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RATIONALE OF THE THERAPEUTIC ACTION OF ARSENIC IN DISEASES OF THE SKIN.

There is perhaps no remedy in the entire range of the *Materia Medica* that can be relied upon with greater certainty to produce its legitimate results in a given time than arsenic.

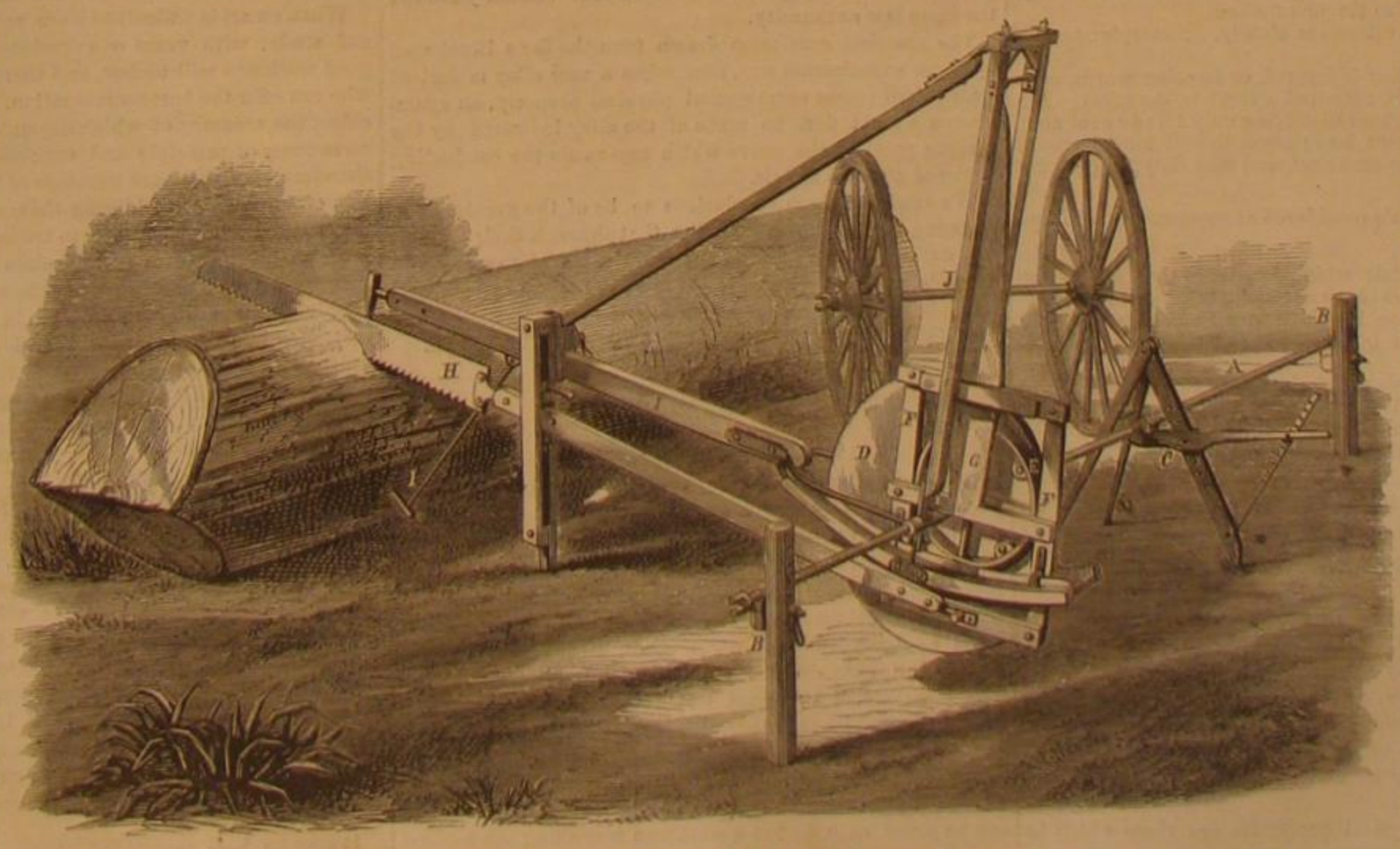
It is generally indicated in diseases of the skin, Eczema being one of the most common of these troublesome affections. It is usually exhibited in the form of K O, As O_3, in solution called in the pharmacopœias, Fowler's Solution, and its effect is so marked and so obviously tracable to itself, as often to create wonder even in the minds of those accustomed to witness its action upon the human system.

The diseases for which it is administered are situated upon the surface, and have long been suspected, and more recently, by microscopic examination, many of them have been determined to be parasitic in their character. Such being the case, the manner in which arsenic taken into the stomach effects a cure, becomes an interesting subject of inquiry; and as we have never met with an explanation of the phenomenon, we venture to suggest that the following may be the rationale of its action.

Arsenic, and its oxides, arsenious acid, As O_3, arsenic acid, As O_5, and its salts are all highly poisonous. When taken into the stomach they are not assimilated, but are absorbed and distributed through the entire system. When taken in extremely small doses, no inconvenience is felt by the patient; it is eliminated as fast as it is supplied. But if the dose be increased, poisonous effects will be produced, because the system cannot clear itself of the noxious matter with sufficient rapidity. The eyelids present a puffed appearance, which is an indication that the remedy has accumulated, and that its further administration would inconvenience and endanger the patient. Now at this stage the poison is equally distributed, in a state of extreme subdivision, and its elimination takes place largely through the pores of the skin, each of which is a nidus for a parasitic growth, and here becoming mixed with the pabulum which nourishes the parasite, it, by actual poisoning, destroys the cause of the mischief.

Improvement in Portable Reciprocating Sawing Machines.

When timber is felled it must be cut into convenient lengths for transportation, unless the trunk of the tree is intended for spars or long lumber; but especially where it is intended to use it for shingle or stave bolts, or for fuel it is evident that much time and labor will be saved in the cutting up of the logs *in situ*. This is the object of the machine herewith illustrated. It is a simple frame supporting the driving apparatus for a saw, and capable of being moved from place to place as occasion may demand. A long shaft, A, is supported near its ends by stakes, B, driven into the ground, having adjustable boxes for the purpose of properly leveling it and being further sustained and prevented from springing by movable supports, C, also adjustable, constructed in a manner similar to the carriage jacks in common use. On this shaft is a balance wheel, D, and an eccentric, E, the latter of which plays between two parallel upright bars, F, secured to a swinging bar, G, and by this device the saw, H, is driven by means of a pitman attached to the lower part of the swinging bar, G. Suitable dogs, I, hold the log while being sawed, and a guide and support driven into the ground near the log control the movements of the saw. In this guide is a box with rollers for the pitman, the box having a handle by which it and the saw can be raised.



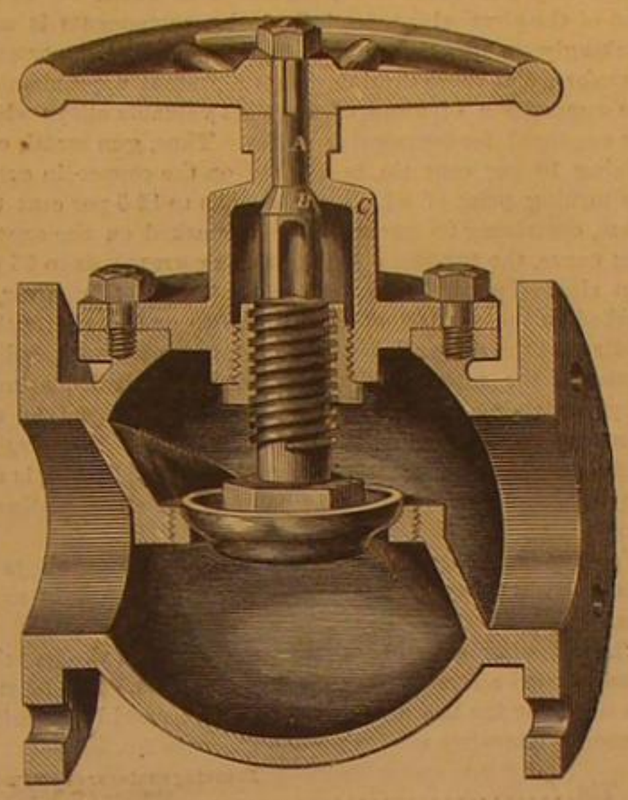
BELL'S PATENT PORTABLE SAWING MACHINE.

The shaft, A, is slotted nearly its whole length and the wheel and eccentric, D and E, have a feather in their hubs to engage with it. By this arrangement a log of many feet in length may be sawed into a number of bolts without disturbing the supports of the shaft. A pair of wheels, J, on a shaft of the same diameter as A and similarly slotted, is used to transport the machine from place to place, and also when slightly sunk in the ground they serve as supports to the machine while in operation. The power, of any sort, is attached to the end of the shaft by a clutch or any other suitable means.

Patented through the Scientific American Patent Agency Feb. 4, 1868, by G. W. Bell, who may be addressed for further information at Rising Sun, Ind.

PATENT SELF-PACKING STEAM VALVE.

Not among the least of the annoyances attending the operation of ordinary gates or globe valves is the necessity of occasional and sometimes frequent packing of the stem. Efforts have been made to construct a valve that should be self packing and be always, under all circumstances, tight. This valve seems to be perfect in this respect. Externally it is like the ordinary valve, but internally very different. The revolving stem, A, has formed on it a valve, B, the seat of which is in the under side of the bonnet, C. The lower part of this stem is slotted, forming a key which fits loosely in a corresponding recess in the screw stem, which is of usual form. Thus the two are not rigidly connected, but one is allowed to act, in a measure, independent of the other.



The result is that while the revolving stem will readily, as in the ordinary valve, turn the screw, it will not prevent the valve of the latter from finding its seat. As this portion moves freely on the revolving screw it is evident the valve of the former will always prevent the escape of steam or water. There can be no transverse strain upon the stem under any circumstances. The valve is manufactured by Morris, Tasker & Co., 209 South Third street, Philadelphia, Pa, under patents issued to Sargent & Towne, June, 1865, and John C. Schaefer, Feb., 1866. All orders and letters relating to this invention should be addressed to Morris, Tasker & Co., as above.

Influence of Anæsthetics on Brain and Nervous System.

Dr. Richardson's fifth lecture, was a study of the influence exerted by anæsthetics on the brain and nervous system. The obvious fact that the motion of the heart and the movements of respiration continue in action while the rest of the body is under the narcotic effect, during anæsthesia, proves that the whole nervous system is not involved, and that the involuntary and semi-voluntary muscular mechanism is also not involved except when extreme and fatal symptoms are developed. What parts, then, are influenced by an anæsthetic? The idea was almost intuitive that the brain was the organ affected, and that the centers of consciousness are those chiefly held in abeyance. But, to prove this as true, experiment was necessary. In proof, the lecturer took a large pigeon, narcotized it deeply with chloroform, and in this state passed through its body, from the head to the foot, a rapid intermittent induction current. The bird instantly rose from the table, extended its wings, opened its eyes, and seemed as if restored; the current was then stopped, and the bird was shown to be as deeply asleep and as powerless as before. Another bird was put to sleep by freezing the brain, and when utterly insensible was subjected to the electrical shock in the same way, when it flew from the table into the room, where, breaking its connection with the battery, it dropped on the floor comatose, motionless, and as anæsthetized as before, in which condition it remained for many minutes. The lecturer in these experiments demonstrated that the anæsthetic action was localized in the cerebrum. His battery was like an outer brain, which supplied power without intelligence, and which, by the effects of its current, showed that all the muscular elements were ready for work, and only awaited the order from the brain. The lecturer next discussed the question—What, during the process of anæsthesia, leads to this change in the brain? Is there a chemical action on albumen? Is there pressure on brain matter? Is there deficient oxidation of the blood? Is there contraction of blood vessels, and diminished supply of blood from that cause? All these hypotheses were experimentally tested and negatived. It was admitted that during extreme anæsthesia there is reduced oxidation and a singular reduction of temperature. These changes are inevitable, because the anæsthetic vapors replace oxygen during their diffusion into blood; but the diminished oxidation is not the cause of the insensibility. In proof of this Dr. Richardson showed an animal breathing an air in which the oxygen was reduced by addition of nitrogen from 21 parts to 9 parts in the 100, side by side with another similar animal breathing an air in which the oxygen was reduced by the addition of vapor of bichloride of methylene only to about twenty parts in the 100, viz., four cubic inches in 500. The result was that the animal in the extremely reduced atmosphere was quite unaffected, while the animal in the slightly reduced atmosphere was in the deepest narcotism. Then a correcting experimental test was adopted, and the bichloride was administered in an atmosphere containing an excess of oxygen, the oxygen being present in double its ordinary or natural proportion; the excess of oxygen exerted no perceptible obstacle to the anæsthesia. To determine whether there was contraction of blood vessels under anæsthetics, the lecturer had had recourse to transparent small trout; through their bodies, with the microscope and the inch lens, the bloodvessels could be seen, and the corpuscles flowing through them. These animals can be narcotized readily by making them breathe water saturated with

chloride of methylene or ether. In the narcotized condition, the vessels do not contract, but under the influence of ether, in the later stages, before death occurs, dilation and regurgitation are observed. The latter is noticed also when chloride of methylene is used. With both reagents breathing and vessel circulation cease before the heart's action. The lecturer concluded that anæsthetic vapors act directly upon nerve matter either by preventing the developement of force or by stopping conduction. The latter hypothesis is supported by the fact, proved by experiment, that these vapors obstruct the conduction of heat and electricity.—*Med. Times and Gaz.*

ALLOYS--REVIEW OF A LECTURE BY DR. A. MATTHIESEN, F. R. S.

Up to a very recent period the knowledge of alloys was confined to the physical characters of a very few of the possible combinations of different metals, and the chief contributions to the general stock of information in relation to the subject were the result of unsystematic and desultory experiment. Nothing like generalization was reached, and it was impossible, from the knowledge of the properties of an alloy containing definite proportions of two or more elements, to predict, even approximately, the properties of a combination of the same elements in varied proportions. The great importance of the subject, has, however, stimulated investigation, until at last something definite has been reached; and although as yet the smallest possible portion of the field has been worked over, an approach has been made to the proper method of working, and as a consequence we shall no doubt witness results equal in importance to other modern chemical discoveries which have created new branches of art and manufacture and revolutionized many of the old.

The researches of Dr. Matthiesen, the results of which he submitted to the Royal Society, in a lecture delivered at the Royal Institution, on the evening of March 20, are of great interest. The lecture was illustrated by many beautiful and ingenious experiments, and undoubtedly ranks among the most valuable recent contributions to science.

Dr. Matthiesen's definition of the term alloy is, *a solidified solution of one metal in another.* By solidified solution is meant a solution of substances which have become solid, *e. g.*, glass obtained by fusing together different silicates, and allowing the homogeneous liquid to solidify. The most important characteristic of a solidified solution is its homogeneousness. The most powerful microscope should not reveal its components.

As an illustration of the difference between chemical combination and the solution of metal in metal, the lecturer plunged a rod of gold and another of copper into separate portions of molten tin. The gold dissolved rapidly in the tin, but the copper rod, though previously tinned to insure perfect contact between the two metals, remained undissolved. To properly appreciate this experiment it should be borne in mind that the fusing points of gold and copper are nearly the same (gold 2,016° F., copper 1,990° F.), and much higher than the fusing point of tin, which is 442° F.

This experiment was followed by others equally instructive and interesting, calculated to show the solvent power of fused substances.

Dr. Matthiesen proceeded to classify the phenomena attending the solution of metals in metals, as follows:

I. The solid metal dissolves quickly in the melted one with evolution of heat. Examples: gold in tin just melted; sodium in mercury.

II. The solid metal dissolves quickly without evolution of heat. Example: lead in tin just melted.

III. The solid metal dissolves slowly. Example: copper in tin just melted.

IV. Only a partial alloy is formed, or in other words, each metal dissolves to only a limited extent in the other. Examples: lead and zinc, lead dissolving only 1·6 per cent zinc, and zinc only 1·2 per cent lead; bismuth and zinc, bismuth dissolving only 8·14 per cent zinc, and zinc only 2·4 per cent bismuth.

He also divided metals considered as components of alloys into two classes:

Class A.—Those metals which impart to their alloys certain physical properties (such as conducting power for electricity) in the proportion in which they themselves exist in the alloys. The metals belonging to this class are lead, tin, zinc, and cadmium.

Class B.—Those metals which do not impart to their alloys such physical properties in the proportion in which they themselves exist in the alloys. All the metals, except the four named as belonging to class A, probably come under this head.

He further separated alloys into three groups:

a. Those made of the metals belonging to class A with one another.

b. Those made of the metals belonging to class A with those of class B.

c. Those made of the metals belonging to class B with one another.

The Doctor showed by a series of conclusive and remarkably ingenious experiments that in alloys specific gravity, specific heat, and expansion due to heat, are in all cases approximately equivalent to those possessed by the component metals; and that fusibility and some other properties are never equivalent.

Another class of physical properties are those which in some cases are, and in others are not, imparted to alloys in the ratio in which they are possessed by the component metals. This class of properties includes conducting power for heat and electricity, sonorousness, elasticity, and tenacity. The separation of metals into two classes (A and B) is founded on a consideration of the latter class of properties.

Alloys made of the metals belonging to class A only (lead, tin, zinc, and cadmium) conduct electricity in the ratio of the relative volumes of the component metals. The conducting powers of a series of such alloys, say those of tin with zinc, may therefore be represented graphically by straight lines.

In alloys made of the metals belonging to class A with those of class B, the conducting power of the B metal undergoes a marked change, while that of the A metal remains unaltered. The conducting powers of a series of such alloys, say those of copper with tin, is represented graphically by a bent line approximating to the form of the letter L. There is a rapid decrement on the side beginning with the metal belonging to class B (copper in the case referred to) until a certain point is reached, when the line turns and goes straight to the metal belonging to class A (tin in the case cited).

In alloys made of the metals belonging to class B only, the conducting power of each component undergoes a marked change, hence such alloys do not conduct electricity or heat in the ratio of the relative volumes of their component metals. The curve which represents graphically the conducting powers of a series of such alloys, say those of silver with gold, has approximately the form of the letter U. There is a rapid decrement on each side of the curve, and the turning points are connected by a line nearly straight.

The turning points of the curves representing the conducting powers of series of alloys of the second and third groups, necessarily correspond to certain alloys in which the alteration of the physical properties of the components is most strikingly exemplified. It is a fact of no small importance, therefore, that these turning points represent approximately the composition of some of the most valuable alloys which are employed for technical purposes. Thus, gun metal, containing 10 per cent tin, is marked on the copper-tin curve, the turning point of which corresponds to 12·5 per cent tin. Brass, containing 28 per cent zinc, is marked on the copper-zinc curve, the turning point of which corresponds to 25 per cent zinc. Twenty-two carat gold, alloyed with silver, is marked on the silver-gold curve, close to one of its turning points, and the same alloyed with copper, on a corresponding portion of the copper-gold curve. Again, a silver-platinum alloy, containing 33 per cent of platinum, employed by the electrical standard committee for their unit-coil, and largely used by dentists for making springs for artificial teeth, is the alloy which forms the turning point of the silver-platinum curve.

Further experiments demonstrated the fact that alloys of class B with those of class A give a great increase of sonorousness.

The following experiments were made to test the tenacity of metals and alloys. with the annexed results. The tension was made by the use of a winch, and measured by a spring balance. The wires used were double, gage No. 23:

	Breaking strain for double wire.
Tin	under 7 lbs.
Lead	" 7 lbs.
Gold	about 25 lbs.
Copper	" 30 lbs.
Silver	" 50 lbs.
Platinum	" 50 lbs.
Iron	" 90 lbs.
Tin-lead alloy	under 7 lbs.
Tin-copper alloy (12 per cent copper)	about 7 lbs.
Copper-tin alloy (12 per cent tin)	" 90 lbs.
Gold-copper alloy	" 75 lbs.
Silver-platinum alloy	" 80 lbs.
Steel	above 200 lbs.

These results show that the tenacity of metals belonging to class B is greatly increased by alloying them with metals of the same class. By experiments with spirals of hard drawn wire of the same gage it was shown that elasticity follows the same law as tenacity.

The practical conclusion drawn from the facts illustrated by these experiments was, that when a new alloy is desired which shall posses some special physical property, an examination should first be made of the alloy indicated by the turning point of the curve which represents the conducting power of the two metals.

We consider these conclusions to be of the greatest importance, and venture to predict that through their application during the next decade many valuable discoveries will be made, and a new impulse given to the art of metallurgy.

THE WATCH--ITS HISTORY AND MANUFACTURE.

BY H. F. PIAGET.

No. 3.

THE SELECTION OF WATCHES.

Were it possible to give rules for the selection of watches, society might be benefited, as the young man who has a bad watch is less likely to obtain habits of punctuality than he who has a good one. I once heard an anecdote of two young persons who were allowed to select watches for themselves. One chose a plain watch, from being told that its performance could be depended upon. The other, attracted by the elegance of the case, decided upon one of inferior construction. The possessor of the good watch became remarkable for punctuality, while the other, although always in a hurry, was never in time, and discovered, as a celebrated writer justly observes, "that next to being too late, there is nothing worse than being too early." Unfortunately, no efficient instruction can be given, as none but a workman possessing the highest knowledge of his art is capable of forming a correct opinion, and a watch must be bad indeed for an inexperienced eye to detect the defects, either in its principle or its construction. Even a trial of a year or two is no proof, for wear seldom takes place within that time; and while a good watch, if in order, can but go well, a bad one may by chance occasionally do so.

I have myself seen some of the old rack lever watches that were more than fifty years old, and worn constantly, nearly as good as new, by having been properly attended to, and in time. It is not sufficient that a watch be well constructed, and on good principles. The brass must be hard, and the steel properly tempered. The several parts must be in exact proportion, and well finished, so as to continue in motion, with the least possible friction. It must also be made so that when taken to pieces all its parts may be replaced as firmly as before.

A watch thus constructed and properly adjusted will continue its motion and correct performance for years without trouble, and with little expense, except occasionally cleaning. A bad watch is one to which no more attention has been paid to the proportions of the parts or durability of materials than was necessary to make it perform for a time. It is either the production of inefficient workmen, or of those who, being limited in price, are unable to give sufficient time to perfect their work. There is a great fault in many watches and movements, sent both from England and Switzerland—they are not properly examined, adjusted, and regulated, before exported.

Formerly, and it is still the case in many instances, the most eminent watchmakers were all practical workmen. At present, there are but few manufacturers who work themselves, and if they do, have not time to see to every watch sent away. Those who value the reputation of their watches have a practical workman, one who understands thoroughly every branch of the business, who is called the examiner, whose duty it is to take every part and see that it is properly made, adjusted, and put together on correct principles; for where a piece of mechanism like a watch is made in so many parts or pieces, it is next to impossible but some slight oversight or imperfection may occasionally occur. The examiner or manufacturer then regulates every watch or movement (if correct) before being sold.

But latterly, the competition for cheapness has been so great that in many cases the examiner is dispensed with, as good examiners are paid very high wages—it being necessary for him to have considerable skill and experience before being entrusted with such an important position. Also, many watch manufacturers have not the opportunity of examining every watch, in order to fulfill their orders in time at the busy season, and many watches, particularly cheap ones, are merely *going machines*, and not time-keepers.

Another fault with many watches sent from Europe to this country, is that the oil has not been changed; the oil mostly used in the manufactories will not do in this climate, and but few watches will perform correctly until the oil is changed. Still, another fault, and one which often brings discredit on a good maker, particularly in cheap work, is that when the watch or the movements are cased in this country, the movements go in the hands of workmen, who merely take them down for casing, or are paid so little for the work that they cannot properly examine them, and correct any oversight or imperfections in manufacturing, and frequently have to do the work in great haste; if the balances only vibrate with a good motion, it is all that is wanted of them. Bad watches in some instances, with strong springs, will go well for a time, but as they wear from friction, they require frequent repairs, which cannot effectually be done, for in correcting one defect in a badly constructed watch, you frequently find several others, which could not be discovered before.

The principal cause of imperfect watches is the universal desire of obtaining them for as little money as possible, and to reduce the work of watchmaking to the same value, is to compel good workmen to produce bad work.

When an art is difficult to learn, requiring much knowledge and study, with years of experience, the number of really good workmen will be few, and therefore employed by those who can offer the best remuneration. Few can judge of a machine, the accuracy of which depends upon the most minute correctness of principle and execution; it is not wonderful, therefore, that there are numbers of bad watches, since a portion of the public considering them as mere ornaments, or in many instances only bought to trade, and not for use as time keepers, procure them from dealers who, however just and honest they may be, can never possess that knowledge which is only acquired by long practice in that particular art, and may therefore be themselves deceived. Those, also, who in order to meet the general desire for cheapness sell at low prices, can only do so by producing inferior watches, for a greater division of labor, or use of machinery, can scarcely be brought into operation. The workmen are therefore compelled to do the greatest quantity of work in the least possible time, and good work in watches must not be slighted. It is often supposed that the principle on which a watch is constructed must determine its quality. This is far from being the case. A duplex watch may be very bad if not well made and the escapement in its true principle. A chronometer watch with the same fault is still worse, while a common vertical watch may be good if well made. I have seen good vertical watches which had been in constant use for upwards of fifty years, with new verges put in occasionally, and kept reglarly cleaned, which were still much better than many of the full jeweled levers made at the present time. To make one watch better than another, execution must be added to principle.

It may be here mentioned, that undue importance is frequently attached to watch jeweling; many low priced and bad watches have eight or ten holes jeweled, while many that are good have but four. To state the number of holes which ought to be jeweled, would require details ill suited to a work which is merely elementary. But when it is known that in common watches the holes can be jeweled in Europe at less than fifty cents each, it will be seen that the number of holes jeweled affords no criterion by which to estimate the value of a watch. But in fine watches, which are jeweled with rubies

and are highly polished, the cost is four times more. Therefore the judgment of the seller may be fairly questioned, should he attach much importance to the number of holes jeweled. The high sounding description, the maker's name (unless it is genuine), the offered trial, the enticing cheapness, are often effective baits to the short-sighted.

It has already been shown that the principle of a watch is no proof of the excellence of its quality, the beauty of its case, etc., in no way effects its works, and even the offered trial is not a sufficient test. The purchase of a very cheap watch may teach the useful lesson, that low price is not exactly the word for cheapness. The size and form of a watch are determined by fashion or convenience, and although the appearance is of less consequence to a person buying one for his own use than the quality, yet no reason exists why a good watch should not be handsome, while many that are showy and handsome are good for nothing as time keepers, and are merely useful as articles of trade.

The individual who wishes to procure a good time-keeper should apply to a watchmaker or dealer of known honesty and ability in his art or business, and who therefore should be implicitly trusted. The various prices will point out the comparative qualities of the works, for the external ornament of a good watch form but a small portion of the expense. In regard to choosing either an English, an American or Swiss watch, circumstances must in many instances determine that. There are good makers in each country. If you have a preference for any particular maker, be sure to get one with the genuine name engraved on it. For a moderate thick watch, choose an English or American watch; for a thinner watch, or one of small size for a lady, take a Swiss one, as Swiss watches are to be preferred for small size, style, and lowness of price. With the exception of size, the appearance of a watch is totally independent of its quality as a machine—it may be handsome, yet bad. But a good watch is seldom unsightly, for the knowledge of form, indispensable to a good watchmaker, is doubtless the reason why watches made by good makers generally look well, although they have become antiquated. With regard to size, although there is no necessity for the large, thick watches worn some years ago, yet those very flat and small are deficient in the first principles required for correct performances and durability, and are more easily spoiled by unskillful workmen in repairing. Although all the parts may be in equally reduced proportion, the very particles of the metals, the more rapid decay of the small portion of oil which can be applied, and the limits to the visual power of man, must ever prevent a very small watch from being as serviceable as one of moderate size; that is, the smallest consistent with accuracy and durability. The large, thick, old style of watch is less absurd than some now made. Reason may justify the one, while fancy is the only apology for the other.

There are other circumstances which must also determine the choice. If the purchaser is going in parts of the country where he may not find skillful workmen in case of an accident or repairs, he should procure a watch constructed on a principle generally understood, and which can be easily arranged when out of order.

The preceding remarks are all that suggest themselves as useful to the inexperienced in selecting watches. More detailed instructions would explain the construction of the machine, and might be interesting to a few, in particular to watchmakers—there are works published for their use and instruction; but to be able to discover the quality or imperfections of a piece of mechanism so minute and complicated as a watch, requires knowledge and patience attainable only by a long experience. I will therefore explain the different kinds of watches made, and leave it to the purchaser to make his selection.

Correspondence.

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

Do We See the Sun so soon as it Rises?--Aberration of Light.

MESSRS. EDITORS:—When there are books, as stated on page 277, in which it is laid down that "as it takes light eight minutes to come from the sun to the earth, we do not see the sun until eight minutes after it has risen," then such writers, in order to be consistent, must also state that as it takes light one second to reach us from the moon, we see her at the place she left only one second ago; and as it takes light three, ten, or a hundred years to come from different fixed stars to the earth, we now also see those different stars at the place they occupied three, ten, or one hundred years ago, which is perfectly absurd; this might perhaps be the case if the earth stood still and the stars revolved. As however the earth moves between the sun and fixed stars, which are comparatively at rest, leaving out refraction or other disturbing elements, we see the sun, not eight minutes after it has left the place where we see it, but we see the sun (not only at sunrise but always) twenty seconds of a degree in its apparent orbit ahead of the place it really occupies. This may appear paradoxical, but I will prove it to be the fact.

EFFECT OF ATMOSPHERIC REFRACTION.

It may be well to dispose here of refraction, notwithstanding it is left out of account, its knowledge is related to our subject. It amounts at sunrise and sunset to about half a degree, thus equal to the apparent diameters of our sun or moon. We see, therefore, those bodies when rising or setting so much higher than their true position, so that when they are exactly below our horizon, so that this is in line with their upper edge, we see them above our horizon, touching it with their lower edge, as the apparent motion of the sun amounts to 15° per hour, or 30′ in two minutes' time, its apparent place, when rising almost perpendicular, is, at sunrise, two minutes ahead, and at sunset as much behind his real position. In winter and at high latitudes where the sun rises and sets in an orbit not perpendicular but very oblique to the horizon, its displacement by refraction is not in its orbit, as it is always an apparent lifting up, vertical to the horizon.

DISCOVERY OF THE ABERRATION OF LIGHT.

The problem of the combined effects of the velocity of light and the earth's motion, has been solved by the astronomers of a former century, and is known as the theorem of the aberration of light. Its theoretical solution is in perfect accordance with the minutest practical observations, made with the most elaborate and largest astronomical instruments, which in some observatories of Europe have been constructed, chiefly for the special purpose of measuring the amount of this aberration. The history of this discovery, and of the gradual development of its theory is very interesting, but would occupy many pages of this paper and therefore must be passed by. I will only state that it means the apparent displacement of all heavenly bodies by the motion of the earth, that its amount is independent of their distances from us, that it is zero for those bodies, towards or from which the earth is moving in its yearly orbit, and at its maximum for those placed at right angles to the direction of this motion.

EXPLANATORY ILLUSTRATION OF ABERRATION.

To understand this combined effect of the earth's motion with the transmission of light, let us imagine rain-drops to fall down like they do in a perfect calm, perpendicular to the earth's surface. Let us now suppose we are standing on the platform car on a railroad track, and rapidly moving forward or backward; when moving forward the rain drops will strike the front part of the body, and will appear to arrive under an angle, deviating forward from the perpendicular and greater in proportion as the motion of the car becomes more rapid. When moving backward, the opposite will be the case, the rain-drops will strike from behind at an angle which also will deviate more from the perpendicular in proportion as we are moving faster. In both cases the rain will appear to us to arrive or come down from a direction inclined towards the side we are moving to, and not perpendicular as is really the case.

APPLICATION TO THE ABERRATION OF LIGHT.

Now this is exactly the case in regard to light coming from the heavenly bodies. When we compare the direction of the rain-drops with that of the light, and the motion of the earth in its yearly orbit with the moving railroad car; when the light comes to us at a right angle with the direction in which the earth is moving, it will cause an apparent change in the direction of the light, and consequently in the apparent place of the heavenly body the light is coming from. If the velocity of the earth's motion in its yearly orbit was much slower than it really is, so that it was to our instruments incomparable with the velocity of light, it would exert no influence on its apparent direction; but it happens to be so rapid that the relation is quite within the pale of actual measurement, as the following calculation will demonstrate.

SIMPLE CALCULATION OF THE AMOUNT OF ABERRATION OF LIGHT.

The earth moves in its yearly orbit with a velocity of nearly 70,000 miles an hour, the light is transmitted at the rate of 650 million miles an hour, which is 9300 times faster than the velocity of the earth. When now we take in consideration that an equal velocity of both would change the direction of the perpendicular or 90° into its half or 45°, we see that a velocity of only $\frac{1}{9300}$ will deviate the angle only to $\frac{1}{9300}$ of 45°, or 18 seconds; which, however, ought to be corrected trigonometrically, (for which we have here no space) to about 20 seconds. This now must be the maximum aberration produced by the yearly motion of the earth, on the position of all stars observed at right angles to the direction of that motion. They must all appear displaced to an amount of 20″ forward to the direction of the earth's motion, and this is the most easily observed in all those placed at about right angles to the ecliptic. As the earth moves in its yearly orbit around the sun in the opposite direction it did exactly six months before or after, the apparent displacement or aberration must for the same stars near the ecliptic pole be 20″ in one direction, and six months afterward 20″ to the opposite side of the heavens, making in all 40″ displacement in their positions; they therefore will yearly appear to move in small circles of $\frac{2}{3}$ of a minute in diameter.

ACCORDANCE OF THEORY WITH OBSERVATION.

This now is actually and exactly the case. It takes, of course, very perfect apparatus to observe seconds of degrees, but the more correct and minute the observations have been made, the more they correspond with this theory; for stars around the poles of the ecliptic it is proved fully 40″, for those toward the ecliptic less, and finally for those in the ecliptic, for the time that the earth is moving towards or from them, no aberration whatsoever can be observed.

INFLUENCE OF THE EARTH'S DAILY MOTION ON THE APPARENT PLACE OF THE SUN.

The velocity of the earth's equator by the daily rotary motion, is 1500 miles per hour (only that of a cannon ball), and being thus about fifty times smaller than that of the yearly velocity, would in the most favorable circumstances cause an aberration of less than half a second, which is almost imperceptible by the at present existing most correct instruments, therefore it may be left out of our calculations.

As the daily rotation of the earth cannot to any perceptible degree have any influence on the apparent position of the heavenly bodies, it can have no influence whatsoever on the apparent position of the sun, even at midday, and much less at sunrise or sunset, when this rotation turns us toward or from this luminary.

APPARENT DISPLACEMENT OF THE SUN BY ABERRATION PRODUCED BY THE EARTH'S YEARLY MOTION.

It is only the yearly motion of our earth then, always nearly at a right angle to the position of the sun, which displaces this body apparently, but always in the same direction, to the amount of about 20″, to that part of the heavens toward which the earth is moving at the time of the observation; and as this yearly motion is from east to west, like the apparent daily motion, it must cause an apparent displacement of the sun also towards the west, therefore ahead. The daily rotation is retrograding in regard to the yearly motion, for those parts of the earth's surface where it is midday, and accelerating where it is midnight; at the equator this would diminish the sun's aberration less than half a degree, and in higher latitudes even less, therefore the effects of the daily rotation may be neglected.

RECAPITULATION.

Displacement of the sun upward, observed when at the horizon, caused by atmospheric refraction, 30′ of a degree and 2″ in time. Displacement of sun, forward aberration caused by the earth's yearly revolution as any where observed, 20″ of a degree, 1⅓″ in time. Displacement of sun, backward aberration by daily rotation observed at the equator at noon, ½″ of a degree, $\frac{1}{30}$″ in time. Displacement of sun, aberration by daily rotation observed near the poles, 0.

New York City. P. H. VANDER WEYDE, M. D.

Velocity vs. Power.--The Value of the Indicator.

MESSRS. EDITORS:—I was much gratified with your article on "Shafting and Belts—Absorption and Transmission of Power," in No. 16, current volume. Permit me to make a few remarks on the same subject.

That the indicator does determine, in the only positive and correct degree, the power developed by the steam engine, has come to be an established and indisputable fact. It has necessitated the abandonment of many beautiful theories, both in regard to the length of belts and the velocity of shafting. Many suppose that an engine of say eighty horse power, shou'd work up to its maximum under all circumstances, and yield that amount of useful power, whatever the length of the driving belt, the relative position of driver and driven, or the velocity of the shafting. The engine that drives its shafting at six hundred revolutions cannot be supposed to yield such an amount of power as one that jogs along at one hundred and eighty. Velocity is a great absorbent of power, and in the first case a very large percentage of the real power of the engine is taken up by the friction of the shafting.

An experiment was recently made to determine the relative amount of power required to drive ring spinning frames at differing velocities. The result was as follows: Thirty-six frames of one hundred and twenty-eight spindles each, one and a half inches ring, running at 6,400 revolutions absorbed, exclusively of necessary friction of shafting and engine, 59.36 indicated horse power; at 6,000 revolutions, 52.78; at 5,400 revolutions, 51.21, and at 4,800 revolutions, 47.38, the other conditions being the same in each case.

More care should be used in the proportions of engines, as well as in the arrangement and velocity of shafting. Some engines have their pipes, valves, and ports too small to ever allow an approximation to the boiler pressure. Some users of steam believe that if an engine has a cut-off it *must* work on the expansion of steam to perhaps double its intended capacity. If valves are properly set, and the ports are of sufficient area, we shall not find, so often as we do now, one end of the cylinder doing from sixty to eighty per cent of the work. It is a wonder that some engines run at all, and they would not in some cases perform a revolution but for the momentum of the fly wheel. The indicator is the instrument for ascertaining these difficulties, and the time will come when it will be held in the estimation it deserves. He who makes its manipulation his specialty, should also understand how to remedy the defects his instrument discovers. He should be able to adjust the parts of the engine, and also ascertain the points at which the power is absorbed by improperly placed shafting, belts, and pulleys. T. P., JR

Providence, R. I.

Cutting Mirrors.

MESSRS. EDITORS:—Your correspondent "A. M. S., of Mass.," in reference to cutting small mirrors from large ones, is evidently an unskilful operator in the use of the diamond. A pure, clean diamond cut will separate silvered plate just as cleanly as ordinary glass, and without in the least degree injuring the silver. Solutions or other preparations are rather injurious than otherwise, owing to the contraction in drying, tending to "drag" the amalgam.

The chief danger in cutting silvered glass, lies in the unguarded manner in which some undertake the work. Secure a steady, level table; spread evenly thereon a piece of cloth or flannel, free from lumps, chips, drops of hardened glue, etc., (so frequent in workshops); measure off the desired size, and with a skillful confidence put in the cut, taking care not to change the angle of the diamond as the hand is drawn toward the body; commence the breaks at the end where the diamond leaves the glass.

A word as to the cutting properties of the diamond might not be out of place in this connection. Not over one-half of those who use this tool do so intelligently. A true diamond cut in ordinary glass, is a beautiful, clear, hair-like line scarce observable, and noticed plainly in silvered glass only on account of reflection. The usual so called "*cut*" with many is a heavy white line, *something they can see*, or they are not

satisfied. Such a cut is mere *abrasion* of the glass, in the part over which the diamond has traveled.

The cutting point is found, in the ordinary glazier's diamond, somewhere between the perpendicular and the angle at which a pen is usually held while writing. This point must be sought for, and the diamond used only by one person. Here is applicable your frequently urged advice, "study the use of your tools," and have your own "kit."

The natural philosophy of the diamond cut in glass has not yet been satisfactorily explained, though studied over by some of the first minds in this country and in Europe. After the fracture of a piece of well cut glass, the track of the diamond is marked by a serried line (something like saw-teeth) of a beautiful regularity, penetrating to the depth of about $\frac{1}{64}$th of an inch, varying slightly according to pressure. This appearance is quite plain to the naked eye, but under the microscope is the full beauty and much cause for astonishment. Thus seen it presents the idea of the line of holes in a sheet of postage stamps, with the exception that the holes are much closer, and appear as if made with an oval instead of a circular punch. A true cut is the result of much practice and study, and will become familiar by a clear, whistling, somewhat musical sound.

Again reiterating your excellent advice, "Study the use of your tools," and much real pleasure will result in their use. ENTERPRISE.

Cincinnati, Ohio.

Electro Magnetism as a Motive Power.

MESSRS. EDITORS:—I have been for years in receipt of numerous letters of inquiry on this subject, and as the writers are undoubtedly for the most part readers of your journal, permit me to refer them to your excellent report of my experiments at the Tabernacle in New York, found in your paper of November 15th, 1851, Vol. 7, No. 9.

It will be remembered that on that occasion I raised by the axial force of magnetism, with a huge helix, a bar of iron of 2000 lbs. weight, 5 inches from the floor. The bar weighed 800 lbs., the platform fastened to the top of it 300 lbs., and the six men on the platform over 1000 lbs. more. The huge mass I caused to vibrate for an inch by my finger. The bar and helix were the kind used in the engine exhibited. The battery used was 50 pairs Groves with platinum plates 12 inches square, 10 inches immersed. Such an enormous power has never been thus far repeated. Zimmermann, a late German author on electricity and magnetism, ridicules the idea, and says, "*It is an American story, and beats Munchausen.*" It will also be remembered that before this, I started with an electro magnetic locomotive to go from Washington to Baltimore. The car weighed 11 tuns, containing 14 passengers, two axial engines under the passenger seats, and a Groves battery of 100 pairs of the above size, swung on rubber springs underneath the car. On the way out the battery cells gave way, the acids mixed, and this happened twice before we reached Bladensburgh, a distance of six miles. It was for the most part an ascending grade. On a level track we made 19 miles an hour, although the machinery was rude and the friction of the engines and car couplings very great. We deemed it prudent to go no further, and had three more breaks on our way home. The engines were rated at four horse power each. All that can be inferred from the experiment is that the power can be increased on the axial plan to any extent, and that the larger the engines and battery the greater the portion of power obtained. The reverse of this is true in every form of engine which employs *electro magnetic attraction* as a source of power. The larger the magnets and engines the greater the loss of power. I have long since, however, come to the conclusion that a practical working engine cannot be made on any plan where the circuit is broken.

The combustion of metals with a three or four horse power is terribly rapid at all the breaks in the cut off. The magnetism must be unchanged and the current unbroken to get a working engine, if it can be obtained at all; and the battery must be constant and convenient. The cost per diem is not the real question. Produce a reliable working engine of even half a horse power, and it will be used in many places with great convenience, and in some with profit, even if it should cost twenty times the amount of steam in a Cornish engine. I need not dilate upon this part of the subject.

CHARLES G. PAGE.

Washington, D. C.

Casting Metal in Plaster Molds.

MESSRS. EDITORS:—When reading No. 13, current Vol., on page 201, I see one of your correspondents speaks of plaster of Paris for molds for castings of low fusible metals, and recommends that the mold be subjected to a heat of 400° F.

I must differ with the writer. I have had some experience in the use of plaster of Paris for molds, and I found the best plan was to dry the molds perfectly in open air. When about to use them, I warm them just enough so that they would not chill the metal when poured in. After warming I held them over a flame that produced a good deal of smoke, until the inside of the mold was completely blackened over. Then I could get about two hundred castings from each mold, after which the plaster became soft and small particles broke off. Upon examining I found the plaster was burnt and of no further use for molding purpose. A. C. SMALL.

Augusta, Ga.

Water Rams.

MESSRS. EDITORS:—As a more full reply to the correspondent, p. 167, about the water ram, we may say that a good water ram yields 60 per cent of the water expended, thus: that it yields 60 per cent useful effect of the mechanical power expended. This mechanical power and effect we obtain, of course, by multiplying the weight of the water by the height it falls or is raised. For instance, let 100 lbs. of water fall 3 feet, the power is represented by 300; this will raise 6 lbs. 30 feet, of which the mechanical effect is represented by 6 × 30, or 180; now 180 is 60 per cent of 300; and so the mechanical effect is 60 per cent of the power expended.

M. P. P., of E. W., Mass., states that he finds that his ram raises by a fall of 3 feet about one-sixth of the water expended, some 30 feet; this would for 100 lbs of water expressed be 16 lbs. raised. The mechanical power is here 3 × 100, or 300; the effect is expressed by 16 × 30, or 480; more than three times the effect of the best ram, and 60 per cent more than the power employed, which evidently is an absurdity. If this was so, he could obtain from the water thus raised more power than from the original fall; and being able to raise easily six times the amount of water to only one-tenth of the hight, he would possess perpetual motion of the hydraulic kind. Evidently our correspondent overestimates the amount of water raised, and it should, according to the other circumstances mentioned, read $\frac{1}{10}$ in place of $\frac{1}{6}$.

Screw Threads---Honor to Whom Honor is Due.

MESSRS. EDITORS:—In your edition of April 25th I notice an article entitled "Screw Threads and Bolts—A Uniform System," in which you speak of my system. Doubtless you have before you one of my drawings of the Franklin Institute System, which I published about one year ago, and which has come into very general use in many parts of the country. Now I am not in any way responsible for this system, nor would I claim the honor of originating it.

The committee who prepared this system had it under investigation from April 21, 1864, to December 15th of the same year, when it was reported to and adopted by the Institute and the committee discharged. It consisted of the following named gentlemen: Wm, B. Bement, Chairman, firm of Bement & Dougherty; C. T. Parry, Superintendent Baldwin's Locomotive Works; J. Vaughn Merrick, firm of Merrick & Sons; John H. Towne, firm of I. P. Morris, Towne & Co.; Coleman Sellers, Engineer Wm. Sellers & Co.; B. H. Bartol, Superintendent Southwark Foundery; Edward Longstreth, Foreman Baldwin's Locomotive Works; James Moore, firm of Matthews & Moore; Wm. Sellers, firm of Wm. Sellers & Co., and Algernon Roberts, of the Pencoyd Iron Works. The above committee have given good reasons for the adoption of this system as stated in my circular, and in view of all the facts it is due to them, and to the machine making public, to yourselves and to myself, that this explanation be published, believing that you wish to do justice to all concerned in this matter. EDWARD LYMAN.

