliance, Ohio.

We claim, 1st, The T-shaped box, D, for forming the main frame of a double-shovel plow, substantially as herein set forth.

2d, In combination with the box, D, the braces, C C, and handles, A A, substantially as and for the purpose specified.

3d, The arrangement of the braces, F F, C C, and the rod, H, and tube, G, with the handles, and beam for contracting and expanding the frame, substantially as herein set forth.

75,989.—SAND SCOOP.—John Sheets, Columbia, Pa.

I claim the arrangement of the socket, scoop, and handle, H, with its shoulder, D, ring, E, braces, F F, in combination with the rope, or its equivalent, and links, L, when made substantially in the manner and for the purpose specified.

75,990.—SICKEL SECTIONS, AND METHOD OF SERRATING THEM.—Samuel D. Sheldon, Fitchburg, Mass., assignor to "The Whitman and Miles Manufacturing Company."

I claim, 1st, The beveled faced anvil or block, for supporting the blank sections while the serrations or cuts are being made, substantially as and for the purposes set forth.

2d, The mode of forming the serrated cutting-edge, c, of the section, as and for the purposes set forth.

3d, The serrated-edged sickel section, as an improved article of manufacture, made as shown and described, and for the purposes set forth.

75,991.—ATOMIZING APPARATUS FOR SURGICAL USE.—A. M. Shurtleff, Boston, Mass.

I claim the combination of the elastic bulb, f, and its flexible connection, with the atomizing tubes, the vessel, a, the atomizing tubes, b c, and the shield, h, substantially as described.

Also, constructing the shield, h, with a mouth tube, k, substantially as set forth.

Also, arranging the mouth of the shield to drip directly into the vessel, a, substantially as shown and described.

Also, making the stopper, d, with an orifice, i, for receiving the edge of the shield, and conducting the excess of fluid back into the vessel, substantially as described.

Also, supporting the shield by means of a ring or band encompassing the mouth tube, substantially as set forth.

Also, connecting the shield directly to and supporting it by the liquid-containing vessel, substantially as described.

Also, applying the shield so as to swing up from and down into connection with the orifice, i, substantially as set forth.

Also, applying the standard, m, so as to be adjustable in hight and in distance from the vessel, a, substantially as and for the purpose set forth.

Also, a stopper of rubber or rubber compound, when made with a center

hole for insertion of the atomizing tube, and an orifice for return of the excess of fluid, substantially as set forth.

75,992.—COMPOSITION FOR EMBALMING.—James C. Sickel, Philadelphia, Pa.

I claim the combination of glycerin, alcohol, and sulphurous acid, flavored with acetic acid and essential oils or flavors, for the preservation of dead bodies, in the manner described.

75,993.—FRUIT JAR.—Charles S. Siddons, Rochester, N. Y.

I claim the fruit-jar cover, composed of a single sheet-metal plate, having a vertical rim, B, and projecting flange, F, and used in combination with the ordinary packing-ring, A, and jar having an internal shoulder or projection, as and for the purposes set forth

75,994.—FENCE.—A. D. Smith and E. Stow, Townsend Station, Ohio.

We claim a fence, constructed with an indented wire or wires, in combination with the hooks, a, and pickets, C, as and for the purpose specified.

75,995.—FLAT IRON HEATER.—S. W. Smith, Addison, Vt.

I claim, 1st, The construction and arrangement of the plate, A, with the flange or side wall, C, and the plate, F, combined and operating substantially as shown and described for the purpose set forth.

2d, The chamber, A', when formed by two open plates, substantially at and for the purpose described.

75,996.—DOOR BUTTON.—Wm. E. Sparks (assignor to Sargent & Company), New Haven, Conn.

I claim the lever, E, provided with a spring point, d, operated by the plate, A, the said plate, A, provided with one or more indentations to receive the pivot, a, substantially as and for the purpose specified.

75,997.—HORSE HAY FORK.—J. W. Summers, Sandy Hill, N. Y.