New Haven, Conn.

Why is it?---Water vs. Beer.

MESSRS. EDITORS:—I have frequently amused myself by arranging a row of common glass tumblers, and pouring a greater or less quantity of water into each, thereby producing the different tones of the diatonic scale. But the other day on attempting the same experiment with ale, I found that the sound was deadened—that on striking the tumblers there was no vibration, the effect being as if they were cracked. Can you inform me why ale should thus check the vibration, while water only alters the pitch of the tones without destroying their ringing quality? O. T. A.

Geneva, N. Y.

[Beer is to some extent gelatinous in consistency and thus cannot give the ring of the more mobile water.—EDS.

Editorial Summary.

AMMONIA IN COAL GAS.—Dr. Gunning of Amsterdam, calls attention to the fact that coal gas, however well purified, is by no means free from ammonia. The result of some experiments he has conducted, shows the existence of a little over one cubic foot of ammonia, or ammoniacal substances, in every one thousand cubic feet of gas. Attention is called to the fact that where wet gas-meters are in use, the water, being rarely if ever changed, must in time become fairly saturated with ammonia. A meter used for two years in the laboratory at Amsterdam, with a capacity for fifty-seven gallons of water, held no less than nine pounds of these bases. Since coal gas also contains sulphur compounds, there is formed sulphate of ammonia, which, converted by the intense heat into bisulphate of ammonia, attacks the glass cylinders, or chimneys, placed on the Argand gas burners.

CHLORIDE OF COPPER is now extensively used in Germany as a preventive against the cattle plague. The mode of administering the specific is as follows: A solution is first made by dissolving one quarter ounce of the green crystalized salts in spirits of wine. In this solution a pad of cotton is soaked for a time, and is then laid on a plate and set on fire in the center of the stable, the animals' heads being turned toward the flame, so as to make them breathe the fumes. The operation is performed morning and evening, and a spirit lamp filled with the solution left burning in the stable every night. The liquid is also administered internally, with the addition of one half ounce of chloroform for the above quantity, a teaspoonful being put into the animal's drink three times a day.

EXPERIMENTS WITH CATERPILLARS.—A late experiment in the southern part of England has proved that the ordinary caterpillar cannot be made available in yielding, like the silk worm, a profitable article of merchandise. Plantations of ailanthus trees were set out, and many eggs were procured. After hatching, the young caterpillars fed plentifully, attained their growth, and finally made cocoons. So far all was encouraging, but, on unwinding, it was found that unlike the cocoon of the silkworm proper, which sometimes yields a thread two thousand yards long, the filament from the caterpillar cocoons was in short lengths, necessitating carding in order to arrange the fibers, a process very expensive, and furnishing a weak, lusterless material when finally woven.

CURE FOR WHOOPING COUGH.—Physicians in Hartford, Conn., have adopted with marked success a new method of treatment for curing children afflicted with whooping cough. The juvenile patients are taken on a tour of inspection to the city gas works, and while intently engaged in witnessing the various processes employed in manufacturing their evening's artificial-illumination supply, they breathe the not very pleasant air of the gas house. In some way, not very clearly understood, the inhaling of this air is found to cure or greatly alleviate the complaint. This ingenious method of benefitting the youthful mind and body simultaneously has become immensely popular in the place, the people at the gas works asserting that during the last twelve months no less than three hundred cases have been experimented upon, the results, generally, being of a most favorable character.

EFFECT OF EXPOSURE ON COAL.—Prof. Rockwell, has called attention to the deterioration which coal suffers from exposure to the weather, and to the importance of keeping it as dry as possible. Anthracite suffers the least; bituminous the most. According to the experiments of Grandmann, in Germany, coal exposed to the weather in heaps lost during a period of nine months 50 per cent of its value as fuel, and about as much as a gas making material; it undergoes a process of slow combustion, taking up oxygen, and giving off the volatile products of oxidation,—air and moisture playing the principal part, and warmth promoting it; the valuable combustible ingredients are lost, and the injurious ones, as sulphur, oxygen, and ash, are relatively increased. Coke from weathered coal is of inferior quality, losing its coherence.

A WEATHER TOY.—A Bostonian, says the *Commercial Advertiser*, has a toy barometer on exhibition, which consists of a miniature cottage, with two doors. At one of these stands a man, clad in such purple and fine linen as constitute a Sunday-go-to-meeting garb in New England, while at the other appears a female arrayed in like apparel. These twain seem to watch the impending weather. If there are signs of rain, the man, with a noble bravery worthy of a better fate, steps boldly out of doors, while the woman shrinks into the cottage. But if the signs are favorable, the woman goes forth to shop and gossip, while the man stays at home and tends house and baby. A thermometer forms part of the household furniture of this institution.

FRENCH OPIUM. It has been demonstrated in France that opium can be extracted from the poppy, the greatest and almost the only drawback to its profitable manufacture, being the frequency of rains occurring at the time when incisions have been made in the stems, whereby a large portion of the juice is either lost or spilt. Lately M. Lallier has tried the plan of pulling up the plants by the root, in the proper season, and bringing them under shelter, where the incisions may be made regardless of the weather. The plan has answered beyond expectation, and the roots being kept in water during the process, a larger proportion of milky juice is obtained than usual.

THE MEDALS and diplomas awarded to the American exhibitors at the late Exposition, are now on exhibition in Washington. The collection is one of great interest, comprising four crosses of the Legion of Honor; three grand prizes; fifteen gold, seventy-four silver, and ninety-five bronze medals; two hundred diplomas, and a series of photographic views of the Exposition. One silver medal was decreed to the United States government for specimens of settlers' houses; a bronze medal was also struck for the Agricultural Bureau, and one gold medal was awarded to the "*Industrie armoirière des Etas-Unis d'Amérique.*

A NEUTRAL MAGNETIC CHAMBER.—Faraday has shown that if a small cubical space be inclosed by arranging square bar magnets, with their like poles in apposition, so as to form a chamber, within that space all local magnetism inferior in power to the magnets employed, will be neutralized. The same effect may be obtained with electro-magnets as with permanent magnets, and it is proposed in the *Mechanics' Magzine* thus to inclose the compass of an iron ship, as a remedy for the deviation by local attraction. A battery might be constructed to be excited by the sea water flowing through it, requiring no attention as long as the zinc plates lasted.

ENGLISH TELEGRAMS.—The uniform rate for transmission of messages throughout the United Kingdom,—provided the English government decide to take the telegraph lines under its charge,—is not to exceed one shilling for every twenty words, irrespective of the distance sent, and exclusive of the names and addresses of senders and receivers; the same charge also including the cost of delivery by special messenger, within one mile of the terminal office.

STEEL BILLIARD BALLS.—Among other new uses of steel, one of the latest, as we learn from a foreign cotemporary, is the employment of this metal in the manufacture of billiard balls, in place of ivory. Such balls are recommended for their great elasticity and their freedom from any liability of cracking.

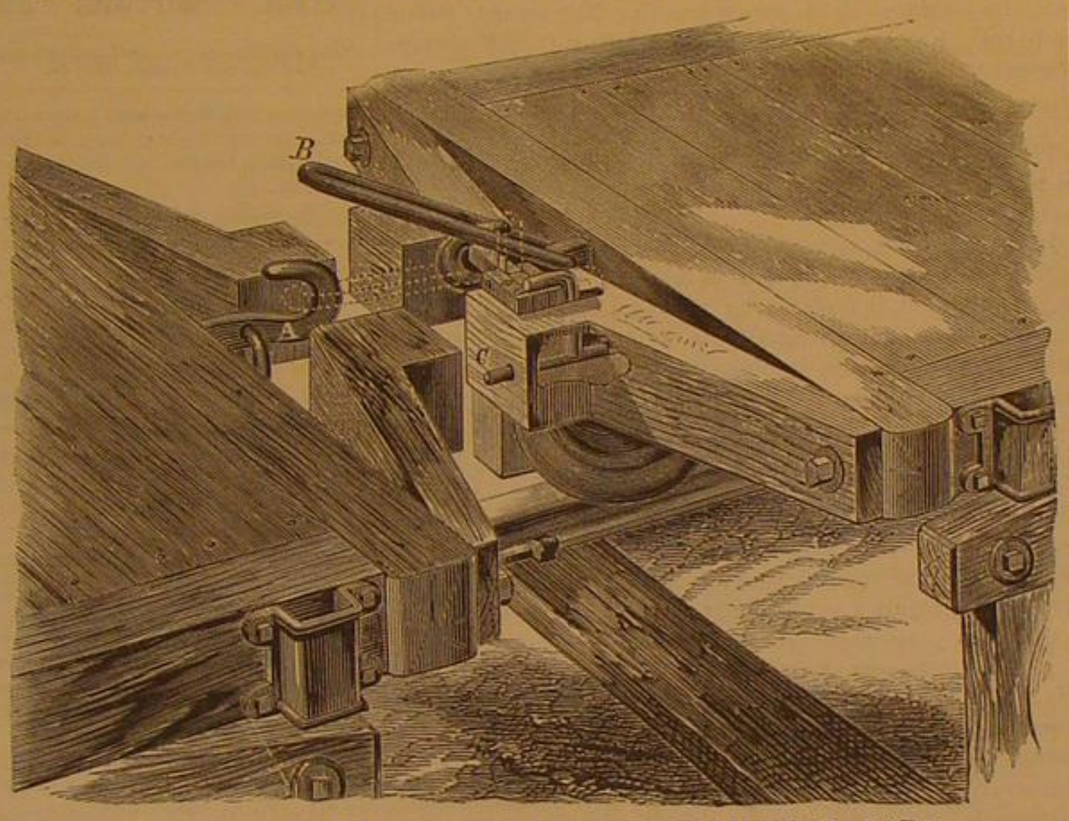
CARBOLIC ACID.—A correspondent of the *Lancet* testifies that among the many other virtues of this substance, is its value in odontalgia, or, less technically, toothache. To one drachm of collodium flexile add two drachms of Calvert's carbolic acid. A gelatinous mass is precipitated, a small portion of which inserted into the cavity of an aching tooth invariably gives immediate relief.

AMERICAN INSTITUTE POLYTECHNIC CLUB.

The greater part of a recent evening was occupied by a long lecture on longevity, of which the points of interest may be condensed in a few words, viz: 1st. That persons whose ancestors have long lives live long themselves, and *vice versa;* a fact well known. 2d. That persons with large, well developed trunks live longer than those with small trunks and short necks. 3d. That large noses and the ears low down on the side of the head is also a sign of longevity. The lecturer stated that he had taken the trouble of investigating these points during the last thirty years, among more than 200,000 people, and so far we have no fault to find, but object to a person spinning out three or four facts, which he can state in as many minutes, to a long address of more than an hour, and aiming chiefly at amusing the audience more than instructing them; even the amusement aimed at was of doubtful character, as the speaker said too much about himself, how he had too small a nose and too short a neck; how his ribs were too horizontal, so that he could not breath with his chest, but only with his abdomen. He complained that people commenced calling him an old fellow; said that his little fingers were crooked, which he demonstrated by exhibiting them repeatedly, that all his family and ancestors had such crooked fingers, etc. We confess we do not see the usefulness of this information for people who come to the Polytechnic Club to be instructed, but think that they care very little about the knowledge of these facts. Some of his arguments were rather unique; for instance, to explain hereditary tendencies, he proposed the question why a dog was a dog, and answered it by saying, because his father was not a cat.

Improvement in Self-Acting Car Couplings.

Although fearful accidents continually occur in the running of trains of cars, by which passengers are maimed and killed, and the records, with all the horrible details, are spread far and wide by the press, the injuries of railroad employés received in the performance of their duties are not so prominently noticed, and consequently comparatively few appreciate the extent of these accidents. Yet one cannot spend a day among railroad men without finding specimens of crippled humanity injured for life by some accident received while attending to the duties of their position. One of the most dangerous of these duties is that of going between cars for the purpose of coupling or uncoupling. The object of the inventor of the coupling herewith illustrated is to entirely prevent the possibility of such accidents, by providing a self-acting coupling.



WEILER'S PATENT COUPLING FOR RAILROAD CARS.

At the base of a hook, A, secured to the end frame of a car platform or to the draw-bar, is pivoted a link, B, which engages with the hook of the next car. In operation the link is supported at an angle above a horizontal by the long arm of a latch lever pivoted between suitable blocks on one of the bumpers, the other end being sustained by a right-angled catch, the horizontal end of which, C, projects beyond the bumper in which it is seated when the link is supported in the position described above. The link being in this position, the bumper of the next car will strike against the projecting end of the catch, C, and, driving it in, release the link, which will fall by its own gravity and engage with the hook on the next car. The dotted lines in the engraving show the position of the parts when the cars are coupled. The bumpers may be made as show in the illustration, or as ordinary bumpers are made, in either case giving some elasticity, sufficient to relieve the shock of collision when the cars come together. The length of the upper part of the hook is sufficient to prevent accidental uncoupling on grades or curves. While one link is engaged that on the next car hangs free. The simplicity of this contrivance is such that it may be adapted to any car without radical alteration of parts, and it is adjusted from the car platform.

It was patented January 25, 1868, by Wm. Weiler, whom address for further particulars at Washington, N. J.

CONTROLLING WATER CURRENTS — DEEPENING THE CHANNELS OF RIVERS.

We have received a pamphlet issued by the New Orleans Academy of Sciences, containing a plan for deepening the mouths of rivers and reducing the hight of bars in navigable streams. It is illustrated by engravings, and the plan is based upon the well known mechanical law, "the angle of incidence is equal to the angle of reflection." Taking advantage of this law, in its action upon all movable bodies, the author of this plan, Lieut. E. Manico of the British Royal Marines, recommends the construction of jetties or dams built at an angle to the stream, the action of which shall be to divert the course of the current and confine it within certain limits.

He proposes to build caissons of iron or wood filled with stone, or heavy ballast, whose weight will hold them down, and whose angular forms prevent them from being moved by the currents or waves of strong or stormy waters. They are cubes of any dimensions, single, or joined together in the form of the letter L, or T, or any other that may be desired, or single cubic yards holding half a tun's weight, or eleven hundred pounds of stone. The crates in which queensware is usually packed for commerce, will give one a good idea of their form. Their cubical shape, and crossed bars of iron, or wood, possess many advantages for the work of "rip raps," or regular foundations for all submarine structures, whether jetties, breakwaters, forts, or light-houses upon bottoms of mud, sand, or rock. They are used by the British Government for such works on tempestuous and rock-bound coasts, but they are especially suited for such a bottom as that of the bed of the Mississippi, and of the bars at its mouth. Their ribbed planes prevent them from sinking deep into the mud or sand, and their ribs, and angular points and edges, hold them firmly upon rocks, or soft bottoms. Their cross bars furnish holds for the hooks of cranes by which they can be lowered down and placed with the regularity of bricks in a wall, or like the stones of the pyramids, terrace above terrace, or they can be chained together, or dropped irregularly and held by their angular points to make a submarine spine or *ridge*, against which loose stones may be dropped, and piled at an angle of 45°. Let them be dropped, or placed upon any bottom, or in any current, and experience proves that they cannot be moved by water. Every interstice between the stones they hold becomes filled with mud and sand, until the whole caisson is like a solid stone. Such an object, which cannot be removed by a current, controls it. The water fills and surrounds it with deposit. It is isolated, and made a bar, or island; and it turns the current in another direction. The wreck of a vessel, with its ribbed and angular skeleton, produces a similar effect; and sometimes becomes a dangerous impediment to navigation. One has recently made itself an obstruction to the navigation of the South-west Pass. It has divided the current and is forming an island in mid-channel.

Whether it is desired to make them of iron, or wood, inexhaustible supplies of cypress timber are convenient to us; and forests of it cover the bottoms of the Mississippi and its tributaries. The bluffs of stone above, forming its cliffs, and those of the Ohio and Tennessee, and the yet nearer and more accessible rock of the Washita in Catahoula parish, La., will afford us cheaply all the rock needed to construct jetties of any size, or length, at the mouth of the passes.

Mr. Halliday, the chairman of the committee says:—"I cannot recommend the extension of parallel works. *They would exert no eroding power* such as will be produced by converging walls, reflecting the water from both sides, and throwing it with accumulated force upon a central line. Another objection is the danger of undermining. If a log, or the wreck of a vessel should sink diagonally between these walls; or if, what is more to be apprehended, a *mud lump*, one of those phenomena of our Delta, which Thomassey terms the "evil geniuses" of the passes, should be upheaved by the weight of the deposits, by gas, and artesian pressure, in the channel, the current would be deflected against one of these walls, and perhaps be reflected from it against the other, and undermine it, and destroy the work.

A better plan for their extension is, to throw out diverging flankers, and then perfect converging flankers ending in converging parallels to the original jetties.

This will continue the convergence of the water, and its erosive action, so far and so long as it may be necessary. The important desideratum supplied by Manico's patent, is a material which will not sink in soft mud and sand; and which cannot be removed by water from the hardest rock. The ribbed planes and sharp edges of their bars, the angular points of the rocks they enclose, and the angles of the cubic caissons effectually prevent them from both. Like the knotted toes, sharp nails, and outspread webs of the feet of the alligator and duck, they cannot sink in mud, or sand; and they cannot slip and be moved from a foundation of rock.

These patented caissons, I learn, have been used by the British Government to form the foundation of the most important light-houses on the East coast of England—the Goodwin lights, off the Island of Thanet, constructed upon the treacherous Goodwin sands, where the straits of Dover enter the North sea, in sight of which vessels from every continent must pass to enter the Thames. They have made a permanent foundation there which stands the shock of the storms which beat upon it from the coasts of Scandinavia, and the Arctic Ocean; and they will resist equally well the ground swells and the Typhoons of the Gulf of Mexico.

Wherever they are sunk, they will remain forever, unless lifted up by very powerful machinery, applied very soon after their deposit. For they become immediately filled; and their materials compacted with sand, clay, shells, and whatever else the water can drive into them; and even in the salt water the *teredo* would have but a short time to work upon their ribs, if made of wood, before they would be buried in the mass of deposit heaped by the waves against them and upon them. One important advantage secured by the construction of the jetties at the mouths of the passes, would be the permanency of the work. The new land would be made rapidly, and attach the jetties themselves to the permanent shore. Storms from the south-west might make temporary deposits and slight obstructions at the mouth of that pass; but as soon as the storm shall have subsided, the strong river current passing over the bar, at a rate varying from $1\frac{3}{4}$ to 3 miles per hour, condensed and accelerated by the converging jetties, will sweep them away into the deep waters of the Gulf. The Mississippi river, with a current of 4 miles per hour a short distance from the south-west pass, has cut itself a channel from 60 to 120 feet deep. It is self-evident that if it can be confined between converging dams, and extended into the Gulf, it will make for itself a similar channel where the bars are now formed.

The expense of the work is easily estimated, and when the benefits are considered which would accrue to the whole valley of the Mississippi, now occupied by 17,000,000 of inhabitants, and to the millions more in our own and other lands interested in its priceless commerce, the sum of 1,000,000, which would more than cover all the cost of removing the principal obstruction, the bars of the South-West Pass, seems contemptibly small."

Primitive Climate of the Earth.

The primitive atmosphere of the earth was greatly richer in carbonic acid than the present, and therefore unfit for the respiration of the warm-blooded animals. The agency of plants in purifying this atmosphere was long ago pointed out, and the great deposits of fossil fuel have been derived from the decomposition of this excess of carbonic acid by the ancient vegetation. In this connection the vegetation of former periods presents the phenomenon of tropical plants growing within the Polar Circle. Prof. T. Sterry Hunt considers as unsatisfactory the ingenious hypotheses proposed to account for the warmer climate of ancient times, and thinks that the true solution of the problem is to be found in the constitution of the early atmosphere, when considered in the light of Dr. Tyndall's researches on radiant heat. He has found that the presence of a few hundredths of carbonic acid gas in the atmosphere, while offering almost no obstacle to the passage of the solar rays, would suffice to prevent almost entirely the loss by radiation of obscure heat, so that the surface of the land, beneath such an atmosphere, would become like a vast orchard house, in which the conditions of climate necessary to a luxuriant vegetation would be extended even to the polar regions.—*Mechanics' Magazine.*

The Woodpecker's Foresight.

The woodpecker in California is a storer of acorns. The tree he selects is invariably of the pine tribe. He bores several holes, differing slightly in size, at the fall of the year, and then flies away, in many instances to a long distance, and returns with an acorn, which he immediately sets about adjusting to one of the holes prepared for its reception, which will hold it tightly in its position. But he does not eat the acorn, for, as a rule, he is not a vegetarian. His object in storing away the acorn exhibits foresight, and knowledge of results more akin to reason than to instinct. The succeeding winter the acorn remains intact, but becoming saturated with rain, is predisposed to decay, when it is attacked by maggots who seem to delight in this special food. It is then that the woodpecker reaps the harvest his wisdom has provided, at a time when, the ground being covered with snow, he would experience a difficulty, otherwise, in obtaining suitable or palatable food. It is a subject of speculation why the redwood cedar or the sugar pine is invariably selected. It is not probable that the insect, the most dainty to the woodpecker's taste, frequents only the outside of two trees; but true it is, that in Calaveras, Mariposa, and other districts of California, trees of this kind may be frequently seen covered all over their trunks with acorns, when there is not an oak tree within several miles.—*A. B. Barton.*

Coloring of Zinc Plates.

A variety of beautiful colors, corresponding to those of the rainbow, can be imparted to zinc surfaces by a simple chemical application continued a length of time proper for the desired color. It is necessary that the metal be pure, and especially free from lead. It is therefore to be rubbed with siliceous sand moistened with hydrochloric acid, then dipped in water and rubbed vigorously with blotting paper. The zinc is then immersed in a solution of 3 parts by weight of dry tartrate of copper in 4 parts caustic soda, with 48 parts distilled water, the whole at a temperature of about 50° Fah. The colors will appear successively, in the prismatic order, according to the period of immersion. In two minutes, the violet will appear; in three, dark blue; in four and a half, a golden yellow; in eight and a half, a red purple. Intermediate terms give intermediate tints. When colored, the zinc is well washed with water, and for greater permanence of color may be varnished.—*Annual of Scientific Discovery*, 1868.

A Novel Gunboat.

A boat named the *Staunch*, built for the Admiralty upon the proposition and plans of Mr. Rendel, of the firm of Sir W. Armstrong and Co, has just been tried off the Tyne. A correspondent gives us the following account: "This vessel, though wholly insignificant in appearance and cost, represents some very novel principles. She is only 79 feet long and 25 feet beam; her draft of water when loaded of 6 feet, and her displacement 150 tuns. She has twin screws driven by two pairs of condensing engines of 25 horse-power (nominal) combined, giving her a mean speed of 7½ knots. Such being her dimensions and power it is hard to suppose that she can be in the least degree formidable. She carries, however, as heavy a rifled gun as any in the navy, and to all appearance carries it most efficiently. The gun, a 12½ tun 9 inch Armstrong, is mounted in the fore part of the boat in a line with the keel, and fires through a bulwark or screen over the bow, which is cut down and plated something like that of a monitor. Thus placed, it is easily worked in a rolling sea, and its change of position by recoil does not appreciably affect the trim of the vessel. At the same time, to provide for heavy weather, it is made capable of being lowered into the hold, so as to relieve the little vessel of its deck load, and enable it to carry the weight as cargo. Machinery is also employed for the purpose of working the gun, by which means more than half of the ordinary gun's crew can be dispensed with. It is in these mechanical arrangements that much of the interest of this vessel lies. The operation of lifting and lowering is performed by simple but powerful machinery. During the trials the gun, with its carriage and slide, and the platform carrying them—weighing in all 22 tuns—was raised and lowered in a rough sea, with the boat rolling 11° each way, in from six to eight minutes. When the gun is lowered the gun well is closed and the deck left perfectly clear, but in a few minutes the gun can be again brought up ready for action. During the trials the 12½-tun gun was easily handled by six men, and fired with extra charges of 56½ lbs. of power and 285 lbs. shot. It must be observed that very little, if any, training is requisite with the gun of the *Staunch*. The vessel is so small as to be a sort of floating gun carriage. Her twin screws enable her to turn rapidly in her own length. Her helmsman is placed just behind the gun. The gun, therefore, can be laid by rudder right and left with far more ease and speed than any gun of similar weight otherwise mounted. During the recent trials, with the engines driving reverse ways, the vessel made the full circle in her own length in 2¾ minutes. With both engines going full ahead she made by the helm a complete circle of seventy-five yards diameter in 2¼ minutes. The *Staunch* is wholly unarmored. Her strength and security lie in her great gun and her diminutiveness. And she must be considered as one of a flotilla of similar vessels. Sixty such could be built at the price of a single armor-clad frigate, and ten of them, acting from different points, doubling in their own length, escaping into shallows, sheltering under forts, would drive off or render a good account of any hostile vessel venturing to attack our harbors. Primarily they are intended for harbor defence; but the power of lowering the gun and carrying it as cargo, would afford great security for these vessels at sea, and enable them to be sent from harbor to harbor with safety. The *Staunch* is now to be sent round to Portsmouth, where she is to be attached as experimental gunboat to the gunnery ship *Excellent*."—*Pall Mall Gazette*.

Trial and Loss of a Self-Propelling Vessel.

A San Francisco letter in the N. Y. *World*, says that a Mr. Robinson has from time to time, in the papers, put forward an invention which he claimed was to be almost self-propelling, without the use of steam power. The peculiar features of the new aquatic craft was, that two or three boats hitched together, one behind the other, by the action of the waves the series of boats was to obtain propulsive power. An experimental craft was built at an expense of about $8,000. Considerable curiosity was felt in the community as to the success or non-success of the new notion, and many went to view the craft during construction. If it succeeded, a revolution was to be worked in navigation. Sails and steam would be superseded. On the ocean and great lakes the rougher the sea the faster the boat would travel.

The inventor was sanguine that his new craft would travel the water by its innate propulsive power, independent of steam or other expensive motor, enjoying the tempest and glorying in the storm. The craft was completed, and the day for the trial trip appointed. So confident was the inventor of success that he took on board stores for a ten day's voyage. At ebb-tide the new (to be) sovereign of the seas put off from the wharf to which she had been fast since her construction had been completed, and started out on her voyage. There were on board four persons: the inventor, Captain Young (a pilot), and two sailors. She was hardly clear of the wharf when she swung around broadside to the tide and commenced a series of movements not very promising of success to the undertaking. She would not obey the helm at all, but lurched continually, in an uncomfortable manner for those on board; first one wheel house would be submerged, then the other. The new craft made excellent time, proceeding endwise like a crab, but the wheels seemed to have no effect whatever on speed or direction. The wheels, depending upon the water they were passing through for motion, would turn any light machinery on board the boat, but would not move the boat ahead an inch. The craft would simply move with the water, not through it. The inventor was still sanguine that, with regular waves, the boat would be an assured success. All he required was regular waves. Once outside among them, things would change; the rougher it became the better. The boat went on like a raft until it got outside the heads, then over the bar into rough water, and no sooner was it in rough water than the whole contrivance was turned over. The party on board sought the water for safety, and clambered into a boat which had been taken in tow in case of accident. The pilot boat *Caleb Curtis* picked up the unfortunate navigators. The steam tug *Rescue* came alongside the *Curtis*, and offered to tow the refractory craft up to San Francisco for $500, but Mr. Robinson did not seem disposed to give so much, so the unfortunate craft went on toward the resting sun, keel upward. Mr. Robinson is reduced to poverty by the result of his ill-starred experiment.

Earth Circuit in Telegraphy.

The failure of the earth circuit of a short telegraphic line in the Pewable copper mine, Lake Superior, is interesting from a practical point of view. The wire used was a one-sixteenth inch copper wire, wound in the same manner as waterproof fuse, the wire taking the place of the powder. To the surprise of all, no signals could be transmitted through the line. The end of the wire underground was put into a hole drilled into the rock and tamped in; a bed of earth was then made, and lastly a pool of water tried, but all to no effect. Above ground the line worked well enough.

Though the earth, generally speaking, will conduct electricity, some substances, of which any specific portion of the earth may be composed, will not conduct it; for example, dry sand and dry freestone rock will not, and quartz rock will not any more than glass; dry earth will not, as is recognized by all telegraph constructors, who bury the earth plates deep in damp earth. In this case an attempt was made to form an earth circuit in non-conducting material. The end of the wire in the mine was tamped into the solid rock, probably quartz, which would be about the same as tamping it into a glass bottle, filled with earth or water. The chances of electric communication would be still less, if the wire was not perfectly insulated in its whole length. The remedy would be to make a return circuit of insulated wire.—*Mechanics' Magazine*.

Mirrors Without Mercury.

The ordinary method of preparing looking glasses is with an amalgam of tin and mercury: four parts of tin to one of mercury.

In the invention, reported by M. Salvetat to the Society of Encouragement, in Paris, neither mercury nor tin is used at all. The tinfoil is replaced by platina, not applied in leaf form, of course, but chemically, in a metallic and brilliant powder. The operation is perfectly simple. The glass, having been carefully cleaned and polished, is covered, by means of a brush, with a mixture of chloride of platina, essence of lavender, and a dissolvent composed of litharge and borate of lead. When dry, the glass is placed in mufflers, when the essence, being volatilized, leaves a deposit of platina dust firmly united to the glass. While two or three weeks are necessary for the manufacture of ordinary mirrors, the new process only requires a few hours.

Insect Fabricators of Iron.

It is well known that some insects are skilful spinners, but it was not known that some of them fabricated iron. A Swedish naturalist, M. de Sjogreen, has published a curious memoir on this subject. The insects in question are almost microscopic; they live beneath certain trees, especially in the province of Smaland, and they spin, like silk worms, a kind of ferruginous cocoons, which constitute the mineral known under the name of "lake ore," and which is composed of from 20 to 60 per cent of oxide of iron mixed with oxide of manganese, 10 per cent of chloric, and some centimeters of phosphoric acid. The deposits of this mineral may be 200 meters long, from 5 to 10 meters wide, and from 8 to 30 inches thick.—*Rev. de Thérap. Med. Chirurg.*

MANUFACTURING MINING, AND RAILROAD ITEMS.

A report by the superintendent of the geological survey of India, shows that the British territories cannot be considered as either largely or widely supplied with coal. He ascertained that extensive fields existed, but they were not distributed generally over the districts of the Indian Empire. In the opinion of the superintendent, the very best coal from India only touches the average quality of English coal, and, moreover, the former is not capable of more than two thirds, in most cases not more than one half, the duty of the English coal.

The distance between London and Paris is now traversed daily by the South, Eastern and Northern of France railways, in less than ten hours. Two express trains leave the Paris terminus of the Northern of France system daily for England. More than 200,000 passengers passed over this route in 1867.

Among other sequences of the passage by the State Legislature of the Erie bill, is the prompt finishing of the Albany and Susquehanna railroad, now destined to become virtually a branch of the Erie road, running from Binghampton to Albany. The bill just passed requires the money received from the recent issues of bonds to be expended on the road, and as a consequence of this provision, and the late terrible tragedy caused by a broken iron rail, the entire Delaware division of the road is to be relaid with a double track of steel rails.

The London *Colliery Guardian*, speaking of the presence of phosphorous in the Cleveland iron, which so seriously reduces its market value, and renders it necessary to bring iron from other districts to mix with it in the puddling furnaces—calls for some method of removing this sulphur, showing that if extracted, even in its lowest priced form—as a manurial ingredient—it would be worth at least $330 per tun. There is, therefore, a tolerable good margin for working expenses, while the iron now worth $17 per tun, and containing one per cent of phosphorus, would, if freed from this element, be worth at least as much as hematite iron, or say 13.50 per tun.

Engineer Roebling thinks that railroad draw bridges are a nuisance, which can readily be done away with. He would substitute high bridges, even with steep approaches, a stationary engine and a wire rope being provided to assist the trains over the rise. In other words, treat the bridge like an inclined plane, and draws will be unnecessary.

A new railroad project is exciting the wide-awake capitalists of Pittsburgh, Pa. It is proposed to build a road from Pittsburgh to Newbern, N. C., along the Monongahela river to its source in West Virginia; thence by Greenbrier Mountain and river to the junction of the latter with New River, and thence to Newbern. The road would penetrate a rich mineral region, and would bring large quantities of iron ore to Pittsburgh

The Metallic Cartridge Company, of East Bridgeport, Conn., have a contract from the government of Brazil for 6,000,000 cartridges. They have now supplied two thirds of the order, and after shipping the remainder the company will immediately begin the manufacture of 7,500,000 for the Russian government. The daily product of the works at present is 150,000 to 170,000 cartridges.

The Allentown Rolling Mill is one of the largest establishments of the kind in Pennsylvania. It is for the production of railroad iron exclusively, and turns out four hundred tuns of rails per week. The daily work is two hundred and sixty-six rails, thirty feet long and weighing fifty-six pounds to the yard, or five hundred and sixty pounds each.

The rails of the Union Pacific railroad are now being laid on the descending slope of the Rocky Mountains, the summit of the Black Hills, the highest point of the system being crossed on the 16th ult. According to Blickendorff's survey, the railroad crosses the mountains at this point at an elevation of 8,242 feet, being, as we have before had occasion to state, the highest point reached by any railroad in the world.

Professor Chapman, of Toronto, writes that he has discovered gold on Lake Superior, the metal existing in certain specimens of galena and copper pyrites, occurring together in well defined veins in the region of Black Bay. Surface specimens entirely destitute of "free" or visible gold, show a value of nearly $21 per tun, irrespective of the large amount of lead and copper present in the ore. The rocks are identical, in general age, with the gold bearing rocks of Nova Scotia.

All the conductors on the New York and New Haven railroad have made their appearance in new uniforms, furnished by the company. The largest part of the road lying in Connecticut, the law of this State, requiring railway officials to be thus distinguished, does not affect this company, and hence their action in this matter is the more to be commended. In this connection we note that our Legislature has empowered railroad conductors with the authority of special policemen, the better to preserve order on the railway trains. We hope they will use their authority by arresting some of the numerous pickpockets who infest the trains out of New York.

The Mount Washington Railway, in the White Mountains, was completed last fall one mile and thirty rods of the three miles up the mountain. For the next mile the tracks are covered with snow two feet deep. The number of hands will be increased in three weeks from fourteen to fifty. The present estimate of the cost is $100,000, though the figures may add differently at the completion of the work on the 1st of September. The road is built on what is known as the "Marsh" plan, illustrated in Vol. X., No. 10.

Recent American and Foreign Patents.

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

MACHINE FOR MEASURING CLOTH.—George R. McIntire, Houghton, Mich In this invention the cloth is placed between two rollers, which are rotated by its motion, and the revolutions of which are recorded by a registering apparatus.

WATER WHEEL BUCKET.—Jacob Clark, Clarksville, Pa.—In this invention the bucket has two curves, one of which receives the direct impulse of the water as it enters the bucket, the other receiving an indirect or "reacting" impulse, as the water leaves the bucket.

SHINGLE MACHINE.—Smith Head, Halifax, Pa.—This invention has two carriages and two sets of saws, and cuts a shingle at each forward or backward motion of either carriage. It has a new apparatus for adjusting the bolts to the saws, and a new edging apparatus.

CORN PLOW, PLANTER, AND CULTIVATOR.—Isaiah B. Arthur, Sidonsburgh, Pa.—This invention combines a new arrangement of the plows' cultivator guards, and covering roller, with a new and greatly simplified method of operating the seed distributor.

CRYSTAL FOUNTAIN.—J. C. Johnson, Louisville, Ky.—In this invention the water is mingled with air in the apparatus, and is found in the form of beads or spray from the fountain, forming a beautiful jet for scenic and ornamental purposes.

SAFETY TRUCK.—S. Y. Bradstreet, Monticello, Iowa.—This invention has for its object the prevention of railroad cars from bouncing off of the track, and consists in the employment of an auxiliary truck of peculiar construction, which guides the main trucks, and which cannot by any ordinary obstructions be thrown off of the rails.

NAILS.—F. Davidson, Richmond, Va.—This invention relates to a machine for making cut nails, and it consists in a peculiar construction and arrangement of parts, whereby a very simple and efficient machine for the purpose is obtained.

LOCK.—H. H. Elwell, South Norwalk, Conn.—This invention relates to a lock of that class which are provided with a reversible slide catch so arranged that it may be adjusted to suit either a right or left hand door—that is to say, be capable of being applied to a door which swings in either direction. The object of the invention is to obtain a lock of the kind specified, which will be simple in construction, and which will not be liable to get out of repair, and require but a simple manipulation to adjust the slide catch as circumstances may require in applying the lock to the door.

SAWING MACHINE.—Thomas Jenkyn, Thetford Centre, Vt.—This invention consists in a novel arrangement of circular saws and rotary cutters, in connection with frames and tables, whereby a machine is capable of performing various kinds of work, such as slitting boards, planks, or other stuff, cross-cut sawing, the cutting of shoulders or tenons, grooving or beading, and chamfering or cornicing.

CLOTHES WRINGER.—M. Pierce, Winona, Minn.—This invention relates to a simple arrangement of parts, which is a great improvement on ordinary designs.

CAR BRAKE.—L. J. Smith, Hamilton, Ohio, and D. S. Knight, New York city.—This invention relates to a combined railroad car brake and starter, the device being so arranged that when the brake is applied the starter will be wound up, so that when the brake is again released the cars to which the device is applied will receive a start, thus overcoming the inertia of the car, whether the same is at rest or in motion.

MACHINE FOR BENDING RINGS.—Wm. H. Peckham, New York city.—This invention relates to a machine for bending metal bars into perfect and correct rings, of any suitable diameter, and it is particularly intended for jeweller's use, to form finger rings, bracelets, and other suitable articles, and may, if desired, be used with equal advantage for shrinking tires and other large and heavy rings.

LARD PRESS.—Solomon S. Avis, Pens Grove, N. J.—The object of this invention is to furnish a cheap, simple, and effective lard press for household use.

FLUID METER.—Charles E. Moore Elizabethport N. J.—This invention consists of a measuring cup affixed to a lever beam, properly weighted, by means of which the quantity of spirits filling the cup is both weighted and measured. The cup being filled is decanted automatically by its own weight, at which instant the spent pipe is cleansed by a proper mechanism, and the supply cut off until the cup returns to its first position, when the spirit is again permitted to flow. The trimmings of the lever are connected with suitable registering mechanism, and the whole apparatus contained in a locked case of sheet metal, having a dial plate in front for the registering pointers.

GATHERING TURPENTINE.—A. Pudigon, Charleston, S. C.—This invention relates more particularly to the gathering of crude turpentine from the pine tree, but may be employed for the collection of all resinous gums of a kindred character, which exude from wounds in trees.

MAKING ROOFING.—James H. Cole, Adrian, Mich.—This invention is designed as an improvement upon the device recently patented by Edmund Richardson and James H. Cole, for a process for making roofing and machines for the same, and consists in supporting the rolling instrument employed in said process, by an arm which reaches to and travels upon ways overhead, so that the operator can travel alongside of the instrument and direct the same.

QUARTZ CRUSHER AND PULVERIZER.—Benj. Babbitt, New York city.—This invention relates to a device for crushing and pulverizing quartz, and it consists of a series of crushers arranged on the toggle principle, and provided at one end with elastic or yielding bearings, whereby the crushers are allowed to yield or give in case of coming in contact with any hard, foreign substance, such as spikes, or other metal articles, and the crushers prevented from being injured or broken thereby. The invention further consists in a novel construction of pressure rollers for pulverizing the crushed quartz, whereby the rollers are allowed to yield, or give, to admit of any hard foreign substance escaping between them without injuring the rollers or subjecting the same to any undue strain.

TOILET ATTACHMENT FOR BUREAUS.—Henry W. Eastman, Baltimore, Md.—This invention is a neat and ornamental attachment for bureaus which serves the purpose of a support for holding and adjusting the mirror, while it furnishes a convenient receptacle for combs, brushes, perfumery, etc., etc.

BALE TIE.—J. H. Gooch, Cheraw, S. C.—This invention relates to that class of bale ties in which the ends of the hoop are secured in a single slotted plate and consists in so forming the slots and tongues of the plate that the hoop can be more easily attached and fastened than by any other tie, and that when once fastened it cannot be untied, and will not be liable to fracture.

FRUIT AND GRAIN DRYER.—Solon L. Cheyney, Wooster, Ohio.—In this invention the fruit is dried in an oven by means of a current of hot air caused to flow over it from a heater beneath. The peculiar construction of the apparatus, by which the current is properly directed and its heat utilized to the fullest extent, constitutes the main feature of the invention.

DRAY SADDLE.—John O'Mahoney, Savannah, Ga.—This invention consists in a novel construction of the saddle whereby it may be made to conform to the shape of the back of the horse, and a very durable saddle of the kind specified obtained, and one which will not chafe or injure the horse in the least.

TIRE SHRINKER.—John Macy, Pine P. O., Oregon.—This invention relates to a device for shrinking tires, and it consists in the employment or use of a fixed bed provided with a fixed and an adjustable flange in connection with a fixed and an adjustable clamp, whereby tires of different widths may be contracted or shrunk with the greatest facility and in a perfect manner.

SCOOP AND SCREEN.—Augustus Thayer, Albany, N. Y.—This invention relates to a combined scoop and screen, whereby the device by a very simple adjustment may be used in either capacity, as desired.

HELIOMETER.—Conrad Friedrich L. Risch, Huntingburg, Ind.—This invention relates to an apparatus of very simple construction for observing and ascertaining the effects of the sun's rays upon the earth. By the use of this invention the exact decree of latitude at which an observation is made can be ascertained. Also by the aid of a suitable guide book, the date at which the observation is made, as well as the time of day, and the angle formed by the rays of the sun at noon of each day upon the level or water line.

FLEXIBLE GAS TUBING.—E. L. Perry, New York city.—This invention consists in outer flexible tubes of vulcanized rubber provided with one or more interior tubes of strong paper, the latter joined together by gum, glue, or other suitable substance which will make an impervious seam, the rubber tube being rolled up around the paper tube and the edges joined together in the usual manner, enveloping the said paper tube and serving as a protection to it, the latter being impervious to gas preventing the escape of the same.

DRYING APPARATUS.—F. I. Norton, Fremont, Ohio.—This invention consists in an arrangement of steam pipes within a suitable building, whereby the steam is conveyed around the interior of said building in any desired manner on the floor of the same by pipes, the said conveying pipes being provided with vertically projecting pipes having small orifices in their tops through which a very small jet of steam is allowed to escape, the hubs or other article to be dried being set on the said vertical pipes so that they discharge the steam into the holes through the same.

ANIMAL TRAP.—William J. Woodside, Zanesville, Ohio.—This invention has for its object to furnish an improved self-setting trap, simple in construction, not liable to get out of order, and effective in operation, instantly killing the animal that springs the trap.

SPRING BED BOTTOM.—Charles Walker, Chester, Vt.—This invention has for the object to furnish a neat, simple, durable, convenient and elastic bed bottom, and one which can be easily and quickly put up or taken down.

PAN FOR CONCENTRATING SULPHURIC ACID.—P. Marcelin and J. Saunders, Greenpoint, N. Y.—This invention consists in providing the pans with elongated, downward-extending spouts which reach from the upper part of that pan to which they are attached, to close above the bottom of the next pan below, so as to carry the lighter, impure contents of the upper pan to the bottom of the lower pan, and to thus create a complete circulation.

ROLLS FOR COTTON AND WOOLEN MACHINERY.—Francis Crague and Geo. G. Crague, Lewiston, Me.—This invention relates to an improvement in machinery for the manufacture of cotton and woolen goods, whereby an important saving in the expense is secured.

OSCILLATING OR VARIABLE ECCENTRIC MOTION.—Timothy Keeler and Geo. S. Avery, Danbury, Conn.—This invention relates to an improvement in applying the eccentric motion to various purposes, whereby the uses to which the eccentric motion is adapted are greatly increased.

FEATHER DUSTER.—M. A. Goodenough, New York city.—The object of this invention is to so construct a feather duster that the center of the brush shall be filled up with feathers of a less expensive quality than those used for the outside of the brush, and still make the brush elastic, more durable and useful than the ordinary kind.

FELLY DOWEL PIN.—O. D. Tyler, Gibson, Pa.—This invention relates to an improvement in dowel pins for fellies of wheels, and consists in forming it of a metal tube or thimble.

BASE OF ARTIFICIAL TEETH, ETC.—John A. McClelland, Louisville, Ky.—This invention relates to the composition and preparation of a new and improved material for the base of artificial teeth, and for other purposes in the arts.

ANIMAL POWER.—Jos. J. Adgate, Liberty, N. Y.—This invention relates to an improvement in machinery for utilizing the power of horses and other animals, whereby the same is more simple in construction and more effective in operation.

EXCAVATING VEHICLE.—James P. Smith, Cherry Hill, Pa.—This invention relates to a vehicle or self-loading wagon which may be used for excavating the earth in the process of grading, or in moving earth from one place to another.

DISINTEGRATOR FOR GOLD MINING PURPOSES.—Jerome B. Cox, San Francisco, Cal.—This invention relates to a method of separating gold from the cement or other material with which such metal may be combined.

MEDICAL COMPOUND.—John Bender, Lonaconing, Md.—This invention and discovery has reference to a composition formed of various ingredients known to the medical faculty, and which composition or compound is intended as a "tonic elixir," or cure for certain diseases, as dyspepsia and diseases of the stomach and bowels.

PLOW LANDSIDE.—Jerome Bacon, Medina, Wis.—This invention has reference to an improvement in plows, and especially to the manner of constructing the landside, whereby it is made adjustable and rendered much more durable than the ordinary kind.

DOUBLE SHOVEL PLOW.—Andrew J. Craig, Ashmore, Ill.—This invention has for its object to furnish an improved double-shovel plow, so constructed as to be easily adjusted to run at a greater or less depth in the ground, or so that one plow may run deep while the other runs shallow, and to which the whiffletree or doubletree may be readily and quickly attached.