I claim the shanks, A and B, the single tine, G, pauls, D D, cam-loop, H, catch loop, J, notches, I and m, and cord, I, all constructed and operating substantially as shown and subscribed, and for the purposes set forth.

75,998.—STEAM PUMP ENGINE.—James Sutherland and Francis Moakley, Easthampton, Mass. Antedated Feb. 18, 1868.

We claim, 1st, The secondary valves, a and a', with their respective ports, e and e' and f and f', whereby each performs the functions of exhausting steam from one end of the main valve, and supplying steam at the other, by their alternate movement respectively, substantially as shown.

2d, The arrangement of ports, e and e' and f and f', with the secondary valves a and a', substantially as shown and described.

3d, The arrangement of the pieces, H and H, in the main valve, and channels g and g, in communication with them, substantially as shown.

75,999.—CARRIAGE SPRING.—T. W. Suthff, Town Line, Pa.

I claim, 1st, Spring bars, F F, provided with metal plates, a a, perches, D D, arranged in combination with clips, K E, and bolts, c c, as and for the purpose set forth.

2d, The adjustable cross bars, G G, in combination with spring bars, F F.

3d, The employment of the screw rods, K K, in combination with adjustable cross bars, G G, and spring bars, F F, substantially as and for the purpose specified.

76,000.—HARVESTER RAKE.—Jerome B. Sweetland, Pontiac, Mich.

I claim, 1st, The rod, Q, with its weight and notch, used with the plate, n, for holding up the rake, as is herein fully set forth.

2d, The pullers, M and O, and belt, N, used with the rake, P, for giving it motion, the pulley, O, being provided with a spring, which draws the rake back after it has been carried forward by the pulley, M, substantially as set forth.

3d, The arrangement of pulley, M, and sleeve, J', upon shaft, I, with the lever, J, spring, Y, and rod, K, as and for the purpose herein specified.

4th, The bars, e e, in combination with leve, J, and trip bar, V', which is operated upon by the plate, h, on belt, N, as and for the purpose specified.

5th, The bar, R, in combination with the rod, Q, upon the rake, used as and for the purpose described.

6th, The rack or guard, U, upon the reel standard, when used substantially as and for the purpose set forth.

76,001.—HARVESTER.—D. H. Thayer, Ludlowville, N. Y.

I claim the plates, D, on the wheels, B, provided with curved eccentric edges b, and springs, E, in combination with the chambered disks, C, secured permanently on the axle, A, and the rollers, F, placed in the chambers, between the curved edges, b, of the plates and the rims or edges, d, of the chambers, a, substantially as and for the purpose set forth.

76,002.—STEAM ENGINE PISTON VALVE.—W. R. Thomas and Thomas Evans, Catasauqua, Pa.

We claim the valves, G G', operated by the arms, D D', and by the exhaust steam, in combination with a steam engine with steam and exhaust ports, a a and c c, arranged as described, the whole combined and operating substantially as shown and described.

76,003.—WATER WHEEL.—I. M. Thompson, Edinburgh, Ind.

I claim the combination of the two sets of buckets, c d, with the two sets of gates, g and F, all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

76,004.—WASHING MACHINE.—J. P. Thompson, Kirkville, Iowa.

I claim the combination of the corrugated rollers, C C', slotted standards, blocks, E, elastic bands, F, and boxes, G, arranged to operate substantially as set forth.

76,005.—BASE-BURNING STOVE.—Robert B. Thompson, New York city.

I claim, 1st, Supporting the reservoir, E, upon brackets, Q Q, in combination with the air pipes, H, substantially as set forth.

2d, The combination of the annular air chamber, F, formed around the lower part of reservoir, E, with air pipes, H H, when the latter extend downward through the base flues, J J, substantially as shown.

76,006.—CAR COUPLING.—W. E. Twining, Morrison, Ill.

I claim the draw head, B, constructed with the hook, B1, and recesses, B2 and B3, arranged substantially as described.

76,007.—DASHBOARD AND REIN HOLDER.—P. Verplanck, Jr., Binghamton, N. Y.