BRACE FOR CARRIAGE AND OTHER SPRINGS.—L. C. Miller, Humphrey, N. Y.—This invention has for its object to furnish an improved brace for springs for carriages, railroad cars, locomotives, spring seats, and wherever elliptic or half-elliptic springs are used, which shall be so constructed that it will hold the spring always perpendicular to the plane of the wagon, and which will protect the springs from any wrench or twist.

DISTILLING APPARATUS.—Jane Riley, Cincinnati, Ohio.—This invention relates to a new apparatus, to be put upon a still, for condensing and separating the various grades of spirits, and consists chiefly in such a construction of the condenser and water distributor that, without the use of a worm, and without requiring large quantities of water, the desired results may be quickly obtained.

PAN FOR CONCENTRATING SULPHURIC ACID.—Paul Marcelin and Joseph Saunders, Greenpoint, N. Y.—This invention relates to a new pan to be used in furnaces for concentrating sulphuric acid, and consists in arranging a partition across the pan, which reaches nearly to the bottom of the same, and which causes the lower settled portions of the acid to flow out of the pan.

CHANGEABLE COMBINATION LOCK.—Wm. D. Field, Providence, R. I.—This invention relates to a new changeable combination lock, which is so arranged that it can be applied to doors, and that it can be changed without inconvenience by simply removing the inner plate.

FOLDING BEDSTED OR CRIB.—R. S. Titcomb, Gloversville, N. Y.—This invention has for its object to improve the construction of the improved bedstead or crib, patented by the same inventor Dec. 17, 1867, so as to make it more strong, durable, and convenient.

PLOW.—Wm. Gallagher, Shullsburg, Wis.—This invention has for its object to furnish an improved sulky plow or plows, which shall be simple in construction, strong and durable, and which will do more and better work with a less outlay of power than any of the plows now in common use.

ANIMAL TRAP.—A. J. Adams and Boyd P. Quincy, Portland, Oregon.—This invention consists in providing the extremities of a circular or spring with hooks, and extending them apart by means of a device for mounting them as set.

WEEDING HOE.—Andrew Coleman, Red Bank, N. J.—This invention relates to a new and improved form for pointed weeding hoes, and consists in forming the plate for the hoe of corrugated sections, formed by striking up a pointed plate by means of dies, to the form shown, which is a succession of pointed arches, each having a V-shaped section.

MAGIC LANTERN.—L. J. Marcy, Newport, R. I.—This invention relates to the construction of the body or box of magic and signal lanterns, and consists of forming the same with an inner and outer shell with an air space between, whereby the body of the lantern may be made much smaller than were heretofore made, without becoming unduly heated. Other devices, perfecting the whole, render this an improvement on the magic lantern, as heretofore made.

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.*

J. A. D., of Mo.—We know of no sure antidote for the sulphur of coal when used in iron working. It is said, however, that a solution of salt or salammoniac sprinkled on the coal before use, greatly mitigates the evil.

M. C., of Ga.—Soluble glass may be made by fusing ordinary glass with about one tenth of dry carbonate of soda. Both materials should be powdered and intimately mixed before putting them in the crucible. Soluble glass is an article of commerce and you can purchase it of excellent quality.

J. R. S., of N. Y.—Kane's Chemistry is right and you are wrong, for chloride of silver is soluble in ammonia. It dissolves more readily in cyanide of potassium and hyposulphite of soda. A good way to reduce the silver from the chloride is to place lumps of zinc in a thin paste of the chloride and water. The action is much more rapid when the paste is acidulated with sulphuric acid.

S. G. T., of O.—The source of carbolic acid is coal tar. The acid is separated from the distillate of the tar by means of treatment successively with caustic soda and sulphuric acid.

O. S., of N. Y.—There are great practical difficulties in the electro-deposition of iron and nickel, and no process is yet known which is satisfactory. Nickel is chiefly used as an ingredient of German silver.

S. S. C., of Ga.—You can get fine and rare chemicals of Luhme & Co., Lafayette Place, and of many other dealers in New York city.

P. S., of Minn.—Shellac dissolved in alcohol, with or without the admixture of lampblack, is the varnish used on wooden patterns.

E. E., of Ind., asks how to prevent the action of the sulphur contained in his forge coal on iron and steel in welding. The metal runs or drops before it gets to a welding heat. He ought not to attempt the welding of iron with "green" bituminous coal. If he cannot procure charcoal he should coke his coal before using it for this purpose.

E. G. P., of Iowa.—The question who was the original discoverer of chloroform or chloric ether as an anæsthetic has been sufficiently discussed. The subject is dead.

M. P. P., of Mass.—That your tin can when filled with steam and suddenly collapsing by injecting cold water, assumed a hexagonal shape, was simply because in six places the tin happened to be strongest; when you repeat the experiment with tin cans made of various samples of tin you surely will collapse them to a great variety of shapes. It has nothing to do with the hexagonal shape of the snow crystals, which are thus simply because water belongs to a certain system of crystallization; why it does belong to this system and to no other we know about as much as why sulphur is yellow and vermillion red; recent researches, however, indicate that the form of crystallization is intimately connected with the chemical composition or the arrangement and attractive power of the atoms of a body.

R. A. M., of Conn.—The present method of hardening the surface of malleable iron is to make the object red hot, then strew equally on the surface powdered ferrocyanide of potassium (yellow prussiate of potash) and plunge it quickly in cold water. The old method is to take horn, hair, dried blood, salammoniac, or other nitrogenized substances, and pack them with the objects to be hardened in a sheet-iron case or box make this box with contents red hot, open it then quickly and throw all in cold water. This is the genuine original case hardening, but has now been abandoned for the use of the ferrocyanide which is manufactured from the above-mentioned nitrogenized substances. The paragraph page 231, relative to converting cast iron into steel, needs correction. Cast iron has an excess of carbon and is converted into steel by the Bessemer process which robs it of a part of this carbon, by blowing air through it, from which it probably also absorbs some nitrogen in its stead. Puddling robs cast iron of all carbon and transforms it into malleable iron.

James Duncan, of Pioneer City, Idaho, is a miner and is willing to pay five hundred dollars for a recipe which will enable him to get the gold out of sulphurets, a specimen of which he sends us, without roasting, etc. It seems to us that this is not a case where recipes will prove useful unless to extract V's from our correspondents' pocket.

G. T., of Pa.—"Is there any metal composition similar in nature to brass, but cheaper, color immaterial?" Common type metal is hard but not tough. Copper, zinc, and lead will make an alloy suitable to your demands, but as copper is costly you must obtain the quality of cheapness by using less of it and more of the others. A few trials will give you the right proportions.

H. W., of Pa.—"The best composition for strengthening the fiber of wood, making it more difficult to split." Kyanized wood is tough, and wood impregnated with copperas becomes harder and more indestructible.

I. B. F., of R. I., is not satisfied with our simple "yes," given page 247, on his question if "in a common pump the water is raised by the muscular force of the operator." He thinks this does not agree with the teachings of the philosophical books who say that it is raised by the pressure of the atmosphere; to this we also answer, yes; but in order to give the atmosphere standing on the surface of the water in the well an opportunity to press the water upward in the tube, the muscular force of the operator must by means of uplifting the piston remove the pressure of the atmosphere on the water inside the tube, therefore it is directly the atmosphere which lifts the water but, of course, indirectly the muscular exertion of the operator, who destroys the equilibrium in the atmospheric pressure outside and inside the tube by applying a lifting power equal to the weight of the column of water under the piston.

Dr. W. F. Q., of Del.—Your theory of the agency of electricity in attracting or repelling atoms of matter is not new, but neither your paper nor the treatises of others who have written on the subject furnish proof of the theory or solve the problem.

A. G. B., of Ind., wishes the opinions of practical carriage makers and users as to the proper diameter of axles for light vehicles running over sandy or muddy roads. Some say the smaller the arm the less the friction; others, the contrary.

W., of N. Y., asks the components of axle grease. Water, 1 gal.; tallow, 3 lbs.; palm oil, 6 lbs.; soda, ½ lb. Heat to 210 Fah., and stir until cool. Tallow, 8 lbs.; palm oil, 10 lbs., and plumbago, 1 lb., make a good lubricator for wagon axles.

S. P. H., of L. I.—This correspondent asks for a description of the process of galvanizing iron. We believe we have answered a similar question before, but as we have had lately several applications for the information we will reply again. Sheet iron, when cleansed by means of sulphuric or hydrochloric acid diluted with water, may be dipped in a bath of melted zinc covered with powdered salammoniac, when a thin film of zinc will adhere to the surface. A better and more effectual way is to employ a melted amalgam of 202 parts by weight of mercury and 1·3 of zinc. The iron should be cleaned as before.

C. W., of Ohio.—Partly worn files may be renewed in a degree by standing the files, tang down, in a jar of dilute nitric and sulphuric acid, letting them stand over night.

E. G. P., of Iowa, says that Dr. Samuel Guthrie, of Sackett's Harbor, N. Y., manufactured percussion powder in pill form as early as 1818, and it was used to some extent in the navy for firing cannon. We are aware that Dr. Guthrie's experiments are recorded in the *American Journal of Science* for January, 1832, but Rev. Mr. Forsyth, in 1807, patented a fulminating powder composed of chlorate of potash, sulphur, and charcoal.

B. F. W., of N. Y.—"Why cannot the electric light be used for street lamps and locomotive head lights?" We know of no reason why it may not be adapted to the lighting of streets, but the motion and jar of a locomotive would seem to be an almost insuperable obstacle to its adoption for railway trains.

W. H. P., of Iowa, referring to our reply to "E. O. McC.," on page 231, current volume, says: "It is well known that friction will induce magnetism in steel rods or bars when they are in a position at right angles to the west and east current of electricity. Of course, when upright, they are at right angles with such current, and also when in a horizontal position north and south. When horizontal, east and west, friction will not produce magnetism.

Business and Personal.

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

Patent for sale—the most improved egg beater yet invented. Address the inventor, Wm. N. Angus, Morristown, N. J.

For sale—shop and four lathes for manufacturing spools and pill boxes. Terms easy. M. H. Brown, Potsdam, N. Y.

Wanted—parties to manufacture a small article made of wood and wire. Address M. N. Lovell, 84 East 8th st., Erie, Pa.

Manufacturers of bells suitable for mounting on farm houses would do well to send cuts and price list to Fred Hertel, Baraboo, Wis.

Olmsted's oilers are the best. Sold everywhere.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

First class lock makers wanted. Address Jones & Nimick Manufacturing Co., Pittsburgh, Pa.

Paper-collar machines and linen bosom, collar, and cuff-plaiting machines, upon improved principles, at W. H. Tolhurst's, cor. Union and Fulton sts., Troy, N. Y.

E. F. Mallory, West Springfield, Pa., wishes to contract for the manufacturing of a quantity of his Patent Burglar Alarms. Anybody can make them. Sample, by mail, $1.

Globe valves, oil cups, and for all kinds of water, gas, and steam goods, address Baily Farrell & Co., Pittsburgh, Pa.

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.

Make your patents pay!—J. H. White, Newark, N. J., will make to order, and introduce to the trade, all descriptions of metal small wares, small machines, etc., etc. Also furnish dies and tools for all kinds of metal work.

For improved double and single-roll carding machines, seven roll rubbers, twisters, card grinders, etc., address Union Iron Works, Rhinebeck, N. Y.

Spring-bed bottom—cheapest and best in use. Responsible Agents wanted in each State. Address S. C. Jennings, Wautema, Wis.

One half of patent right of Wyatt's mode of reefing top gallant sails given for obtaining patent in England. Geo. Hart, New Bedford, Mass.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

Paper Makers, Tanners, etc., wanting the Best and Cheapest Pump in use will send for Circular to Heald, Sisco & Co., at Baldwinsville N. Y. Agents wanted.

Tube Well—Best in Use.—Patented in 1865. State, County, and Town Rights for sale. Send for circular and prices. Address Dutton & Maguire, Port Jervis, N. Y.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

Bartlett's machine and needle depot, 569 Broadway, New York. Needles for all machines. Hackle, Gill Pins, etc.

Engineering facts and figures for 1867, mailed on receipt of $3. John Penington & Son, 127 S. 7th st., Philadelphia, Pa.

DE GALLEFORD'S IMPROVED PIPE CUTTER.

Tools for hand cutting tubes and pipes have been or some years in use, but whatever their conveniences, each one has had some objectionable feature, one of the commonest of which is the rigidity of position of the cutter, whether rotary or fixed, which would not give to any inequality on the pipe and must be forced through all obstructions. This objection, probably more than all others combined, has delayed and obstructed the general introduction of hand tube cutters,

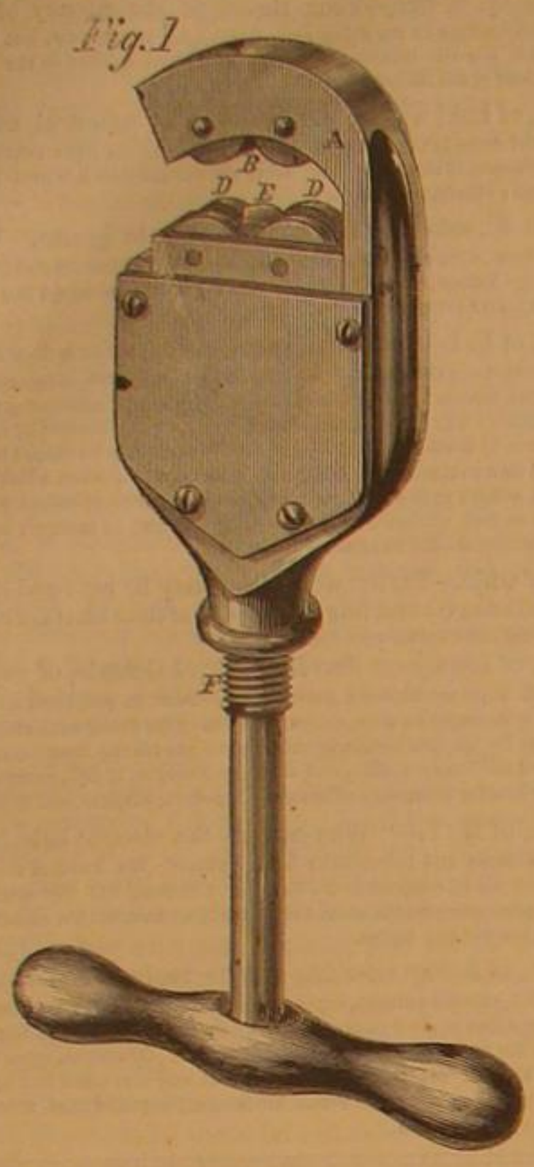


Fig. 1

most workmen preferring the lathe, or even the vise and file or saw, to the uncertain results of the hand cutting tool.

Fig. 1 of the engravings shows a perspective view of a tool on which a patent was issued through the Scientific American Patent Agency April 14, 1868, to J. De Galleford and Wm. E. Marston. Fig. 2 is a section showing the principal working parts. The stock, A, curved or C-shaped, contains two friction rolls, B, on fixed axes, seated in a recess, C, Fig. 2 being the tube or pipe to be cut. In the lower part of the stock is a movable block, the upper part of which holds two other friction rolls, D, which, in connection with the rolls, B, retain the pipe in place, while the cutter, E, performs its work, it being fed against the pipe by the screw F, into which it is seated and by which it is guided as seen in Fig. 2.

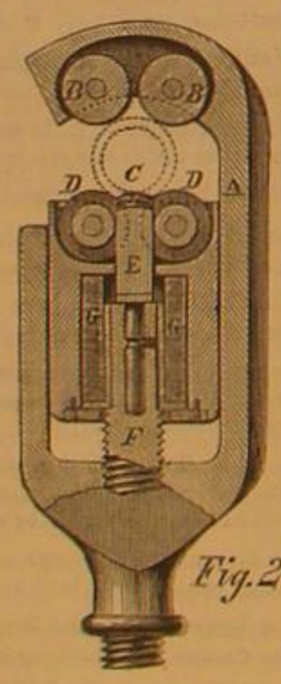


Fig. 2

The principal improvement, however, designed by the inventor, is the yielding of the cutter to obstructions offered by the irregularities in the surface of the pipe to be cut. In this device the cutter and the rolls, D, are sustained on a rubber tube or spring, G, seen in section in Fig. 2. A pressure of 150 pounds is required to compel this rubber tube to yield, which is sufficient to hold the cutter to its work, while not allowing it to be destroyed or even injured by the obstructions offered by inequalities of the surface of the pipe.

For further information address Wm. E. Marston, manufacturer, 326 River street, Troy, or John De Galleford, Box 478, Cohoes, N. Y.

Hardening Iron and Steel.

Francis E. Sessions, of Worcester, Mass., has recently obtained as above.

The article made of iron or steel, to be carbonized or hardened, is immersed in a bath of molten cast iron and allowed to remain the desired length of time, after which it is removed and thrown into cold water. It is found that the melted cast iron, or bath of molten cast iron, works the best when heated to the degree required by founders for pouring good castings, and when thick or large pieces are to be carbonized or hardened, it may be well to raise the heat of the molten metal still higher. The depth at which the metal will be carbonized and hardened will depend much upon the length of time it is allowed to remain in the molten bath of cast iron, and also somewhat upon the degree of heat to which the melted metal is raised, so that each operator can, by a few trials obtain almost any desired depth or carbonization or hardness, whether operating upon iron or steel. The bar or article, if instantly withdrawn from the molten bath, as soon as immersed, and plunged or thrown into cold water, will be carbonized or hardened to a slight depth, and which, in case of thin bars or articles made from thin sheets of iron or steel, may be all-sufficient.

It is unnecessary to recapitulate and enumerate the advantages of my invention, since all, and especially workers in metal will readily appreciate the value and extent to which my invention may be applied successfully. Articles made from iron can be carbonized and hardened at a slight expense, so as to have a surface equal in resistance and hardness to the best tempered steel, while at the same time having an elasticity, owing to the malleability and toughness of the central parts, which prevent the breaking or cracking of the articles.

New Mode of Printing and Embossing Cloth.

Hitherto the art of printing and embossing figures and designs on fabrics has demanded consecutive or separate operations. The ordinary stencil is often employed, and the figures or patterns filled in afterwards. The colors have been piled up or laid on thickly, so as to project the figures and present the appearance of raised work. This mode is defective, since the colors are brittle and liable to crack, and every time the figure comes in contact with any object a portion thereof is broken off, and soon the ornamentation is destroyed and the fabric laid bare again.

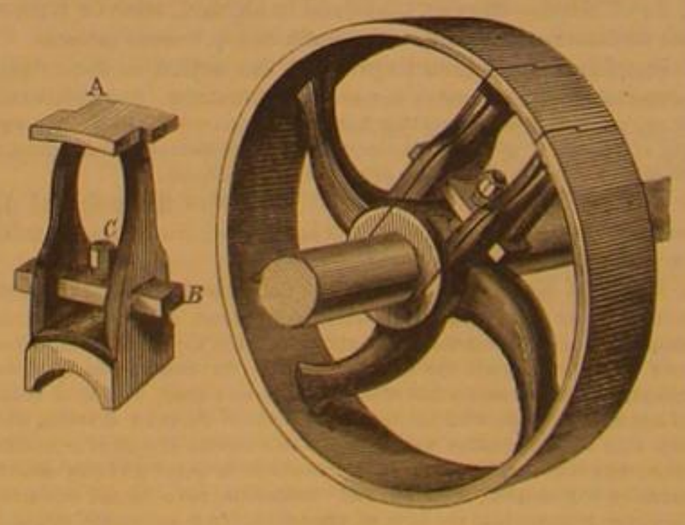
In carrying out this invention, first engrave an ordinary brass plate with sunk or depressed figures, such as flowers, fruit, animals, or whatever designs or representations desired, and charge or feed them throughout with various colors, according to taste. This plate is applied directly to the top of the cloth or fabric, the colors being in a wet state. An iron plate is then heated to a certain degree, and laid on the top or back of the engraved plate, and the whole is placed under a press. The hot iron plate being applied to the engraved plate, the heat will slowly be diffused through the latter plate while the cloth and the two plates are under pressure.

The color is gradually absorbed by the fabric as it enters or is forced into the depressions or engraved portions of the plate, and then it dries with a uniform and elastic finish; and so perfect is the drying that each ornamentation appears to be homogeneous from the surface to the back of the fabric, and therefore the parts thus ornamented present the appearance of fine velvet, or ordinary worsted, embroidered, or raised work. This invention can be applied to any fabric, and in the ornamentation of table covers, piano covers, skirts, slippers, ladies' cloaks, and the like.

Recently patented by Lewis Murr, of Philadelphia, Pa.

WHEELER'S ADJUSTABLE PULLEY FOR ATTACHING TO SHAFTS IN PLACE.

The annoyance of taking down a section of shafting, driving out keys, and removing couplings, merely to slip on a pulley needed for some machine added to the *materiel* of a concern, requires time and necessitates trouble. Frequently, also, it is found that when keyed back the couplings do not assume their former position exactly, and when the faces of the halves are brought together they throw the shafting out of line. Pulleys intended to be placed on a shaft without this trouble are usually cast in halves, and it is notorious that those so made are generally unreliable and troublesome to fit. First, it is difficult to cast them; secondly, they are difficult to turn; and, third, when put on the shaft they seldom run true.



The plan shown in the engraving appears to be the most feasible and reasonable of any we have yet seen. Every practical man must see its advantages at once. One or more of the arms of the pulley is enlarged, or divided, admitting a piece shown at A, a casting separate from the pulley, and easily fitted to the latter by the file. This supplementary piece has a section of the hub embracing one half of the shaft. It engages with the rim of the pulley by a parallel cut, divided in the center at right angles. This form of division, however, is not material. The piece is held in place by a bar, B, passing through the true arms of the pulley and the false arms of the segment and held in place securely by a set screw, C. Instead of this arrangement the bar may be a single key without set screw. Every machinist and millwright will see, at once, the advantages of this simple device for adjustable pulleys. There is no set screw to mar the shaft and no key in the hub of the pulley or key way on the shaft to be cut. Most of the fitting required is at the rim, as the hub portion may be cast accurately enough and the key may be forged to fit.

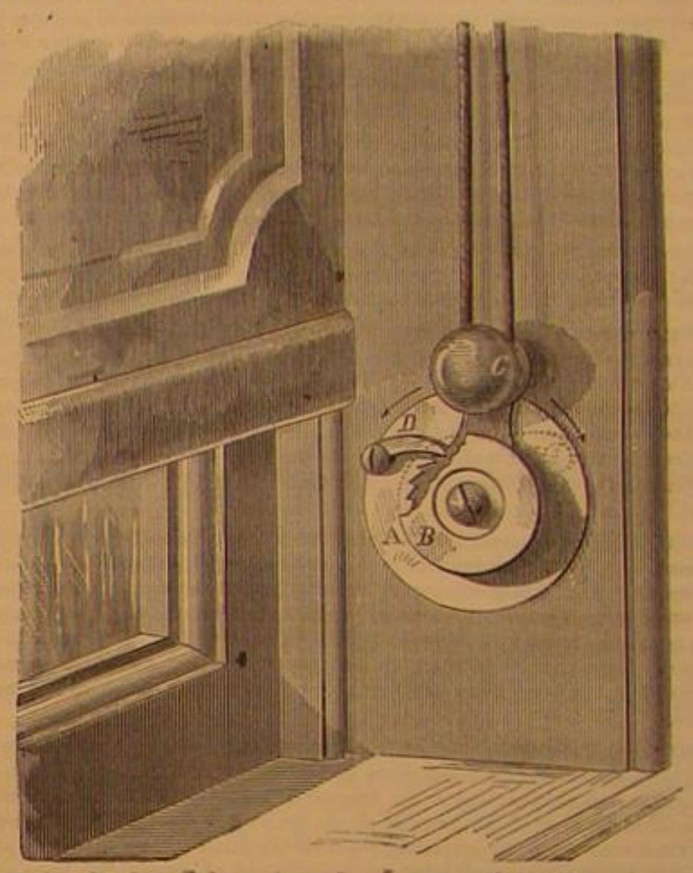
Patented April 24, 1868, by Seth Wheeler, who may be addressed at Albany, N. Y.

Baldwin's Automatic Lathe.

On page 268, Vol. XVI., we gave an illustration and description of Baldwin's automatic lathe for turning ornamental wood work and pieces of unequal diameter. Its simplicity and compactness, with its uniformity of work recommended the machine to us at that time, although our ideas were drawn wholly from a model, a miniature machine. A few days ago, however, we examined one of a size calculated to turn work of from one and a half inches diameter down to the size of a pen holder and even smaller. It may be seen in operation at No. 65 Liberty street, New York city, and we recommend practical mechanics and others interested in this class of work to witness its operation. In length and variety of work it has scarcely any limit, a single machine being capable of turning a fishing rod forty feet long and the most elaborate patterns for architectural, furniture, or cabinet ornamentation. The marvelous rapidity of its action and the exactness of the work performed would hardly be credited except by actually witnessing its operation.

CURLEY'S PATENT ADJUSTABLE CURTAIN FIXTURE.

The neatness and simplicity of the little device shown in the engraving are among its desirable features. It is, as seen, a holder for the cord by which the curtain is raised and lowered, and is attached to the casing of the window frame. There



is a circular base plate, A, and an outer and smaller plate, B, between which is the lever, C, the whole held together and to the wood work by a single central screw. The lever, C, has a pulley for the reception of the cord, and its central portion is cut into a right and left hand ratchet with which the pawl, D, engages. This is for tightening the cord when loose, by depressing the handle of C. The pawl may be used on either side, the right or left, simply by taking out its screw, turning the base plate half way round, and replacing the screw. Having tested it in practice we consider it a very convenient and useful device.

This device was patented through the Scientific American Patent Agency, March 24, 1868, by Thomas Curley, who may be addressed relative thereto at Troy, N. Y.

Magnetic Figures with Iron Filings.

These iron filing magnetic figures are, and, as we believe, have always been, of scientific use. For example, in magnetizing steel bars for permanent magnets, in what other way are we to detect faulty bars. Though the steel may be selected with the greatest care, and very carefully hardened and tempered, and they may appear to be perfectly similar, yet on being magnetized it is probable that not more than 30 per cent will be good; at least, we have always found it so. If the fault be in defective tempering that is easily rectified, but if it be through internal flaws, iron filings only will detect these. Let the bar be magnetized and covered with a stout sheet of paper on to which sift iron filings, and if they arrange themselves round several vacant points along the bar it may be concluded that under these there is an internal flaw, and in all cases it will be found to be so on breaking the bar; such a bar is of no use for a magnet. The cracks in the bar divide it into a series of small magnets.

This is the use that these figures have been put to for many years—at least, we have used them for this purpos, and no doubt others have done the same; but latterly the principle has been put to a most valuable use in a manufacturing and engineering point of view. It has been applied to testing the soundness of manufactured iron, for the detection of internal flaws and unsound welds. For the testing of chain cables and anchors it will be invaluable, so much property and so many lives depending on their soundness. Though these may look sound and perfect externally, they may have internal flaws which will surely cause them to give way when the stress comes upon them. For testing chains and anchors experimentally, it has already been applied, and doubtless it will be soon brought into universal practice, and also for testing the material of which bridges are to be made, and also railway wheels and tweers, and, in fact, manufactured iron of every kind which is required to resist great strains or shocks.—*Mechanics' Magazine.*

Pisciculture.—A gentleman in Mumford, N. Y., extensively engaged in trout breeding, lately intrusted to the mercies of the postal service a package of trout spawn for transportation to the far-off land of Dakotah. A letter has just been received informing him that out of two hundred spawn sent, all but six hatched out in a breeding trough and the fish are doing well.

Scientific American.

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NEW YORK, SATURDAY, MAY 18, 1868.

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ALUMINUM---A FIELD FOR SCIENTIFIC EFFORT.

The comparatively new metal, aluminum and its alloys, which have lately attracted considerable attention and awakened some curiosity, seem to afford a promising field for the investigations and experiments of scientific men and inventors. It is singular that since its discovery, as a metallic oxide existing in aluminous earths, no cheap and rapid method of extracting it has been discovered. All clays contain it, some in a less pure state than others, but all in large proportions; in fact it forms the basis of clay. It might be supposed that chemical science, aided by mechanical ingenuity, might, before this, have found a means of producing this metal in unlimited quantities and at a low cost. The process, however, of its extraction is somewhat complicated and quite expensive. Its cost, at present, confines its use to small articles and the purposes of ornamentation. Some of its alloys make it a substitute for silver and gold, to the former of which it is superior in several respects. It is not affected by air containing sulphur; pure, it is whiter than silver and is capable of as high a polish; it is very ductile and malleable, and its tenacity is wonderful. But, perhaps, its most remarkakle quality is its elasticity. When wrought by the hammer rollers, or in any other manner, and fashioned into a hollow vessel it will withstand violent blows which would permanently indent other metals.

Cryolite a species of clay found abundantly in Greenland and also in the Ural, is preferred as a material for the extraction of alumina. It is a compound of sodium, fluorine, and aluminum. In its color it is snow white. It is not unjustly called native fluoride of aluminum, and contains thirteen per cent of metallic aluminum. Fluor spar is frequently employed in combination with cryolite, for the purposes of reduction, because of its value as a flux. The emerald, the topaz, and some other valuable stones contain a large per centage of aluminum or aluminous oxide, and the metal, aluminum has been extracted from the emerald, ruby, garnet, topaz and from corundum. Of course such scientific experiments are costly, and cannot, in themselves be of immediate practical advantage; yet it would seem that so valuable a metal as aluminum distributed (in the form of an oxide) more generally and plentifully over the globe than iron is, might be procured with no greater expenditure of labor, time, and money than iron. The fact of its being presented only in the form of an oxide need not militate against its reduction from its matrix in a metallic form. Some of the best of iron—that cheapest, but most valuable of metals—is produced from its oxide. To be sure, we cannot apply the same crude means to the reduction of aluminum from its base, mother clay, that we can use in the reduction of iron; and this is just where scientific knowledge and practical talent is needed. We want the metal; the exigences of the times demand its general use. It will readily combine with other metals, as copper iron, gold, etc., and with them forms very valuable alloys. With iron three parts, and aluminum one part, the composition will not oxidize when exposed to moisture; with copper, ninety, and aluminum ten, a beautiful metal is produced, harder than the best bronze, whiter than copper and capable of being wrought under the hammer. One part of aluminum, to one hundred parts of gold, gives a fine greenish gold color, more agreeable to the eye than that of gold, and much harder. Some of these qualities seem to recommend this metal or its alloys as a material for minting, and others stamp it as of vast value in the arts.

What we now need is its production in sufficient quantities and cheap enough to be employed in the arts.

THE VALUE AND USES OF WORN-OUT FILES.

Although the invention and use of machines for finishing work in metals has, to a large extent, superseded the employment of files, it is difficult to believe the day will ever come when the file will cease to be an important tool to the metal worker. We have planing machines, shaping machines, milling machines, and their adaptations, which do a large proportion of the work formerly performed through the medium of the cold chisel and file, directed by the expertness and skill gained by long experience; but still the file is one of the most necessary and valuable tools of the machine shop. Numerous attempts have been made to cut files by machinery, and we understand some of the later have been successful, but have had no opportunity to test the correctness of the statement. Generally, however, files are cut entirely by hand, and the skill required in their production affords one of the most beautiful illustrations of the capacity of the workman to reproduce indefinitely the results of acquired experience.

But "what shall I do with my worn-out files? shall I have them re-cut? will it pay?" asks one of our correspondents. During an experience of fifteen years we had many opportunities to solve this question. Over and over again we sent our old, unbroken, files to be recut, with the assurance, each time, that they would last nearly as long as new, but each trial confirmed the conviction that it was all "vexation of spirit." If there is any annoyance more aggravating to the machinist than another, it is a file that fails him when engaged on a nice job. It requires some little time for the hand of the workman to become habituated to a new file, and to have it break or refuse to cut just when his whole mind is intent upon his work, is very vexatious. We never yet used a re-cut file with any satisfaction. If one can be re-cut to give good after service, it must be a heavy finishing file, the teeth of which are fine, and the stock of which is sufficient to withstand the manipulation necessary to reproduce it. We have little faith in re-cut files; they are tender, apt to break, quickly worn, and altogether unprofitable.

Yet old files have a use. They make excellent hand turning tools. For this purpose the end merely has to be ground to the proper shape. Probably to the hand-tool turner no implement is susceptible of a greater variety of adaptations than a turning tool made from a triangular or three-cornered file, while the flat files make superior chisels for finishing plain work, and the square file becomes both a roughing and finishing tool. Old files make good scrapers. For this purpose they must, sometimes, be partially forged, enough to turn their ends at an angle to the file. In this case—and in all others where files are subjected to the action of the hammer—the portion to be forged should be ground until every mark of the teeth is obliterated. No matter how careful the heating and the hammering, if a vestige of the teeth is left the result will be a weak place, a "cold shut," or a crack in the tool. It is useless to attempt to forge a good tool, as a cold chisel or turning tool, from an old file, unless the teeth of the file and their marks are all obliterated by the grindstone; the indentations seem to enlarge and expand by the heat and show themselves in serious fractures at the most inappropriate time.

Treated in this way, old files may be wrought into dies for screw cutting, punches, small cold chisels, keys, and many other articles and appliances continually needed in the shop. The work of grinding can employ the leisure hours of apprentices, and if judiciously performed, it will, at the same time, tend to true the face of the grindstone. Any of these ways of utilizing old files we believe to be preferable to the mistaken economy of paying for their re-cutting and worrying over their unsatisfactory after performance.

IMPORTANCE OF STUDYING CAUSE AND EFFECT.---A HINT TO INVENTORS.

A very large proportion of the time, labor, and money usually spent in perfecting new inventions is often needlessly expended in the trial of experiments to determine facts which should be determined without any experiment at all. We have in mind two remarkable instances of this kind, which have come under our own observation. One was the attempted construction of an air gas light machine, in which the object to be attained was the supplying of the material (gasoline) to a reservoir in which revolved a device for charging the air with the vapor of the fluid. The condition to be observed was, that a given level of the fluid in the reservoir was to be maintained. To do this a second reservoir of the fluid was placed over the first, communicating with it by means of a tube passing from the lower part of the upper reservoir, and opening into the lower reservoir at the precise point at which the level was to be maintained. The upper reservoir was filled at the top, the communication between the two chambers being meanwhile interrupted by a stopcock, and when filled, securely seated by a stopper screwed down upon a washer of leather. It was expected that this arrangement would operate as follows: When the fluid in the lower chamber was exhausted, so as to uncover the mouth of the tube, a bubble of air would pass into it, and rising to the upper reservoir, displace a small portion of the fluid, and this operation repeated would produce the required result.

Now had the fluid been glycerin, or sperm oil, or any other non-volatile substance, the result anticipated would have been attained; but the gasoline volatilized so rapidly in warm weather, that the fluid was forced entirely out of the upper reservoir when the stopcock in the tube was left open, a result which should have been foreseen and which was predicted by us before the apparatus was set in operation.

Even at this stage the radical fault of the device was not discovered, but the inventor strove to overcome the difficulty by the use of siphons, tubes bent in the form of the letter S, etc.

The faults of this inventor are not, we are sorry to say, rare ones. They were his imperfect knowledge of the material with which he had to deal, and his tinkering when he should have been thinking, and searching for the information which he lacked. How much time and money have been thus wasted upon the futile attempt to construct the so-called perpetual motion! And have we not heard somewhere of a man who was to revolutionize ideas of motive power by pumping water with a diminutive steam engine upon a gigantic overshot wheel? Yes, we have not only heard of that individual, but have seen him expending his money, regardless of the warnings of those who saw and realized his folly, until a reasonable competence, which he had accumulated through a steady and industrious life, had melted away, and left him a poverty-stricken and disappointed old age. This individual is by no means a natural fool. He is capable of attaining and applying knowledge. He failed in that he substituted tinkering for thinking, and supposed himself competent to force nature to yield him obedience, without a knowledge of her mysteries. The folly of this man forms the second instance of useless and vain experiment above alluded to.

He only need expect to avoid such follies who thoroughly informs himself in regard to what has been done in the particular department to which his proposed improvement belongs; who can distinguish principles, and avoid confounding them with mechanical details; and who has mastered the philosophy of all the natural phenomena with which he has to deal. To such a man, speedy and sure success will be the reward of his efforts, or the speedy and not valueless knowledge that success is, from the nature of the case, impossible.

GREAT REDUCTION IN COST OF FOREIGN PATENTS.

The increasing disposition on the part of American inventors to secure their inventions abroad, has induced us to reduce our fees for obtaining patents in all foreign countries to the lowest maximum price. Hereafter we shall solicit patents in England, France, Belgium, Prussia, Austria, Spain, Cuba, Russia, Saxony, Norway and Sweden, Australia, and in every other country which has patent laws, at greatly reduced prices, making our terms most favorable to the inventor. We have agencies established among the oldest and most reliable foreign solicitors, with some of whom we have had business relations for nearly a quarter of a century.

It is important to the owners, that patents in foreign countries be solicited through some old established and well known agency. We have known parties to meet with great discouragement in trying to introduce their inventions in England, from the fact that the patent was solicited through obscure agents unknown to the manufacturers. The English people are very peculiar in this respect, and on the continent the same prejudice exists against patents not obtained through well established houses.

We have in press, which will be issued in June, a comprehensive work on the patent laws of all countries. A pamphlet on foreign patents with terms for obtaining them, may be had by addressing this office.

ETCHING GLASS---ONE OF THE USES OF FLUOR SPAR.

The mineral known as fluor spar or Derbyshire spar from Castleton, Derbyshire, England, where it is found in large quantities, is largely employed in the form of fluorine or hydrofluoric acid, for the ornamental etching of glass. The acid is obtained by heating the fluor spar, coarsely pounded, with sulphuric acid in a leaden vessel; glass will not do, as the acid acts powerfully on that substance. Glass to be operated upon is coated with beeswax, or a resisting substance of which beeswax is the principal component. By means of a pointed instrument, as a needle, the design is sketched so as to expose the glass where the lines have been made. A mixture of spar and sulphuric acid is placed in a leaden tray and the glass with the side on which the design is sketched suspended over the mixture, when a gentle heat, as that from a spirit lamp, is applied to the under side of the tray. The vapor of the combined acid and mineral rises and attacks the glass, producing in a short time the design with as much delicacy and distinctness as could be done with the glass cutter's wheel. If desired, the figures or tracery may be left bright and the ground etched, simply by sketching with a camel's hair pencil, dipped in melted wax, the pattern or design on the glass. The effect is very fine.

This mineral is quite extensively manufactured into articles of use and ornament, it being readily wrought in the lathe by skilled workmen. Very handsome specimens of cups, vases, boxes, etc., are produced from the Derbyshire spar, which is frequently found of a rich blue, green, red, or purple color. The pure white variety is found in large quantities in Hardin county, Ill., and in other localities in this country, the colored specimens are quite plentiful.

"THE WHEEL."

Our readers are aware that we design shortly to print, under the title of "THE WHEEL," such new or surplus correspondence on the Wheel-question as the writers desire to place in print at their own expense. The new publication will be issued May 15th, in handsome magazine style, price 25 cents. In addition to the above correspondence, "THE WHEEL" will contain a large amount of other valuable scientific matter. For example, among its contents will be found the whole of the recent splendid series of lectures by Prof. John Tyndall, upon "HEAT AND COLD," profusely illustrated. These lectures are replete with rare and instructive information, given in most attractive style. To lovers of

interesting scientific truth they will be worth ten times the price of the book. All orders for "THE WHEEL" should be addressed to Munn & Co., 37 Park Row, New York.

TO ALL WHOM IT MAY CONCERN.

MESSRS MUNN & CO.:
37 Park Row, New York.

GENTLEMEN:—Whereas you have been in the habit of publishing in the SCIENTIFIC AMERICAN notices of pending applications for the reissue of Letters Patent; and whereas such publication has been declared to be illegal by Mr. Justice Fisher; and whereas we have lately filed in the Patent Office an application for the reissue of a patent owned by us; now you are hereby notified that in case you shall publish notice of our said application or the claims which we have made in the specifications accompanying the same, we shall hold you responsible for all damages that may accrue to us by reason of such publication, whether by delay in the grant of our application, or by the expense to which we may be put in prosecuting our application.

THE GROVER & BAKER SEWING MACHINE CO.,
By their Attorney,
E. S. RENWICK.

34 Beach St., New York, April 29th, 1868.

What is up now? Is there a Sewing Machine Company endeavoring to get a reïssue of a patent to cover claims which they are ashamed to have the public scrutinize? or what is the matter?

On reading the first lines of the above letter we thought it a hoax, but on approaching the end our eye caught the signature to the document, and we could no longer believe the portentious threat a joke. The public will look with more than ordinary interest for the claims which the parties would restrict us from publishing. We expect some dire misfortune awaits us for not obeying "The Grover and Baker Sewing Machine Company, by their attorney, E. S. Renwick's" injunction; but the curiosity of our readers must be gratified, and we abide the result for our temerity.

P. S.—Up to the time of going to press we had not received any notice from the Patent Office which we identify as coming within the above injunction. We are looking with impatience, however, to see what it is that calls forth a letter of such threatening import.

East and West.

When we look east or west, our line of vision is of course at right angles to the meridian, and in a plane, which, being vertical, passes through the center of the earth. At the equator, this plane of east and west vision coincides with the latitude, that is, with the plane of the equator, and all countries actually east or west are in the direction which the eye takes in looking east or west. But in all other places the plane of vision deviates from the plane of the latitude, and people who think that the places set down on the map as east or west of them are actually in the direction that they are accustomed to call east and west, are generally very much deceived. The plane of latitude cuts off a slice of the earth, larger or smaller, according to its distance from the equator, north or south; but the plane of east and west vision, passing through the center, divides the earth into equal hemispheres. The plane of latitude is always equidistant from the equator; but the plane of east and west vision cuts the equator at the real horizon both ways, and comes out at the antipodes, as far south of the equator as the latitude is north, and *vice versa*.

This idea can be realized and made clear by the artificial globe, in the following manner: To find the regions through which the plane of east and west vision for any place passes, bring the place to the brass meridian, and also revolve the meridian till the place touches the wooden horizon. Then the plane of the wooden horizon will be the plane of of east and west vision for the given place. The sun at the time of the equinox, when it stands exactly on the equator, nevertheless rises exactly in our east, though we are forty-three degrees north of the equator, and as it ascends toward the tropic, rises apparently far to the north of east, though in reality it never comes north of the equator more than twenty-three and a half degrees. These phenomena show that our plane of east and west vision cuts the tropics and the equator, and, instead of coinciding with our latitude, takes nearly a southeast direction to our antipodes, on the other side of the equator.

These facts, says a writer in *The Circular*, ought to be considered by the Jews, who are said to pray with their faces to the east, imagining that they are looking toward Jerusalem. Praying in that position from New York, they are really looking over the Desert of Sahara, and Jerusalem is far away from their line of vision to the northeast. Moreover, their line of vision is in the tangent to the curve of the earth, while Jerusalem is nearly a quarter of the way round the globe on the curve itself, and consequently far below the straightforward outlook. The real direction of Jerusalem from New York, as near as we can calculate with our rude appliances, is thirty-five degrees north of the east line, and forty-five degrees below the horizontal line. In other words, a Jew, in order to pray right at Jerusalem from New York, ought to face by compass about N. E. by E., and look at the ground about six feet before him.

Taxation.

From a very able essay from the pen of E. H. Derby, of Boston, on the position and prospects of the United States with respect to finance, currency, and commerce, we extract the following:—

"Mr. Rollins, in his last report, condemns those taxes whose collection is costly, and his objection applies most forcibly to taxes on gross receipts and incomes. On railways the cost of collection from the public ranges from fifty to ninety per cent. It now averages nearly seventy per cent on our American railways, for two-thirds of the gross receipts are absorbed by expenses, and for each dollar of the tax collected by the railway, three and a third must be taken from the public—such taxes carry with them their own condemnation. A tax on premiums of insurance, which compels the poorer classes to pay for the privilege of guarding their houses and furniture against their most dangerous foe, is also objectionable. To avert pauperism we should stimulate rather than discourage insurance.

"It is urged that the Income tax is a tax on capital. If it be so, let it be continued on coupons and on the dividends of factories, railways, banks, and insurance companies; but when it is applied to the irregular incomes of private citizens and uncertain receipts of professions, terminable with life or health, it may well be questioned. The Income tax in 1865, then three times as high as the English Income tax, was levied on four hundred and fifty thousand people, and doubtless as many more were required to make returns to prove they were exempted by poverty from the assessment.

"If we rate the cost to each individual of posting his books and making his computation at ten dollars only, the cost to the public, besides the salaries of assesors and collectors, would exceed nine millions on the tax payers of 1866, and an equal number exonerated. The estimate of Mr. Rollins for the returns the present year is less than twenty-five millions from the Income tax, while the returns from gross receipts of railways were last year but four millions of dollars. Is it wise to continue taxes so costly to collect?

"But a still stronger objection to the Income tax is the publicity it gives to the private affairs of the citizen. He is obliged to disclose important secrets, often to the injury of his trade and credit, or to the detriment of his family and fortune. No distinction is made between permanent and temporary incomes. With people of limited means, the greenback set aside for a new suit, or to sustain the son in college or the daughter at school, obeys the peremptory call of the collector, and honesty pays what dishonesty evades.

"The operation of the tax is most unequal. Massachusetts, with seven thousand square miles only, contributes more than eight million dollars to the Income tax, while all the Cotton States, with half a million miles of surface, pay but three-fourths of that amount.

"The Income tax is a direct tax on the rents of real estate, and operates as directly and effectually as a tax on the land itself. The constitution provides that all direct taxes shall be levied in equal sums on each Congressional district; but now single districts in New York, Pennsylvania and New England pay more than twenty Southern districts. Such taxes, if continued, may be contested, and large reclamations probably demanded."

Whether an Application for a patent interferes with Another Patent is a Question to be Determined by the Commissioner of Patents.

An interesting question in relation to interfering applications has lately been decided by Judge Fisher, of the United States District Court, Washington, in the case of Marsh *vs.* Dodge. This case was before the court in February last, on the question of priority of invention of the specific devices by which a self rake is attached to a two-wheeled reaping machine, and was decided in favor of Dodge. Marsh then reconstructed his application and specifications, and began *de novo*. In the outset, he demanded that a new interference be declared between himself and Dodge, that the question might be tried again. The Commissioner of Patents refused to do this, and from his action the present appeal was taken. The following is Judge Fisher's decision:

Appeal by James S. Marsh from the Commissioner of Patents.

A motion is made in this case to dismiss the appeal on the ground of a want of jurisdiction in the Judge to whom the appeal is taken from the Commissioner of Patents. The case is either the same which was decided by me on appeal in the month of February last, or it is a new case between the same parties. If it be the same case, the former decision has put an end to it, so far as respects any appeal to be had before me or any other Justice of the Supreme Court of the District of Columbia. If it be a new case, then I am clearly of the opinion that there is want of jurisdiction in any Justice of the Supreme Court of the District of Columbia, because it is not one of those cases in which appeals are provided for by the law. Since it does not appear that the application of Dodge for reissue did in the opinion of the Court interfere with any other patent, nor is it a case in which either Dodge or Marsh is dissatisfied with the decision of the Court upon the question of priority of right or invention. Had there been an Interference declared in this case and a decision of the Court thereon the case would have been appealable, but whether an application for a patent will interfere with another patent or another application pending, is in my judgment, a matter to be finally determined by the opinion of the Commissioner himself.

The appeal in this case is therefore dismissed.

Spiritualism in the London Polytechnic Institute.

Prof. Pepper has been doing, this last winter, a great work before the thousands who nightly visit the above institution. Besides explaining the latest discoveries in electro-magnetism, light, etc., he discoursed on spiritual manifestations, pointing out the extensive impostures that have been practiced on the public in the name of mesmerism and spiritualism. He illustrates his lectures with startling illusions, such as the floating in the air of hats, tables, and even stout ladies. He does not only every thing that ever spiritualists have pretended to do, but a great deal more; with this difference, however, that he explains how it is done by well known natural and material means, whereas spiritualists pretend that they do it by unknown, supernatural and spiritual powers.

Solid Back Brushes.

Mr. George L. Cannon, 152 Broadway, New York city, has shown us some specimens of brushes comprising all styles in common use, from the tooth to the blacking brush, which are made wholly by machinery and each bunch of bristles separately secured to the back, which is solid, having no cover or veneer. No glue or pitch is used to secure the bristles, each bunch being held by a staple of wire, the ends of which are crossed and seated in a drilled hole. The crossing of the staple ends firmly locks the bristles so that they cannot be removed. It appears to be a very valuable improvement.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING APRIL 28, 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.*

77,157.—ANIMAL TRAP.—A. J. Adams (assignor to himself and Boyd P. Quincy), Portland, Oregon.

I claim the spring, C, and claws, B, in combination with the hinged treadles and the base, A E, all constructed, arranged, and operating substantially as described.

77,158.—LATHE FOR CUTTING IRREGULAR FORMS.—Peleg Barker, Battle Creek, Mich.

I claim the sliding adjustable frame, G, containing the holding devices for the uncut timber, arranged relatively with the curved knife, C, when constructed and operating as described.

77,159.—CAR BRAKE.—William T. Batty (assignor to himself and Griffith Deshart), Canton, Ohio.

I claim, 1st, The supporter, P, with axes, b and c, and crank, R, when used in connection with knuckle joint, O, substantially as and for the purpose herein shown.

2d, The peculiar arrangement and combination of the crank, R, chain, S, pulley, T, iron, W, iron, V and car body, X, the several parts being arranged as and for the purposes herein specified.

3d, The peculiar arrangement and combination of the draw bar, K, knuckle joint, O, supporter, P, and brake lever, H, the several parts being arranged and combined substantially as and for the purpose specified.

77,160.—CHURN.—Wm. T. Best (assignor to himself and Daniel Vaughan), Scranton, Pa.

I claim, 1st, The supplementary box, B, having a converging bottom, and being provided with the slotted and perforated cylinder, C, and used with the staff, E, and its brakers, as and for the purpose set forth.

2d, The frame, N, constructed substantially as described, and provided with a rim around its lower end for collecting the butter, said frame being used in the churn, A, and with the staff, L, and its dashers, as and for the purpose specified.

3d, The gate, d, surrounding the slotted portion of cylinder, C, for regulating the flow of cream to said cylinder, substantially as herein specified.

77,161.—SPRING FOR CHAIRS.—A. M. Blake, Canton, Ohio.

I claim the use of the conical spring, F, in combination with the foot plate, G, plate, E, socket or spindle, D, and chair leg, C, in the manner and for the purpose herein specified.

77,162.—CARRIAGE LOCK.—J. A. Bower, Middlefield, Ohio.

I claim in the brakes for carriages the levers, B B, hinged heads, E E, springs, J J, and rods, G G, as arranged in combination with the thills, A A, in the manner and for the purpose substantially as set forth.

77,163.—MANUFACTURE OF BRICK.—Silas H. Bowman, Half Moon Bay, Cal.

I claim the use of petroleum and peat in the manufacture of bricks, by mixing both or either one of them with a clay of which bricks are to be made, substantially in the manner and for the purposes herein set forth.

77,164.—PIANO FORTE STOOL.—Joshua Briggs, Peterboro, N.H.

I claim constructing the stool with metal legs, c, each having a flange, d, containing a socket, e, to enable the leg to be fastened by and slid from screw, f, which connects it to the seat, and pins, g, to keep the leg in position, substantially as set forth.

Also, combining with each leg, as described, the toe piece, i, of wood, driven into a socket, h, in the leg, substantially as and for the purpose set forth.

77,165.—KEYHOLE GUARD FOR DOOR LOCK.—Asa T. Brooks, (assignor to Russell and Erwin Manufacturing Company), New Britain, Conn.

I claim the combination and arrangement of the oscillating spring guard or ward bar, A, with the latch and tumblers, substantially as and for the purpose described.

77,166.—BOOT AND SHOE CONFORMATEUR.—Lorin Brooks, New York city.

I claim the combination with the horizontal scale or size stick, A, of the vertical sliding standard, B, provided with the scale, d, adjustable arm, C, and spring table, D, arranged and operating substantially as and for the purposes set forth.

77,167.—MECHANICAL POWER.—Charles P. Carter, Poughkeepsie, N. Y.

I claim, 1st, The wheel, d, with teeth, formed as shown and described, in combination with pawls, E E, for imparting motion to flange, f, and arm, J, in the manner shown and described.

2d, The ball, h, when arranged and combined with shaft, g, and flange, f, and pawls, E E, substantially the same as shown, and for the purpose as set forth.

77,168.—INHALING GASES.—Wm. Z. W. Chapman, New York city.

I claim, 1st, Placing the gas pipe, a, in said apparatus, at an angle with the pipe, b, for inhaling through, to obviate the necessity of a valve to prevent the return of the exhaled gases into the gas pipe, substantially as herein described.

2d, The expanding mouth piece, constructed and arranged substantially as and for the purposes set forth.

3d, A suspending device, employed in combination with the breathing apparatus, by which the same is drawn out of the way and supported when released by the operator, substantially as and for the purposes set forth.

4th, The formation of the joints of the apparatus, by compressing the elastic tube between the surfaces of two rigid tubes, as above specified.

5th, The construction and operation of the breathing apparatus, substantially as herein described, so as to administer the gas, if required, during an operation, or while the mouth is open and free therefor, as well as before the patient is rendered insensible, substantially as above specified.

6th, Affixing a gas inhaler to the nose of a patient by the employment of an apparatus, substantially as herein described, in combination with said inhaler, so as to administer gas, while the operator is free to operate upon the patient without the aid of an assistant, as would otherwise be required.

7th, Affixing the apparatus either to the operating chair or other suitable permanent fixture, so as to relieve the operator or patient of the weight and annoyance of the apparatus, while it is at all times ready for use without other aid, substantially as herein described.

8th, The devices illustrated in figs. 3 and 5, adjustable or otherwise, substantially as there represented, for opening the jaws of the patient, as herein set forth.

9th, The employment of an indicator in combination with a respirator and gas receptacle, presenting to the eye of the operator at all times the state of the apparatus and the supply and quantity of gas taken, substantially as and for the purposes set forth.

10th, The diaphragm, substantially as described, to be placed in the mouth to cut off communication being the lungs and the external air through the mouth when the mouth is open.

77,169.—LOOM.—George Cliff, Memphis, Mich.

I claim the combination of the top beam, A, the lathe, B, the breast beam, C, the cloth beam, D, the frame, E, the treadle wheel, F, the shuttle thrower, G, the latch, H, the treadles, I, the pulley, J, the yard beam, K, the pins, L, the spring bar, M, the standard, N, the frame, O, the button, P, the cords, Q, the transverse tie, R, the standard, S, the oscillating frame, T, the connection, U, the spring, V, the hangers, W, the guard wheel, X, the dog and spring, Y, the geared wheeel, Z, the bed, 2, and the cord, 3, when constructed, arranged and operating substantially as and for the purposes hereinbefore described and shown.

77,170.—DIE FOR MAKING THIMBLES AND FERRULES.—J. H. Cole, Milbury, Mass.

I claim jointly the die and plunger, A and B, the coacting surfaces of which have the configuration herein described and shown, for the manufacture of ferrules and thimbles from disks of cold wrought iron, in the manner herein set forth.

77,171.—DRIVE WELL.—Thomas B. Conklin, Rockford, Ill.

I claim the pipe, A, with slits, a, and lips, a', in combination with bands, B, and screen, C, arranged as described.

77,172.—CHURN.—George W. Corbit, James M. Orput and George M. Case, Malta, Ill.

We clasm, 1st, The combination of the cam, e f g, bar, f h, and wheel, 1 2 3 4, substantially as described.

2d, The method of connecting and detaching the cog wheel, P, with the other parts by the device substantially as described.

3d, The combination of the cam, e f g, and wheel, 1 2 3 4, substantially as described.

77,173.—ROLLER FOR DRAWING MACHINE.—Francis Cragne George G. Cragne, Lewiston, Me., assignors to Wm. N. Higgins, and said Higgins assignor to himself, F. O. Sands, W. M. Emerson and W. T. McNally.

We claim the within described roll for machines for treating cotton and wool, when constructed and operating as and for the purposes set forth.

77,174.—FARM GATE.—John Curtis, Truro, Ill.

I claim, 1st, The combination of the gate, P, with the crane, z, link or hinge g, and screw rod, E, substantially as in the manner and for the purpose herein shown and described.

2d, The construction and arrangement of the slotted angular bar, Q, metallic plate, D, and lever, h, when used in combination with a farm gate, and operating substantially in the manner and for the purpose as herein set forth.

77,175.—CUTLERY.—R. E. Curtis, Great Bend, Pa.

I claim as a new article of manufacture, knives or forks constructed substantially as described.

77,176.—CULTIVATOR AND POTATO DIGGER COMBINED.—Martin Darling and Hala Gray, Marathon, N. Y.

We claim the frame, A a, oblique cultivator rake, B b, laterally adjustable plows, C C, and adjustable supporting wheels and standards, e f, all combined, constructed, and arranged as herein shown, and for the purposes set forth.

77,177.—MODE OF ROOFING BUILDINGS.—Charles de Hass, Washington, D. C.

I claim a roof, constructed as herein described.

77,178.—TWEER.—Lewis Donnell, Columbus, Ohio.

I claim a combination of the screw, p, with the revolving top, A, the valve O, the cylinder, C and J, and the handle or lever, N, constructed and operated substantially as and for the purpose set forth.

77,179.—STOVE DRUM.—Nicholas Downes, Syracuse, N. Y.

I claim the shell, B, flues, d d, pipes, C, e, f, g, l, and damper, h, all constructed and arranged as herein shown and for the purpose described.

77,180.—RAILWAY RAIL SPLICE.—Robert Elliott, Chester, Pa.

I claim, 1st, The railroad rail joiner, composed of the double flanged plates, D and E, of wrought iron, the bolt, F, burr, g, and guards, G and H, all constructed substantially as set forth.

2d, The guard, H, overlapping a series of two or more projecting bolt heads, f, to prevent the bolts, F, from working out of their places in case of the accidental removal of some of the burrs, g.

77,181.—WRIST PIN FOR REAPERS AND MOWERS.—John H. Elward, Chicago, Ill. Antedated April 15, 1868.

I claim the combination of the wheel, B, provided with an angular recessed or slotted opening, b, with the wrist pin, C, provided with angles corresponding with the said opening, and a key, a, all arranged and operating substantially as set forth.

77,182.—BEAN POT LIFTER AND CARRIER.—George F. Foss (assignor to himself and Samuel C. Hopkins), East Boston, Mass.

I claim the bean pot carrier, made substantially as described, that is, of the bottom guard, d, the wires, a and b, the cover, g, the connecting piece, e, and the clamp screw, i, arranged and combined, as specified.

77,183.—AMALGAMATOR.—Stephen Fountain, Silver City, Nevada.

I claim casting the pan with a hub, having an opening through it for the shaft to pass through, and having a double wall around this opening to form a steam chamber for supplying heat to the machine, substantially as described.

77,184.—REVOLVING MOLD BOARD.—Joseph S. Godfrey, Leslie, Mich.

I claim the combination of the mold boards, A A, with the cutters, B B, the shares, C C, the shafts, D D, and the frame, E, when constructed substantially as described for the purpose designed and set forth.

77,185.—MODE OF ATTACHING AXLES TO VEHICLES.—Wm. Gray and Henry E. Porter, Hebron, Conn.

We claim, 1st, As a new mode of manufacture, a device for securing together the forward axle and rocker of a vehicle

2d. The combination of the plate, B, having a round flange, D, plate, F, with a corresponding round flange recess and plate, G F, which encloses and allows the flange, D, to work closely and freely therein, by means of the segmental portion, H, of said plate, and the projections, K, for griping the rocker, A, and axle, E, substantially as and for the purpose described.

77,186.—MODE OF PREVENTING THE CORROSION OF CAST IRON VESSELS.—Chauncey O. Greene, Troy, N. Y.

I claim as a new manufacture the improved article of cast iron vessels, as described herein, and having their interior surfaces prepared or lined by the application thereto of oil and heat, thereby forming a hard, durable lining coat therein, in the manner substantiantially as set forth, and by which said vessels are made non-corrodible, as described.

77,187.—ENAMELING MACHINE.—Henry R. Hall, Philadelphia, Pa.

I claim, 1st, Making the hoppers and scrapers self-adjustable by the application of springs thereto, substantially as shown and described.

2d, Feeding the moldings or other objects to be enameled through the scrapers, by means of endless chains set edgewise, and provided with flat links to prevent indentation of the moldings, substantially as shown and described.

3d, Making the bed plates, b and b2, both or either of them, with their chains or other attached parts, adjustable relatively with the fixed bed plate b1, its chain and other attached parts, to adapt the machine to the various sizes of moldings or other objects to be enameled, substantially as shown and described.

4th, The endless chains, k k1, their respective ways or lateral bearings, m m', and the mechanism for giving motion to said chains, in combination with two scrapers or a single scraper, substantially as shown and described for the purpose specified.

77,188.—PLOW.—John S. Hall, Pittsburg, Pa.

I claim a mold board and land side united in one piece, the former having the share and point attached to it, and the latter having the "renovator" or sole attached to it, and both united to a standard, A, so as to be readily removed when worn out, and replaced by another mold board and land side, in the manner and for the purpose described.

77,189.—CLOTH DRAWERS.—Henry Heath (assignor to Fisk, Clark & Flagg), New York city.

I claim the combination of a pointed waistband with a cloth leg, constructed with a seam at the rear of the knee, substantially as before set forth.

Also, the combination of the drawers leg, constructed with a seam at the rear of the knee and a band at the lower end of the leg, substantially as before set forth.

Also, the combination of the drawers leg, constructed with a seam at the rear of the knee, with both a pointed waistband and an ankle band, substantially as before set forth.

77,190.—WAGON BRAKE.—Smith S. Henderson, North Cohocton, N. Y.

I claim, 1st. The arrangement and combination of the wagon tongue or pole, I, bent metal bar, H, chain, F, roller, G, and slide bar, E, to connect with the brake bar, D, for operating in the manner herein described.

2d, The brake blocks, c c and a a, hinged together with slotted straps, e e, as constructed and secured to the hinged brake bar, D, the same being connected by levers, d d, with the slide, E, by a plate hinge, f, so as to adjust the pressure of the brakes to the wheels, substantially as and for the purposes set forth.

77,191.—CAPSTAN FOR HOISTING MACHINES.—C. S. Houck, Greenport, N. Y.

I claim, 1st, The combination of lever, H, connecting bar or leg, C, lever frame, L, yoke, K, slide block, b, long arm or connecting bar, e, short arm, g, and rod, f, or their equivalents, when arranged and employed in the manner, or substantially in the manner, and for the purpose herein set forth.

2d, The combination and arrangement of the lever frame, L, or its equivalent, with the brake blocks, d d', and rim or circle, s s, as, or substantially as, and for the purpose herein described, when located with respect to shaft, A, and to each other, substantially as described.

77,192.—SAFETY POCKET.—J. C. Iden, Buckingham Township, Pa.

I claim the catch, E, in combination with the thumb piece, D, spring, C, clasp, A A', with the indentation, G, therein, and hasp, B, substantially as set forth for the purpose specified.

77,193.—HOSPITAL BEDSTEAD.—Anthony Iske (assignor to himself and Benj. Mishler), Lancaster, Pa.

I claim, in combination with my swinging trap, L, the sliding table, Q, with its grooves, q, supported on the cross braces, I, with the stop, i, together with the arrangement of the several rack bars, D K, when held in pivots, and mode of making and connecting the several segments, all arranged and operating in the manner and for the purpose specified and shown.

77,194.—METHOD OF EXPRESSING LIQUIDS FROM SOLIDS.—D. A. James, Cincinnati, Ohio.

I claim, 1st, The method of expressing fluids from solids, by the pressure of the material to be acted upon, in a tube or trunk, substantially as described.

2d, The perforated trunk, in combination with the cloth or canvas lining, substantially as and for the purposes described.

3d, The combination of the perforated trunk with the discharge valve, C, substantially as and for the purposes described.

77,195.—SAWING MACHINE.—T. Jenkyn, Thetford Center, assignor to Bartlett Burr, Fairlee, Vt.

I claim the construction and arrangement of the reciprocating table, P, hinged table, H, tables, Q T V, saw arbors, C D, and cutter heads, U W, all operating upon the same frame, in the manner and for the purposes herein shown and described.

77,196.—CHECK BRACE FOR CARRIAGES.—I. D. Johnson, M.D., Kennett Square, Pa.

I claim the combination of the two braces, B B, their attachment to the upper half of the springs or spring bars, E E, the braces, A and C, and the flexible plate, B, all constructed, arranged, and employed in the manner and for the purpose herein shown and described.

77,197.—VARIABLE ECCENTRIC.—Timothy Keeler and G. S. Avery, Danbury, Conn.

I claim connecting the rod, C, to the eccentric, A, whereby an oscillating motion is imparted to the rod, C, varying from a line at right angles with the eccentric shaft, and without varying the throw of the eccentric, as herein shown and described.

77,198.—HOG-SCALDING TANK.—Gideon King, Eminence, Ky.

I claim, 1st, The bevels, R R, and the adjustable sheet iron plates, N N, when applied to the tank, G, as and for the purpose described.

2d, The sheet iron, M, with the angle, D D, when confined to the tank, G, as and for the purpose set forth.

3d, The crank, T, cog wheels, K, windlass, H, and rack, E, in combination with the shafts, F F, when arranged, constructed, and attached to the tank, G, as and for the purpose specified.

4th, Rope, A', pulleys, j j, pole, w, and pole, v, in combination with shafts, F F, when constructed and operated substantially as and for the purpose described.

77,199.—SPIKE MACHINE.—Wm. Koplin, New Castle, Pa.

I claim, 1st, The cutter, k, moving in the arc of a circle, in combination with the receding cutter, h, substantially as and for the purpose set forth.

2d, The combination and arrangement of the dies, K K', sliding cutter, h, pivoted stock, s, carriage, t, arm, u, springs, s' v, lever, m, and shaft, m', substantially as and for the purposes described.

77,200.—EQUALIZER.—Augustus Lafever and R. K Laraway, Battle Creek, Mich.

We claim the combination of a draft indicator, on the draft pole, with an equalizer, D, on the doubletree, F, substantially as described.

77,201.—FRUIT BAG.—W. I. Ludlow, Cleveland, Ohio.

I claim the bag or vessel, A, when provided with a bail, B, and when connected at its under side with a rope or cord, C, to which a double hook, D, or its equivalent, E, is attached, all made and operating substantially as herein shown and described.

77,202.—PAN FOR CONCENTRATING SULPHURIC ACID.—Paul Marcelin and Jos. Saunders, Green Point, N. Y.

We claim providing a pan for concentrating sulphuric acid, with a partition or partitions, a, reaching nearly to the bottom of the pan, substantially as and for the purpose herein shown and described.

77,203.—PLOW FRAME.—Seth March, Norfolk, Va.

I claim the frame, A, provided with the elongated slots, a', for the adjustment of the mold board, and the elongated slot, 1', for the adjustment of the plow beam, substantially as described.

77,204.—PACKING FOR ENGINES, PUMPS, ETC.—W. H. Miller, Philadelphia, Pa.

I claim, 1st, The use of calcimine, china clay, or white clay, or their equivalents, as a substitute for dry powdered soapstone, and other dry powdered substances, in their combination with fibrous or other materials in the manufacture of packing.

2d, The use of calcimine, china clay, white clay, or their equivalents, for the purpose above described, in the manner above described, or any other practical application thereof, whereby said substances become ingredients of packing for the stuffing boxes of engines, pumps, and for the joints of other machinery.

77,205.—DRYING APPARATUS.—F. I. Norton (assignor to himself and W. H. Cloud), Tremont, Ohio.

I claim, 1st, An apparatus, substantially as described, for discharging steam into the central openings of wagon hubs, and other similar perforated articles of wood, for drying the same, as and for the purpose described.

2d, The combination of the steam coil, C, and vertical ejecting pipes, d, substantially as and for the purpose described.

3d, The combination, with a drying chamber, A B, of the steam pipes, C d, substantially as and for the purpose described.

77,206.—GRAIN SEPARATOR.—S. E. Oviatt, Richfield Ohio.

I claim, 1st, A grain separating conveyer constructed in sectional carriers, B, provided with bars, D, and fingers, a, so arranged that the axis of the lower end of one carrier is below the axis of the upper end of the next lower carrier, substantially as and for the purpose set forth.

2d, A conveyer or carrier, constructed in sections, with each section provided with bars, D, and fingers, so arranged that the fingers of one sectional carrier will interlap with the fingers in the adjoining carrier, as and for the purpose set forth.

3d, The carrier sections, so arranged in relation to each other, when provided with bars, D, and fingers, a, that the plane or upper end of one carrier substantially as and for the purpose set forth.

77,207.—MOSQUITO-NET FRAME.—G. T. Palmer, Brooklyn, N. Y. Antedated April 14, 1868.

I claim, 1st, A radially folding mosquito net canopy frame composed of folding arms, e e e, disk or support, d, and supporting arm, C, made substantially as and for the purpose shown and described.

2d, Supporting a radially folding canopy frame from under its center by means of the standard, B, and supporting arm, C, when the arm, C, extends over the bed and the folding frame is pivoted thereon, substantially as shown.

3d, The rods, f f, suspended from the folding arms of a mosquito-net frame, for the purpose of folding and unfolding the frame, substantially as shown.

4th, The pins, a" a", in combination with a radially folding mosquito-net frame, whether said pins are affixed to the arms of the frame or fitted in sockets at the ends of the arms, for the purpose described.

5th, Supporting the radially folding arms of a mosquito-net canopy frame by supporting braces, pivoted to the upright, c, substantially as shown.

77,208.—ROADWAY PAVEMENT.—J. T. Parson, Washington, D. C. Antedated April 18, 1868.

I claim a paving block, having an octagonal-shaped end, composed of clay treated as described, and for the purpose set forth.

A paving block of octagonal or other form, designed and arranged so as, when laid, to leave small holes at regularly recurring intervals, for the purpose set forth.

The herein-described baked or burned clay paving block, as a new article of manufacture.

The combination, to form a roadway pavement, of paving blocks, having an octagonal or other form, designed and arranged so as, when laid, to leave small holes at regularly-recurring intervals, and wooden keys, substantially as described.

77,209.—STRAW CUTTER.—G. W. Parsons, Harrisburgh, Pa.

I claim, 1st, The pinion, O, on the end of the shaft, c, of the driving-gear wheel, in combination with the movable and adjustable brace, N.

2d, The internal gear wheel, H, in combination with the driving-gear wheel K, whose shaft is supported by a movable and adjustable brace, as set forth.

3d, The movable and adjustable brace, N, supporting the large gear wheel, K, in combination with the cog pinion, I, on the knife shaft, D.

4th, The pinion, P, fitting on and over the pinion, O, in combination with the shaft, c, and driving-gear wheel, K.

5th, The combination, in a straw cutter, of a feed roller whose shaft moves up and down, with the driving-gear wheel, K, and pinion, O, when said wheel and pinion are supported by an outside brace.

6th, The employment of detachable counterbalances, F F, on the arms of the knife-shaft, D, when combined with a single adjustable rotary knife.

7th, Operating the feed roller, C', of a straw cutter by means of the disks, R, when constructed with cog teeth, f f, disconnected radially from the hubs thereof, in the manner and for the purpose as described.

8th, The screw nut, T, elastic washer, g, and fixed driving washer, S, with radial ribs, in combination with radial ribs on the hub of the fly wheel, substantially as described.

9th, The construction of the hub and fixed driving washer, with holes, h, for the insertion of wooden pins, substantially as described.

10th, The construction of the shaft, with a hole, g', for the insertion of a wooden pin, with the slot across the hub of the fly wheel, substantially as described.

77,210.—MANUFACTURE OF BALLS, BLOOMS, AND SLABS OF Malleable Iron.—John Plaver, Norton, England.

I claim the forming a ball, bloom, or slab of iron or steel, made malleable by the operation of puddling, by moving the metal out of the furnace where it has been puddled into a mold or form, in which it is subjected to heavy pressure, substantially as described.

77,211.—CUTTING TOOL FOR PLANING AND MILLING MACHINE.—E. T. Prindle, Aurora, Ill.

I claim the cutting tool, composed of the shank, A, cutter, B, with the shoulder, F, and set screws, D and G, when constructed in the manner and for the purpose substantially as herein specified.

77,212.—CHUTE FOR RIVER NAVIGATION.—I. A. Putnam, Mexico, Me. Antedated April 18, 1868.

I claim the construction of a chute for the passage of boats over the shallow or rocky parts or rapids of a river, in the manner substantially as specified.

77,213.—SELF-WINDING WATCH.—Ulysse Humbert Ramuz, Chaux De Fonds, Switzerland, assignor to Henry Hirsh and Seligman Oppenheimer.

I claim, 1st, The rack or ratchet, E, operated by the lever, D, and connected to the cover, A', and to the works of the watch, substantially as and for the purposes herein set forth.

2d, In combination with the means, substantially as herein specified, for winding the watch by the motion of the hinge, the independent button, H, shaft, h, and crown wheel, J, arranged and connected with each other, and with the hands, and with means for holding the button within the case when not required, substantially as and for the purposes herein set forth.

77,214.—HYDRAULIC ENGINE.—F. Ransom, Buffalo, N. Y.

I claim the engine, A, and pump, G, connected to the supply pipe, N, by the brances, o and p, so as to operate in the manner and for the purpose substantially as set forth.

77,215.—TUMBLER HOLDER.—C. Reistle, Brooklyn, N. Y.

I claim a tumbler holder, having a handle, b, ring, c c, projection, d, and button, e, in substantially the manner described and shown, and for the purposes set forth.

77,216.—DISTILLING APPARATUS.—Jane Riley, Cincinnati, O., administratrix of the estate of John D. Riley, deceased, assignor to H. G. Dayton, Maysville, Ky.

I claim, 1st, A condensing apparatus for stills, consisting of the pan, C, and and vessel, D, and receiving the vapors through perforated upright pipes, f, that are covered by cooling caps, k, substantially as herein shown and described, the pipes, f, passing through the pan, C, in the lower part of which cooling liquid is contained, substantially as herein shown and described.

2d, The above, in combination with a doubler, A, made substantially as herein shown and described.

3d, The water distributer, E, consisting of a pan, from which a series of pipes l l, projects downward, to conduct cooling liquid to the lower part of the condenser substantially as herein shown and described.

4th, The arrangement and combination with each other of the doubler, A, vessel, B, pan, C, pipes, f, condenser, D, having caps, k, and of the distributer E, with its pipes, l, all made and operating substantially as herein shown and described.

77,217.—MITER BOX.—Clark Robinson, Fox Lake, Wis.

I claim, 1st, The combination of standards, C, cross bars, B, and rod, L, constructed to operate substantially as described.

2d, The combination of rods, N, support, S, rod, L, blocks, D, and rods, K, constructed to operate substantially as set forth.

77,218.—BLIND-SLAT FASTENING.—T. F. Rockwell, Yorkville, N. Y. Antedated April 15, 1868.

I claim the pendent plate, , attached to the slat rod, B, and perforated with holes, b, and an oblong slot, c, in combination with the bent wire or rod F, and the socket or guide, D, all constructed, arranged, and applied to the window blind, to operate substantially in the manner as and for the purpose set forth.

77,219.—BRACE FOR BIT.—S. C. Rundlett, Portland, Me.

I claim the arrangement, in the horizontal slot, b, of the slide c, having the shoulder, b, slot, d, edge, e, rod, l, spiral, k, and adjusting thumb piece, j, as and for the purposes set forth.

77,220.—ATTACHING WHEELS TO AXLES.—George W. Swain, Nashua, N. H.

I claim the combination of the latches, E E', with the hub, A, and ring, H, made substantially as described and for the purpose set forth.

77,221.—ROTARY STEAM ENGINE.—Peter Shellenback and John Augsburger, Middletown, Ohio, assignors to Peter Shellenback and James Hudson.

We claim, 1st, The valves, I I, constructed, arranged, and applied in combination with the nut, A, and its sliding pistons, J, in the manner and for the purpose substantially as described.

2d, The combination, in a rotary steam engine, of the slotted block, B, and lugs, m, curved slotted arms, n n, levers, r s, and their connecting mechanism, for reversing the action of the engine, in the manner and for the purpose specified.

3d, The arrangement of the induction orifice, D, in relation to the exhaust pipe, E, and the valves, I I, and pistons, J, in the manner and for the purpose described.

77,222.—BEE HOUSE AND HIVE.—Wm. M. Simpson, Davisburgh, Mich.

I claim the construction of a bee house and hives combined, when constructed, arranged, and operating substantially as and for the purposes hereinbefore described.

77,223.—CAR BRAKE AND STARTER.—L. J. Smith, Hamilton, Ohio, and D. S. Knight, New York city.

We claim, 1st, The slotted and notched or recessed plate, g, when arranged substantially as herein shown and described, for the purpose of throwing the pinion, a in or out of gear, and also for raising and lowering the rack frame, H, substantially as and for the purpose herein shown and described.

2d, The plate, g, when connected with or part of the sliding bar, G, in combination with the pawl, d, carrying a friction roller, j, and with the clutch, b, and spring, l, all made and operating substantially as herein shown and described.

3d, The slotted sliding plate, g, when arranged as described, in combination with the slide, r, fixed frame, E, and rack frame, H, all made and operating substantially as herein shown and described.

4th, The sliding rack frame, H, in combination with the pinion, a, and with the notched bar, l, and spring pawl, J, all made and operating substantially as herein shown and described.

5th, The device for throwing the spring pawl, J, off the bar, l, consisting of the cam, m, slotted plate, plate, p, and sliding bar, K, having two studs, t, and u, all made and operating substantially as and for the purpose herein shown and described.

6th, The bar, K, carrying the studs, t and u, when hinged to the end of the bar, g, and when connected with the adjustable swinging bar, r, all made and operating substantially as herein shown and described.

7th, The rack frame, H, when provided with the pin or stud, w, in combination with the sliding bar, M, and crank, e, all made substantially as described, and operating so as to automatically throw the clutch off the pinion, a, when the rack frame is at either extremity of position.

8th, The rack frame, H, when provided with a notched bar, l, and when fitted around the pinion, a, and axle, B, in combination with the springs, l, or their equivalents, all made and operating substantially as herein shown and described.

9th, A combined railroad car brake and starting apparatus, made and operating substantially as described, and connected with vertical shafts, F F, at the ends of the car, so as to be under complete control of the brakeman, as set forth.

77,224.—BRICK MACHINE.—Peter J. Smith, Philadelphia, Pa.

I claim, 1st, The reciprocating double-acting skeleton clearer, J, arranged and operating substantially as set forth.

2d, The combination, substantially as set forth, of a reciprocating mold, a piston, and an oscillating carrier, with a top plate, A1, and an inclined plane, a', whereby the bricks are compressed during the discharge movement of the mold, as set forth.

3d, The combination, substantially as set forth, of an open-ended box, a reciprocating mold frame, pistons, H, a hopper, E, and a plunger, D, with a reciprocating clearer, which sweeps off the bricks discharged by the molds.

77,225.—MACHINE FOR CUTTING KEY SEATS.—William H. Smith and Rollin S. Eddy, La Crosse, Wis., assignors to themselves, Seth Dean and Henry Merrill.

We claim, 1st, In combination with the slotted pin, d, the cutting tool, C, having its front edge provided with saw teeth, and made tapering longitudinally for the purpose of feeding forward in descending and cutting a key seat, substantially as described.

2d, In combination with the reciprocating rack bar, B, the adjustable collars, g' g", or their equivalents, arranged with the shifting mechanism to operate in the machine, as described, for shortening or lengthening the movement of the cutting tool, C, as set forth.

3d, The guard, U, and spring, U', in combination with the cutting tool, C when arranged as herein described, and for the purpose set forth.

4th, The combination of the pulley, K, and pinion, L, on the same sleeve, the pinion, M, wheel, G, and pinion, I, on the same sleeve, wheel, O, and pinion, N, wheel, F, and pinion, F, attached to same shaft, b, rack, B, and clutch, P, all constructed and arranged as described, for the purpose of giving a reciprocating motion to the cutting tool, C, to cut key seats, as set forth.

77,226.—APPARATUS FOR CONSUMING SMOKE AND GAS, AND INCREASING DRAFT IN BOILER FURNACES.—Daniel E. Somes, Washington, D. C.

I claim, 1st, The drawing or forcing, or drawing and forcing, the smoke, gases, vapors, etc., from the fire chamber of a boiler or furnace, or other heating apparatus, and into the same fire chamber again by a current or blast of air, steam, or vapor, or any or all of them, for the purpose and in the manner set forth.

2d, The drawing or forcing, or drawing and forcing, the smoke and other products of combustion from the fire chamber of a steam boiler, furnace, or other heating apparatus, by means of a current or blast of air traversing one or more different channels from such products of combustion, for a given distance, and then made to impinge on said products so as to mingle with and drive or draw them through a common flue into the originating fire chamber, substantially as and for the purpose set forth.

3d, The drawing or forcing, or drawing and forcing, the products of combustion from the fire chamber of a flue or puddling or other furnace, or steam boiler or other heating apparatus, through the flues of another steam boiler or other heating apparatus, by means of a current or blast of air, or steam or vapor, substantially as set forth.

4th, The combination of the shell, A, and the flues and flue spaces of a steam boiler, with the chamber, D, and its flue openings, a a', and an air pump, fan blower, or equivalent device, substantially as and for the purpose set forth.

5th, The chamber, D, when divided by a partition plate, d d', and combined with a steam boiler or other heating apparatus, substantially as and for the purpose set forth.

6th, The connection and arrangement of the perforated pipes, F and I, with the shell, A, and flue spaces of a steam boiler, or with the chamber, D, or with both, substantially as and for the purpose set forth.

7th, The combination of the air chambers, O O', and pipes, P Q, or their equivalents, whether on the outside of the shell of a boiler or other heating apparatus, or extending through the interior of the same, substantially in the manner and for the purpose set forth.

8th, The combination of the pipes, P Q, or their equivalents, with their interior steam pipes, fig. 11, for the purpose set forth.

9th, The combination of the air chambers, O O', and air pipes, P, or their equivalents, with the flues of a steam boiler or other heating apparatus, substantially as and for the purpose herein set forth and shown in fig. 13.

10th, Heating air by forcing or drawing it through pipes or channels, along or around the shell, or through the interior of a steam boiler, substantially as set forth.

11th, Oxygenizing gas and smoke, as and for the purpose set forth.

12th, The pipes, P and Q, substantially in the manner and for the purpose set forth.

13th, The smoke and air tubes, substantially as shown in fig. 12, and for the purpose set forth.

14th, Generating steam, as set forth and for the purposes described.

77,227.—CORN SHELLER.—Joseph Warren, Lodi, Ohio.

I claim the case, A, having one of its sides provided with a circular depression around the axis of the disk, in combination with the segmental discharging tube, J, in the manner and for the purpose specified.

77,228.—CHAIR SEAT.—G. A. Watkins, Proctorsville, Vt. Antedated April 6, 1868.

I claim a chair or other seat or bottom constructed substantially as described, of a web of splints, D, secured at their ends by means of a rabbet, a, made in and around the face of the frame, A, in combination with the strips, C, held to their places by a strengthening band or hoop, E, essentially as specified.

77,229.—LOOKING GLASS.—Urban A. Woodbury, Morrisville, Vt.

I claim the shaft or pin, G, with its arm, E, and arm, I, connected to glass, B, and to bar, D, in such a manner that the glass can be revolved or adjusted and held at any desirable angle to the bar, D, and glass, A, as and for the purpose herein set forth.

77,230.—MODE OF PRODUCING DESIGNS FOR PAPER.—Walter Bentley Woodbury, London, Great Britain.

I claim the peculiar method, hereinbefore described, of producing transparent designs or water marks upon paper from reliefs or intaglios obtained by the aid of photography, and also of producing, by the same means (with the interposition of paper charged with a greasy substance), of designs, either directly upon stone, or which may be transferred on to stone, for printing by the ordinary lithographic process.

77,231.—PRODUCTION OF ORNAMENTAL SURFACES FOR JEWELRY, ETC.—Walter Bentley Woodbury, London, Great Britain.

I claim the production of surfaces to be used for jewelry and other ornamental purposes by the aid of photography, substantially as hereinbefore set forth and described.

77,232.—PRODUCING SURFACES FOR PRINTING FROM PHOTOGRAPHS.—Walter Bentley Woodbury, London, Great Britain.

I claim, 1st, The method hereinbefore described of improving or adding pictorial effects to the gelatin reliefs by painting thereon by hand with a colored solution of gelatine.

2d, Producing such gelatin reliefs entirely by hand, as hereinbefore described; and

3d, Producing the metallic intaglio from the gelatin reliefs by pressure, substantially as hereinbefore described.

77,233.—WHIP HOLDER.—Alva Worden, Ypsilanti, Mich.

I claim making the clasping extension or extensions a part of one of the jaws of the whip socket, and substantially in the manner and for the purpose herein described.

77,234.—SURCINGLE.—S. V. R. York, Antwerp, N. Y.

I claim the combination of the series of rings, numbered 1 to 13, inclusive, with the surcingle, A and B, long line or rein, D, pastern straps, C and F, and foot strap, E, arranged and applied in the manner and for the purposes shown and described.

77,235.—BITTING ATTACHMENT.—S. V. R. York, Antwerp, N. Y.

I claim the combination, with the neck strap, A, provided with the ring, B, of the elastic webbings, b b, cords, E E, and bearing rings, C C', arranged applied, and operating substantially as and for the purposes set forth.

77,236.—ANIMAL POWER.—Joseph J. Adgate, Liberty, N. Y.

I claim, 1st, A machine for utilizing and economizing animal power, composed of a platform wheel, L, rotating in bearings in a vibrating arm, J, adjustable at any required angle by the supporting attachment, I, held upon the circular projection, K, substantially as shown and described.

2d, The rotating supporting attachment, I, furnished with notches or teeth, a3, in combination with the circular projection, K, and the notches, a1, on the end piece, A, substantially as shown and described.

3d, The device for tightening the supporting attachment, I, upon the circular projection, K, by means of the bolt, c2, and the opposite inclined faces on the attachment, I, substantially as shown and described.

4th, The vibrating arm, J, formed with the projection, c, in combination with the movable bearing, e1, and the spindle, M, substantially as shown and described and for the purposes set forth.

5th, The slots, c and a2, in combination with the bolt, c2, substantially as shown and described and for the purposes set forth.

6th, The manner of joining the end pieces, A and A', with the perch, B, by mortises or slots, and wedge-shaped and dove-tail tenons, substantially as shown and described and for the purposes set forth.

7th, The double-acting friction brake, G, in combination with the wheel, E, substantially as shown and described and for the purposes set forth.

8th, The crank pin, O, arranged to be adjusted in a radial slot in a wheel, F, and secured in place by means of nut and washers, operating substantially as and for the purpose set forth.

77,237.—APPARATUS FOR RAISING SUNKEN VESSELS.—George M. Allerton, New York city.

I claim, 1st, A series of casings, provided with eyes around their edges, to be secured to the vessel by spikes, in combination with separate air bags introduced within said casings, and capable of inflation, as and for the purposes specified.

2d, An escape air tube, extending below the air bag, substantially as and for the purposes set forth.

3d, A series of air bags, connected to the supply pipe, d, by the tubes, e, in combination with cocks, c' d', as and for the purposes set forth.

77,238.—COMBINED CORN PLOW, PLANTER, AND CULTIVATOR.—Isaiah B. Arthur, Stidonsburg, Pa.

I claim the combination and arrangement of the plow, F, plows, M M R R, beams, J K K, roller, I, lever, I', guards, G G, seed box, C, slide, e, lever, L, shaft, S, and wheel, B, when the said parts are constructed, combined and arranged so as to operate substantially as and for the purpose specified.

77,239.—LARD PRESS.—Solomon S. Avis, Penn's Grove, N. J.

I claim the screw, D, cross bar, E, links, h h', follow block, G, cylinder, I, chamber, m, spout, l, and eye plates, A, all constructed, combined, and arranged substantially as shown and described and for the general purpose set forth.

77,240.—QUARTZ CRUSHER.—Benjamin Babbitt, N. Y. city.

I claim, 1st, The toggles, C, provided with or connected to the shoes, C', in combination with the slides, E, and rubber or other springs, F, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The securing of the periphery or shell, u, of the roller, J', to its shaft, g, by means of the india-rubber heads, r r, expanded by the fixed collars, q, loose collars, o, and the nuts, t, or their equivalents, all arranged substantially as and for the purpose herein set forth.

3d, The eccentrics, d d, applied or arranged in relation with the slides, E, of the toggles, substantially as and for the porpose specified.

77,241.—MACHINE FOR MAKING PEGS.—Juan S. L. Babbs (assignor to himself and J. B. Ford), New Albany, Ind.

I claim, 1st, The splitting knife, q, and cutting bits, p p, on the under side of the movable head, K, in the sliding frame, F, when arranged to operate substantially as specified.

2d, The arrangement of the table, M, upon the ways, I, screw shaft, w, ratchet wheel, L, double pawls, v v, levers, R and N N, connecting strips, P P, and spring, T, in combination with the movable frame, F, the several parts being constructed to operate substantially as set forth.

77,242.—PLOW LAND SIDE.—Jerome Bacon, Medina, Wis.

I claim, 1st, The ears, C, attached to the shoe, B, by which the shoe is secured to the land side, thus relieving the rear of the land side from all weight and wear, substantially as described.

2d, The slots, d, in the ears, C, by which the shoe is made adjustable, substantially as and for the purpose set forth.

3d, The adjustable shoe, B, applied to a land side, A, in the manner described, and provided with ears, C, having slots, d, adapted to fit over bolts, e, fixed in the land side, A, substantially as and for the purpose herein set forth.

77,243.—FLOOR CLAMP.—J. H. Baker, Saratoga Springs, N.Y.

I claim the arrangement of the pivoted arm, F, and slotted extension arm, F', both having ratchet teeth, and secured together by a set screw, for forcing one board to another, or two or more boards of different widths, constructed to operate substantially as herein set forth.

77,244.—HARVESTER RAKE.—C. L. Barritt, Richland, Mich.

I claim, 1st, The arrangement and combination of the driving pulley, P', or equivalent gear wheel, stud pin, p, and slotted radius bar, E, with the rocking shaft, F, and connected rake, R, substantially as and for the purpose herein described.

2d, The stationary arm hook, H, in combination with the spring catch rod, I, when connected and arranged relatively with the rocking shaft, slotted radius bar, and frame aforesaid, for the elevation of the rake during its return stroke, substantially in the manner as set forth.

77,245.—BITTERS.—John Bender, Lonaconing, Md.

I claim a medical compound or composition, formed by combining the above-mentioned ingredients, substantially as described.

77,246.—FORE-PART IRONS.—James Blease, Richmond, Ind.

Antedated April 25, 1868.

I claim adapting the tool, a, to the different thicknesses of the soles by means of the adjustable lips, substantially as set forth.

Also, adapting the tool, a, to the different purposes herein specified by means of the detachable lips, as shown and described.

77,247.—HAY RAKER AND LOADER.—J. Marcus Boorman, Scarborough, N. Y.

I claim, 1st, So pivoting the apparatus to the vehicle that it may be tilted to bring the driving pinions, m, out of gear with the toothed rims or spur wheels, b, on the rear wheels of the vehicle, substantially as and for the purpose specified.

2d, The attachment of the forks, h, to the endless belt by means of the plates, n, furnished with lips, e", and the studs or rivets, f", substantially as and for the purpose specified.

3d, The transverse rod, n, and pins, s', in combination with the series of slats, r, their side frames, s, and the frame, A, supporting the carrier belts, B, whereby the slats, r, with their side frames, may be readily detached, substantially as and for the purpose specified.