I claim, 1st, The combination of the rein holder, z, with the dashboard irons, A B C, as shown.

2d, So forming the side and top irons of the dashboards of carriages as to receive, in an indentation in those irons, the rein holder, the top of which shall be but little above the line of the iron, the ends of the indentations being so shaped as to be a stop or guard to the rein, preventing it from being snatched or switched out of the holder, as hereinabove set forth.

76,008.—FRUIT JAR AND PRESERVING VESSEL.—A. Warner, Williamsburgh, N. Y. Antedated March 18, 1868.

I claim, 1st, A vessel with its lid, cover, or stopple, constructed and combined substantially as herein described, whereby a vent is opened and closed by simply turning the lid, cover, or stopple, or the vessel, the one relatively to the other, as herein set forth.

2d, Likewise, in combination with the same, a perforated elastic packing or gasket interposed between the lid or cover and perforated portion of the jar, substantially as specified.

76,009.—MEANS FOR CLOSING PRESERVING VESSELS.—Alexander Warner, Williamsburgh, N. Y.

I claim, 1st, A cover composed of two principal perforated pieces, combined to operate substantially as herein specified.

2d, The perforated gasket, in combination with the perforated valve and perforated seat, substantially as herein specified.

3d, The wrench composed of two connected prongs, one or both of which are made tubular, to form an air passage communicating with the corresponding aperture or apertures in the cover of the vessel, substantially as and for the purpose specified.

76,010.—HEATING FURNACE.—Joseph Watts, Birmingham, Great Britain.

I claim, 1st, Arranging the grate bars or fire bars in such a manner as to deflect the draft, or a portion thereof, in a downward direction, or in the direction in which the fuel is introduced, substantially as and for the purpose set forth.

2d, The grate bars, f b, bent in A-shape, substantially as and for the purposes described.

3d, In combination with the grate bars, f, a conical hollow bed, d, and the flue, i, below the grate and bed, forming a downward and outward passage for the heated air and products of combustion, substantially as and for the purposes described.

4th, A grate formed of consecutive rings of A-shaped grate bars, arranged above each other in any suitable manner, substantially as and for the purpose set forth.

76,011.—WEEDING TOOL.—Nelson Webster, Plainfield, N. J.

I claim, 1st, The shuffling hoe and rake; constructed as described, consisting of the cutter, C, provided with upturned cutting ends, c, and secured to the bow, B, carrying the teeth, D, as herein shown and described, for the purpose specified.

2d, Making the teeth of the rake, when they are fitted into a bow, B, longer toward the rear, substantially as and for the purpose herein shown and described.

76,012.—ROOFING COMPOUND.—E. B. Wells, New York city.

I claim the within-described compound, when mixed and used substantially as and for the purpose specified.

76,013.—REED ORGAN.—Franklin A. Wells (assignor to Jacob Estey & Co.), Brattleboro, Vt.

I claim the combination and arrangement of the friction spring or brake, with the adjustable knee piece and lever, E, of the mechanism for effecting the elevation of the swell.

76,014.—SLATE FRAME.—W. C. Wendell, Albany, N. Y.

I claim the elastic cushions, b b, formed upon the ends of a contracted neck, a, and adapted for the protection of slates, substantially as described.

76,015.—DRESSING HIDES AND FURS.—Chas. L. Weston, Cummington, Mass.

I claim, 1st, The tanning composite, the combination of the ingredients herein named, when applied substantially in the manner and for the purpose set forth.

2d, The composition herein named for coloring furs and leather, substantially as shown and described.

76,016.—BUTTON.—Alonzo S. Wheeler (assignor to himself and J. E. Wheeler), Westport, Conn.

I claim the arrangement of the button attachment or rivet within the button, so that, while the button is secured by the attachment to the garment, the button may be drawn from the garment, and returned, substantially in the manner herein set forth.

76,017.—FAUCET FOR SODA WATER FOUNTAINS.—Albert M. White, Thompsonville, and Edward G. Barsham, Bridgeport, Conn.