77,248.—SAFETY TRUCK.—S. Y. Bradstreet, Monticello, Iowa.

I claim, 1st, The combination of the inclined grooved wheels, C C, with the horizontal bracing wheels, F F, substantially as and for the purpose set forth.

2d, The spring, J, in combination with the sliding plate, G, and fixed plate or block, H, substantially as and for the purpose set forth.

3d, An auxiliary truck, provided with inclined wheels, C C, and bracing wheels, F F, and sliding vertically in guides, H H, in the manner and for the purposes indicated.

4th, The combination of the plates, G G, with the wheels, C C F F, the spindles, D D, having shoulders, d d, and the nuts, a a, substantially as and for the purpose specified.

5th, The guide blocks, H H, when supported by pivots, M M, working in elongated bearings, in the manner and for the purposes described.

6th, The rubber cushions, e e, when used in combination with the auxiliary safety truck above described, in the manner and for the purposes specified.

77,249.—MACHINE FOR WOOL BURRING.—Louis Brumbach, Reading, Pa.

I claim the receptacle, G, arranged in respect to the slatted and toothed rollers of a wool-burring machine, as described, and so balanced that it will be raised by a burr carried beneath it, and will fall with its edge in contact with the fleece before the slatted roller strikes the burr, all as and for the purpose described.

77,250.—VEGETABLE SLICER.—Isaac Bullard, Dedham, Mass.

I claim the disk, C, with an opening, F, and cutting plate, a, in combination with the rim, A, and plate, D, and the point, E, and knife edge, H, all substantially as and for the purpose shown and described.

77,251.—FARM GATE.—E. P. H. Capron, Springfield, Ohio.

I claim, 1st, A gate, consisting of the longitudinal bars, A, cross bars, B C and E, braces, E F, connnecting bar, a, and ratchets, e, constructed and arranged to operate substantially as herein described.

2d, In a gate, adjustable as described, the use of a pin, f, for the purpose as herein set forth and in the manner described.

77,252.—WASHING MACHINE.—H. J. Case and F. J. Johnson, Sugar Grove, Pa.

I claim an improved washing machine, consisting of a box, A, having mounted therein the grooved roller, B, in combination with the grooved rollers, C and D, mounted respectively in the arms, E and F, hinged independently of each other and provided with the cross bars, c and d, all constructed and arranged to operate substantially as herein described.

77,253.—DRYER.—Solon L. Cheney, Wooster, Ohio.

I claim, 1st, In an apparatus for drying fruit, the arrangement of the furnace, D, chamber, s, drying oven, A, pipe, p, and aperture, s', by which the cold air is caused to traverse the whole length of the furnace, in contact with the floor of the drying oven, in order to thoroughly heat it and utilize its heat, substantially in the manner and for the purposes specified.

2d, In an apparatus for the purpose specified, the flange, m, and wall, w, in combination with the aperture, r, and damper, r1, substantially as and for the purposes set forth.

3d, The non-conducting beds, t t, when arranged along the bottom of the drying oven, and leaving the space, u, between them, for the purpose specified.

4th, The regulator, E, when constructed with the openings, e e, arranged in the manner and for the purposes specified.

77,254.—LAMP BURNER.—George Chinnock, New York city, assignor to City Manufacturing Company, Waterbury, Conn.

I claim in kerosene and like burners, the detachable annular transparent rim or plate, E, arranged in relation to the cone, C, perforated disk, D, and transparent shell, A*, substantially as herein shown and described.

77,255.—MACHINE FOR PLANTING CORN.—D. Chipman and Wm. F. Chipman, Mount Carmel, Ill.

We claim, 1st, The combination of the loose wheels, b, provided with cams b3, ratchet wheel, b1, and spring pawl, b2, arranged and operating substantially as and for the purpose set forth.

2d, The combination of the slides, c c2, levers, D D', and springs, d d', arranged and operating substantially as and for the purpose set forth.

3d, The hand lever, a', pivoted to the swinging arm or standard, a, and operating substantially as and for the purpose set forth.

77,256.—WATER WHEEL.—Jacob Clark, Clarksville, Pa.

I claim, 1st, The wheel having the shaft, B, the plate, B', and the two series of buckets, the latter constructed in the form described, and arranged one above and one below the plate, B', substantially as specified.

2d, The buckets, c c, having the curves v and w, in combination with the plate, B', substantially as and for the purpose specified.

77,257.—ROOFING MACHINE.—Jas. H. Cole, Adrian, Mich.

I claim, 1st, Supporting and guiding the rolling instrument, A, by means of the ways, F F, substantially as and for the purpose set forth.

2d, The guide, J, when applied at the end of the bed, G, substantially as and for the purpose described.

77,258.—WEEDING HOE.—Andrew Coleman, Red Bank, N.J.

I claim, 1st, A weeding hoe composed of a succession of connected corrugations, B B B, etc., formed from the same plate of sheet metal, substantially as and for the purpose shown and described.

2d, The points, D D D, etc., substantially as shown and described, in combination with the corrugations, B B B, etc., all as and for the purpose set forth.

77,259.—APPARATUS FOR DISINTEGRATING ORES.—Jerome B. Cox, San Francisco, Cal.

I claim disintegrating or reducing any gold bearing material by means of agitation and friction with water, so as to permit of the separation of the gold from such disintegrating material, by the ordinary means of sluice box amalgamation, etc.

77,260.—DOUBLE SHOVEL PLOW.—A. J. Craig, Ashmore, Ill.

I claim, 1st, Adjustably attaching the plow standards, D, to the rear ends of the beams, A, by means of the vertical cross heads, a', formed upon the said rear ends of the said beams, substantially as herein shown and described and for the purpose set forth.

2d, Adjustably connecting the handles, F, to the beams, A, and plow standards, D, by means of the uprights, G, constructed and arranged substantially in the manner herein shown and described and for the purpose set forth.

77,261.—SELF-LUBRICATING BOX FOR SHAFTING.—Wellsly W. Crane, Auburn, N. Y.

I claim the combination of the loose, hanging interior bearing, O, slotted in its center, and provided with a depending tube, C, with the elongated receiver E, having a circumferential groove, and suitable bearings for the journals of the hanger, O, to rest on, the whole constructed and used substantially as specified.

77,262.—NAIL MACHINE.—F. Davison, Richmond, Va.

I claim, 1st, The rotary wheel or die, in combination with the plunger, or die, J, vibrating cutter, L, and box, M, all arranged to operate in the manner substantially as and for the purpose specified.

2d, The feed tube, Q, lined with a suitable non-conducting material, and arranged to operate in connection with the cutter by means of spring bar, S, and cam, F, substantially in the manner as and for the purpose set forth.

3d, The combination of the feed tube, R, box, M, cutter, L, wheel, I, plunger or die, J, and discharging ledges, f f, all arranged for joint operation substantially as and for the purpose specified.

77,263.—TOILET ATTACHMENT FOR BUREAUS.—Henry W. Eastman, Baltimore, Md.

I claim the toilet attachment for bureaus above describe l, consisting substantially of the upright cabinet, B, provide l with horizontal shelves, s, the frame, D, swinging on side hinges, and the mirror, M, hinged to the frame D, and provided with an adjusting rod or cord, r, the whole together in the manner and for the purposes specified.

77,264.—REVERSIBLE KNOB LATCH.—Henry H. Ellwell, South Norwalk, Conn.

I claim, 1st, The hub, D, when adapted to be moved longitudinally with its axis through the lock case, to release the latch and admit of its being turned, substantially as described, for the purpose specified.

2d, In combination with the sliding hub, D, the flange, l, surrounding the hole for the passage of the hub, upon the inside of the case, whereby said hub, when operated to release the latch, will not be displaced laterally, as herein shown and described.

3d, The arm, j, of the bar, E, arranged as shown, and in such relation with screw holes, k, as to cause, when the lock is screwed to the door, the arm, j, to bear against the hub, D, and prevent the latter from moving longitudinally to release the slide catch, as set forth.

77,265.—MILL BUSH.—John M. Evril, Center, Pa.

I claim the box, A, provided with groove J, chambers K, blocks C, wedges e, and bolts, D, all arranged, combined, and used substantially as and for the purposes specified.

77,266.—TICKET HOLDER FOR RAILROAD CARS, ETC.—Oliver G. Fessenden and Seth G. Fessenden, Stamford, Conn.

We claim, 1st, The ticket holder made substantially as described, and its equivalents, for the purposes specified.

2d, The roller, E, and its equivalents, for the purposes specified.

77,267.—DOOR LOCK.—Wm. D. Field, Providence, R. I.

I claim, 1st, Providing the bolt, B, with tongued or grooved edges, substantially as set forth, and combining it with the guide plates, C C, as described, so that it will remain on the lock when the inner plate of the same is removed, substantially as herein shown and described.

2d, Forming the arms, h and l, by means of which the bolt is moved, on a plate, E, which is screwed upon the bolt, so that the tumblers are held in place by the said plate, and can be removed when the same is taken off, substantially as herein shown and described.

3d, The bolt, B, plate, E, oscillating and sliding tumblers, D, springs, f, and revolving tube, G, having a projecting arm, l, all arranged in combination with each other and with the key, F, having changeable wards, and all made and operating substantially as herein shown and described.

77,268.—CLOTHES PIN.—Perry Finley, Memphis, Tenn.

I claim a clothes pin constructed of sheet metal and coated with rubber or gutta percha, in the manner and for the purpose set forth.

77,269.—FERTILIZER ATTACHMENT.—C.C. Foster, Odessa, Del.

I claim, 1st, The mode of sowing phosphate, or any like manure, by means of an attachment constructed and operated as above described, or any other substantially the same.

2d, Wings, W S, combined with pins, P, and shaft, S' H', for the purpose and in the manner above set forth and described.

3d, Rollers, R M, springs, S C P, reversed bearings, R V, the whole combined, constructed, and operated in the manner and for the purpose above set forth and described.

77,270.—RAILROAD CAR HEATING AND VENTILATING APPARATUS.—Samuel W. Francis, Newport, R. I.

I claim the combination with the locomotive of the air tube or conduit communicating with pipes opening into the cars, and a removable heat confining jacket surrounding the said conduit, under the arrangement herein shown and described, so that the said conduit and pipes may constitute either a ventilating or a heating and ventilating apparatus, as herein shown and described.

77,271.—DERRICK.—Charles Fricke, Mobile, Ala.

I claim the arrangement of the shoes or sockets, B B, on the horizontal beam, A, adjustable legs, C C, winding drum, H, and cord, N, provided with a ring, and three small cords, g g g, at one end thereof, when operated as described, and adjusted on the joists of a new building, for the purpose of elevating the material therefor, substantially as herein set forth.

77,272.—PLOW.—William Gallagher, Shullsburg, Wis.

I claim, 1st, The combination of the vertical bar, E with the axle, B, and forward end of the plow beam, F, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the levers, K, with the plow beams, F, and vertical arms or bars, E, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the braces, O, with the axle, B, and plow beams F, substantially as herein shown and described and for the purpose set forth.

77,273.—TRESTLE.—James E. Gedney, Petaluma, Cal.

I claim, 1st, The legs, B, attached to the beam, A, by means of the plates D, bolts, E, and thumb nuts, as herein shown and described and for the purpose set forth.

2d, The combination of the beam, A, extension legs, C, legs, B, removable plates, D, having sockets, d', and flanges for the passage of the bolts, I J, thumb nuts, K L, and plates, M and N, as herein described, for the purpose specified.

3d, Securing the extension legs, C, to the legs, B, by means of the bolts, I and J, thumb nuts, K and L, and plates, M and N, as herein shown and described and for the purpose set forth.

77,274.—CLOTHES LINE HOLDER.—James W. Gladding, Normal, Ill.

I claim the jaws, A, and the tongue, D, constructed, arranged, and operating substantially as shown and described, for the purposes set forth.

77,275.—MANUFACTURE OF PACKING FOR STEAM ENGINES.—James Glanding (assignor to himself, David H. Wilson, and Edward S. Lowry), Philadelphia, Pa.

I claim the process herein described of applying lubricating material to packing, that is to say, introducing the material among the fibrious strands during the plaiting of the latter together, and at the point where they are being united, substantially as specified.

77,276.—SPRING AND BODY BRACE FOR VEHICLES.—Christopher C. Gleason, Wauconda, Ill., assignor to himself and L. M. Kimball.

I claim the levers, a and b, and straps, F F, arranged as described, in combination with perch, A and body, E, the whole arranged and operating as and for the purpose set forth.

77,277.—COTTON BALE TIE.—J. H. Gooch, Cheraw, S. C.

I claim the plate, A, constructed with the depression, a a, the bars, c c1 c2, the tongues, m n, and the slots, B and C C', the latter slot being constructed with the recesses, e e', having the inclined edges, i i', and the whole apparatus operating substantially in the manner and for the purposes set forth.

77,278.—FEATHER DUSTER.—M. A. Goodenough, N. Y. city.

I claim in combination with a feather duster, the elastic stem, B, arranged substantially as and for the purposes herein shown and described.

77,279.—POTATO DIGGER.—Alvah Graves, Marcellus Falls, N. Y.

I claim the suspending frame, A, and flexible or swinging connection, c, in combination with the fork, B, substantially as shown, and for the purpose described.

77,280.—WATER COOLER.—John L. Hadden, Philadelphia, Pa.

I claim a sheet metal water cooler, having the bottom, B, of its inner cylinder, A, made of sheet metal, raised and corrugated substantially as described and shown, for the purpose specified.

77,281.—MACHINE FOR CLEANING EMERY.—J. H. Hawes, Boston, and George H. Bliss, West Stockbridge, Mass.

We claim, 1st, The combination with the cylinder, A, of the rotating rubber, D, of serpentine form, substantially as specified.

2d, The combination of the plate or disk, E, with the cylinder, A, and rubber, D, for operation together as described.

77,282.—BELT CLASP.—Jacob H. Hawes, Boston, and George H. Bliss, West Stockbridge, Mass. Antedated April 25, 1868.

We claim, 1st, The clasp constructed with the leaves, a, and internal lips, serving conjointly to hold the ends of the belt, substantially as herein set forth.

2d, The detachable spring slip, B, constructed with the toothed lips, b, and arranged within the shell of the clasp substantially as and for the purpose specified.

77,283.—SHINGLE MACHINE.—Smith Head, Halifax, Pa.

I claim, 1st, The arrangement in a sawing machine, of the four saws, C C1 C2 C3, the two mandrels, a a', each bearing two of the four saws, and the oscillating arms, L L', for the purpose of communicating a reciprocating motion to the mandrels, when used in connection with two bolt carriages, D D', one on each side of the machine, and the whole being constructed, and operating substantially in the manner and for the purposes specified.

2d, The combination of the shaft, F, the branks, G G, the pitman, H H', the arms, I I', moving the carriages, D D', and the oscillating post or shaft, K, having the lateral arms, M M', and the longitudinal arms, L L', all the parts being constructed, combined, and operating together substantially as and for the purposes set forth.

3d, The edging apparatus above described, consisting of the mandrel, R, working in the sleeve mandrel, R', and adjusted therein by the set screw, s, the mandrels bearing the auxiliary saws r and r', when constructed and operated substantially as and for the purpose described.

77,284.—PULLEY.—Frederic Hewitt, Newark, N. J.

I claim, 1st, The pulley constructed with the divided hub and the detachable rim, substantially as herein set forth, for the purpose specified.

2d, The combination of the divided rim, the wrought iron arms formed with connecting parts, ax, and the divided hub, substantially as herein set forth, for the purpose specified.

77,285.—TUBULAR STRUCTURE.—Wm. F. Holske, N. Y. city.

I claim, 1st, The rings, A, formed with a groove, a, on each side, and provided with breaks, b, and ears, d', substantially as and for the purpose described.

2d, In combination with the above, the staves, B, tongued and grooved, and formed with tenons, substansially as and for the purpose set forth.

3d, The combination of rings, A, staves, B, and tie rods, C, all constructed and arranged substantially as described.

4th, The rings, A, when provided with loops, D, substantially as and for the purpose set forth.

77,286.—APPARATUS FOR DIFFUSING LIQUIDS.—Chas. Hodge Hudson, Roxbury, Mass.

I claim, 1st, In an apparatus for atomizing liquids, the use of a hydrostatic blower, substantially as described, in combination with an adjustable reservoir for supplying a head of water which will produce more or less pressure in the air vessel or blower, as may be required.

2d, The combination of the cans, A and B, and tube, D, constructed and operating substantially as described.

3d, In an apparatus for applying hydrostatic pressure to produce a current of air to operate an atomizer, a regulating device, substantially as herein described, acting automatically, to adapt the apparatus to the use of an excessive head of water without affecting the strength or evenness of the air current.

4th, In an apparatus for applying hydrostatic pressure to produce a current of air to operate an atomizer, a regulating stop cock in the tube leading from the air vessel to the atomizer, to vary or stop the flow of air, substantially as described.

77,287.—SPECTACLES.—Edward Hunter, Philadelphia, Pa.

I claim the nose piece, C, adapted to projections, b, on the frames of the spectacles, for adjustability of the same, substantially in the manner set forth.

77,288.—STEERING APPARATUS.—Peter H. Jackson, New York city.

I claim the right and left handed screw shaft, c, set in vertical sliding boxes, in combination with the arms, l, that are jointed in pairs to the nuts, m, and extend to the gudgeons, t, of the rudder head, as and for the purposes specified.

77,289.—VISE.—Abiezer Jameson, Trenton, N. J.

I claim, 1st, The combination of a plate, B, jaws, A A', and screw, F, connecting the said jaws, the whole being arranged and operating substantially as and for the purpose specified.

2d, The combination of the said sliding jaws, A and A', movable plate, B, and lower permanent plate, D, the whole being constructed and arranged for the lateral and longitudinal adjustment of the jaws, substantially as herein described.

77,290.—CRYSTAL FOUNTAIN.—John C. Johnson, Louisville, Ky. Antedated April 17, 1868.

I claim the crystal fountain above described, having the cylinder, A, supply pipe, B, pipes, C D, faucets, E F, valves, G H, and bent pipes, I K, communicating with the fountain jet, the whole apparatus being constructed, combined and arranged substantially in the manner and for the purpose specified.

77,291.—TEA AND COFFEE POT.—Amasa C. Kasson (assignor to himself and Nelson C. Gridley), Milwaukee, Wis.

I claim, 1st, A tea or coffee pot consisting of an upper chamber for the tea or coffee, and a lower chamber, B, for hot water, with an outer central tube, C, attached, and cover, D, with tube, E, whistle, F, and hood, I, all constructed and arranged substantially as described.

2d, In combination with the hot water chamber, B, and central tube, C, the cover, D, with hood, I, and tube, E, when constructed and arranged substantially as herein described.

3d, The cover, D, with the tube, E, and conical deflecting tube or hood, I, attached substantially as described.

77,292.—COTTON SCRAPER.—I. J. Kidd, Young's Settlement, Texas.

I claim the cams, C C, in combination with the horizontal bars, H H, beam, L, and plows or scrapers, P P, when constructed, arranged and used substantially as and for the purpose specified.

77,293.—COTTON CHOPPER.—I. J. Kidd, Young's Settlement, Texas.

I claim, 1st, The knives, K K, secured to the disks, H H, and shaft, C, when constructed and operated substantially as and for the purpose specified.

2d, The arrangement of the shafts or axles, B and C, and their cog wheels, D and E, disks, H H, and knives, K K, with the frame, A, provided with cross bar, H, longitudinal pieces, g g, and the plows, L L, substantially in the manner set forth.

77,294.—COLLAR MACHINE.—H. F. Knapp, New York city.

I claim the knives and cutters, I M K, cutting block, D and cutter, L, arranged to operate together, essentially as herein set forth.

77,295.—BELT COUPLING.—C. W. Theodore Krausch, Philadelphia, Pa. Antedated April 21, 1868.

I claim, 1st, An adjustable belt or band clasp (coupling), by means of which also the degree of tightness of a belt or band can be effected.

2d, A belt clasp, combined with a belt tightener, substantially in the manner as and for the purpose set forth.

77,296.—MACHINE FOR TRIMMING TEAZLE.—Elisha Leffingwell, Sempronius, N. Y. Antedated April 16, 1868.

I claim, 1st, The tubes, J J, constructed substantially as described, and used with the pulleys, K K, and their revolving blades, e e, as and for the purpose set forth.

2d, The cutter bar, o, with its cutters, s s, in combination with the tubes, J J, as and for the purpose set forth.

77,297.—TIRE SHRINKER.—John Macy, Pine, Oregon.

I claim the fixed bed, B, provided with the fixed and adjustable clamps, a a', in combination with the sliding plate, C, actuated by the cam lever, D, and the clamps, G G', fitted to the uprights, E E, F F, when all said parts are constructed and arranged in the manner substantially as and for the purpose set forth.

77,298.—GAS METER.—James W. Mahlon, Brooklyn, N. Y.

I claim, 1st, The combination, with the measuring or working chambers, of separate water escapes or outlets and lower receiving chamber or compartment, with valve or valves, for operation in such manner as that the several chambers making up the body of the meter may be relieved of water collecting in them without disturbance or removal of the meter, and when the valves are closed, without establishing communication between the several chambers to interfere with the operation of the meter, substantially as specified.

2d, The combination with the supply chamber, to which gas is admitted from the measuring compartment, of a water escape pipe or outlet, lower water receiving chamber and valve controling said outlet within the latter compartment, essentially as herein set forth, and whereby a single water escape may serve to relieve both the supply chamber and inlet and outlet pipes, also whereby the meter is better protected against being tapped of gas drawn from the inlet pipe, as specified.

3d, In combination with the several nozzles or outlets to the water escape pipes, or their equivalents, from the several gas chambers that compose, or mainly so, the body of the meter, a valve or valvular device, arranged to simultaneously control said outlets, essentially as described.

4th, The hollow and perforated water discharging screw or its equivalent, in combination with the valve or valular device that controls the water nozzles or outlets to the several chambers, or certain of them, of the meter, substantially as specified.

5th, The combination with the water discharging screw, or its equivalent, and valve or valvular device controling the outlets from the several chambers of the meter of an elastic or spring like connection interposed between said screw and valve, essentially as herein set forth.

77,299.—HORSE HAY FORK.—H. C. Mapes, Rushville, N. Y.

I claim the catch, g, and the clamping tine, f, formed with notches, f', arranged in relation with each other, and with the ball, d, tines, a, and handle, b, substantially as and for the purpose specified.

77,300.—MAGIC LANTERN.—L. J. Marcy, Newport, R. I.

I claim, 1st, Forming the box or body of a magic lantern, or other lens lantern, with a double shell, A D, and double chimney, C E, substantially as shown and described and for the purpose set forth.

2d, The slide plate, K, lever, G, grooves, d d and f f, and tube plate, Q, all constructed and operating substantially as shown and described and for the purpose set forth.

3d, The double cylinder, A D, caps, I and G, chimneys, C E, and lens, J J, all constructed and operating together substantially as shown and described and for the purpose set forth.

4th, The cylindrical form of the box or body, A, of a magic or signal lantern, when the diameter of the same is just sufficiently large to contain the condensing lens or bull's eye (or a reasonable approximation thereto), substantially as shown and described, for the purpose of rendering the said lantern more portable, in combination with a sheet metal chimney and condensing lens or bull's eye, J J, all as set forth.

77,301.—STEAM SLIDE VALVE.—Jacob Martin, Cairo, Ill.

I claim, 1st, The combination of the steam chest, B, exhaust pipe, M, and cylinder, J, substantially as herein set forth.

2d, The combination of the suspended plate, I, piston, K, piston rod, N, and spring, L, substatially as shown and described.

77,302.—WATER WHEEL.—M. H. Matson, Horseheads, N. Y.

I claim, 1st, The water space of the curb and wheel, each divided into compartments, 1 2 3, etc., by the partitions, b b, b' b', when combined with the eccentric chutes, a a, the whole arranged and operating in the manner and for the purposes herein set forth.

2d, The combination with the above of the series of gates, d, and the arrangement of the hoop, C, arms, g, and lugs, f, for operating the gates, in the manner and for the purposes specified.

3d, The combination of the convex bearing block, l, bearing, n, with upturned edges to retain the oil, and the adjusting nut, m, the whole so operating as to suspend the wheel, and allow its vibration from the axial line, as set forth.

4th, The combination of the clamping, disks, t t, and bolts, u u, with the globe coupling, S, operating in the manner and for the purpose herein set forth.

77,303.—MACHINE FOR FACING GRINDSTONES.—Reuben B. Matthews, Fitchburg, Mass.

I claim, 1st, Applying the carriage, A, and its above described mechanism, to the shaft, a, in such manner as to be enabled to effect its horizontal adjustment, or angle of departure from a horizontal line, substantially as before described.

2d, The combination and arrrangement, with the carriage, A, of the tubular screw, k, hollow shaft m, and beveled gear, q, the whole being arranged and operating as before set forth and explained.

3d, In combination with the carriage, A, screw k, shaft, m, beveled gear, q, and shaft, b, the screw, y, as supported upon the adjustable post, w, and provided with the beveled gear, s, in the manner and operating as before set forth.

77,304.—MATERIAL FOR DENTAL PLATES AND FOR OTHER PURPOSES.—John A. McClelland, Louisville, Ky.

I claim, 1st, The methods of preparing and working collodion and its compounds to form an improved material, substantially as herein described.

2d, Forming dental plates of the improved material, prepared as herein described.

77,305.—APPARATUS FOR MEASURING CLOTH.—George R. McIntire, Houghton, Mich. Antedated April 16, 1868.

I claim, 1st, The combination and arrangement of the three rollers, B B C, with the cam, e, hinged dog, d, ratchet wheel, r, dial, D, index, f, and movable frame, a, the whole operating substantially in the manner and for the purpose indicated.

2d, The cloth measuring instrument above described, consisting of the parts referred to in the first clause of this claim, in combination with the shafts, M M', screw, N, guides, G G, and board, H, all constructed, arranged and described substantially as and for the purposes specified.

77,306.—SPRING BRACE FOR CARRIAGES, ETC.—L. C. Miller, Humphrey, N. Y.

I claim an improved brace, A, for carriage and other springs, constructed substantially as herein shown and described, that is to say, consisting of a longitudinal bar or stem, a1, having two inclined or curved arms or branches, a2, projecting at one end, and having two arms, a3, projecting from its opposite sides, as and for the purpose set forth.

77,307.—FLUID METER.—C. E. Moore, Elizabethport, N. J.

I claim the combination of the hinged meter pan, K, arm I, weight, J, cock, d, pawl, i, ratchet wheel, k, and any suitable registering dials, all constructed and operated substantially as shown and described, and for the purpose set forth.

77,308.—BUILDERS' AND PAINTERS' SCAFFOLD.—Charles Mudge, Ovid, Mich.

I claim, 1st, The slide bars, M, the supports, N, standard braces, Z, the plates, C, provided with slots, E, spur hooks, D, vibrating rods and springs, P, when arranged and operating in connection with hanger plates, F.

2d, The standards, G, the platform supporters H, projections, 3, pawl or chip, X, operated by ropes, R and Q, pulleys, T, and rod, K, when constructed and operating substantially as and for the purposes set forth.

3d, The combination of the forgoing named parts with the adjustable hook plates, I, and braces, L, when arranged, constructed and operated substantially as herein shown and described.

77,309.—CLAMP FOR VEHICLE SEATS.—H. E. Murray, Chester, N. Y.

I claim, 1st, The plate, C, with its rack extension, D, with its pawl, E, the lever, B, hook, K, and link, H, with its foot catch, I, all constructed and operating together substantially as shown and described and for the purpose set forth.

2d, The rubber spring, Q, hollow head, a, and hook, K, in combination with the link, H, lever, B, and pawl, all substantially as and for the purposes set forth.

77,310.—DRAY SADDLE.—John O'Mahony, Savannah, Ga.

I claim in a dray saddle the beveled blocks, C C, secured to the leather covering, A, in combination with the pads, D, and grooved bar, B, said blocks C, being secured to the pads at their centers, for the purpose of preventing such pads from flattening upon the back of the animal, under the weight of the dray, as herein shown and described.

77,311.—FOLDING BED.—F. C. Payne, New York city.

I claim the bed composed of the central frame, A, and two end frames, B, beveled at their contiguous ends, and connected by the slotted hinges, c d, in such manner that with the mattress attached thereto, they may be brought or folded into rectangular form without outwardly extending or excrescent parts, substantially as herein set forth.

77,312.—MACHINE FOR BENDING RINGS.—Wm. H. Peckham, New York city.

I claim, 1st, The combination of the revolving axles, B C, adjustable friction rollers D D, upon the concentric bearing plates, d, concentric guides, c, connecting rods, e, and gear wheels, f f, as herein described for the purposes specified.

2d, The device herein shown and described of operating the friction rollers, D D, consisting of the guides, c c, slides, d d, rods, e e, and wheels, f f, all made and operating substantially as herein shown and described.

3d, Adjusting the friction rollers, D D, around the larger roller, C, and with relation to the upper adjustable roller, B, by means of the curved plates d, operated in concentric guides around the roller, C, by the connecting rod, e, and gear wheels, f f, as herein described.

77,313.—BUTTON.—F. J. Perkins, Salem, Mass.

I claim the disk, b, formed with parallel lips, b', in combination with the plate, d, having parallel straight sides, and each slotted as described, for application to the circumferentially grooved stem, a, of the button, essentially as shown and set forth.

77,314.—GAS TUBE.—Edward L. Perry, New York city.

I claim as a new article of manufacture impervious flexible gas tubing, composed of rubber and paper tubes, substantially as and for the purpose described.

77,315.—CLOTHES WRINGER.—M. Pierce, Winona, Minn.

I claim, 1st, The yoke frame, G H, applied to the main frame, A, and carrying lower roller of machine, substantially as described.

2d, Extending the shaft, E, of the upper roller, D, at one side of the wringer, and the shaft, E, of lower roller, D, at the other, so that a crank handle may be applied to one or both at the same time, substantially as described and for the purposes specified.

3d, The wooden spring, J, when constructed, arranged and applied substantially as and for the purpose described.

4th, Making the upper roller, D, of larger diameter than the lower roller, when the shafts of both rollers are extended and in opposite directions, so that the power may be applied to the smaller roller, when it is only desired to use one crank, substantially as described and represented.

77,316.—ENVELOPE.—Charles R. M. Pohle, Richmond, Va.

I claim the manner I connect the different parts and close the whole.

77,317.—DEVICE FOR PREVENTING HORSES FROM DRAGGING WEIGHTS.—Alexander Pope, Jr., Dorchester, Mass.

I claim, 1st, The bar or lever, A B, provided with a cross piece, c, or its equivalent, in combination with cross bar, D, substantially as and for the purposes specified.

2d, The swivelled bar, D, provided with the fastenings, d s, as and for the purpose set forth.

3d, The attachment to a horse's bit of the lever, A B, and swiveled cross bar, D, as and for the purpose described.

77,318.—CHECK REIN SLIDE.—W. B. Potter, Boston, Mass.

I claim the check rein slide, constructed as described, as a new article of manufacture.

77,319.—GATHERING TURPENTINE.—A. Pudigon, Charleston, S. C.

I claim the V-shaped sheet metal gutter, b, substantially as shown and described.

77,320.—TOY.—Joshua Pusey, Philadelphia, Pa.

I claim a toy arranged, constructed and operating in the manner as above set forth and described.

77,321.—PLATFORM BRIDGE FOR RAILROAD CARS.—Amos Rank, Salem, Ohio.

I claim a bridge or footing, C, constructed with recesses, c c, or their equivalent in its side edges, and adapted to be applied between railway cars which are coupled together, substantially as described.

77,322.—MECHANICAL MOVEMENT.—Granvil Rich, Smithville, Mo.

I claim, 1st, The combination of the lever, I, rope or strap, K, wheel, C, rope or strap, L, and wheel, E, all as shown and described.

2d, The combination of the wheel, E, constructed with the hub, c, on one side, and having on the other side a pawl, G, and spring, b, with the ratchet wheel, F, all as shown and described.

3d, The combination of the wheel, E, constructed with the hub, c, pawl, G, and springs, d and b, all as shown and described.

77,323.—COMPOUND FOR TEMPERING CAST-STEEL.—Granvil Rich, Smithville, Mo,

I claim, 1st, The compound, as described, and for the purposes specified.

2d, The process of tempering steel by the use of said compound, as described.

77,324.—HELIOMETER.—Conrad Friedrich L. Risch, Huntingburg, Ind.

I claim, 1st, A heliometer, constructed and arranged to operate in the manner herein shown and described.

2d, The arrangement of the northern and southern polar surfaces on opposite sides of the revolving cube, C, substantially as herein shown and described.

3d, The revolving dial-plates, h, when arranged within the stationary dial-plates, d and e, and when arranged within the circle on which the degrees of longitude are marked, substantially as and for the purpose herein shown and described.

4th, The semi-cylindrical sun-dial, D, when arranged as set forth, and when provided with a gnomon, I, substantially as and for the purpose herein shown and described.

5th, The semi-cylindrical sun-dial, D, when arranged as set forth, in combination with the double polar surfaces of the revolving cube, C, upon which the dials for the northern and southern hemispheres are respectively arranged, substantially as and for the purpose herein shown and described.

6th, The triangular plate, E, provided with a hand or pointer, K, when connected with the revolving cube, and when combined with the semi-annular arc, c, substantially as and for the purpose herein shown and described.

7th, The flange around the plate, E, when provided with a hole at m, for a ray of light to fall upon the opposite arcs, substantially as and for the purpose herein shown and described.

8th, The curved block, l, when attached to the revolving plate, E, and when combined with the arc, c, and when graduated, substantially as and for the purpose herein shown and described.

9th, The plate, when arranged in combination with the cube, C, and arc, c, all made and operating substantially as herein shown and described.

10th, The arrangement of the hour lines, latitude lines, and diagonal lines, on the plate, F, as set forth.

11th, The plate, F, when arranged as set forth, and in combination with the stationary day and night divider, n, on the arc, c, made as described.

12th, The plate, F, when arranged as described, in combination with the plate, E, and arcs, c c, and with the cube, C, all made and operating substantially as herein shown and described.

13th, The plates, E and F, in combination with the sun-dials on the revolving cube, C, made as described.

77,325.—HEATER RANGE.—Abraham K. Sanders, Brooklyn, assignor to himself and John H. Burns, New York city.

I claim, 1st, The arrangement of the flues, o o, and dampers, 7, at the sides of the range in the air-spaces, d, in combination with the flues, g, to the ovens, h h, as and for the purposes specified.

2d, The heating chamber, k, provided with the plates, 8 and 9, in combination with the flues, o o i and p, and ovens, h h, the parts being arranged and operating in the manner and for the purposes set forth.

77,326.—WASHER.—Thomas Shaw, Philadelphia, Pa.

I claim the washer, d, constructed as described.

77,327.—BOILER UPON STOVEPIPE.—Morrill A. Shepard, Bridgeport, Ill.

I claim, 1st, The cone-shaped pipe, A, connected with the vessel, S, as shown and described.

2d, The inverted cone-shape pipe, B, attached to the pipe, A, for the purpose set forth, as specified and described.

77,328.—WHISTLE.—Patrick Slevin, John Slevin, and Francis Slevin, New York city.

We claim the combination of the bow-shaped holder and reed, substantially as and for the purpose described.

77,329.—EXCAVATING VEHICLE.—James P. Smith, Cherry Hill, Pa.

I claim, 1st, The combination of the shovels, D, provided with friction rolls, with the eccentric, F, and wheel, P, said eccentric being adjusted by means of a rod, a, and lever, H, all constructed, arranged, and operating as and for the purpose herein shown and described.

2d, The hollow band, C, provided with a scraper, K, in combination with the wheel, B, when said band is adjustable simultaneously with the eccentric, F, by means of the rod, f, and lever, H, all constructed and arranged as described, and for the purpose specified.

77,330.—STONE-DRILLING MACHINE.—A. M. Southard and W. J. Hobson, Savannah, Mo.

I claim, 1st, The arrangement of the cans V, upon the slotted brace, W, by the bands, z, and bolts, y, for adjusting the same to operate with bars, L L, as set forth.

2d, The slotted plates, x' x', when constructed and used in combination with the bars, L L, for the purposes described.

77,331.—PIPE COUPLING FOR RAILROAD CAR HEATER.—Thomas S. Speakman, Camden, N. J.

I claim, 1st, A pipe, F, having a bell mouth at one end, arranged beneath a car as described, and adapted for the reception of a flexible tube, G, which communicates with a reservoir beneath another car, and slides in the pipe, F, all as set forth.

2d, The reservoir, B, communicating with the tubes, H and G, and having a recess for the reception of a coupling-pin, D, substantially as specified.

77,332.—FILE HANDLE.—H. C. Storrs, New York city.

I claim the internally and externally threaded nut, O, in combination with the chambered handle, A, for holding the shank, c, of the tool, B, substantially as specified.

77,333.—COMBINED SCREEN AND SHOVEL.—Augustus Thayer, Albany, N. Y.

I claim, 1st, A combined scoop and screen, provided with a removable bottom or slide, and a removable or sliding screen, arranged in the manner substantially as shown and described.

2d, The flap or door, C, arranged with a spring to operate in the manner substantially as and for the purpose specified.

3d, The combination of the screen and removable bottom with the flap or door, C, all constructed, arranged, and applied to operate in the manner substantially as and for the purpose set forth.

77,334.—FOLDING BEDSTEAD OR CRIB.—R. S. Titcomb, Gloversville, N. Y.

I claim, 1st, The combination of the plates, F, attached to the bars, D, of the bed frame, with the plates, E, secured to the posts, A, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the plates, F, attached to the bars, D, of the bed frame, with the plates, G, secured to the stationary part, C, of the end boards, substantially as and for the purpose specified.

77,335.—OPERATING THE HARNESS IN LOOMS.—Frederick Traub, Philadelphia, Pa.

I claim, in the combination with the frame, B F, the upper and lower series of levers, and the mechanism for operating the same, arranged as herein set forth and described.

77,336.—STEAM PUMPING ENGINE.—Joshua Tufts, Athens, O.

I claim the provision, in a steam cylinder, of the hollow piston and rod, F and B, communicating with the feed water of the boiler, in the described combination, with a stationary plug, C, substantially as set forth.

77,337.—FELLY DOWEL PIN.—E. D. Tyler, Gibson, Pa.

I claim a tubular metal felly dowel pin, employed substantially as herein described.

77,338.—SUPPORT FOR PASSENGERS IN CARS.—Henry S. Vrooman, Boston, Mass.

I claim a double-acting flexible passenger support in horse railroad cars, constructed substantially as and for the purpose herein shown and described.

77,339.—BED BOTTOM.—Charles Walker, Chester, Vt.

I claim the spring bed bottom, constructed as described, and consisting of the transverse supports, C, spring cross slats, D, blocks, E, springs, B F, slotted slats, A, and loose cross bars, G, provided with pins, H, all constructed, arranged and operating substantially as and for the purposes specified.

77,340.—WASHING MACHINE.—J. T. Wheeler, St. Charles, Ill.

I claim a washing machine, consisting of the box, A, lever, F, gear wheels, C and D, and stirrer, E, provided with the spreading pins, e, when constructed and arranged as herein described and for the purpose set forth.

77,341.—ANIMAL TRAP.—W. J. Woodside, Zanesville, Ohio.

I claim, 1st, The combination of the perforated plate, D, knives, L, sliding block, J, connecting rod, I, crank, H, and shaft, E, with each other, whether said shaft is operated by a weight or spring, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the bait hook, N, short shaft, o, crank, P, and trigger bar, Q, with each other and with the cam, M, upon the shaft, E, for the purpose of tripping the trap, substantially as herein shown and described.

3d, The combination of the bent or hook lever, R, with the cam, M, and trigger bar, Q, for the purpose of setting the trap, substantially as herein shown and described.

77,342.—SUGAR PAN DERRICK.—David Young, East Topsham, Vt.

I claim, 1st, The steadying staff, G, and frame, a b b, substantially as shown and described, in combination with the cord, I, and derrick, A B D, all as and for the purpose set forth.

2d, The block, E, bearing the pulley, e, and held between the arms, B, of the derrick, when said block is slotted for the passage of the vertical bar, G, which steadies the pan as it is elevated by the cord, I, as herein shown and described.

3d, The arrangement of the steadying bar, G, frame, a b b, pulley, e, slotted block, E, arms, B, and elevating cord, I, with relation to the derrick, A D, whereby a series of pans in a row is elevated in a vertical line without removing the derrick, as herein shown and described.

77,343.—MEDICAL COMPOUND.—Robert Alexander, Eugene City, Oregon.

I claim the combination of the foregoing mixtures of medicines, to be used for the cure of cancer in the human system.

77,344.—ATTACHING DOOR KNOBS TO SPINDLES.—William H. Andrews (assignor to Burton Mallory), New Haven, Conn.

I claim forming upon one angle of the spindle a flat surface parallel with the axis of the spindle, combined with a set screw in the neck of the knob, so as to secure the knob to the spindle, substantially as set forth.

77,345.—WAGON BRAKE.—David M. Bailey, Carlisle, Pa.

I claim the manner of securing rubber blocks to a bar in a wagon brake, substantially as specified.

77,346.—WRINGING MACHINE.—Selden A. Bailey (assignor to Bailey Washing and Wringing Machine Company), Woonsocket, R. I.

I claim, 1st, Flanged teeth, with their extremities enlarged and nearly circular in form, and with shanks diminishing toward the hub, substantially as shown and described.

2d, A gear having a separate flange on each tooth, as and for the purpose set forth.

3d, The collars, D, constructed to admit and retain the stiffening rods of the rolls, substantially as described.

4th, The stiffening rods, d, so fitted and held in the collars as to allow end play, substantially as and for the purpose set set forth.

77,347.—NUT MACHINE.—Albert B. Bean (assignor to himself and W. Scranton), New Haven, Conn.

I claim the arrangement of a spring or springs, f, upon the face of the cam, so as to yield at the point of pressure, and relieve the strain upon the machine, substantially as herein set forth.

77,348.—JIB BOOM.—William E. Beman, Portland, Me.

I claim the jib boom, a, when hinged to the bowsprit, in the manner herein set forth and for the purpose specified.

77,349.—SPIT FOR ROASTING MEATS.—Elijah W. Bigelow, Worcester, Mass.

I claim, 1st, The frame, A, with standards, C C', constructed as described, so as to receive the dripping pan, B, and support the spit, D, for the purpose set forth.

2d, The spit, D, provided with the rectangular portion, h, in combination with the slot i, of proper size to fit said rectangular portion, as set forth.

3d, The detachable standards, C C', constructed as described, in combination with the lugs, a a, as and for the purpose set forth.

77,350.—SLED KNEE.—John W. Blake (assignor to Amaziah T. Howes), Jefferson, Wis.

I claim the metallic sled knee, consisting of the upright, A, and brace or braces, B, with their extensions, a b and x, each made and arranged as described, and combined with plates, D and E, in the manner herein shown and specified, the whole arranged and operating as and for the purposes set forth.

77,351.—CORN PLANTER.—John M. Blessing, Jeffersonville, Ohio.

I claim the arrangement of a reciprocating feed bar, J, having the boss, j, in combination with the rollers, I I' G G', and openings, b, as and for the purposes set forth.

77,352.—CHURN.—Caleb H Bradley, Coatesville, Pa.

I claim the construction of flues or passages of escape for the air from the buckets or chambers, with the projecting covering for the mouth of the flues, as and for the purposes herein described and set forth.

77,353.—REEL.—Jarius Brown (assignor to himself and Theodore B. Hubbard), Portland, Mich.

I claim the combination of the adjustable sleeves, H and J, arms, L, bars, M, braces, N, bar, D, having a screw thread, E, and being hinged at C, with the holder, A, wheel, F, and spring, G, all constructed and arranged substantially as and for the purposes described.

77,354.—ADJUSTABLE HARROW.—J. C. Center, Bath, Ill.

I claim, 1st, The harrow, consisting of one or two draft beams, A A', and frame beams, B B' and C C', hinged together as described, and arranged and operating substantially as set forth.

2d, The hinges, D D' and G G', constructed as described, in combination and connection with the parts of the harrow, substantially as herein described and specified.

77,355.—MOP WRINGER.—B. B. Choate, Springfield, Vt.

I claim the bars, A and B, pivoted together and curved as represented bar A, being provided with the hooks, d d, and the two used in combination with the rollers C and D, and a mop pail, as and for the purpose set forth.

77,356.—STARCHING APPARATUS.—W. B. Coates, Philadelphia, Pa., assignor to David Lyman, Middlefield, Conn.

I claim the starching device herein described, consisting of a rigid vessel, A, closing means, B, and a strainer, C, constructed and adapted to operate substantially in the manner and for the purpose herein specified.

77,357.—TENONING CHISEL.—Andrew J. Cochran, Indianapolis, Ind.

I claim the combination of the bits, B B, with the stock, A C, key, D, and right and left screws, when constructed and arranged to operate substantially as described.

77,358.—DUST PAN.—D. C. Colby (assignor to Josiah Humphery), Washington, D. C.

I claim a dust pan, provided with the part, B, so arranged as to serve for the incline on which to receive the dust, and also as cover to the box part, A, for the purposes specified and set forth.

77,359.—VALVE FOR SUGAR PAN.—Lewis Colwell, New York city.

I claim, 1st, In combination with a sugar pan, a valve, inclosed in a globular chest, arranged so as to concentrate the sugar into a solid stream as it issues from the chest and pan into the receiver.

2d, The use of a puppet valve, inclosed in a chest, in combination with a sugar pan, substantially as described.

3d, The use of the breaker, c, on the end of the valve stem, to break the crust of the sugar, and clear the neck of the pan or nozzle of the valve chest and allow a free exit for the sugar, substantially as described.

4th, Arranging the valve stem guide, e, in the chest, substantially as described, by which it, the valve stem and breaker, can be removed out of the chest by simply taking out the screw in the end of said valve stem guide.

77,360.—WAGON BRAKE.—J. B. Cook, Lyons, Iowa.

I claim tongue, C, yoke piece, B, lever, A, rod, K, chains, L L and O O, lever J, brakes, H H, and doubletree, D, all arranged and operated as and for the purpose described.

77,361.—LOOM.—Geo. Crompton, Worcester, Mass.

I claim, 1st, In combination with the shipper lever, the swing latch, t, arranged to hold the lever in position, substantially as set forth.

2d, In combination with a swing latch for holding the shipper lever, the fork, x, rack gear, w, and segment gear, v, operating together, substantially as described.

3d, Combining the shipper lever latch mechanism with the hand lever, z, at the opposite end of the loom, substantially as and for the purpose set forth.

4th, The shipper fork, mounted on the rocking arm, and connected, substantially as described, with the shipper lever.

77,362.—DRYER.—L. J. Crow and G. Sanderson, Fredericksburgh, Ohio.

We claim the metallic furnace, B, when made cylindrical on its upper face and tapering from its mouth to the smoke pipe, C, and arranged under the box, A, with its drawers and ventilating openings, whereby the flow of heat to the fruit is equally distributed, in the manner as specified.

77,363.—KNITTING MACHINE.—J. Dalton, Brooklyn, N. Y.

I claim, 1st, The point slides, C C, arranged in a tilting frame, C', and reciprocated toward and from the needles by the direct action of the jacquard plates, substantially as and for the purpose described.

2d, The spiral stop, A, with its ratchet gear or equivalent, operating with the thread guide and needles, as described, in combination with jacquard cards, B B, and point slides, C C, controlled by said cards for the purpose of narrowing the goods, substantially as herein specified.

3d, The ratchet cam, D, in combination with the spring guide, F, stationary pawl, G, and pawl, H, substantially as and for the purpose herein set forth.

4th, The suspended reciprocating pawl, H, in combination with the ratchet cam, D, and spiral stop, A, and its ratchet wheel, I, substantially as and for the purpose herein described.

5th, The perpendicular slide bar, J, operated by the shoe, K, and cam, L, or their equivalents, and acting in combination with the thread guide, M, and moving, by means of its pawl, H, the spiral ratchet, all substantially as herein described.

6th, The sliding thread guide, attached to the regular thread guide, in combination with the horizontal lever, which acts directly on the upright slide thread gide, and is operated by the upright shaft that drives the spiral ratchet gear, substantially as and for the purpose set forth.

7th, The point slide transverse stay bar, S, turning in contact with the point slides in the direction opposite to its foward movement, substantially as and for the purpose herein set forth.

77,364.—HORSE-HITCHING DEVICE.—F. Deming (assignor to John B. Anthon and Henry A. Wheeler), Bridgeport, Conn.

I claim, in combination with the hook, A, formed upon the plate, B, the spring, C, having one end fixed and the other bearing upon the surface of the plate, and curved so that the surface of the spring bears upon the end of the hook, and so as to close the same in the manner described, and with this combined, the ring, D, as and for the purpose specified.

77,365.—FISHHOOK.—R. A. Fish, Worcester, Mass.

I claim, 1st, The method of adjusting the line to the hook, as shown in fig. 3.

2d, Leaving the end of the wire, A, in such position that by pressure it will turn the point of the hook, C, either up or down, causing it to hook the fish either in the upper or lower jaw, thus overcoming the difficulty of the old style hook, which often slips flatwise from the mouth of the fish without hooking, constructed substantially as and for the purpose shown and described.

77,366.—ICE BREAKER.—Andrew Flannigain, Trappe, Md.

I claim projecting finger beams, D D, combined with the front edge, w, of an inclined frame, A, on either side thereof, and with cutting blades arranged at their intersection with said frame, and operating to cut the ice on the upper and lower sides thereof, all substantially as and for the purpose herein set forth.

77,367.—DOUBLE SLIDING OR TURNING GATE.—R. Fleming, Victory, N. Y.

I claim, 1st, In combination with said gate, and as a component part thereof, the pulleys, O and T, and the pulley, Q, in the stand, E, as above set forth.

2d, The five posts, in combination with the cords, W, and cords, A' and B, when all are constructed in the manner and used as and for the purpose specified.

77,368.—MACHINE FOR SLAUGHTERING HOGS.—J. J. Fouts, Middletown, Ohio.

I claim the construction, combination, and arrangement of the frame, A B, extended rails, C, pulley-supporter, E, with the adjustable platform, I, and windlass, H, in the manner and for the purpose described.

77,369.—EXPANDING MANDREL.—Martin Gardner, Sr., Carlisle, Pa.

I claim, in combination with the mandrel for chucking wheels, pulleys, washers, and other articles, the arrangement of the radial "gibs" and their inclined planes, the longitudinally moving screw cylinder and its inclined planes, and the screw, D, all constructed and arranged as described.

77,370.—PNEUMATIC TOOTH BURR AND DRILL.—George F. Green, Kalamazoo, Mich.

I claim, 1st, The combination of a rotary engine, operated by means of compressed air, with a burr and drill, in the manner and for the purposes set forth and described.

2d, The mode of attaching the burr or drill to the holder, in combination with an engine, as set forth and described, in the manner and for the purpose specified.

3d, The mode of attaching the burr or drill holder to the shaft of the engine, in the manner and for the purpose specified.

4th, The combination of burrs or drills, rotating in one direction, with an engine, as set forth and described, in the manner and for the purpose specified.

77,371.—PORTABLE FENCE.—C. S. S. Griffling, Unionville, Ohio.

I claim, 1st, The post for a portable fence, composed of the pieces, A B C and D, arranged in relation to one another substantially as and for the purpose set forth.

2d, The post, when constructed with side braces, B B, of unequal length, and an inclined sill piece, A, substantially as set forth.

77,372.—ANIMAL TRAP.—Benj. F. Hancock, Monroe, Wis.

I claim the door, F, rod or trigger, h, spring, m, platform, G, and rods, d and c, all constructed, arranged, and operated, substantially as and for the purpose described.

77,373.—ROTARY ENGINE.—Dexter D. Hardy, Cincinnati, Ohio, assignor to Henry J. Behrens, Henry C. Dart, and Edward Dart, New York, N. Y.

I claim, 1st, The concentric fixed hubs, recessed substantially as described, in combination with the two geared shafts, their attached pistons, and the cylinder or case, substantially as set forth.

3d, The pistons, attached to the facing sides of the two disks, secured to their respective shafts, and so arranged that the piston or pistons of one shaft work against the face of the disk of the other shaft, substantially as herein described.

77,374.—FLOUR PACKER.—Silas Hewitt, Seneca Falls Village, N. Y.

I claim the combination of the weighing receiver, T, provided with its hinged bottom, the vertical shaft, E, follower, D, and cam, G, all constructed, arranged, and operated substantially as and for the purpose herein set forth.

77,375.—RAFTER HOOK FOR HOISTING APPARATUS.—David Hicks and Sidney Doty, Pontiac, assignors to themselves, Jerome B. Sweetland, Charles E. Adams, Samuel N. Bronson, and Alonzo Barbour, Oakland, Mich.

We claim the combination of the hooks, A and B, with the lever, D, the latter constructed as described, and pivoted between the plate, C, and lower end of the hook, A, in such a manner that its outer end is extended up the side of the hook, B, and made to force said hook against and penetrate the rafter as specified.

77,376.—MILKING STOOL AND PAIL HOLDER.—L. B. Hoit, Cedar Falls, Iowa.

I claim, as a new article of manufacture, a combined milking stool and pail holder, constructed substantially as described.

77,377.—RACK FOR HATS AND DISHES.—W. W. Horton, Katonah, N. Y.

I claim the combination of the feet, A, standards, B, slotted at E, and an expansion frame, composed of divisions, D, jointed to each other, and having parallel rods, 1 2, as specified.

77,378.—VIAL.—W. Storer How, Cincinnati, Ohio. Antedated April 22, 1868.

I claim providing the neck of a bottle, vial, or jar with one or more apertures, d d', which are so located as to be closed when the cork or stopple is completely inserted, and to be opened when the said stopple is partially withdrawn, as and for the purpose herein described and set forth.

77,379.—MANUFACTURE OF SADIRONS.—A. Y. Hubbell, Elmira, N. Y.

I claim casting the top or hollow parts with rivets, upon which is cast the lower part of the iron, the intervening space or chamber being either supplied with a filling or a vacuum, created substantially for the purpose described.

77,380.—SADIRON HOLDER.—Josiah Humphrey Washington, D. C.

I claim the combination of the three pieces, A B A, lined with pasteboard, or some other non-conductor of heat, punctured and made rough on their under surface, and riveted to a covering of cloth or other cheap material, for the purpose of holding and handling flat-irons, tailors' irons, and for use about stoves, ranges, furnaces, forges, &c., the whole being constructed substantially in the manner and for the purpose described.

77,381.—MANUFACTURE OF CARBONATE OF SODA AND POTASH.—A. G. Hunter, Flint, Wales.

I claim the process of converting the sulphate of soda or sulphate of potash into the corresponding carbonate by double decomposition with bicarbonate of lime, substantially as described herein.

77,382.—CARRIAGE POLE SUPPORT.—Hosea B. Hurd (assignor to himself, John N. Hurd, and Samuel Hurd), Aurora, Ill.

I claim the combination and arrangement of the tube, b, spring, c, bar, F spring, d, shoulder, h, and lip, g, with the axle, B, and pole, A, in the manner herein set forth.

77,383.—BREAD CUTTER.—George L. Jones, Chicopee, Mass

I claim, 1st, The combination of the knife, B, having its end free, with the

eccentric guide, C, and projecting plate, D, substantially as and for the purpose described.

2d, In combination with the device above claimed, the reversible gage, consisting of the piece, G, and pins, I, arranged as described.

77,384.—FLOOD GATE.—H. A. Kephart, Fletcher, Ohio.

I claim the hinged posts, A A, in combination with the sliding gate, B c, and the valve, C, in the manner and for the purpose set forth.

77,385.—IMPLEMENT FOR EXTRACTING HEDGE PLANTS AND WEEDS.—James L. Knick, Lexington, Ill.

I claim, 1st, An instrument which is adapted for the extraction of plants and weeds, consisting of handle portions, a a, and jaws, b b, united together by a spring strap, g, and provided with a slotted strap, d, and spring, e, substantially as described.

2d, In such an instrument, the elastic lining, g' g', applied to the jaws, b b, substantially as described.

77,386.—CLOTHES WRINGER.—A. F. Lapham, New York, and Frank E. Pratt, Mott Haven, N. Y., assignors to Malcom C. Turner.

We claim a clothes wringer, composed of the compressing bars, A B, link, C, with its thumb nut, a, springs, E E, and rollers, D D, all constructed, arranged, and operating in the manner and for the purposes herein specified.

77,387.—VALVE FOR GAS ENGINE.—William H. Laubach, Philadelphia, Pa.

I claim the devices herein described, consisting of the sliding sleeve, m, provided with the cams, k, constructed as described, the lever, n, shaft, l, valve, d', and stem, d''', with its tooth, k', for regulating the flow of a combined current of gas and air, alternately with air alone, into the cylinder of a gas engine, in such a manner that the former current shall continue to flow until the closing of the induction port and the moment of the ignition of said gas, substantially as described.

77,388.—MANUFACTURE OF GLUE.—John A. Lighthall and Reuben Lighthall, Brooklyn, N. Y.

We claim, 1st, The combination of the series of plates with the belt and driving pulleys, as and for the purpose set forth.

2d, In combination with the series of plates, attached to the belt, as before named, the arrangement for blowing a blast of cold air on the said plates after they have been dipped into the reservoir, for purpose of preventing the drip from the same, so that the glue attached to the plates shall be preserved of an equal and uniform thickness.

3d, In combination with the series of plates, attached to the belt, as before named, the arrangement for blowing a blast of hot air on the said plates on the descending side of the apparatus, for the double purpose of removing from the glue attached to said plates any moisture that may remain in it, and for removing the finished glue from the plates, as set forth.

77,389.—VENTILATING SHOW CASE.—William Henry Lockwood, Brooklyn, N. Y.

I claim, 1st, The combination, in a show case, of the ventilating sides or walls, A A, with the vertical partitions, C C, parallel to a transparent front, E, substantially as and for the purpose specified.

2d, A false bottom, B, and a sliding pan, F, in combination with a show case with ventilating sides or walls, A A, and vertical partitions, C C, substantially as herein described and specified.

77,390.—VISE.—Austin D. Mason (assignor to himself and Richard B. Robbins), Adrian, Mich.

I claim, 1st, The adjustable ring, C, constructed with oblique faces, x y, and a handle, h, for turning it on its axis, to adapt it to impart any desired to set to the face plate, D', in the manner and for the purposes set forth,

2d, In combination with the adjustable ring, C, the washer plate, B, and the face plate, D', with its spherical bilge, D, all constructed in the manner set forth and described.

77,391.—MOP WRINGER.—John M. May, Janesville, and Winslow M. Colton, Stoughton, Wis.

We claim the combination of the base, B, and lever, E, with rollers, C D, and thumb screws, F, substantially as and for the purpose specified.

77,392.—SIGNAL BOX.—William McKee, Neponset, Ill.

I claim, 1st, The combination of a box, M, tubes, C D, provided with ways, H, blocks, E F, with lips, e f, cords and pulleys, I I, arranged and operating as and for the purposes set forth

2d, The combination of the box, M, tube, C, block, E, cord and pulley, I, and the ventilator or draught inducer for the lantern, arranged as described, and for the purposes specified.

3d, Providing the tube, C, with a glass, or its equivalent, O, when used in combination with the block, E, and lantern, in the manner and for the purposes set forth and shown.

4th, The combination of the box, M, tubes, C D, guides, H, blocks, E F, with their lips, e f, cords and pulleys, I I, ventilator, L, and glass, O, all arranged and operating in the manner and for the purposes specified and set forth.

77,393.—SHIELD FOR NIPPLE.—Thomas McLaughlin, Millville, N. J.

I claim the shield or covering, A, with the small holes, B, in combination with the can, C, constructed and arranged as and for the purpose set forth.

77,394.—CORN HARVESTER.—George Meader, Prairie Center, Ill. Antedated April 19, 1868.

I claim, 1st, The combination of gatherers, J, cutters, n, and pickers, I, arranged and operating substantially as and for the purposes set forth.

2d, The combination of said gathering arms, J, with a rock shaft, L, or its equivalent, for rendering said gathers adjustable, substantially as described and set forth, and for the purpose of adapting the machine to corn of different hights.

3d, Providing said gatherers with the partitions, m, substantially as and for the purposes set forth.

4th, Providing said gathering fingers, J, with the depressions, c, in the manner specified.

5th, The arrangement of the cutters, n, immediately behind the shoulders, c, as and for the purposes set forth.

6th, In combination with said gatherers, J, and pickers, I, the adjustable husking plates or wheels, M, arranged and operating substantially in the manner and for the purposes set forth.

77,395.—FORWARD GEAR FOR CARRIAGES. — John J. D. Meincke, Milwaukee, Wis.

I claim draught irons, C C, and bottom and top pieces, D and E, in combination with king bolt, F, substantially as described.

77,396.—APPARATUS FOR TEMPERING SAW PLATES AND SIMILAR ARTICLES OF STEEL.—Geo. Mercer and John Hinton, St. Louis, Mo.

We claim, 1st, The carriage, B B1, when constructed of perforated plates, and the trussing ribs, b2 b3, substantially as shown and described.

2d, The combination and arrangement of the cap, B1, rope or chain, D, clevis, d, and pin, d1, and crab, d2, all arranged and operated as described and set forth, for the purpose of clamping and straightening the plates, E.

3d, The cap, B1, when combined eccentrically with the carriage, B, by means of the eccentric shaft B2, and operated by the chain or rope, F, roller, F', and crank, f, for the purpose of exposing the whole surface of the plate to the action of the tempering fluid.

4th, The springs, H, when arranged in combination with the bath tub, A, as herein described and set forth.

5th, The set screw, G, when employed in connection with the tub, A, and carriage, B B1, as described and set forth.

77,397.—WINDOW HOLDER FOR CARRIAGES.—J. H. Moore and William Johnson (assignors to Henry Hale & Co.), New Haven, Conn.

We claim the arrangement of the two parts, D and D, hinged to and combined with the holder, A, the whole constructed in the manner substantially as herein described.

77,398.—CAR COUPLING.—Thomas M. Moore, Newton, N. J.

I claim the arrangement of the notched plate, d, on the rear of the head, m, in combination with the sliding box, j, with its projections, c c, and interior pivoted plate, f, and spring, k, all constructed and operating substantially as specified.

77,399.—PACKING FOR CARRIAGE SHACKLE.—F. B. Morse, New Haven, Conn.

I claim the packing herein described, as an article of manufacture, and consisting of block, E, with the projections, F, and lip, f, as set forth.

77,400.—FRUIT GATHERER.—H. Walker Neal, Sidney, Ohio.

I claim, 1st, The slide, D, attached to the basket of the fruit gatherer, and working up and down upon the guide, E.

2d, The combination of the cord, h, and multiplying pully, G, for the purpose of rapidly elevating the basket.

3d, The combination of the cords, f and h, basket, C, and hook, B, arranged and operating as described, for the purpose set forth.

77,401.—QUARTZ STAMP MILL.—P. M. Papin, St. Louis, Mo.

I claim, 1st, The stamp, B, its serrated shoe, B2, and the spring pawl, d, when arranged and operating as described and set forth.

2d, The stamping boxes, E E', when constructed with the floor of one higher than that of the other, and arranged as herein described and shown.

3d, The friction brake, H, when applied to the rod, B or B1, as and for the purpose set forth.

77,402.—APPARATUS FOR DISCHARGING BILGE WATER.—Phineas Pardee, New Haven, Conn.

I claim the combination of the flexible tube, B, and its open mouth, C, together constituting a portable apparatus, and constructed and arranged so that the said tube will lead from the hold of the vessel out through any convenient opening, or over any convenient point above the water line to the said open mouth, so as to suspend the said mouth from the vessel, and so that the vessel passing through the water, or the water passing through the vessel, will create a draught through the said mouth and tube, and by such draught cause the water in the hold to pass through the said tube and out at the said mouth, all as herein set forth and described.

77,403.—REGISTER.—H. H. Phinney, Cambridgeport, Mass.

I claim the sectional frame, b, made in parts connected together and to the register plate, a, substantially as described.

Also, in combination with the slide, r, the spring, w, inserted beneath and bearing against the plate, a, and against an extension, v, from the slide, substantially as set forth.

77,404.—READY SOLDER.—D. H. Priest, Watertown, Mass.

I claim the above described composition for soldering metals, prepared and compounded substantially as described, and in about the proportions specified.

Putting up the above claimed composition in bottles having solder wire wound around them, convenient for use and transportation, substantially as described.

77,405.—CANAL LOCK GATE STEP.—Homer Rexford, Sandy Hill, N. Y.

I claim the construction and arrangement of the step, B, with its pivot, A, and feather, F, when combined with the metallic box, C, constructed with its annular slot, D, in the manner and for the purposes herein described.

77,406.—LIFTING JACK.—Ezra S. Robertson and Austin B. Collins, Mount Liberty, Ohio.

We claim the combination and arrangement of the lifting bolt, B, having a groove, d, and pulley, c, with the standard, A, lever, F, curved wedge, C, and thumb screw, E, the whole when constructed and operating in the manner and for the purpose as herein shown and described.

77,407.—MOWING MACHINE.—H. J. Ruggles, Poultney, Vt.

I claim the combination and arrangement of the swinging frame, E, adjusting rings, t t t, or their equivalents, on the sides of the frame, the draught chains, s s, and the sliding draft hook, L, substantially as and for the purposes herein specified.

Also, the suspending hook, T, arranged and operating substantially as herein specified.

77,408.—REFLECTOR.—William G. Schmidlin and Jeremiah W. Driscoll, New York, N. Y.

We claim the concave dome reflectors, introduced in the sections or sides of the conical polygonal reflector, as and for the purposes set forth.

77,409.—WROUGHT IRON ROOF TRUSS.—George H. Sellers, Phœnixville, Pa.

I claim, 1st, A bulb beam, A, or rafter, having a bulb, b, below, instead of a flange, for the purpose of uniting the struts and tie rods thereto, without deflecting them from a straight line, substantially as described.

2d, Securing the purlines to the rafter, by means of notches in each at the points where they meet, and thus make a firm and simple union between them without the use of bolts, or rivets, or other fastenings, and allowing room for expansion or contraction without separating, substantially as described.

3d, A skew back, made of angle brackets, d, bolted or riveted on each side of the web of the beam, as and for the purpose herein described and represented.

77,410.—CORN SHELLER.—John H. Sharp, Wortsville, N. J.

I claim the employment of a series of yielding bars, C C, suspended over the inclined roller, B, by means of springs, d d, and rod, e, when all are arranged as and for the purpose described.

77,411.—LOCK NUT FOR AXLE AND SKEIN BOXES.—Joseph R. Smith, Bethel, Conn., assignor to himself and W. S. Shaw, Buffalo, N. Y.

I claim, 1st, The internal lip on the nut and the external lip on the axle or skein box to secure the nut on the axle or box, as set forth.

2d, The combination of the key, F, with the spring catch and the intervening lips of the nut and axle.

77,412.—HAND TRUCK AND SACK HOLDER.—Gideon Smoker and Jonas Smoker, Smithville, Ohio.

We claim the combination of the hand truck, A, with sliding platform, D, arranged to slide in grooves in the sides of the truck frame, said platform being provided with springs, C C, and rods, F F, upon which are spiral springs, e e, all arranged as and for the purpose set forth.

77,413.—WASHING MACHINE.—Otis W. Stanford and Selden S. Scoville, Lebanon, Ohio.

We claim, 1st, A washing machine, consisting of the yielding bed or frame, g I, rollers, G, battens, J J', stems, j j', rock shaft, K k k', and link, L, the whole being combined and operating substantially as herein described and set forth,

2d, The devices, J J' j j' K k k' and L, when attached to the sliding lid, N, and adapted to be operated in either of the chambers, C D or E, as explained.

3d, The devices, P Q V v, for enabling the shifting of the lid, N, and for securing it at any desired position, for the purpose described,

4th, In combination with the sliding lid, N, and its described accessories, J J' j j' K k k' and L, the chambers, C D E and F, for the object explained.

5th, In a washing machine constructed substantially as above set forth, the shiftable wringer rest, T U u, as described and set forth.

77,414.—STEAM GENERATOR.—J. Sutliff, East Boston, Mass.

I claim the hollow steam bridge wall, C, the sides braced by the hollow bolts, g g, and connected to the boiler pipes, f and d, constructed and arranged substantially as and for the purpose set forth.

77,415.—TABLE FAN AND CASTER STAND.—Noah H. Tilman and David G. Good, Arcanum, Ohio.

We claim the arrangement of the frame, E, outside of the box, D, and the stationary caster stand, B, said frame being perforated as described, whereby the fans, F F, may be adjusted to operate as herein specified.

77,416.—COMB CLEANER.—Edwin J. Toof, Fort Madison, Iowa. Antedated April 17, 1868.

I claim the arrangement of converging elastic strips, a, with a head, A, whether said head be provided with a brush, B, or not, as and for the purposes specified.

77,417.—WASHING MACHINE.—N. Trowbridge, Tully, N. Y.

I claim, 1st, The combination of the barrel, A, and reciprocating pounder, B, constructed with wedge formed projections, B1, and an inclined projection, B2, substantially as and for the purpose set forth.

2d, The combination of the barrel, A, the pounder, B, the shank, C, rod, D, and crank, E, spring lug, E2, pinion, F, spur wheel, G, and lever, H, all arranged to operate substantially as set forth.

77,418.—ROOFING CEMENT.—Newton Trowbridge and Edward Richardson, Tully, N. Y.

We claim the composition, compounded from the ingredients, and in the manner substantially as and for the purpose set forth.

77,419.—GRAIN SEPARATOR.—J. S. Upton, Battle Creek, Mich.

I claim, 1st, The screens, D D' D'', combined with the cylinder, B, and operating in the manner set forth, for separating the grain from the straw, substantially as specified.

2d, The vibrating spout, C, in combination with a threshing cylinder, and the series of screens, D D' D'', when used substantially as and for the purpose set forth.

77,420.—ARTIFICIAL SLATE SURFACE.—Oscar A. Wagner, Davenport, Iowa.

I claim a composition of matter for forming an imitation of the surface of slate, compounded from the ingredients named, substantially in the manner set forth.

77,421.—BOOT AND SHOE STUD.—H. S. Walcott, Boston, Mass., assignor to Boston Shoe Stud and Button Company.

I claim a shoe stud formed of a solid piece of metal and having a head and a shoulder or flange, with a groove between them of sufficient size to permit the lacing to move freely therein, and having a tubular stem, by which it can be secured to the shoe, as herein shown and described.

77,422.—PEN HOLDER.—Albin Warth, Stapleton, N. Y. Antedated April 19, 1868.

I claim a pen or brush holder the finger part of which is made triangular to fit the space between the fingers grasping the same, and which is provided with a triangular end that is twisted in regard to the finger part, and made to fit the V-shaped or triangular socket of a pen or brush, substantially as and for the purpose described.

77,423.—TRUNK.—Rebecca Weaver, Washington, D. C.

I claim, 1st, A rolling trunk constructed as herein described, as and for the purposes specified.

2d, The construction of the tills, B B, having rims, d d, with hinged or other props, f f, so that they may be set up or collapsed at pleasure.

3d, The jack-up cleats, C, in combination with the tills, B, and the cylindrical or rolling trunk, A, substantially as and for the purposes herein set forth.

4th, The manner of constructing the cover or lid, D, and cap, F, for protecting the lock and securing the trunk water tight, substantially as herein set forth.

5th, The manner of constructing the cover or lid, K K, with the hinged bolts and overlapping cap, substantially as and for the purposes herein set forth.

6th, Placing drawers, H, within the cylinder, A, to be drawn out at the end, thus giving double security to the contents when closed, as herein described.

77,424.—TAG FASTENING.—Wm. N. Weeden, Boston, Mass.

I claim the improved anchor as made with the hook, e, the encompassing flanges, d d, and the angularly formed barb, f.

77,425.—LAST HOLDER OR JACK.—George M. Wells (assignor to Moses D. Wells), Chicago, Ill.

I claim the rotary block or ball, A, as constructed, with a shank recess socket, and combined with a carrier, B, formed to receive such ball, as set forth.

Also the carrier, B, as cast with an opening through its bottom, and in one piece, on the rotary block or ball, provided with a shank socket, as set forth.

Also the carrier, B, as cast in one piece, upon the rotary block or ball, and with an opening through its bottom, and a fastening flange projecting from its sides, all as specified.

77,426.—CLEVIS.—Ralph C. Whitehouse, Boothbay, Me.

I claim the combination of the clevis box, a, having its pivoted clevis, b, hold back, c, either with or without the helix, f, and to be attached as and for the purposes set forth.

77,427.—INSTRUMENT FOR DRAWING NAILS.—Edward P. Whitney, Stamford, Conn.

I claim, 1st, The combination of the claw head, A, and shoe, B, constructed and operated substantially as and for the purpose herein specified.

2d, A spring, C, in combination with the claw head, A, and shoe, B, substantially as and for the purpose specified.

77,428.—BELLOWS FOR REED MUSICAL INSTRUMENTS.—A. W. Wilcox, New Haven, Conn.

I claim, 1st, The arrangement of the valve chamber, within the reservoir, B, by the construction of the wall, E, therein, with the openings, e, and valves, d, thereon, substantially in the manner and for the purpose specified.

2d, The construction of a recess in the floor, G, of the exhaust, beneath the openings, f, substantially in the manner and for the purpose described.

77,429.—MUCILAGE BRUSH.—G. D. Wilcox, Providence, R. I.

I claim the improved instrument for spreading mucilage or adhesive compositions, substantially as herein described.

77,430.—MACHINE FOR ATTACHING LABELS TO NEWSPAPERS, ETC.—John F. Zacharias, Leesburg, Va. Antedated April 11, 1868.

I claim, 1st, The combination of the sliding gate, L, and the scissors, M M, of an automatic labeling machine, with the eccentric, J, the transmitting devices, P and T, giving proper periods of rest to the carrying bands, C' C', all arranged and combined substantially as set forth.

2d, The slotted connecting rod, P, having a compound reciprocating and oscillating motion upon the fulcrum pin, P5, for the purpose of transmitting a rotary motion from one crank to another, in combination with the other devices of the machine, substantially as set forth.

3d, The combination with the said devices, or their equivalents, for transmitting rotary motion, of the auxiliary slot, V, in the connecting rod, T, for permitting a rest for the carrying bands, C' C', at every revolution of the roller, B, as and for the purpose set forth.

77,431.—CHURN.—Charles H. Elliott, York, Pa.

I claim, 1st, Communicating a vertical reciprocating motion to the dash rod, N, at the same time giving to this rod right and left rotary motions, by means of a vertically moving sash, C, a spirally grooved portion, f, and fixed but adjustable teeth, e e, arranged and applied within a frame, and driven from a shaft, E, substantially as described.

2d, The movable head piece, D', arranged over the churn vessel, and provided with adjustable toothed plates, J J, in combination with sash, C, and a spirally grooved portion, f, on the dash rod, substantially as described.

3d, The churn vessel, K', seated into a fixed base ring, L, in combination with the movable head piece, D', and the means substantially as described for operating the dash rod.

4th, The perforated dasher, P, and dash rod, N, provided with perforated or imperforated radial wings, g or h, constructed and applied substantially as described.

5th, The rotary wings, j, applied to rods, i, projecting radially from the dash rod, substantially as described.

77,432.—CONSTRUCTION OF SAFES.—Obadiah Marland, Boston, Mass.

I claim a safe or bank vault, the boundaries of which are made up of or are protected by entire compound plates, each of which is constituted of plate layers of iron and steel welded together, the steel layer or layers of each laminated plate being hardened, substantially as shown and described.

Also, the formation of the joints at the corners of the safe and at the edges of the door, so that the bottom of each section or joint is covered by steel, substantially as shown and described.

Also, the bolts, k, made of alternate tubes of iron and steel, drawn and welded together, substantially as set forth.

Also, inserting the bolts, m, into holes prepared, substantially as described, for their reception, and then changing the form of the bolts by pressure or percussion, so that thereby and with the conjointed action of a spreader, p, the bolts, m, will hold in their sockets, substantially as described.

REISSUES.

2,922.—PATTERN FOR CUTTING BOOTS.—Elias Shopbell, Ashland, Ohio. Dated Jan. 27, 1863.

I claim, 1st, The plate, A, in combination with the pairs of plates, B B', C C and D D', or their equivalents, with their respective slots and angles, producing the simultaneous movement of the several pairs of plates, and the consequent unequal enlargement and contraction of the pattern for boot fronts, substantially as herein set forth.

2d, Stationary and adjustable plates, so constructed and arranged in relation to each other and the slots as to produce a simultaneous contraction and expansion of said plates, according to any required size of boot fronts and backs, substantially as set forth.

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.*

63,378.—BROADCAST SOWERS.—F. G. and E. A. Floyd, Macomb, Ill. Dated April 2, 1867. Application for reissue received and filed April 11, 1868.

I claim, 1st, The frame, A, constructed as described, shaft, B, disc, C, when arranged in relation to each other as and for the purpose set forth.

2d, The disk, C, with projection, c, in combination with shaft, B, the former being attached to the latter in the manner described.

3d, The shaft, B, with gear wheel, b, shaft, D, with gear wheel, d, and standard, E, the whole being combined and operated as set forth.

4th, The slide, F, constructed as described, in combination with pin, f, and holes, f', as and for the purpose set forth.

5th, The revolving disk, C, provided with radial flanges, C', having their outer ends projecting beyond the periphery of the disk and curved in the manner shown, substantially as set forth.

6th, The combination of the frame, A, hopper, G, slide, F, and revolving disk, C, constructed as above set forth, all arranged for joint operation as herein described.

7th, The frame, A, shaft, B, with wheel, b, shaft, D, with wheel, d, disk, C, slide, F, hopper, G, and bag, H, the whole being combined and operated in the manner set forth.

49,203.—MACHINE FOR REFITTING STOP VALVES.—Charles S. and Charles F. Hall, Brooklyn, N. Y. Dated Aug. 1, 1865. Application for reissue received and filed April 11, 1868.

We claim, 1st, The concave mill, B, either provided with or not, an internal yielding center, c, and arranged in suitable bearings, a, in combination with the adjustable center, C, constructed and operating substantially as and for the purpose set forth.

2d, The guide, E, and conical mill, D, applied in combination with each other substantially as and for the purpose described.

3d, A portable apparatus for refitting the valves and valve seats of stop valves and water cocks, substantially as and for the purpose described.

74,582.—DEVICE TO PREVENT HOGS FROM ROOTING.—Geo. O. and Wm. L. Nixon, Sandyville, Ohio. Dated Feb. 18, 1868. Application for reissue received and filed April 11, 1868.

We claim the within described device consisting of the plate, A, arms, C C, with holes, D D, and wire, B, the several parts being arranged and used substantially in the manner and for the purpose herein specified.

64,231.—SKIRT HOOPS.—E. Wooster & Co. and F. Hull & Co. (assignees of John R. Lattin), Birmingham, Conn. Dated April 30, 1867. Application for reissue received and filed April 13, 1868.

We claim as the invention of John R. Lattin, the bottom hoop for hoop skirts formed by combining one or more springs in a single cover, the upper edge of which is formed as described, so as to be secured to the tapes of a skirt as and for the purpose set forth.

68,239.—STEAM DRYING APPARATUS.—William Ryner, Philadelphia, Pa., and John C. Hopewell, Flemington, N. J., assignees of Wm. Ryner, Philadelphia, Pa. Dated Aug. 27, 1867. Application for reissue received and filed April 14, 1868.

We claim as the invention of Wm. Ryner, a drying kiln in which are an upper and lower series of pipes for the passage of superheated steam to that for the introduction of the same into the kiln, so that the material to be dried (situated between the two sets of pipes) may be subjected to the combined action of the heat from the said pipes and that of the superheated steam, as set forth.

☞ 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.

Polly Hunt, of Jersey City, N. J., administratrix, and George W. Hunt, of Newburgh, N. Y., administrator of the estate of Walter Hunt, deceased, having petitioned for the extension of a patent granted to the said Walter Hunt the 25th day of July, 1854, and reissued in four divisions of the dates and numbers respectively as follows: Nov. 29, 1864, numbered 1,828; Feb. 7, 1865, numbered 1,867; April 4, 1865, numbered 1,926; April 4, 1865, numbered 1,927; said last number (1,927) being again reissued in two divisions the 10th day of July, 1866, and numbered respectively 2,306 and 2,307, for an improvement in shirt collars, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

Horace Woodman, of Biddeford, Me., having petitioned for the extension of a patent granted to him the 1st day of August, 1854, and reissued the 8th day of December, 1857, for an improvement in cleaning top cards of carding machines, for seven years from the expiration of said patent, which takes place on the 1st day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of July next.

Hymen L. Lipman, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, for an improvement in eyelet machines, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

Charles A. Wakefield, of Pittsfield, Mass., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, for an improvement in seed planters, for seven years from the expiration of said patent which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday the 6th day of July next.

Griffith Lichtenthaler, of Limestoneville, Pa., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, for an improvement in cultivators, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

Edward W. Brown, formerly of Fall River, Mass., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, and reissued the 14th day of March, 1865, for an improvement in looms, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

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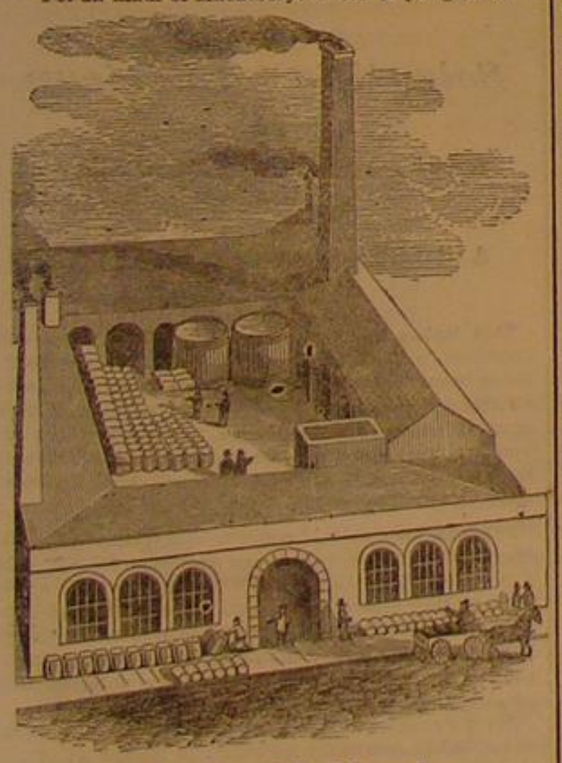

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When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

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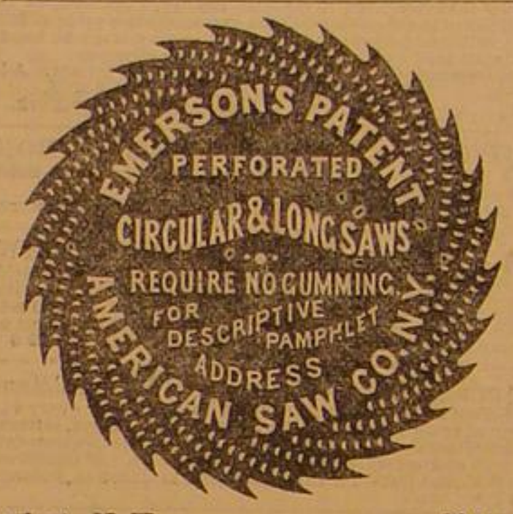

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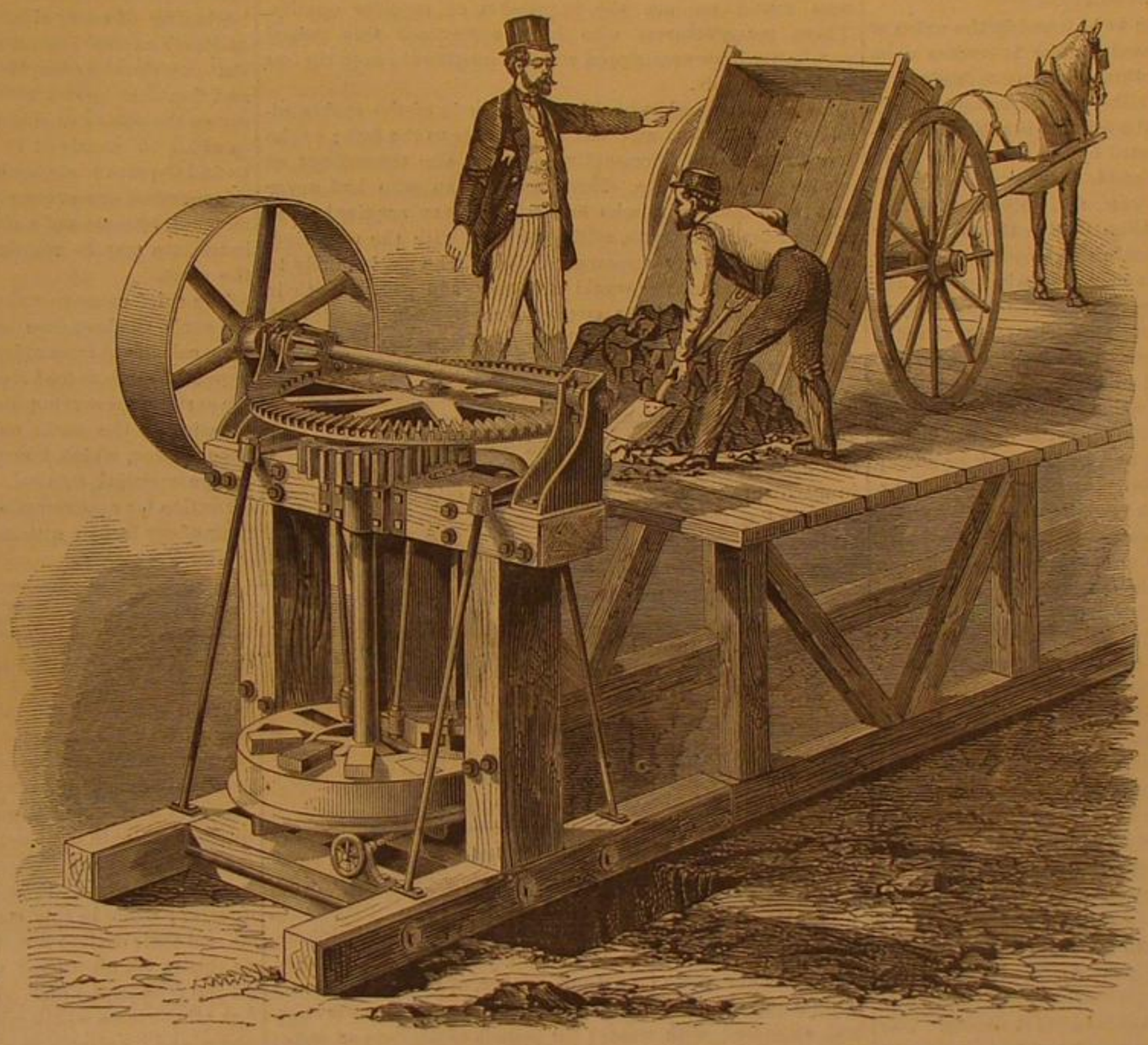
Vol. XVIII.--No. 21. [NEW SERIES.] NEW YORK, MAY 23, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Mold Wheel Brick Machines.

This machine is of that class which uses what is called the mold wheel and pug mill. The internal or detail parts of this machine, are different from any of those we have previously illustrated, although similar in appearance. The propeller for filling the molds; the track for raising and lowering the followers, and changing the thickness of the brick; the novel arrangement of pressing each brick after the mold has passed from under the pug mill, and regulating the pressure so as to make a perfect finish on the top of the brick, without the use of ascraper, have been thoroughly tested, as four of these machine were put in operation and run very successfully last year. This machine was exhibited at the Missouri State Fair at St. Louis, in Sept. 1867, and was awarded the first premium, although several other kinds were exhibited; but the inventor claims that this machine is so constructed that stones or even iron in the shape of nuts, bolts, wrenches, hammers, etc., can pass through without any injury to the machine. The proprietors state the following as the prominent features and advantages of the machine:

"Its weight is about three tuns, all complete; its capacity is from 20,000 to 30,000, by steam power. Serious objections have been made to brick made on mold wheel machines, from the fact that the scraper used on all machines, leaves the top of the brick rough, which when dry is thinner on one side than the other; this objection is obviated in our machine by a very ingenious contrivance, which enables us to make brick with smooth surfaces, square corners, and of equal thickness when dry; the brick, as they come from the machine, are sufficiently pressed to hack from five to ten high, and in some clay can be dried in the sun, but sure to dry under shedding without cracking in from two to four days; the clay is tempered the same as for hand-made brick—no sand used—thus giving a uniform color, will burn as well, and command a better price than hand-made brick; the thickness of the brick can be regulated by an adjustable track while running, producing bricks from two and one quarter, to two and three fourths inches in thickness, as the nature of the clay may require; our improved striker plate and propeller render this machine more durable, and less likely to break by stone; it is extremely simple in construction, and any man of ordinary experience can manage it. The improvements patented have all been thoroughly tested under the supervision of the inventor, which enables him to say that this machine will make brick in any and all clay that can be worked by hand. Opportunity will be given to all persons desirous of purchasing a machine to test it in their own clay, at our shops, before paying for the same."



SERGEANT'S PATENT BRICK MACHINE.

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Pyro-tannin.

The following is from a recent patent by Dexter Symonds, of Marlow, N. H. The invention consists in burning spent tan bark, and in condensing the products of such combustion:

"In carrying out my invention I first provide an apparatus, in which the bark or other substances are consumed by regulated combustion, and in which the vaporized products of such combustion are condensed, collected, and drawn out for use. The particular construction or arrangement of the apparatus for burning the bark or other substance, is of no great importance, since any ordinary stove or furnace may be adapted for the burning operation, provided the draught or current of air can be controlled or regulated so as to produce rapid or ordinary combustion, and where the pipe or pipes, tube or tubes, arranged for conveying the smoke and vapor from the burning substance, pass into or through a condenser like a trough, filled with cold water, as described, which will condense the vapor, and produce my new and improved tanning liquid, which I call "pyro-tannin."

"This new and improved tanning liquid is produced in large quantities from spent bark, or bark which has been deprived of all its tanning properties that can be extracted by leaching, steeping, or other ordinary process, and the liquid produced or obtained from spent bark, by my process, is in every respect as good for tanning purposes as the liquid produced from fresh bark, and in my opinion, such improved tanning liquid obtained from spent bark, is superior to the tanning liquid obtained from fresh bark by leaching or by steeping or by other ordinary process.

"I do not confine myself to the use of spent bark for obtaining liquid to tan hides or skins, but I use fresh bark, or any other substance from which tanning liquid can be obtained by my process. In my new tanning process, and in the use of my new and improved tanning liquid or "pyro-tannin," for tanning hides and skins, after the hair has been removed from the hides by the liming process, or by any other well known process of removing said hair, the hides are then subjected to the action of the "pyro-tannin," prepared as above described, and without any intervening process between the liming and the tanning process. This pyro-tannin not only neutralizes the lime, but quickly penetrates and tans the hides in a superior manner, without injury to the fibres of the hide, and with a great saving of time in preparing and tanning, so as to produce good leather. Hides and skins are tanned by my improved tanning process without removing the hair or the fur, and without any other operation, except the usual soaking and fleshing of the hide. No other process of preparation is necessary to fit the hide or the skin for my tanning process, which produces much softer and tougher leather than the ordinary process of tanning. After the hides or the skins have been partly or wholly tanned by my improved process of tanning, and to change the character or the appearance of the leather, as to change the color or make the leather harder or stiffer, I remove the partly or the wholly tanned hides or skins or leather from the "pyro-tannin," and subject them to the action of ordinary tanning liquid, procured or extracted from fresh bark, by leaching or steeping, or by other ordinary process."