We claim, 1st, The tubular stem, e, of the valve, B, arranged within the passage, e, of the bib, A*, substantially as and for the purpose specified.

2d, The supplemental valve, C*, arranged in combination with the valve, B, on the tubular stem, e, and so constructed that, after opening the said tubular stem, the continued movement of such supplemental valve shall lift the valve, B, to open the passage, e, of the bib, substantially as and for the purpose specified.

76,018.—HOT AIR FURNACE.—James Whitehill, Frederick, Md.

I claim, 1st, When used in connection with my furnace, as above described, the attachment in fig. 4, substantially as and for the purpose set forth.

2d, The combination of a fan, S, with a pipe, N, leading from the lower part of the room to be warmed to the lower part of the hot air chamber, O, by which a circuit of air can be established that will exhaust the cold air from the room, pass it over the heater, and return it warm to the room again, substantially as and for the purpose set forth.

76,019.—PORTABLE BUILDING.—Daniel S. Whitenhall, St. Louis, Mo.

I claim, 1st, The combination of the rods, c c' c'', angle irons, h h1 h2, etc., straps, p, hing s, e e1 e2, etc., with the sections and battens of a portable house, as and for the purpose specified.

2d, The construction of a portable or permanent building, substantially as shown and specified.

76,020.—AWL HANDLE.—D. R. Wight, Sturbridge, Mass.

I claim the conical nut, b, in combination with the flat-end screw, a, and split cone, c, when constructed and arranged so that the split cone shall be made to close upon the awl by the action of the conical nut alone when screwed up as herein shown and described.

76,021.—PAVEMENT.—C. Williams, New York city.

I claim the arrangement of metal bars, b, inserted into suitable grooves in the upper surfaces of the wooden pavement blocks, A, so as to produce a wearing surface, substantially as and for the purpose set forth.

76,022.—WOOD TURNING LATHE.—Edwin Williams, Rowlesburg, W. Va.

I claim the sliding collar, B, when provided with the arms, c, passing through slots, in the flange, a', of the hollow spindle, A, and having the diagonal slots for the reception of the pin, d', upon opposite ends of the cutters, D, which are also pivoted at opposite ends to the flange of the hollow spindle, all constructed and operating as described, for the purpose specified.

76,023.—FURNACE GRATE BARS.—Jesse Williams, John Forgie, and James Edwards, New York city.

We claim the combination in a furnace grate bar, of two thin arched webs a a, transverse partitions, b, and concave perforated top bar, c, all constructed in the manner and for the purpose herein described and represented.

76,024.—MACHINE FOR OPENING HAIR ROPE.—Philip Wisdom, New York city.

I claim, 1st, The revolving tube, E, operated by the disk, D, and arranged eccentrically within the tube, a, having the handle, b, said tube, E, having eccentrically upon its face the arms, c, bearing the roller, d', whose revolutions are caused by the passage of the rope, as and for the purpose herein shown and described.

2d, The smooth beater, H, in combination with the plate, I, rollers, F G, rollers, d, tubes, a E, and clamp, J, as herein described for the purpose specified.

3d, The loose conical roller, d, when arranged in relation to and combined with tube, E, in the manner and for the purpose described.

4th, The swivel clamp J, when made substantially as herein shown and described, and when provided with the sliding plate or sleeve, h, in combination with the tube, E, substantially as herein specified.

5th, The plate, I, having curved upper and lower edges, arranged and combined with the rollers F G, and with the beaters, H, as herein described, for the purpose specified.

6th, The arrangement and combination with each other of the rail L, block K, swivel clamp, J, tube, E, roller, d, rollers, F G, plate, I, and beaters, H, all made and operating substantially as herein shown and described.

76,025.—COMPOSITION FOR SHARPENING EDGE TOOLS.—Geo. L. Witsil (assignor to Thomas E. Hamberger), Philadelphia, Pa.

I claim a composition for sharpening tools compounded and prepared substantially as set forth.

76,026.—LETTER BOX.—James E. Woodruff, Buffalo, N. Y.

I claim the box, A, with stationary plate, G, and hinged plate, F, both of which extend obliquely below the lid, A, and form a V-shaped throat, which is opened or closed by the cam, B, attached to the cover, A, lever, D, and rod, E, substantially in the manner herein set forth.

76,027.—CUT-OFF VALVE GEAR.—William Wright, New York city.

I claim the combination with the separate induction valves to opposite ends of the engine cylinder, of the fixed cam, E, and variable cam, G, arranged for action in either direction of the engine travel, substantially as described, opening and cut-off toes, D H and D' H', geared by levers, J J', or their equivalents, for joint but independent action in opposite sides of the axes of the cams, and whereby not only are the valves opened and closed independently of each other, and each made capable of different cut-off strokes by the action of said cams on the toes, but whereby both the opening and closing movement is given to either valve, respectively, from the same side of the axes of the cams as that on which the valve lies, essentially as herein set forth.

76,028.—KITE.—Adolph Yorns and Edmund J. Smith, New York city.

We claim the kite frame, A, when constructed of the downwardly converging rods, a, cross bars, b e f, and ring or segment, c, all combined and arranged to produce a kite of substantially the figure herein shown and described.

76,029.—HORSE HAY FORK.—William Zimmerman, Colfax, Iowa.

I claim, 1st, In a hay or manure elevator, the combination of the hook; C, latch, D, yoke, E, chain, B, and connecting bar, G, arranged, substantially as and for the purpose set forth.

2d, The combination with a horse hay fork of the transeverse bar, H', applied and operating substantially as described.

3d, The combination with a horse hay fork of the scoop or blode, K, applied and operating substantially as described.

4th, The detachable handle, I, and rod or brace, J, in combination with a horse hay fork, substantially as and for the purpose set forth.

76,030.—TAPPING PIECE FOR BARRELS.—August Zinsser, New York city.

I claim the cast iron tapping piece, A, with a screw thread, B, and ears, D D, substantially as shown.

76,031.—COMPOUND OF ANILINE COLORS.—Emil Zinssmann (assignor to himself and Charles Rumpff), New York city.

I claim a compound which is soluble in water, and made from such analine colors which in themselves are not soluble in water, by treating said colors with glue or equivalent substances, either alone or mixed together, and with a liquid, such as acetic acid, or glycerin, or their equivalents, either alone or mixed together, as herein set forth.

76,032.—BROILER AND TOASTER.—Wm. F. Collier and Jonah H. Bigelow, Worcester, Mass.

We claim the wire frame, A A, when provided with a series of ears or projections, D D, formed by pressing out part of the metal without bending the wire, in combination with the bars, B B, and handles, substantially as and for the purpose herein shown and described.

REISSUES.

2,901.—LAMP BURNER.—W. H. Love, R. H. Childs, and H. W. Childs (assignees by mesne assignments of John C. Love), Philadelphia, Pa. Patented Dec. 17, 1867.

We claim, 1st, A flat slotted plate, d, arranged above the dome, B, of a lamp burner, as and for the purpose described.

2d, The plate, d, with its flange, I, and opening, n, in combination with the the casing, A, of a lamp burner, when the edges of the said opening, w, are parallel to the upper edge of the wick tube, as set forth.

2,902.—FAGOT FOR RAILWAY RAILS.—Thomas E. Purchase, Reading, Pa. Patented Feb. 2, 1858.

I claim, 1st, The manufacture of railroad rails from a pile, the top bar of which is of a superior quality of iron, immovable laterally, and sufficiently heavy to give the rail when rolled a consolidated head, connecting with the lower layers in the stem of the rail, substantially as above set forth.

2d, An intermediate iron form piece for a fagot for a railroad rail, such form piece being constructed with an irregular welding surface, for fitting a corresponding welding surface in the superior metal cap or top piece, substantially as described.

DESIGN.

2,960.—BOTTLE.—Meigs Jackson, Clarksburg, W. Va.