Pencil-Lead Mines and Lead-Pencils.

Every one knows what a black lead pencil is, but it is not generally known that there is not a particle of lead in the pencil. The material variously known as black lead, graphite or plumbago, is almost wholly composed of carbon. It probably owes its misnomer to the fact that previous to the employment of graphite for making pencils, common lead was used, and this within the present century. For a long time the best graphite was obtained, not in very large quantities, at Borrowdale, in the English county of Cumberland, where it was discovered in 1564, early in the reign of Queen Elizabeth, and pencils, much like those still in general use, were produced in the year following. As the supply of the graphite (known in Cumberland, while in the mine, by the title of wad), was not large, the British government, from the first, took great pains to prevent the exportation of the article, and even to limit its home sale to a supply just sufficient to meet the estimated demand. Graphite is found in various parts of Europe, and even in North America, but of very inferior quality. The Cumberland mines were worked only a few weeks in each year, yet the yield of wad was estimated at £40,000 a year. While the graphite lasted, England had a monopoly in supplying the best pencils to the world. Year after year, for a century past the graphite deposit in Cumberland became "fine by degrees and gradually less." The result was that graphite powder had to be compressed into a solid cake from which pencils could be supplied. A French variation, said to be an improvement, was to mix the powdered and purified graphite with clay, which is largely done still.

Nearly one hundred and fifty years ago, the pencil manufacture commenced in England, and improved in France, was transplanted to the village of Stein, near Nuremberg, in Bavaria, and, little more than a century since, Casper Faber there began to make the pencils which continue to be made by his descendants, and bear the family name through the world. The present John Lothair Faber, great grandson of Casper, has been head of the firm since 1839, and is not only very wealthy, but has recently been ennobled by the king of Bavaria. One of his brothers is associated with him at Stein, in the processes of manufacture; the youngest of the three, Eberhard Faber, represents the firm, for the Western World, at New York. Stein is literally a town of pencil factories, of which Baron Faber is the ruler, taking care of the health, government, education, industry, thrift, and amusements of the inhabitants, and always living in their midst. It may be asked—how do the Fabers make lead pencils without the famous graphite from Cumberland? It appears that twenty years ago John Peter Alibert, a Frenchman, resident in Asiatic Siberia, having heard of the gold discoveries in California, began to examine the sandy beds of various rivers flowing into the Arctic Ocean. He found samples of pure graphite, evidently brought a considerable distance by force of the stream, in one of the mountain gorges near Irkurtsk, and pursuing his discovery, tracked back to a branch of the Salan Mountain range, on the very summit of Mount Batougol, 275 miles west of the town of Irkurtsk, near the Chinese frontier, in the midst of the rocky desert, and found pure graphite. After years of costly labor Alibert found an exhaustless deposit of graphite equal to the best ever taken from Cumberland. Beside decorating and rewarding him, the Russian government changed the name of Mount Batougol to that of Mount Alibert. Nearly every crowned head in Europe has honored him. With the consent of the Russian government, Alibert now supplies Faber's house exclusively with graphite from the mine in Asiatic Siberia. Pencils of this material were first made by Baron Faber in 1861, and were not introduced into the American market until 1865, from which time artists and others perceived and acknowledged their superiority. If the world were to endure a thousand years more, there is sufficient graphite in Mount Alibert to supply its population with good black-lead pencils. —*Philadelphia Press.*

ALL the diamond cutting in this country is done by one firm in Boston, and their business is confined to the re-cutting of stones which have been nicked or otherwise rendered imperfect.

A sycamore tree one hundred and ten feet high, with a hollow fourteen feet in the clear, is reported to be standing in Calhoun county, Ill.

ELEGANCE OF DESIGN AN ELEMENT OF UTILITY IN MACHINERY.

There are many who declaim against anything that seems to them of "no particular use," and whose narrow and sordid views blind them to the value of beautiful objects, valuable simply because they are beautiful, but to such it is not our intention to address ourselves. It is foreign to our present purpose to attempt a demonstration of the æsthetical needs of the human intellect, or to show that their proper gratification is necessary to the mental and moral health of mankind. To an intelligent and thoughtful student of mental and moral science, we should as readily attempt to prove that the body needs to be nourished and warmed, and rested when weary. But there is another class still, who admitting the necessity of a cultivation of a taste for the beautiful, yet fail to appreciate the advantages which result from the combination of the beautiful with the useful. That an artist should spend weeks in perfecting a landscape painting, or that a carpet manufacturer should pay large sums for designs, in order to improve his wares, seems to them perfectly reasonable; but that a hoe, or an ax, or a plow, should be made a subject for tasteful decoration, is in their opinion an absurdity. The piano should have carved legs, but the cooking stove—why should that be ornamented? We propose in the present article to notice briefly the benefits to be derived from a proper attention to the combination of the beautiful with the useful, and also to show that in judicious attempts to make this combination, the highest degree of usefulness in construction will be most likely to be obtained.

The most important advantage to be found in the union of beauty with utility is the increased dignity it confers upon labor. In this both the manufacturer and the one destined to use the product of his skill share alike. The first feels himself elevated, and he is elevated, in the effort to beautify his production; the second is also elevated by the use of the more elegant and shapely implement, and is stimulated to attempt more excellent work on his own part, and this attempt dignifies and sweetens his toil. Who doubts that were fifty girls employed in an establishment with fifty others, one fifty to be supplied with nicely ornamented sewing machines, placed in a tidy and handsome apartment, the other fifty to be supplied with machines of the plainest patterns, situated in a rude and uncleanly room, who doubts that a feeling of superiority on the one hand, and of inferiority on the other, would soon spring up? And who that has any knowledge of human nature but could predict with certainty in which of the two apartments would more and better work be accomplished. Nor would the superiority or inferiority be imaginary, it would be real, and in each case progressive. As long as the causes which produced it should be permitted to exist, the difference between the two classes of operatives and in the quality of their work would increase, within certain limits, until the divergence would reach its maximum point in refinement of the one, and the degradation of the other class. Similar causes have produced the different gradations of modern society, and the history of the world shows that in the gradual transition of the human race from a state of barbarism to one of enlightened refinement, the increased taste for the beautiful combined with the useful, is a sure index of the degree of advancement, attained to at any period in the existence of a nation.

A new mill was to be erected in a large manufacturing town a few years since. The superintendent of the works with the sanction of the company who employed him expended large sums of money in the adornment of the grounds and in architectural display. But in the room usually styled the "weave shop," he was especially lavish. Beautiful mirrors of large size in fine gilt frames with marble wash basins and spacious wardrobes were placed at one end of the room. The gears were boxed in with mahogany, and nothing apparently was omitted which could add to the comfort of the operatives or to the general appearance of the room. His shrewdness and knowledge of human nature were rewarded when (as he quaintly remarked to us once in a conversation upon the subject), "he had skimmed the cream of the help in the entire town, and not another establishment could get them away from him."

A steam engine nicely ornamented and tastily designed, will be found nine times out of ten to wear longer, and to be kept in order with less expense, than one made in the cheapest and plainest style. Better care will be taken of it, because the pride of the engineer will be enlisted to render him vigilant and careful. The same is true of all machinery, and when an operative can be made to take a pride in his machine and in his work, there is little fear that his duty will be neglected.

We have thus attempted to show that judicious ornamentation in the construction of machinery is an element of utility on account of the effect produced upon the workman who is destined to operate it; and we think it will not be difficult to show that the same cause generally results in the production of a better machine than would be produced if a proper consideration of taste in construction were entirely neglected. To do this, only a brief consideration of the nature of the beautiful, and a very partial analysis and examination of its elements will be found necessary.

One of the most important of all the complex ideas and emotions which constitute a sense of beauty, is the full appreciation of the perfect adaptation of an object for the place it is to occupy or the purpose it is designed to subserve. In other words a sense of fitness is a part of the feeling excited in us by the sight of beautiful objects. Many things which at first sight are repugnant to our conceptions of beauty, become beautiful as soon as the sense of their adaptation to some definite purpose is felt. A striking illustration of this truth occurred to us while passing through the machinery department of the World's Fair, as it was called, held in New York in 1853, in company with a friend whose inventions have since made his name familiar to every mechanic in the country. We paused before what seemed to be a huge mass of cast iron, certainly not purposeless, but seemingly without proportion, and to an ordinary observer an unsightly and exceedingly unattractive object. Upon inquiry we found that it was a part of a powerful cutting engine, destined to be used in cutting the teeth of huge gears in one of the largest marine engine manufactories in America. Imagination at once supplied the remaining details, reversed the position of the enormous casting, attached to it the ponderous pulleys and fly wheel, and perceiving the design of every bulky projection forced from us a simultaneous exclamation of admiration. In this instance what was at first apparently rude in substance and uncouth in shape, become interesting through a knowledge of its ultimate purpose; beautiful in the strength and grandeur of its massive and just proportions. So in nature, rude masses of rugged and to the casual observer unsightly rocks, are to the artist, features of beauty in landscape, to the geologist, sublime chapters in the history of the universe. So much this truth impresses itself even upon those who are most utilitarian in their views, that they are in practical life, unconsciously influenced by it. In purchases, one of this class would, all things else being equal, incline to the most beautiful article in a collection of goods, not because they were sensible that it was more beautiful than others, but because in their minds the superior comeliness would produce the impression of superior quality. Those manufacturers who have recognized this mental peculiarity have outstripped and will continue to outstrip less wise competitors.

Conceive a wheel with the large ends of the spokes attached to the rim, and the small ends to the hub; or the connecting rod of a locomotive of equal size throughout, or smallest in the middle. Now fancy a man who had never seen these things, but who had in some way acquired a fine taste for beautiful forms, setting to work with the sole view of improving their appearance. Would he not be likely to hit upon such forms as would not only add greatly to their beauty but also to their strength, most probably without taking anything into consideration except the idea with which he commenced his task, he would finally reach and retain the forms at present used for those objects. For in such things the appearance of strength can only accompany real strength, and in them strength is an element of fitness, and fitness, we have already seen, is an element of beauty. In machinery it may perhaps be as truly said that "beauty is strength" as that "strength is beauty."

Especially should attention be paid to the appearance of machines which are new claimants for public favor. The successful introduction of a new invention depends more upon this than is usually imagined. Many a worthless invention has realized something for its inventor because it looked as though it was valuable, while many a good and useful invention has been neglected because its appearance and finish were not such as would readily attract attention and inspire confidence. Would all inventors realize the value of the advice we give them, we should hear of fewer disappointed hopes and of more frequent successes.

Case-hardening Iron.

Thomas Sheehan, of Dunkirk, N. Y., has patented the following:—

"In a suitable cast iron box put a layer of broken limestone, two inches thick. Over the said layer place a perforated plate. On the plate I next put a layer, of about two inches in thickness, of a mixture made as follows:—200 parts charcoal, saturated with water; 30 pounds of muriate of soda; 12 parts of sal-soda, pulverized; 5 parts of rosin pulverized; and 5 parts of black oxide of manganese. The ingredients thus specified well mixed. I now take the iron intended to be steelified, and put it on the top of said mixture. Another layer of the mixture is now put on the iron, and alternate layers of iron and mixture supplied until the box is filled, always finishing with a heavy layer of the mixture. Care must be taken to prevent the iron designated to be hardened from coming in contact with the iron box. Lute the cover of the box with a mixture of yellow clay and sand, with a little salt in it to keep it from cracking. The box will now be put in an open furnace, suitable for the purpose, and a fire made of hard coal and wood, and keep the box subject to strong heat from two to seven hours, according to the size of the box and the bulk of iron. As the heat increases, the carbon will be expelled from the limestone in the bottom of the box, and will unite with the oxygen and carbonaceous ingredients of the charcoal compound as aforesaid, and will convert the iron in the box into steel on its entire surface. I then take said iron out of the box when it is of a bright cherry red, and chill it quickly in a large vessel of cold, clear water. The surface of the steelified iron will now be smooth, and free from scales."

Improvement in Fire-proof Safes.

Patented by Edward H. Ashcroft, of Lynn, Mass. "I place in the inner perforated compartments of a safe, metallic tubes or vials filled with a liquid acid, (sulphuric acid, for instance,) one or both ends of such tube or vial being stopped with an easily fusible alloy. I surround this, and place in immediate contact with it, bicarbonate of soda. I then put into the compartments a large proportion of carbonate of ammonia, or other volatile salts.

"When the safe becomes heated to about 212° F., the above mentioned fusible alloy melts, thus opening the vial; the acid runs out, and, coming in contact with the surrounding bicarbonate of soda, immediately eliminates carbonic acid gas, which fills the safe and is non-combustible. The evolution of this gas having ceased, if the safe is still longer heated, the carbonate of ammonia or other volatile salt vaporizes slowly, and, being also non-combustible, protects the contents of the safe."

Correspondence.

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

Correspondence of the Sun with the Clocks.—Sidereal Time.

MESSRS. EDITORS:—Allow me to add a few words in further explanation of one of my former articles on this subject, and at the same time to correct a statement made. The best way in which the mean time is obtained every day of the year is by the sidereal days, which consist in the time of apparen revolution of the stars around our earth, and are always perfectly uniform (unlike the solar days); therefore the sidereal days have always the same length, consequently the time obtained by a clock regulated to sidereal time corresponds always with the motion of the fixed stars, without any deviation, except by the aberration of light, as I explained elsewhere in this paper. As now the stars revolve nearly 366¼ times in a year, and the sun 365¼ times, the siderial day is 366¼ part shorter than the solar day, which makes three minutes and 56 seconds nearly, for each day. The passage of a star in Aries through the meridian, has been adopted as the beginning of every sidereal day, and its passage on the 21st of March as the beginning of the sidereal year; as now on that day the sun occupies that very same part of the heavens and therefore passes also the meridian at the same time, it causes the solar and sidereal time to coincide; we have, then, to add 3′ 56″ nearly at 12 M. for every day afterward in order to find the mean midday of the solar day. In this way, in an astronomical observatory the solar time may be found for any moment, by means of a clock giving sidereal time, which clock in its turn may be regulated every night by observations on the stars.

The chief cause now that the solar time, directly proved by the sun's shadow, does not correspond with the mean solar time calculated from sidereal time, and also given by a well regulated clock, is (as I stated) the irregular yearly motion of the earth in its varying distance from the sun, and also the inclination of the earth on its axis has an influence in this phenomenon, which, however cannot be well explained without geometrical figures. This statement may serve as a correction for an expression inadvertently made in the beginning of my former article. V.

New York City.

Storm Theories.

MESSRS. EDITORS:—The theory of Doré, Reid, and others, is what is called the cyclonic theory, in which it is maintained that the storm revolves about an axis, while it is moving over the surface of the earth. The progressive movement of the center of disturbance varies from fifteen to forty miles per hour; while the velocity of the wind around the center is sometimes eighty, ninety, or one hundred miles per hour. The area over which storms extend is seldom less than six hundred miles in diameter, and is frequently much larger, often covering many States. From the examination of some hundreds of storms, in Europe, their form was found to be circular; while in this country they are often more elongated, and their outline sometimes irregular. There is, however, no theory yet discovered that will satisfactorily account for all the facts in the case. Very much remains to be done before all the laws which govern the disturbances of the atmosphere, and its attendant phenomena, will be accurately ascertained.

The prediction of these violent commotions has been a great desideratum from time immemorial; not only to the sailor, but to the farmer, and to all classes of society. Scores of lives and a vast amount of property are lost every year by storms, a large part of which might be saved if the approach of danger could be known a few hours before its arrival. Notwithstanding all the signs and astrological predictions which have been more or less current among mankind, very little has yet been done toward furnishing the world with any safe and reliable means by which they may know when to expect storms long enough before hand to give time for preparation. The interest which has been taken in meteorological observation and the benefits resulting from it are encouraging, and sufficient to point out the direction in which we are to labor if we ever succeed in predicting the approach of storms. After the loss of 60,000 lives and the damage done to the shipping in Calcutta by the storm in October, 1864, the British government established a system of telegraphic meteorological predictions in India, similar to that which was established in this country by the Smithsonian Institution in 1856.

"The information conveyed by telegraphic dispatches in regard to the weather was daily exhibited by means of differently colored tokens on a map of the United States, so as to show at one view the meteorological condition of the atmosphere over the whole country. At the same time publications of telegraphic dispatches were made in the newspapers." [Smithsonian Report, 1865.] It is to be regretted that this system, which was discontinued during the war, has never, to my knowledge, been fully re-established. A committee appointed to consider certain questions relating to the meteorological department of the Board of Trade in England, recommends the appropriation of £10,450 or $52,250 for the successful carrying out of this system. I am glad to learn that this Board of Trade has just established five observa-

tories in different parts of England and Scotland, in which are self-recording instruments, all of similar construction. "A full and accurate record of atmospherical phenomena, supplying, it is hoped, a secure and adequate basis for the discussion of the variations of the weather in the British Islands, will be set on foot. The committee are prepared to convey telegraphic intelligence of the existence of any serious atmospherical disturbance which may come to their knowledge, to all ports to which it appears to them that such information would be of importance. On receipt of such message the local authorities are expected to hoist a drum as a general warning, on seeing which masters of vessels or others interested may learn, by inquiring at the local office, the precise nature of the information received." As most of the meteorological phenomena of the North Temperate Zone pass from west to east, it is evident that this country must afford a much better field for observation than England or any of the west of Europe. And as nearly all the principal cities of America as well as those of Europe are now, or are rapidly coming into telegraphic communication with each other, and the two continents are bound together, it seems highly necessary that some uniform system should be adopted on both continents. This would enable us not only to discover the laws and causes of many interesting phenomena of storms, which would materially advance the interests of science, but would also secure many practical advantages which must be apparent to all. If the attention of Congress has not already been called to this subject, this would seem to be a proper time to urge upon that body the necessity of making an appropriation for the establishment of observatories, etc., in different parts of the country for the carrying out of some system of observation and sending dispatches, as above indicated. Such an undertaking must result in benefits, not only to America, but to the world.

P. H. DOWLING.

Medina, Mich.

The Manufacture of Porcelain Teeth.

MESSRS. EDITORS:—Perhaps but few persons stop to consider the rapid growth and extent of this business in the United States. If we search for the germ of this comparatively new subject of production and sale, we shall be obliged to go some distance. I have seen a tooth taken from the alveolus of an Alexandrine mummy (some leek-eating cotemporary of Pharaoh and Moses, may be), brought by Dr. Gliddon, which had been plugged with gold. Occasional hints are furnished to us by other explanations, that our ancestors attempted the preservation or replacement of lost grinders, but the evidence is so distant and so uncertain, that they must be considered rather as occasional incidents than reliable details. Human nature, always ashamed of the ravages of time or the effect of accident, has been faithful to its instincts, and men and women have disguised the loss of an incisor by bits of bone or other material. Ivory was, until lately, the favorite substance to be used as a substitute for a decayed molar. Volney, Chateaubriand, and the elder Pitt, were not ashamed to make their countenances look sightly by these artificial replacements. I once heard the late Rembrandt Peale account for the material difference that appeared in the two pictures of General Washington, one of them having been painted when the false teeth were in his mouth, and the other when they were out. Washington's teeth were made of bone, and so were most of artificial substitutes forty or fifty years ago, but it soon became evident to "tooth sculptors" that something less liable to decay was necessary, and our French neighbors deserve the credit for devising the present popular substitute.

About the year 1765, one Pierre Lavouse, a workman from the Imperial Porcelain Works at Sevres, made some rude imitations of the natural teeth, and made them of the same material of which the French and German "soft porcelain" is made, but the art of making artificial dentures languished, until the incident I am about to detail transpired in 1833, sixty years afterwards.

At the date I have mentioned there was a little store in Second street, in this city, which was occupied by a man who did a little in dentistry, and eked out a living somehow, by mending watches, selling spectacles, etc. The education of the owner of the little shop was defective, and he devised all kinds of expedients to produce some substance to be used in lieu of bone from which to make the artificial teeth. He was at his wit's end, when one evening as he was closing his shutters a drunken Hollander, named Van Pelt, staggered into the place. The man was well acquainted with the manner of making porcelain, and for twenty-five cents offered to instruct the repairer of old watches, so that he could make porcelain teeth. Van Pelt wanted his whisky. The ambitious dentist embraced the offer, paid the Hollander the "quarter" and the next day burned his face and fingers by beginning to make molars for the million. So strangely do small causes operate.

From this visit of the ingenious drunkard we may date the origin of this kind of manufacture in the United States. After forty years of vicissitude and experiment the amount of labor and capital in this hitherto new business must astonish the statistician. The Revenue Tax paid to the government upon this branch of manufactures exceeds a quarter of a million dollars yearly. More than six hundred men and women—exclusive of dental-chair makers, quarrymen, instrument makers, gold-foil beaters, plaster of Paris makers, makers of tin foil, of vulcanizers, of emery and corundum wheels, etc.—which, with their families, make an aggregate of say five thousand souls, enough to make a village of sufficient size to claim the honors of a Burgess or Mayor—get their bread from this source alone. The capital invested in this business furnishes no mean item of the social wealth. In passing through these factories you miss the machinery, the ponderous iron wheels visible in other manufactories, but your custodian shows to you a pile of brass, and as he clanks the iron door open, tells you that these are his "molds." Little things they are, weighing a pound or so, but as each of them is worth a hundred dollars, and as there are some thousands of them, they cost something, you see, *mon ami*. And the furnaces, too, huge structures sixty or seventy feet high, built with care and skill, and lined with soapstone, excite curiosity.

The constituents, or, as the profound call them, the "molecular atoms," which make an artificial tooth, are few and simple. Feldspar, silex and kaolin, and a little flux, make the body and enamel, and the particular tint and color are imparted by some of the oxides of metals, the oxide of silver, making a straw or lemon color, iron making a brown, cobalt a blue, titanium a yellow, etc. Sometimes the colors are imparted with a brush to the surface of the tooth, but usually the color is mixed with the "body" or the mass of the materials before it is molded. The most difficulty is experienced in preparing the gum color. This substance, called "Purple of Cassius" by the chemists, appears to be a sort of *terra incognita* to the students in that science. They conjecture that it is an oxide, but all of them hesitate in assigning a name or chemical symbol to this production. To make the gum color natural and flesh-like is the *point d'excellence* with manufacturers of artificial dentures. We suppose that the truth is that its purplish flesh-color which makes it so desirable is imparted to it by the admixture of some substance in the "body" of the tooth upon which it is burned. Some manufacturers make this purple of Cassius by melting their gold, tin, and silver in a crucible. This is called preparing it in the "dry way," and some make it by dissolving the metals in acids, which is called the "humid" process. In any way it is uncertain and undetermined, and when a good "lot" is made the manufacturer rejoiceth, vastly.

The crude feldspar is scattered in patches all over the globe, but the best quality used in the United States is brought from the quarries in Delaware Co., Pa. The kaolin which is neither more nor less than disintegrated feldspar is procured from the same places. It may be necessary to say that the feldspar contains about fourteen per cent of potash, which it loses in the process of disintegration; consequently kaolin, or *petunze*, as the Chinese call it, is feldspar deprived of its alkali. The silex is too common to need explanation, as its relations, flint, quartz, sand, etc., are under every one's heels.

The spar is quarried, brought to the factories in barrels, heated in a furnace, and the calcination is completed when it is thrown into water. Next, it is ground in water, and kept standing in vessels for two or three years, during which time a film rises upon the surface of the water which emits a stench not pleasant to dainty noses. (We are told that the feldspar is kept in water in the Imperial Porcelain Chinese manufactories for three hundred years!) It is next dried, and after being mixed with the silex and kaolin to about the consistence of putty, is pressed into the molds and takes the form of the "block" or single tooth, and placed upon clay "slides" and "biscuited," *i. e.*, heated to a degree which makes it hard enough for the workmen to trim the edges of the teeth or blocks and yet not sufficiently hard to become fused, or vitrified. After the edges are trimmed off, they are dipped in a glass and replaced upon the slides and are returned to the muffle where they are again heated to about 4,000 degrees, and when properly vitrified, are taken out and annealed very slowly. This last process demands experience and good judgement. Like all other kinds of glass, porcelain teeth that are not carefully annealed are worthless. When the teeth have been properly made, and all the essentials of strength and beauty have received due attention, they are as translucent as the finest Chinese Porcelain, and as tough as ironstone. I have avoided details as it is not my purpose to instruct in this business, but rather to call attention to the rapid rise of this noticeable feature in American manufactures.

Forty years ago you could have your face shaved, your tooth drawn, and your boots blackened, in the same place by the same hand. Now you are ushered into an elegant office, seated in a chair easier than that of Heliogabalus, and your alveolar ridges are examined by a man whose attainments would reflect honor upon any profession.

GEO. R. WELDING.

Philadelphia, Pa.

Change of Tone in the Sounds of Moving Bodies.

MESSRS. EDITORS:—I wish to confirm the statements made by your correspondent "G. C.," given upon p. 247 of this volume. I have often noticed such a change of tone as is there described, in the screech of a passing locomotive, nor is it difficult of explanation.

The tone or pitch of any sound depends upon the rapidity of the sonorous vibrations, the higher the pitch the more rapid the vibrations. Those produced by the locomotive whistle probably range from 100 to 500 per second, in different locomotives. Let us suppose the vibrations are 200 per second. Then since sound travels in air about 1100 feet per second, each wave will be about five and a half feet long. If the locomotive is approaching at the rate of twenty miles per hour,—which is about thirty feet per second,—we shall hear five more vibrations per second than actually occur; during that time, the locomotive having appproached by a distance somewhat greater than the length of five of the sonorous waves. On the other hand, when the locomotive is receding we hear five vibrations less instead of five more, making a difference of ten vibrations in a second, or one twentieth part of the whole number generated by the whistle; a difference, —amounting to nearly a semi-tone,—amply sufficient to cause a very perceptible change of pitch.

If the locomotive does not approach or recede, that is, if it moves in the arc of a circle, in the center of which the hearer is situated, the pitch of its whistle will be the same as when the locomotive is stationary; but, under all other circumstances of motion, a change of tone, corresponding to the rate of approach or recession, is inevitable.

The elevation in tone of an approaching rifle ball or other projectile will of course be still greater, approximating in amount to an octave, in which the number of vibrations is doubled when the velocity of the projectile approximates to 1100 feet per second, or the velocity of sound itself. In receding, the tone will be depressed a corresponding amount. If the velocity of the projectile exceeds 1100 feet per second, it will not be heard at all on its approach, or it will leave all the sound waves behind it.

An explanation somewhat similar to the one given above, as relating to variation in sound, was proposed in *Silliman's Journal* a few years ago, to account for the change of color in the variable stars. When a star approaches the earth with a velocity having a sufficiently large ratio to that of light, its color would assimilate to the violet, in which the vibrations are the most rapid of all the colors. When its motion changed to an opposite direction, as would be the case of a body moving in a circular or elliptical orbit, in a plane but little if any inclined to the direction of vision, a contrary effect would take place, and the color would change through the entire spectrum to the red, in which the vibrations are the slowest which produce the sensation of vision.

HENRY F. WALLING,

New York City.

Depositing Crystals on Glass,

MESSRS. EDITORS:—Noticing an article in No. 18, Vol. XVIII., entitled "Crystallization," reminded me of some experiments of a similar nature made in the summer of 1865, I was then engaged in the photographic business, and had a window opening from my dark room into the operating room. Thinking I would make it ornamental, I procured a pint of stale ale, four ounces of Epsom salts, and a small vial of Magenta colored liquid. I then took out the window, and in its stead placed a large single pane. After mixing a saturate solution of the ale and salts, and adding the color, I filtered the solution, then cleaned the glass with alcohol and cotton chemically clean, placed it on a leveling stand, and made a small ledge with putty around the edge, then poured on the solution enough to cover the plate evenly in all parts. In a few hours the crystals began to form around the edge, and in forty-eight hours it was all covered with the most beautiful crystals, of large size and of a rich purple color. When it was perfectly dry I placed it in the window, where it remained all summer, and was the wonder and admiration of the curious. But when winter came, and the stove was put up close to it, it soon began to lose color, and the crystals gradually dropped off.

I offer this for what it is worth, but do not claim the discovery, as it first came under my notice on the prescription case of a druggist's window. H. B. NORTON,

Rochester, N. Y.

Novel Way to Fill Teeth.

MESSRS. EDITORS:—In No. 17, current volume, I notice the statement of a dentist of Zanesville, Ohio., who had extracted and replaced a molar tooth for a lady, which had done good service for the space of 11 years, and now had to be again extracted, being found aching from an exposed nerve. What is singular about it is that the nerve, after having been broken, should again reunite; I do not see how this could be possible.

A short time previous to that spoken of by him, while I was practising dentistry in Ohio, a young woman applied to me to fill the cavities in two large incisors. Upon examination I found them so far gone that the task to me would be very difficult, and to her too painful to endure. The surroundings seemed to be sound, with but slight inflammation, so I made the novel proposition to extract, fill, and replace them, to which she consented. I prepared a small vise, fitted the jaws with soft pine, and after getting everything in readiness, I placed her slightly under the influence of chloric ether and extracted the one which was worse decayed, found the lingual surface nearly gone. I placed it in the vise, cleaned it, making the orifice entirely through and consequently had to fill from the inner angles on each side, all of which I performed in about five minutes, when I again administered a little ether, replaced said tooth and extracted the other, and proceeded as with the first, which occupied three or four minutes, the whole being performed inside of ten minutes. I lately heard from her; the teeth remain as sound as they were when I filled and replaced them, doing good service. Any doubting dentist can satisfy himself of the truth of this statement by applying to the lady herself, Susan Liddill, who resides at Union Village, Warren county, Ohio. The nerve in one of these teeth was dead before the tooth was extracted, and both of them doubtless received their nourishment from the surrounding alveolar process. How long they may be nourished from this source and be of service is yet to be determined.

I tried the experiment on a young man, which also proved a success, but it has been some years since I heard from him. I also tried with others partially decayed bicuspids and molars, but did not succeed in getting them into paying service, as they had to be re-extracted in a short time. But I do not see why a perfectly sound one might not re-unite with the alveolar process or surrounding walls and thence receive nourishment and become serviceable. H. L. EADES.

A piece of land in the Virginia valley is said to have been planted in corn for sixty-five years in succession, and still grows a good crop.

Improvement in Self-Acting Horse Hay Forks.

In the accompanying engravings is presented a new cog-wheel hay fork, the invention of P. A. Mowers, of Shippensburg, Pa.

Fig. 1 represents the fork open, as in its descent from the mow or stack to the loaded wagon. A is a lever gearing with the prongs; B B are the prongs; E E the clasps or plates (section broken) in which the cogs of the segment ends of the prongs and lever work; D is a spring attached to the trip, C, which fits securely into a notch of the lever. The manner of its action is simple, and at the same time effective. The curvature of the prongs is such that, as the man loading presses the fork downward into the hay with his foot, they describe a circle until they meet. During this time the lever is brought up by the action of the cogs ready to be locked, although not touched until now, when the person controlling the fork, by grasping the lever with his hand, readily locks it by a slight pressure against the trip, which flies into the notch of the lever, and the fork is locked as seen in Fig. 2, having within its grasp from 300 to 600 lbs. of hay. As quickly as the hay arrives at the point where it is desired to drop it, the off-snap rope attached to the trip is pulled, which releases the lever, the hay from its own weight drops out, and the fork is returned to the wagon, open, as in Fig. 1.

Fig. 1

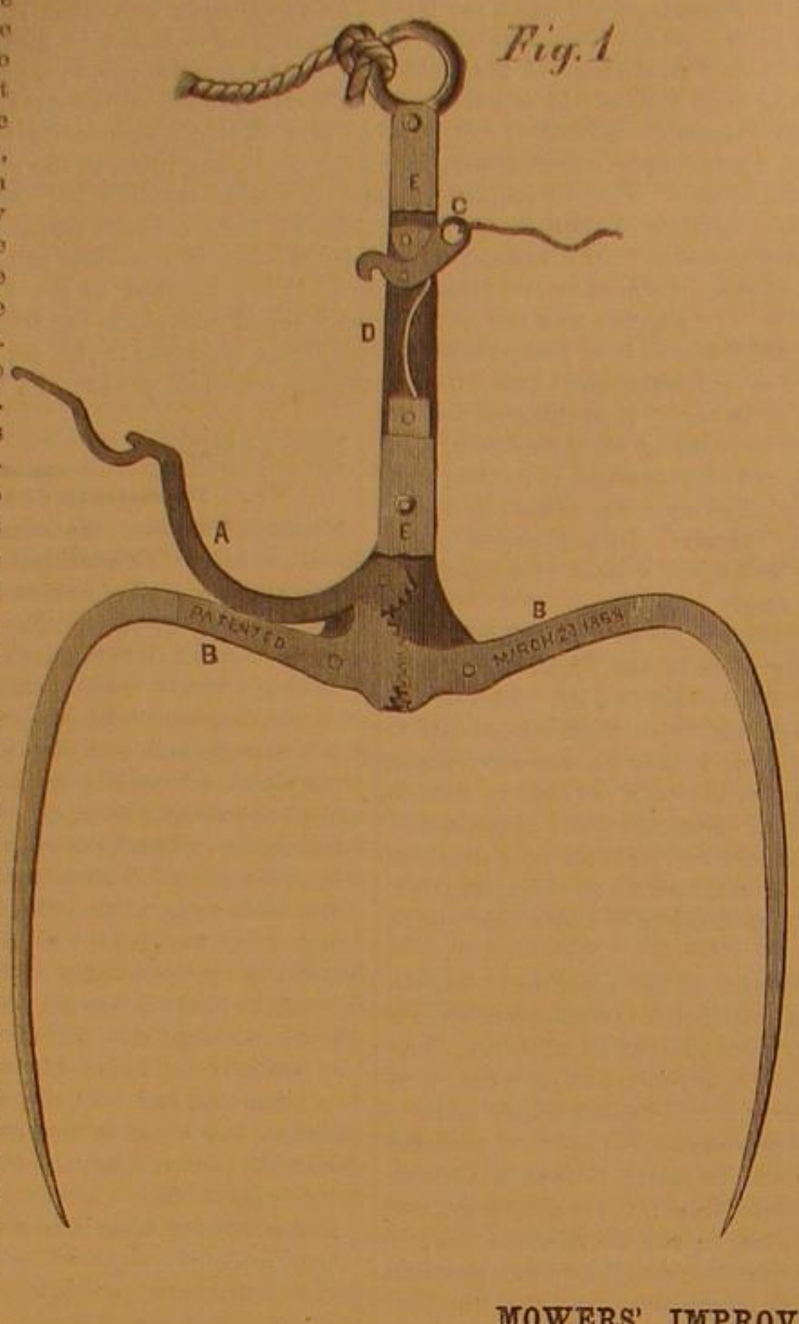
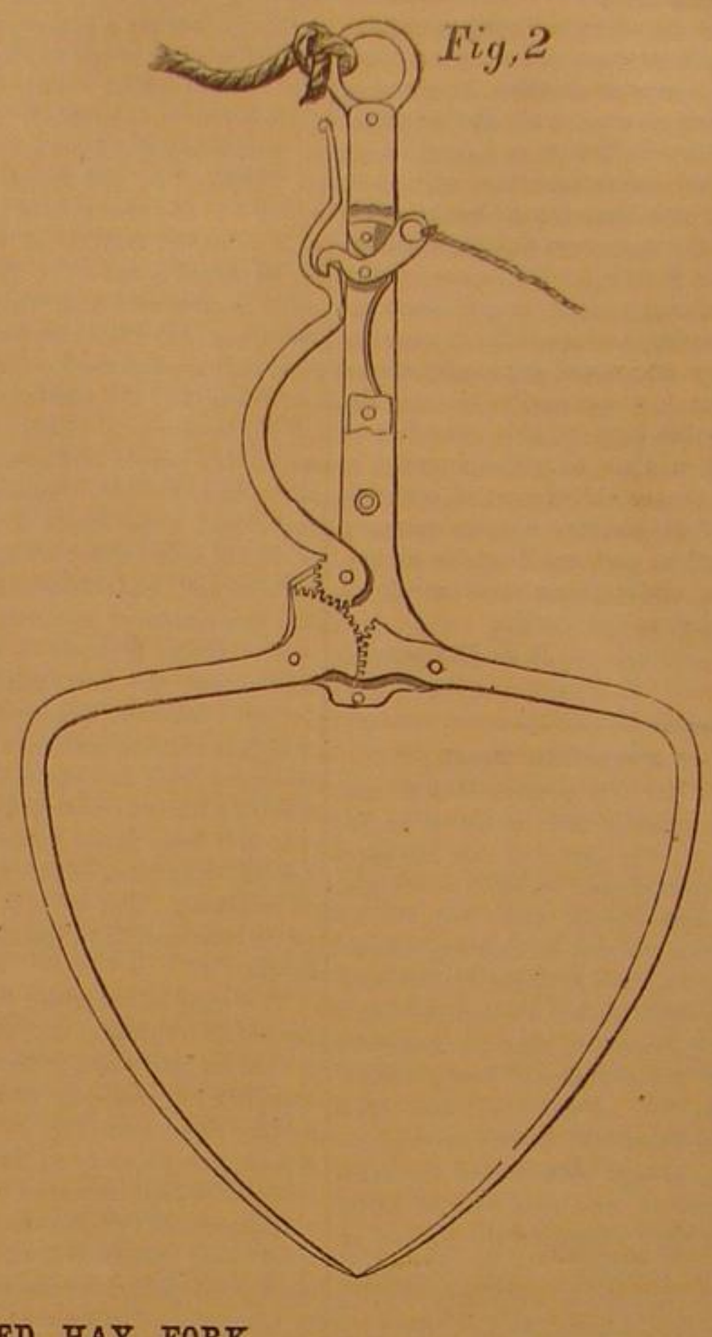


Fig. 2



MOWERS' IMPROVED HAY FORK.

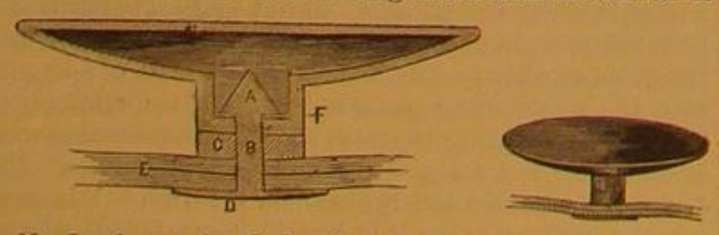
Under the same patent a second variety of fork is included, in which the lever, A, is omitted, and the prong of the opposite side made to coincide with the length of the lever. In other words, this is a horse-setter in which the main rope, spring, and trip are adjusted a little differently from the former. Instead of suspending the fork from a ring, as in Fig. 1, there is a pulley between the plates, E E, under which the rope passes, and then is attached to a hook on the prolonged prong. The principle of its working is the same as the fork already described; and the only advantage it possesses over the lever-fork, is a moment's time saved in locking, as the horse locks it in pulling. Still another variety of fork may be made, in which the lever is placed outside the plate. Either of these forks may be constructed with two or four prongs.

After many and impartial trials of the cog-wheel hay fork, the inventor claims superiority for it over all others in its perfect adaptibility to all kinds of hay—short or long, wet or dry. It may also be used for loading straw and cotton.

The patent was issued March 23, 1868, to P. A. Mowers, Shippensburg, Pa. A firm is desired to manufacture on a royalty for the states of New York, New Jersey, Delaware, and for New England. For particulars, address S. M. Whistler, Albany, N. Y. State and county rights for sale. For further information, as to other states, address the patentee, P. A. Mowers.

JOHNSON'S SELF-FASTENING BUTTON.

The annexed engravings represent a self-fastening button, which can be attached to a garment in a twinkling without the aid of a needle or thread, and can be detached in as little time. They are easily made by the usual mechanism, the tubular shank of the button being raised from the button itself. In the sectional drawing of the button, F represents the shank, its lower end being provided with a slot corresponding with the width of the stud, A, which enters therein. The inner face of this lower end has a recess or depression in a direction opposite to the opening, so that when the stud is turned after entering the shank, the shoulders of the barb will rest in the depression. D is a disk or back plate from the center of which rises a shank, B, terminating in the barb, A, which pierces the cloth, E. A spring of rubber or other suitable material, C, serves to keep the button and stud apart thereby keeping the shoulders of the barb in the depressions before referred to.



The other engraving shows the button when attached to the cloth.

This button was patented by John M. Johnson through the Scientific American Patent Agency, May 15, 1866, and any further information may be obtained by addressing him at Box 45, Station D, New York city.

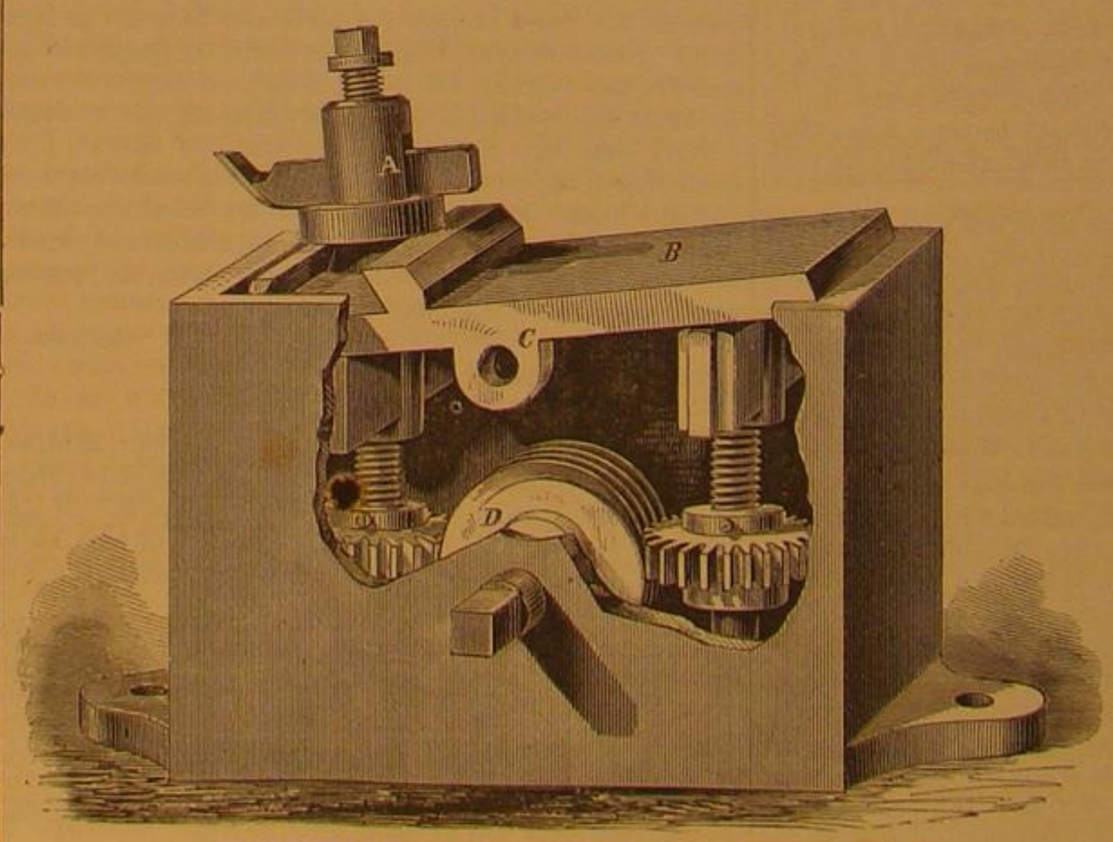
Improvement in Printing Wall Papers.

P. H. Bowers, Brooklyn, N. Y., has patented the following: "I take thin strips of wood, of various kinds, from which I desire to print the wall papers, and mount them upon blocks of wood, or any suitable substance; or I saw out from wood, blocks of sufficient hight to allow an impression to be taken from them when placed in the press. I then thoroughly cleanse the face of the wood blocks with a mild alkaline solution, so as to remove the softer substance filling the pores of the wood. The blocks are then placed in the ordinary machine for printing wall paper, are properly inked, and the paper, being fed into the machine, any number of impressions may be taken.

"The result is the production of a wall paper, in which the grain of the wood used as a type is perfectly reproduced, and the expense attendant upon the same does not exceed the cost of wall paper printed in the usual manner, while a high artistic character is given to the work."

Improvement in Tool Holders for Lathes.

The device herewith illustrated is intended to take the place of the ordinary tool post used on turning lathes, with the object of holding the turning tool rigidly to place, which it is difficult to do with the device in common use. These support the tool only on one end, but this is calculated to sustain it solidly along its whole bearing. The tool post, proper, A, is attached to beveled ledges on the platform, B, in the usual, manner, the platform forming with the tool post, a single device.



GEISSINGER'S PATENT LATHE TOOL POST.

This platform is pivoted to the sides of a box by the ears, C, through which passes a bolt. The box contains a worm, D, and two worm gears, one on either side of it, with both of which it is permanently engaged. Of course there can be no back lash in such a case, and when the worm is turned the gears operate simultaneously. One of the gears carries a screw elevating one end of the platform and the other carries another, performing the same office for the opposite end.

Patented Sept. 17, 1867. Further information may be obained of Elijah Hall, 145 Smithfield street, Pittsburgh, Pa.

Immortal Animals.

Up to the present the law *omnibus moriendum est* has never been controverted, but it seems that it is reserved for science and research to call this immutable dictum into question. It will scarcely be credited that there are animals or at least portions of animals which never die; but, nevertheless, such is the fact with respect to certain marine worms of the genus *Nais* and *Syllis*, possessing but little interest for the cursory observer, but presenting many attractive features to the naturalist and zoologist. These little creatures are endowed with the singular property of multiplying their species by self division. A similar power of procreation is common in many species of the animal kingdom, and also in the vegetable, but in this particular genus it manifests itself in a more remarkable manner. At certain periods in the life of the worm the posterior portion of the body becomes considerably changed in form, increases in size, and the transversal lines dividing it into segments assume a more prominent and marked appearance. After some time, at the point where the anterior and posterior portions of the body join, there is formed a head, with *antennæ* jaws, and, in fact, with every other physical attribute that constitutes a complete marine worm of the particular species alluded to. No sooner is it entirely finished than it detaches itself from the mother body, so to speak, and launches itself out into the world to become, in its turn, subdivided into independent creatures. It is but right to state that these facts have been contested, but they are in strict accordance with accurate observation and disinterested testimony.—*The Engineer*.