NOTE.—FIFTY-SEVEN patents in the above list were obtained through the Home Office of the Scientific American Patent Agency.—EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., *37 Park Row, N. Y.*

[ISSUED FOR WEEK ENDING MONDAY, MARCH 16, 1868.]

61,373.—PISTON FOR STEAM ENGINE.—William D. Whitmore, Boston, Mass. Dated Jan. 22, 1867. Application for reissue received and filed August 28, 1867.

I claim my improved ring section, and wedge piston, as made, not only with its ring sections and their wedges, wholly within and supported by a case, C, separate from and to be attached to the cap, B, by screws, but as having the cap, B, applied to the piston rod, A, the whole being substantially as and for the purpose hereinbefore set forth.

I also claim the combination of the grooved and perforated annulus, made and described, and either connected in one piece with or separate from the cap plate, with such cap plate, the plate, B, the series of ring sections, h, and the wedges, f and springs, g.

14,368.—METHOD OF BOTTLING FLUIDS UNDER GASEOUS PRESSURE.—Paul Schmitt (assignee of Jane Quantin, and H. A. Pintard), New York city. Dated March 4, 1856. Application for reissue received and filed March 4, 1868

I claim, 1st, The method of drawing off aerated liquids, such as mineral or soda water, by the admission of sirup and soda water, through the same filling head or nozzle, and whereby said water or liquid is sweetened, while the bottle or vessel is being filled.

2d, A sirup, measuring chamber, in combination with the filling head of a bottling machine, the two being combined in one apparatus.

3d, In a sirup charging machine, an attachment to a filling head or nozzle causing the sirup to be expelled from the measuring chamber of said device by force applied in rear of it, other than that produced by mere gravity of the sirup, essentially as specified.

4th, The combination with the measuring chamber of a bottling machine, of a piston fitted to said chamber, and so operating as to regulate the quantity of sirup admitted and expelled.

5th, Providing the sirup measuring chamber for operation in connection with a suitable filling head or nozzle, with an air tube or vent, substantially as specified.

6th, The combination, in the one machine or apparatus, of a discharging nozzle, for drawing off the aerated water with a sirup-measuring chamber.

7th, The combination of a cock or valve for controlling the egress of sirup from the measuring chamber, with a conduit for passage of the aerated water.

8th, So connecting or gearing the several valves which control the admission and discharge of the sirup and aerated water, as to effect the mixing and expulsion of both in a continuous manner, essentially as herein set forth.

9th, An apparatus of compound character, constructed and operating substantially as hereinbefore described, that is, to introduce a certain portion of a liquid into the apparatus, and to force it out by the action of another liquid gaseous or fermented.

72,953.—DITCHING MACHINE.—David Whisler, Union Township, Ohio. Dated December 31, 1867. Application for reissue received and filed March 7, 1868.

1st, I claim the adjustable features of the mold board and knives for cutting a wide or narrow ditch, substantially as described.

2d, The peculiar construction of the shovel, as and for the purpose set forth.

3d, The construction of the colter, as and for the purpose specified.

4th, The hinged platform, T, for regulating the depth of the furrow or ditch, substantially as described.

5th, In combination with the above, I claim screw, h, and springs, t, substantially as set forth.

6th, I claim axle, B, wheels, C C, beam, A, platform, T, screw, h, springs, t, and vertical knife, P, all combined and arranged as and for the purpose set forth.

62,051.—DOOR AND GATE LATCH.—James A. Park, White House, N. J. Dated February 12, 1867. Application for reissue received and filed March 11, 1868.

1st, I claim the angular latch, C, secured upon a door, gate, or post, and operating substantially as and in the manner herein set forth.

2d, The arrangement of the angular latch, C, upon a suitable shaft, and provided with a weight, D, or its equivalent, substantially as and for the purposes specified.

3d, The angular latch, C, provided with a weight, D, and shaft, B, and secured to the door or gate by means of the plate, A, or in any other suitable manner, to operate substantially as specified.

4th, The combination of the latch, C, shaft, B, and weight, D, with or without a spring of suitable construction, all constructed to operate substantially as described.

36,268.—HORSE RAKE.—C. M. Titus, Ithaca, N. Y., assignees by mesne assignments of E. L. Bergstresser, Hublersburg, Pa. Dated August 26, 1862. Application for reissue received and filed March 13, 1868.

I claim a pressure bar provided with hanging loops or staples, by means of which the rake teeth are lifted to discharge their load.

The employment of suspending lifting loops or staples, in combination with the rake teeth, as described.

The pressure bar, provided with lifting loops or staples, in combination with a lever for operating the same as described.

43,202.—BRIDGE.—David Hammond, and W. R. Reeves, Canton, Ohio. Dated June 21, 1864. Reissue No. 2,701. Dated July 30, 1867. Application for reissue received and filed March 13, 1868.

1st, We claim the arch, A, constructed of the arch pieces, a a, covering piece, b, clamping pieces, c c, bolts, d d, with nuts, e e, the several parts being arranged and combined substantially in the manner and for the purpose herein specified.

2d, The peculiar arrangement and combination of the arch pieces, a a, covering piece, b, bolt, m, suspension rod, B, or diagonal brace, C, with bolt, x, or w, and nuts, f or h, the several parts being constructed and arranged substantially in the manner and for the purpose herein specified.

3d, The combination of the arch, A, constructed as hereinbefore specified, the chord, D, suspension rods, B B, diagonal braces, C C, and shoes, E, substantially in the manner and for the purpose herein specified.

56,043.—BRIDGE.—David Hammond, Canton, Ohio. Dated July 3, 1866. Reissue No. 2,586. Dated April 30, 1867. Application for reissue received and filed March 13, 1868.—Division A.

1st, I claim the peculiar arrangement and combination of the arch pieces, C C, clamping pieces, q or p, clamping bolts, w or p, and covering piece, b, when said arch pieces, C, have the flanges, x x, rolled on to the web, c, and whether the flanges, y y, be or not be used, the several parts being constructed, arranged, and used in the manner and for the purpose herein specified.

2d, The clamping piece, q, constructed and used substantially as herein specified.

3d, The clamping piece, p, constructed and used substantially as is herein specified.

4th, The combination of the arch, a, constructed as is herein shown, the shoes, g g, chords, d d, suspension rods, f f, and braces, e e, the several parts being constructed and arranged in the manner and for the purpose herein specified.

56,043.—BRIDGE.—David Hammond, Canton, Ohio. Dated July 3, 1866. Reissue No. 2,586. Dated April 30, 1867. Application for reissue received and filed March 13, 1868.—Division B.

1st, I claim the combination of the arch pieces, C C, of solid T or double T iron, and the single or double bolted clamping pieces, P Q Q, and clamping bolts, W W, or P, the several parts being constructed and arranged in the manner and for the purpose herein specified.

2d, The combination of the arch pieces, C C, of solid T or double T iron, rivets, T T, and securing piece, O2, with bolt, O', and nut, O, the several parts being combined and arranged in the manner and for the purpose herein specified.

3d, The peculiar arrangement and combination of the arch pieces, c c, having the upper flanges, x x, rolled thereon, and with or without the lower flanges, y y, the covering piece, B, securing piece, O2, with bolt, O', and nut, single or double bolted sharpening piece, P; or Q Q', and clamping bolts, W W', or P', the several parts being arranged in the manner and for the purpose herein specified.

4th, The securing piece, O2, with bolt, O', and nut, O, constructed and used substantially as is herein specified.

5th, The use of curved T or double T beams, made with solid flanges, while being rolled in the construction of any iron or steel arch, which is united at the ends by chords, and forms a part of the bow string girder, substantially in the manner and for the purpose herein specified.

66,935.—SKATE FASTENER.—E. H. Barney, and John Berry, Springfield, Mass. Dated July 23, 1867. Application for reissue received and filed March 13, 1868.

I claim, 1st, as a new article of manufacture, a skate fastener or key, having the socket or wrench, B, and button, c, and made either with or without the point, f, all constructed substantially as herein described, and for the purposes specified.

2d, As a new article of manufacture, a skate fastener or key, having the socket or wrench, B, and point, f, and made either with or without the button, c, all constructed and operating substantially as described, and for the purposes herein specified.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office, and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

EXTENSION NOTICES.

Finley Latta, administrator of the estate of A. B. Latta, deceased, of Cincinnati, Ohio, having petitioned for the extension of a patent granted to the said A. B. Latta the 6th day of June, 1854, for an improvement in steam generators, for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Thomas Allender, executor of the estate of John Allender, deceased, of West Hampton, Mass., having petitioned for the extension of a patent granted to the said John Allender the 20th day of June, 1854, for an improvement in metallic grommets, for seven years from the expiration of said patent, which takes place on the 20th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 1st day of June next.

Frederick H. Bartholomew, of New York city, having petitioned for the extension of a patent granted to him the 20th day of June, 1854, and reissued in two divisions the 13th day of November, 1860, and numbered respectively 1,071 and 1,072, for an improvement in method of governing the action of valve cocks, for seven years from the expiration of said patent, which takes place on the 20th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 1st day of June next.

Charles Parker, of Meriden, Conn., having petitioned for the extension of a patent granted to him the 20th day of June, 1854, for an improvement in cast iron vises, for seven years from the expiration of said patent, which takes place 20th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 1st day of June next.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

528.—BRICK KILN.—Charles L. Cornish and John McDonald, New York city. Feb. 18, 1868.

535.—BASE OF ARTIFICIAL TEETH, ALSO MOLD FOR FORMING DENTAL PLATES.—John McClelland, Louisville, Ky. Feb. 18, 1868.

MEANS FOR INCREASING THE DRAFT IN STEAM BOILERS.—Jearum Atkins, Washington, D. C. Feb. 20, 1868.

562.—BRUSH.—Thomas Maury, Washington, D. C. Feb. 21, 1868.

592.—MACHINE FOR SUPPLYING TYPE FORMS IN PRINTING PRESSES WITH VARIOUS COLORED INKS FOR EACH IMPRESSION.—Geo. W. Wood, Richmond, Ind. Feb. 22, 1868.

594.—STEAM BOILER.—Wm. H. Nobles, St. Paul, Minn., and Milton V. Nobles, Elmira, N. Y. Feb. 22, 1868.

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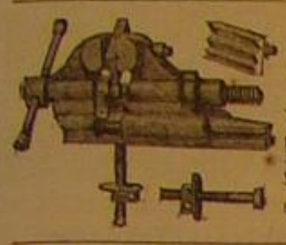

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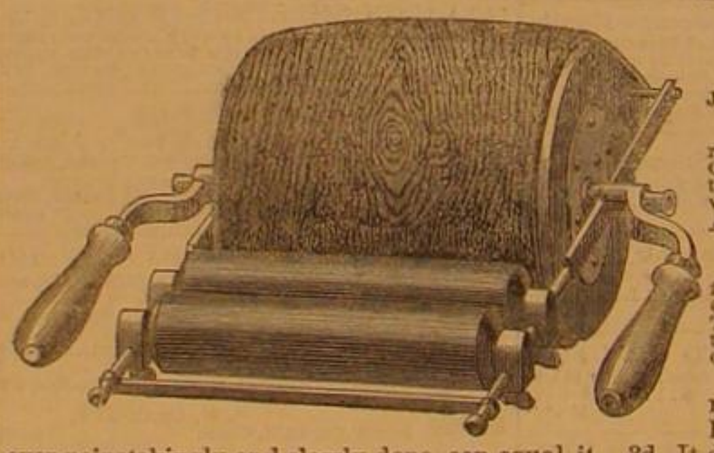

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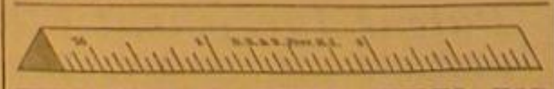

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