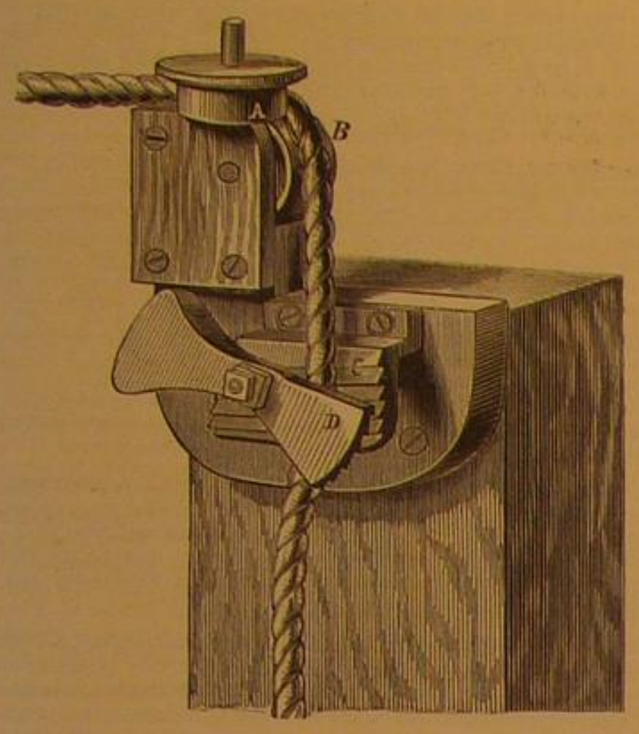
The Travels of a Telegraph Cable.

The submarine telegraph line which is to connect the islands of Cuba and Jamaica with Panama, can boast of quite a history. It was originally manufactured in London to connect Asia and America by way of Behring's straits, and was shipped to Victoria. But the success of the Atlantic cable was the death blow of the Pacific company, and the cable was not unshipped. The East India Telegraph Company then proposed buying it, to be used in China, but the negotiation failing, it was ordered to California. Before, however, it could be appropriated other parties came in and purchased it, and now, never yet having been disturbed since being shipped from London in 1865, there seems every probability that it will finally find a resting place, filling its ultimate mission as a link in completing communication between the United States and the isthmus of Panama.

THE cities live at the expense of the country. Families are exhausted and die out and their places are filled by new comers from the country. This was illustrated by the case of Paris, where it was estimated by a writer in 1842, that among 300,000 people then living in Paris, there were probably not 1,000 who could trace their families in that city back 200 years; or, the 200,000 people living in Paris in the reign of Louis XIII, instead of multiplying to 400,000 in two centuries, had dwindled down to 1,000. According to Price, 10,000, and according to Hume, 5,000 people from the country are necessary to keep the London population up to its number.

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, 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.

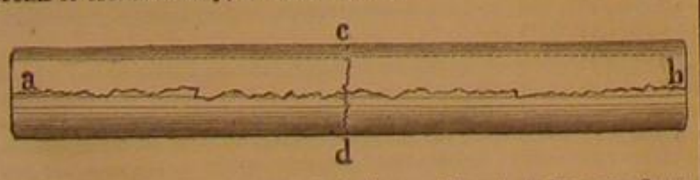
Patented through the Scientific American Patent Agency, Dec. 31, 1867.

THE WATCH.—No. 4 of the articles on this subject is unavoidably postponed until the next number on account of the pressure of matter upon our columns. We shall resume their publication in the next number.

ON THE STRENGTH OF BOILERS.

The capacity of boilers to resist rupture by the pressure of the steam, and the unequal expansion of the material of boilers from unequal heating, is a subject of very great importance, and not generally understood. Some illustrations and remarks relative thereto will be found below.

Any tube closed at the ends and subjected to an elastic pressure from within, will rupture longitudinally (from *a* to *b*) with about one half the force per square inch required to break it transversely, as from *c* to *d*.



For example, a cylindrical boiler, without tubes or flues, made of a single piece of homogeneous iron, one quarter inch thick, without seams, may be conceived, twenty feet long, and thirty-six inches in diameter. For convenience, we will assume that each square inch of the iron of the cross section, from *c* to *d*, and of the longitudinal section, on the horizontal plane, from *a* to *b*, has the ability to restrain a force having a tendency to rupture it, equal to fifty thousand pounds.

The circumference of the boiler is about one hundred and thirteen inches, consequently the area of the cross section of the iron has about twenty-eight square inches; it would, therefore, require one million, four hundred thousand pounds pressure against the heads to pull it apart with a transverse rupture. The whole number of pounds representing the transverse strength, divided by one thousand and seventeen, which is the number of square inches area of the heads, against which the steam would press to cause the transverse rupture, gives thirteen hundred and seventy-six pounds as the pressure per square inch against the head required to break such a boiler in two transversely.

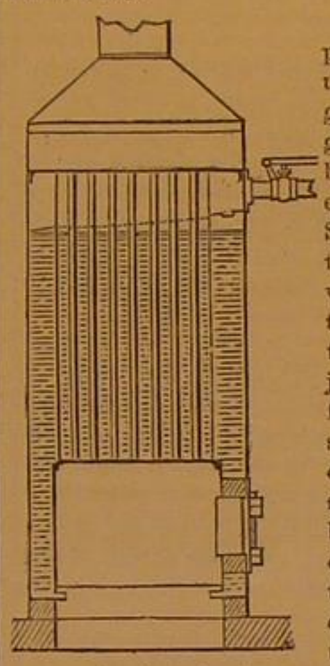
The longitudinal section contains one hundred and thirty-eight square inches of iron; consequently, it requires six millions, nine hundred thousand pounds pressure to break it in two in the longitudinal direction. The area of the surface against which the steam would press—the boiler being two hundred and forty inches long and thirty-six inches wide—is eight thousand, six hundred and forty square inches; which, used as a divisor for the sum of pounds, representing the strength to resist longitudinal rupture, and we have seven hundred and ninety-eight pounds per square inch, as the pressure necessary to pull it apart with a longitudinal rupture. Whether such a boiler could resist transverse rupture until the pressure of the steam reached 1,376 lbs. to the inch, and longitudinal rupture up to 797 lbs. to the square inch, is not material to this particular inquiry.

It is important for engineers and others to know, that a boiler is nearly twice as strong to resist transverse rupture as the longitudinal, because it will be then possible to determine that some other force than the direct pressure of the steam has been the cause, when a boiler is found broken transversely, and not longitudinally, all other conditions being equal, as contemplated herein.

If a boiler of the cylindrical form has flues, or tubes, it would increase the ability to resist transverse ruptures, for two reasons, which should be considered:

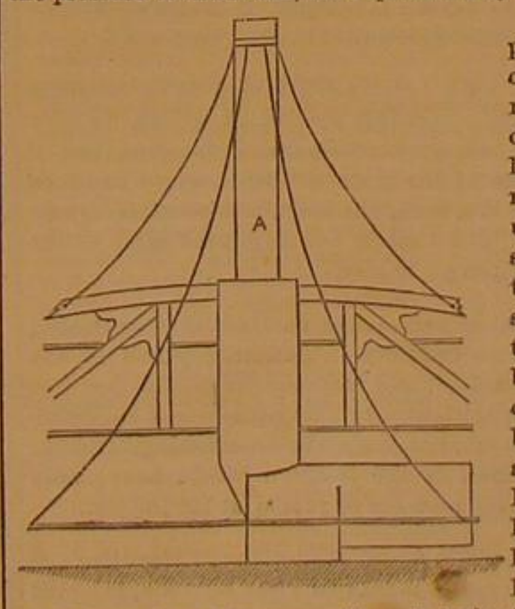
1st. The part of the area of the head covered by the area of cross section of the flues, or tubes, would have to be deducted in determining the sum of the pressure of the steam against the heads acting to pull the boiler apart transversely; and,

2d. The strength of the tubes, or flues, should be added to the strength of the shell, as if they were stays between the heads, increasing the ability of the boiler to resist rupture transversely.

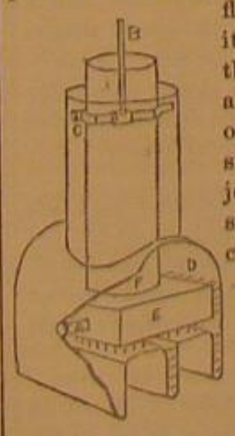


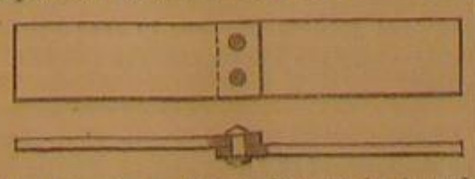
Yet, notwithstanding these important considerations, I do not think there has ever been a single example noticed of the longitudinal rupture of an upright boiler. The cut represents a boiler which exploded disastrously on Stone street, New York; the rupture was transverse, and therefore was not caused by the pressure of the steam. It was established by the evidence before a coroner's jury that this boiler carried but fifty pounds of steam at the instant of the explosion, yet a calculation based upon the actual strength of the iron, determined by actual experiment that a force equal to sixteen hundred pounds to the inch, upon the whole area of the head, would be necessary to break it in the manner it was ruptured; that is, transversely through the intact sheet, about twelve inches above a transverse seam.

If the force with which the tubes would expand, if made hotter than the shell, should be considered, or the increased circumference of that part of the shell above the water from the same cause, should be taken into account, in addition to the pressure of the steam, the explosion may be accounted for.

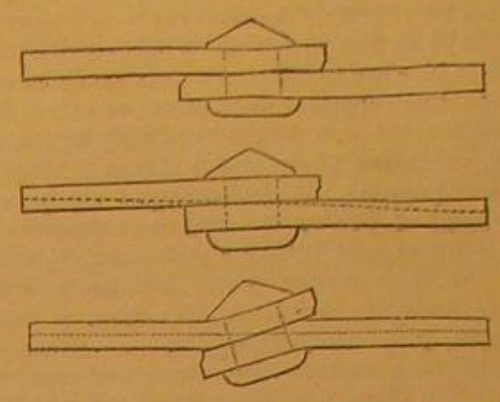


No class of explosion is more common than the rupture of steam chimneys on the kind of boilers almost universally used on river and sound boats along the Atlantic coast, such as shown in the cut. I do not believe a single case can be remembered in which a steam chimney has been ruptured longitudinally. I have known of a large number which have burst transversely, and leaks in the transverse seams are so common that scarcely one can be found which does not leak. It is not the pressure of the steam which is the cause of either the leaks, rupture, or explosion, in this part of the boiler. But if the force with which the uptake flue (F), on the cut, expands upward when it is heated to a higher temperature than the outside shell, is taken into account, in addition to, or even without the pressure of the steam, it can be understood why such parts of a boiler give way when subject to only twenty-five pounds pressure of steam, after the water test has shown them capable of withstanding fifty pounds.





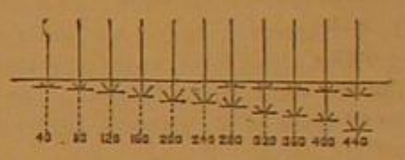
It has been found by actual experiment that single riveted seams have but fifty-seven hundreds of the strength of the iron elsewhere than through the rivet holes. The ratio of weakness is greater than the proportion of the iron, cut out in punching the holes. This is probably due in part to the distortion of the iron by the punch, immediately about the hole, putting the material in a state of tension, or strain. The caulking tool also buckles the iron



and thereby adds to the tension; and the lap of the sheet throws it out of the line of the tension exerted by the pressure of the steam, the tendency being to bend the sheet as shown in the cut.

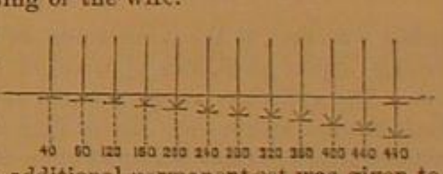
As all structuers are only as strong as their weakest part, it would seem to be a reprehensible error in boilermakers to continue to construct boilers with invariable lines of weakness, like the seams, having but little more than half the strength of other parts. But it has been almost invariably noticed, when examples of exploded boilers were being examined, that the rupture did not either begin with, or follow the rivet holes, or any weak part of the iron with flaws, which is also an indication that some other force than the elastic pressure of the steam caused the initiatory rupture.

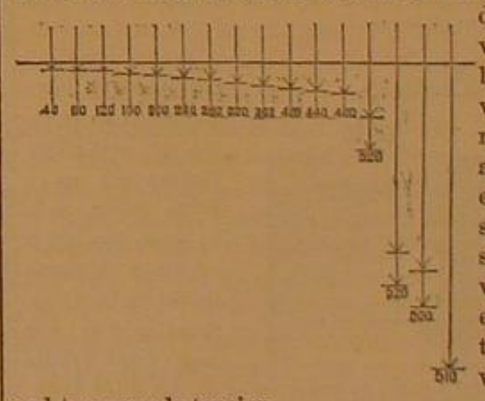
Any piece of iron subjected to a tensile strain will be stretched to the extent which will give it a permanent set by about one half the force which will break it. This curious fact was discovered and demonstrated by Professor Daniel Treadwell, whose essays on some of the qualities of metals are extremely valuable.



The experiment was constructed by stretching a piece of wire along a table, about fourteen feet in length, and by means of a lever, after marking its length, subjecting it to a tension of forty pounds. The extension for that weight, and for each weight applied is shown full size on the cut. The weight was removed after each application, and it was found that two hundred and eighty pounds gave the first permanent set; that is, the iron did not recover its original length after the application of that weight. The continued additions to the weights shown, increased the permanent extension until four hundred and forty pounds were sustained, without breaking the iron, which will be noticed, is nearly double the weight which gave the first permanent stretching of the wire.

Another series of the application of the successive weights from forty pounds upwards, was then began, with the same iron; but no additional permanent set was given to the wire until four hundred and forty was passed. Five hundred and twenty was reached without breaking, which weight being removed, and applied again, was suspended for several hours, stretching the wire slowly, as shown, when it was removed; and afterwards the wire was broken with five hundred and ten pounds tension.



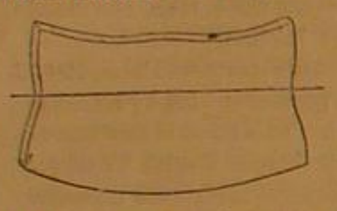


From this we may conclude that if we find a part of a boiler which has burst, of an equal strength with the ruptured part, not stretched or distorted, that it was not the pressure of the steam which caused the initiatory rupture.

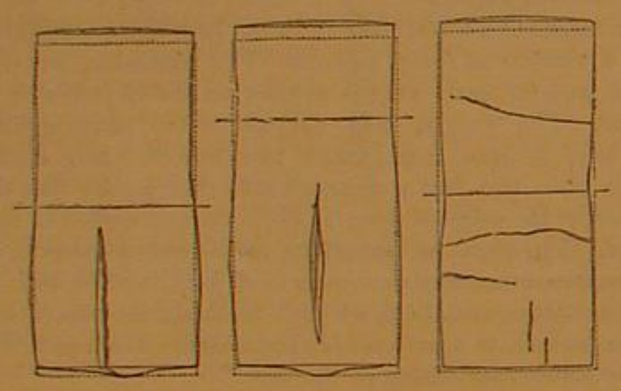
If the pressure of the steam were the only force to be restrained in boilers, it would be easy for the boilermaker, or engineer, to provide boilers which could not possibly be burst. For instance, if a boiler of certain dimensions, made of quarter-inch iron, should burst, make the next one to take its place of iron half an inch thick. Or why not four inches thick? If iron with a tensile strength of 50,000 lbs. to the inch is ruptured, why not take high steel, with a tensile strength of 120,000 lbs. to the square inch? These seem to be natural questions to ask, but they are answered by the statement that it is not the strongest boiler which is found to stand the best, but the boiler which is made of the softest and most ductile materials. A boiler might be made of iron so thick that it would not conduct heat enough through to the water to generate steam at all, while the iron would be entirely destroyed by unequal expansion, from the difference of temperature between the surface of the plates exposed to the fire, and the one exposed to the water. And although a boiler made of high steel would withstand a much higher cold water test than an iron boiler of the same thickness, it could not withstand unequal heating so well, on account of its greater density; and, consequently, the greater force with which it would expand and contract, as it was heated or cooled unequally. Metals expand, as they are heated, with a force which exactly equals the force with which they would resist compression at the same temperature

and contract with a force which exactly equals the force with which extension to the same extent would be resisted.

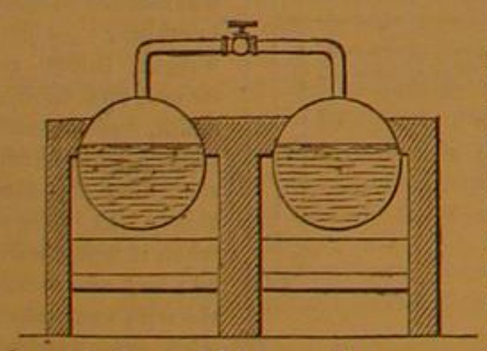
A bar of railroad iron may have eight inches area of cross section, and a tensile strength of 20,000 to the square inch. Such a bar would be pulled apart if it were extended three eighths of an inch lengthwise, and the force necessary to extend it would be 160,000. The same bar would be extended three eighths of an inch by raising its temperature one hundred degrees: If, when so heated, its ends should be so fixed that they could not approach each other; and then, the bar being cooled, it could be broken in two simply by the force of contraction, which would come from a change of temperature of one hundred degrees. If the bar should not be actually broken by the first heating and cooling under such circumstances, it would at least receive a permanent set, and repetitions of the same process would eventually break it. And this is probably the force, viz: unequal expansion or contraction from unequal heating or cooling, which causes all the leaks, ruptures, distortions, and explosions of steam boilers; a force not contemplated when boilers are subjected to the test of cold water pressure by the steam boat inspectors; a force which does not effect the steam gage or safety valve, and therefore these instruments do not indicate it. When we come to examine the ruptured, leaky, or the exploded boiler, we have no means of determining the extent of the force which caused the accident, and the engineer has no means of either determining or preventing it. The boilermaker cannot make a boiler to withstand it, for the stronger the boiler the greater the force. The only practical way to avoid the danger is to equalize the temperature in all parts of the boiler, at all times and under all circumstances, which happily it is easy to do.



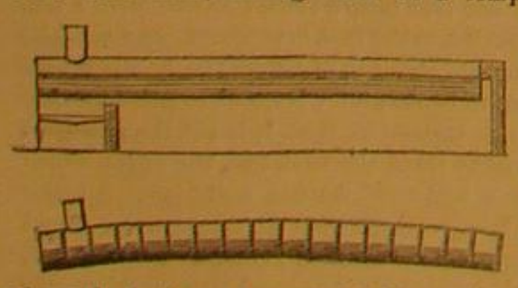
This cut shows the distortions of a piece of boiler iron twelve inches long, eight inches wide, and half an inch thick, which was heated twenty times, red hot, and then dipped edgewise in water, so as to immerse it a little more than half its width, as shown by the line across it, during a series of experiments conducted by Lieut. Col. Clerke, as communicated by him to one of the learned societies in London. The same gentleman also subjected three solid cylinders, twelve inches long, and four



inches diameter, to the same ordeal of heating and partial cooling; one of steel, one of wrought iron, and one of cast iron. The cylinders were ruptured in the manner shown. Each became longer—the dotted lines on the cuts show the original length—the central part of the metal being squeezed out to greater length by the contraction of the outside, which cooled first, and contracted upon the interior metal, like the tire upon a wagon wheel.



It was once my privilege to have a chance to experiment with two boilers set up in brick work, side by side, but with separate furnaces under each. Occasionally the fire was made under only one boiler, and fifty pounds pressure of steam filled both. As water will not receive heat from its upper surface downward, the steam was not condensed by the cold water in the boiler under which there was no fire, and the water remained as cold as previous to the beginning of the experiment. The boilers were thirty feet long, and thirty inches in diameter, of the cylindrical form, without flues. With fifty pounds of steam, the one without the fire under it had a temperature of 301° Fah., in the water, and in the steam; and at that temperature was about one and a half inches longer than when cold. The other, having water at a temperature of 60° in the bottom, and steam at a temperature of 301° in the top, was bent into the form of a segment of a circle, and was caused to leak badly along the bottom. I concluded the strain upon the boiler was quite as great as if it had been bolted down at the ends and jackscrews adjusted under it along the middle of its length, and "worked up" until the boiler was bent to the same extent. It was considered extremely dangerous to carry fifty pounds of steam in a boiler under such circumstances, and the experiment was not repeated. Yet engineers frequently have a high pressure of steam on boilers while subjected to equal strains of unequal expansion, without knowing it. Boilers explode under such circumstances, and everybody



wonders. Enormous pressures are attributed to steam accumulated suddenly in some mysterious manner, and the error is repeated again and again. NORMAN WIARD.

"THE WHEEL."

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Editorial Summary.

ELASTIC AND SWEET GLUE, which does not spoil, is obtained as follows:—Good common glue is dissolved in water, on the water bath, and the water evaporated down to a mass of thick consistence, to which a quantity of glycerin, equal in weight with the glue, is added, after which the heating is continued until all the water has been driven off, when the mass is poured out into molds, or on a marble slab. This mixture answers for stamps, printers' rolls, galvano-plastic copies, etc. The Sweet Glue, for ready use by moistening with the tongue, is made in the same way, substituting, however, the same quantity of powdered sugar for the glycerin.—*Druggists' Circular.*

PHOTOGRAPHING THE INTERIOR OF A TUNNEL. Mr. Evans has presented to the New York Institute of Engineers, a photograph of the high level tunnel of the Central Pacific railroad. The east end of the tunnel being sometimes illuminated at sunrise, a large mirror was employed to reflect the sun's rays equally over the whole of the interior, while the picture was being photographed. The plate having been exposed about fifteen minutes, a print was taken showing every detail, even to the timbering of the drifted headings, with great distinctness and accuracy.

BEFORE washing almost any colored fabrics, it is recommended to soak them for some time in water, to every gallon of which is added a spoonful of ox-gall. A tea-cup of lye in a pail of water is said to improve the color of black goods, when it is necessary to wash them. A strong, clean tea of common hay will preserve the color of French linens. Vinegar in the rinsing water for pink or green, will brighten those colors, and soda answers the same end for both purple and blue.

SWEDISH AGRICULTURAL FAIR. We are in the receipt of the announcement that the Twelfth General Agricultural meeting of Sweden, will open on the fourth day of next August. Two invitations, the one in the French language the other in English, have been sent, urging us to participate in the exhibition. These we generously extend to any of our readers who may desire them. Mr. C. Jahlin Dannfelt is the Secretary, and communications may be addressed to him, at Stockholm, Sweden.

ARTIFICIAL GRINDSTONES.—Few of our quarried stones are of even texture. Sometimes there appears to be a spicula of flint, like a steel spike, extending from the circumference to the center, which will not yield to the razing iron. It is said that the Ransome artificial grindstone is free from this serious defect, and that notwithstanding its greater cost it is really cheaper than the quarried stone. If this is so, this stone, coming rapidly into favor as a building material, will be found to be no less valuable for mechanical purposes.

A PHILOLOGICAL FACT.—Becanus accounts for the presence of the word "sack," variously spelled of course, in very many languages, by the explanation that at the dispersion of mankind at the foot of the tower of Babel, every one took away his valuables in a sack, the most indispensable article on a long journey, and that no one forgot the name of the thing which was all in all to him.

A French medical expert lately testified in a poisoning case, that he had no difficulty in detecting poison in the stomach of the deceased, and acknowledged that he had observed symptoms attributed to this cause sometime before the death of the victim, but declined administering antidotes because their presence in the stomach would have made trouble in proving the presence of poison at the inquest.

A NEW TEST FOR FREE ACIDS.—Chloride of silver dissolved in just sufficient ammonia to make a clear solution, is stated by a correspondent of the *Chemical News* to be a very delicate test for a free acid. If a little of the test is added to ordinary spring water, the carbonic acid present in the latter will neutralize the ammonia and precipitate the chloride.

PEANUTS in North Carolina, where they are chiefly raised, have almost taken the place of cotton as the great staple, and bring their cultivators annually $100 per acre. A correspondent informs us that 8,000 bushels on a single plantation is considered but an average crop, while from 10,000 to 16,000 bushels is not regarded as a very extraordinary yield.

LEADEN TOBACCO BOXES. Dr. Mayer, of Berlin, states that he has traced six cases of lead colic and paralysis to the use of tobacco held in leaden boxes. M. Chevallier has found, also, that tobacco wrapped in lead foil,—improperly called tinfoil,—becomes impregnated in course of time with acetate of lead.

FRENCH FOSSIL REMAINS.—In the commune of Tayac, in the department of La Dordogne, France, seven fossil skeletons have been discovered, the utensils and arms surrounding which indicate the remote period of the age of stone, before the use of metals was discovered.

Recent American and Foreign Patents.

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

SIDE RUDDER FOR SHIPS.—Wm. H. Conway, Harrison, Md.—This device is designed to assist a vessel in turning, and is particularly useful in backing out steamboats from their landings, enabling them to be turned in a much shorter space than when rudders at the end only are used.

VAPOR BURNER.—S. B. Hopkins and E. H. Anderson, Easton, Md.—This invention is an improvement upon the vapor burner patented by us April 3 1860, and consists in using four holes instead of the two holes and slit of the former burner, and a transverse concave plate in addition to the concave plate shown in the former invention.

SHOEMAKER'S BENCH.—J. A. Mahn and Chas. Vogler, Dezraff, Ohio.—The object of this invention is to provide a neat and convenient bench for the use of shoemakers, which shall have, on one side of the operator, an adjustable clamp, of improved construction, and on the other side, an adjustable rotating jack for holding boots and shoes during the operation of pegging.

WINDMILL.—John A. Wheeler, Freeborn, Minn.—This invention relates to a new manner of hanging sectional sails in the frame of a windmill, and consists chiefly in the use of additional arms, which, in connection with the radial arms projecting from the shaft, serve as supports for the sectional sails, so that the same can be pivoted at right angles to the radial arms, whereby the adjusting of the sails is greatly facilitated.

STOVE.—Edwin A. Parker, Horseheads, N. Y.—This invention relates to a novel manner of constructing the base of a stove or furnace, with a view of conducting a supply of fresh, warmed air to the fire, to aid combustion, and of conducting another supply of fresh, warmed air into the room, so that the air in the room will not only not be vitiated by the stove, but will actually be improved and purified by the constant stream of fresh air entering the room, a suitable ventilator being required to carry off the surplus air.

MARINE GRAPPLE.—Joseph T. Martin, New York city.—This invention consists in arranging the claws or hooks on a single bar or beam, which is perforated or slotted so that the claws can be adjusted on it to adapt them to vessels of suitable breadth. By thus doing away with the extension beam that was formerly used, the apparatus is not only made considerably cheaper but also much stronger.

TRAVELING BAG.—Jacob Lagowitz, Newark, N. J.—This invention relates to a new manner of preventing the ends of traveling bags from getting loose, and consists in attaching to each of the links by which the ends of the handle are connected with the bag, two arms, which, when the bag is suspended from the handle, fit over and around the sides of the bag, holding the same together and relieving the lock.

PROCESS FOR CONVERTING CAST IRON INTO CAST STEEL AND MALLEABLE IRON.—Francis Ellershausan, Montreal, Canada East.—This invention relates to a new process for converting cast iron into malleable iron or cast steel, and consists in bringing the carbon contained in the molten cast or pig iron in contact with oxygen contained on the surface of a cold or hot solid substance or substances. The distinguishing feature between this invention and that known as the Bessemer process is, that in the latter the carbon contained in the molten cast or pig iron is brought in contact with and consumed by the oxygen held in vaporous form, while in this process the oxygen is held on the surfaces of substances or solid bodies.

TAPPING AND DRILLING MACHINE.—George Cahill, New York city.—The object of this invention is to facilitate the setting of the turnover tap-stock of a machine for tapping or drilling pipe fittings, without requiring the shaft on which the device turns to be stopped for such setting of the tap-stock.

DITCHING MACHINE.—F. M. Howard and D. W. Avery, St. Paul, Ind.—This invention relates to a new and improved method of constructing machines for ditching and for excavating dirt, whereby the same are more simple in construction, more effective in operation, not liable to get clogged or out of repair, and which can easily be adjusted for the plow to run at any desired depth.

PLANE.—D. E. and A. A. Aiken, Adrian, Mich.—The present invention relates to an improved plane or machine for the cutting of slats, to be used more particularly in making curtains, and the invention consists in making the throat of the cutter in the wedge, and also in the use of a spring within the throat, so constructed as to cause one slat to push another out, whereby the throat and bit are left free and all danger of the throat becoming clogged rendered impossible. This spring also acts to press the slat uniformly and closely up against the bit, thus leaving the slat smooth and straight and is arranged so as to be susceptible of adjustment for thick or thin slats.

WAGON BRAKE.—Claude Ducreux, New York city.—This invention consists in securing adjustable rings around the hubs of the rear wheels, said rings having lugs projecting from their peripheries, and having an oscillating bar hinged parallel to the rear axle, with projecting lugs at its ends, so that when the bar is turned by the forward motion of the brake rod pivoted to a crank on the bar, the lugs will strike against the lugs on the ring, and will thereby prevent the wheels from turning, thus stopping the carriage.

SUSPENDING RING FOR BUSINESS CARDS.—H. S. Griffiths, Brooklyn, N. Y.—This invention relates to a new and useful device for attaching to business cards, by which they may be conveniently suspended against a wall for display and preservation.

REVERSIBLE BOOT HEEL.—Frederick Richardson, New Bedford, Mass.—This invention consists in forming the heel so that its center or wearing portion may be reversed.

COMBINED MOP AND SCRUB BRUSH.—William S. Simpson, Berea, Ohio.—This invention consists in combining with the scrub brush, rollers, between which a mop, or absorbing cloth is confined and operated,

CORN HARVESTER—Peter C. Yost, Hamilton, Ill.—This invention relates to an improved machine for cutting and gathering the stalks of Indian corn and consists of a knife of peculiar construction, mounted on a crossbeam on a sled, the corn being fed to the knife between two hooks one of which serves to catch the corn and the other prevents it from lodging in front of the beam and guides it to the knife.

MACHINE FOR SAWING LATHS AND OTHER SIMILAR LIGHT STUFF.—I. A. Hedges, Cincinnati, Ohio.—This invention relates to a new and improved improved machine for sawing laths and other similar light stuff and consists in a novel construction of the machine, arrangement of its parts, etc., as hereinafter fully shown and described, whereby several advantages are obtained, to wit: compactness, rapidity of work, simplicity in the construction of the machine and the little labor required in attending it while in operation.

GRAIN BINDER.—Marcus M. Wells, Hartwick, N. Y.—This invention relates to a new device for gathering the grain behind a mowing machine or cradle, and for arranging the same so that it can be easily bound into bundles of the required size. The invention consists in the use of a C-shaped rake frame, which is composed of iron or other bars, connected by means of suitable cross-bars, and moved by hand or otherwise through the swath, so that the points of the bars will rest on the ground and will rake up all the grain under which they pass so that the required quantity of the grain will be deposited upon the frame.

SPUR WHEEL.—C. F. Woodruff, Newbern, Tenn.—This invention relates to improvements in wooden spur wheels, and consists in constructing the rim in sectional segments cut in the plane of the wheel centrally and having the ends of the segments lap so as to break joints, which sectional segments are held together by means of double dove-tail tenons or shanks on the cogs fitting in corresponding mortises in the two sections; and also in uniting the arms of the wheel to the rim by passing their ends between the ends or shank ends of two contiguous cogs forming a dove-tail connection that is secured by bolts.

CHURN.—A. L. Converse, Springfield, Ill.—This invention has for its object to furnish an improved churn so constructed and arranged as to throw the cream into a very violent agitation bringing the butter quickly and thoroughly, and with a comparatively small outlay of power.

DOUBLE SHOVEL CULTIVATOR.—Simeon B. Forbes, New Cumberland West Va.—This invention has for its object to furnish an improved double shovel cultivator, simple in construction, effective in operation, and easily operated.

ROTARY SCRUBBING BRUSH AND SPRINKLER.—Charles E. Wareham, Port Washington, Wis.—The object of this invention is to provide housekeepers with a convenient article for scrubbing and cleaning floors or for use on board of ships to scrub the deck, or any similar purpose.

EXTENSION PIPE COUPLING.—James McCarthy, New York city.—This invention relates to a new pipe coupling, which is so arranged that the ends of pipes that are a greater or less distance apart from each other can be connected by the same; its object is to take the strain from pipes and to make up small spaces which may be left between the ends of the pipes.

WHIP.—James R. Gillett, Westfield, Mass.—This invention relates to a new manner of protecting the cone of whips from moisture and from consequent injury, and consists in the application, around the core and between the same and the outer covering, of a metallic lining, whereby the moisture will be completely excluded from the core, and whereby the whip will consequently be made sound and strong.

DOOR DIRECTORY.—Lewis Burger, Springfield, Ill.—This invention relates to a new indicator or directory to be attached to office or other doors. Its object is to indicate to parties intending to enter the office whether the proprietor is in or not, and if not, when he will return, and whither he has gone. The indicator may be connected with a letter box, card holder, and with a slate, for orders.

LAMP BURNER.—Charles M. Miles and George W. Remsen, Lincoln, Del.—This invention relates to a new burner for petroleum and other lamps and consists, first, in the arrangement of a turret between the cap and the ordinary body of the burner, said turret having holes that can be closed by a suitable sliding gate, and through which a match may be applied to the wick for the purpose of lighting the lamp without removing the chimney.

STEAM ENGINE.—J. P. Davis, Stiles, Wis.—This invention relates to certain devices for the purpose of converting rectilinear into rotary motion without employing a crank upon the main shaft.

AUTOMATIC WATER SUPPLY REGULATOR FOR WATER CLOSETS.—George Conron, New York city.—This invention is designed as an attachment for a water closet apparatus, previously invented by me, and for which an application for a patent is now pending in the United States Patent Office. The invention consists of a float ball or vessal within a center chamber which communicates with the discharge pipe of the water closet bowl, the float ball being connected with the supply pipe valve by means of a lever and so arranged that when the water from the bowl is drawn off by lifting its proper valve, the water in the chamber will, in subsiding, lower the float ball and bring its weight upon the lever connecting it with the supply valve, and thereby relieve the latter free to raise and admit a quantity of water for cleaning the bowl and its conpections.

VELOCIPEDE.—O. T. Gleason, Farmington, Me.—The object of this invention is to obtain locomotion by the direct application of the weight of the operator to the crank of the driving shaft.

KING BOLT FOR CARRIAGES.—John Reiber and John Shadrer, Bridgeport, Ill.—The object of this invention is to provide a jointed king bolt for coupling the front and rear axles of carriages, whereby the front axle is permitted to vibrate laterally when the wheels strike any obstacle or obstruction or pass over any uneven portion of ground.

GRAIN MEASURING REGISTER.—Wm. H. Pfrimmer, Lanesville, Ind.—The object of this invention is to keep an accurate record of the quantity of grain measured or weighed by means of a self-registering apparatus, whereby disputes which often occur in the delivery of grain between farmers and dealers are prevented or avoided. This improvement consists in a device connected with a weighing scale for marking the number of bushels or other quantity weighed on a dial plate which keeps the register every time a certain quantity is weighed or measured.

DOUBLE STEAM VALVE.—Albert Moore and A. D. Howes, South Adams, Mass.—The object of this invention is to furnish a valve for steam, water, and gas, or other fluids or liquids, constructed in such a manner that it shall be durable and simple, and perfect in its operation, and it consists in operating two valves by revolving a screw stem, and in the general construction and arrangement of parts.

WEAVING GARMENTS.—Samuel Leather, Dalton, England.—This invention relates to an improvement in weaving garments or wearing apparel, such as shirts, pantaloons, drawers, etc., etc., by stitching double cloth together with seams between the articles, in such a manner that a series of the same garments are woven and stitched at the same time, to be afterwards cut apart between the seams, thus effecting great economy in the making of such garments, and a great saving of material now wasted by cutting.

SEED PLANTER AND CULTIVATOR.—Caspar Rubbles, Lowville, N. Y.—This invention relates to a new and improved combination of a seed planter and cultivator, whereby the machine may be used either as a seed planter or cultivator, and made to work in either capacity equally as well as if made separately for each.

COAL HOPPER AND SCALE.—Frank E. Howe, New York city, and Lindsey I. Howe, Boston, Mass.—This invention consists in combining a coal hopper with a scale in such a manner that coal may be dumped directly from the cart which delivers the coal into the hopper of the scale and weighed, and then discharged into the hole. The object of the invention is to obtain, by a very simple attachment to an ordinary platform scale, a means whereby consumers of coal may weigh the same as it is delivered to them, and thereby prevent the fraud of light or short weight, which is now almost universally practiced by retail coal dealers.

RECIPROCATING SAWS.—Solomon Anderson, West Burlington, N. Y.—This invention relates to a new and useful improvement in reciprocating saws, and it consists in a peculiar construction of the teeth of the same, whereby the teeth are made to cut the wood after the manner of chisels, instead of scraping the same and tearing away the fiber, as is the case with the teeth of ordinary construction, which render the sawed lumber very rough, and require a great expenditure of power in sawing.

STONING CHERRIES.—Rufus Wright, Brooklyn, N. Y.—This invention relates to a new and improved machine for removing the stones from cherries, and consists in the employment or use of an intermittingly rotating feed wheel, and in means for operating the same, and also in certain means for ensuring the feeding of but one cherry at a time to the stone-ejecting apparatus.

CLOTH WATERPROOF BASKET.—Sarah P. P. Miller, Beaver, Pa.—This invention relates to a new and useful improvement in the material used and in the method of forming or manufacturing baskets for various purposes.

RAILROAD CARS.—J. R. Perry and D. W. Perry, Wilkesbarre, Pa.—This invention consists principally in providing an axle for each wheel, and arranging it so that the wheels of the car can revolve independently of each other, and thereby adjust themselves to the curves of the track.

POLISHING MACHINE.—John Stackhouse, West Pittsburgh, Pa.—This invention relates to a new and improved machine for polishing steel rolls, and rolls or rods of other metals.

MACHINE FOR SAWING BOLTS.—T. Bruno, Saginaw, Mich.—This invention relates to a new and improved method of constructing machinery for sawing bolts, or laths, or other strips, from planks or boards, whereby time and labor are economized.

APPLICATION OF SHADES TO WINDOWS.—J. D. Legg, Long Eddy, N. Y.—This invention relates to a new and improved mode of applying shades to windows, whereby the former may be raised and lowered either from the top or bottom, as occasion may require. Its object is to obtain a very simple means for accomplishing the above result, which will not be liable to get out of repair.

DRAFT ATTACHMENT FOR VEHICLES.—Moses Adset, Forrest, N. Y.—This invention relates to a new and useful improvement in draft attachments for all kinds of vehicles which are drawn by horses, and has for its object the equalizing of the draft by admitting of the whiffletrees being automatically adjusted in relation with the double tree under the pull of the team, and in such a manner that if one horse of a team has an inclination to pull more than his share his labor will be perpetually increased, while the other horse will have his labors correspondingly decreased, and will feel encouraged to exert himself and pull up even with the more ambitious one. By this means the device will not only have a tendency to correct a team which pulls unevenly for the time being, but will also have a tendency to break or train an unmatched team, so that the two horses of the same, will, in a short time, be permanently matched, so far as equal draft is concerned.

INSTRUMENT FOR TREATING HEMORRHOIDS.—H. Schevenell and S. S. Rembert, Memphis, Tenn.—The nature of this invention relates to the treatment of the inflammation of the anus or rectum, commonly known as hemorrhoids or piles. Its construction consists in the employment of a galvanic pole, or electrode, composed of a combination of different metals which are most productive of galvanic action. The galvanic action produced by the contact of the metals and the moisture of the parts with which they are in contact, conduces to reduce the tumid and inflamed state of the parts.

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.*

H. C. F., of Ill.—The water color paints are simply made from the different powdered paints in the trade, ground exceedingly fine, and mixed with a solution of gum arabic. There are two kinds; the transparent paints, mostly used for finer work, as portraits, landscapes, etc., and the opaque paints, mostly used for painting coarser work, as stage scenery, etc. These are mixed with glue water without the addition of some gum or glue. All these paints, when dry, would rub off like chalk marks.

A. J. G., of Conn.—The cause of the appearance of solidity so strikingly exhibited by the stereoscope, is to a certain degree shown by a single photograph seen with only one eye, and it is the incomparable correctness of light and shadow in photographs by which we chiefly judge about solidity in single objects, and which is seen even better by examining a photograph with a magnifying glass or microscope. Do not paintings of great artists also exhibit the effect of solidity when seen with one eye?

M. B., of N. Y.—The condensed vapor rising from a black fluid is colorless when the black coloring matter is not volatile at the temperature at which the distillation takes place, if this coloring matter volatilizes at the temperature at the heat applied, the distillate will be black too. Chemists often find that the distillation at first gives a colorless fluid, later a darker, finally a black one. In many instances repeated distillations are required for perfect clarification.

A. G., of N.—When daguerreotypes or ferrotypes show occasionally some single object in its natural color, it is purely accidental. It is very common to see a bluish color in the sky, a gray color in the picture of a gray building, or a hazel color in hazel eyes. The different tones of shadow in photography are often not a neutral gray, but modulate into faint blue, brown and even purple, which tones of color sometimes accidentally correspond with that of the natural object.

C. L. M., of Ohio.—A good silver solution for electro plating white metal and brass is made by dissolving one part of oxide of silver in eight parts of cyanide of potassium and sixty-four parts of warm water. Oxide of silver is made by precipitating a solution of the nitrate by a dissolved alkali like potassa or baryta,

J. J. O. R., of Pa.—The report of M. Balramo's new battery given page 195, we simply extrated from an English scientific journal. We did not try it and therefore cannot guarrantee its asserted virtues; its action appears to be the formation of chloride of iron and sulphate of lime by the mutual decomposition of the liquids employed. We cannot judge of the cause of your failure without seeing your arrangement and testing practically what prevents the action.

J. B. W., of W.—The animalculae theory as cause of the cholera morbus is exploded long ago; the acid theory from fermenting food you appear to defend is only sufficient to explain the common, not malignant cholera; the genuine Asiatic cholera morbus is probably propagated by a vegetable microscopic organism, the existence of which has been practically proved. It is of the crystogamic family, belonging to the kind called *leptothrix*. It is, with help of the microscope, always and exclusively found in the discharge of patients suffering from the malignant Asiatic cholera. Dr. Klob, in Vienna, has lately investigated this subject thoroughly: he calls the plants *Quoglœa termo*. The presence of these discharges poisons the whole neighborhood, the ground and even the water in the wells and springs, which appear in some cases to have become contaminated with the invisible seeds of these parasitical plants.

W. D., of Oregon.—Gelatin molds are made for plaster castings when the details are of such a shape that it would be impossible to get the casting out of the mold when the last was not elastic. To make them, soak glue in a equal quantity of cold water (by weight), a little more or less, according to the quantity of your glue, which has to be found out by trial. The glue will after eight or ten hours be swelled and have absorbed all the water; then melt the mass by a moderate heat and cast your mold. Put it in a cool place for at least 12 hours before attempting to take it out. With such molds, when carefully oiled before each casting, 30 or 40 castings can be taken; or Canada balsam, a solution of india-rubber in benzole, may be added to the glue during the melting and incorporated by stirring; this will cause the mold to withstand the action of water better. Some glycerin added will prevent it from drying out so soon as it will when made out of simple glue. Some persons add also molasses to it, and make then a material very similar to the common printer's roller.

B. M. K., of Ind.—The solvents for india-rubber and gutta-percha are, to commence with the best, its own oil, obtained by distilling, and in which it is dissolved when freshly collected; next chloroform, then benzole or coal tar and turpentine; next bisulphide of carbon, in which it swells up and finally dissolves. Then benzine or petroleum, in which it slightly swells and only partially dissolves; in alcohol it is as insoluble as in water. In the manufacturing establishments of the present day little or no solvents are used; heat and mechanical powerful kneading with sulphur and chlorine for the vulcanizing are almost the only processes now in use; in former times the action of the principal solvents, turpentine and benzole (from coal tar, not benzine from petroleum), were aided by cutting, kneading, and heat, which is necessary to accomplish a good solution, but are abandoned now except in the manufacture of india-rubber varnishes, among which those made with turpentine have the not desirable property of always remaining sticky. Gutta-percha and india-rubber are now very common here. They may be bought by the yard in all our New York rubber stores in any desirable degrees of thickness, from that of paper to sole leather and even one or two inches thick.

P. V., of Iowa.—Aniline colors are made from benzole obtained from coal tar, not to be confounded with benzine distilled from petroleum. The desired recipe how to make them is too circumstantial to be inserted here; our correspondent's desire will be satisfied soon by an article on this subject to complete what was said on page 246.

L. J., of Mass.—After the law of Mariotte (which is not absolutely correct but enough so for all practical purposes), the volume of gases decreases in the same ratio that the pressure increases; therefore we will bring any volume of air to one tenth of its original bulk, when increasing the pressure it undergoes ten times. As now common air is normally under an atmospheric pressure of about 15 lbs. to the square inch we will reduce 25 cubic feet of air to one tenth or 2½ feet, when applying a pressure of 150 lbs. which is 10 x 15 or ten times the normal atmospheric pressure. The air chamber of your pump will therefore contain nine tenths of water and only one tenth of air, and probably even much less, as under such pressure the water absorbs the air very easily. Cases are not uncommon where the air was found to have entirely disappeared from the air chamber, which was totally filled with water, causing the pump to work unequally and with jars, in strong contrast with its smooth operation when the pressure is equalized by the highly elastic cushion formed by the contents of an air chamber entirely filled with air.

J. N., of C.—There is at present no easy nor cheap way to manufacture blocks of ice as large as you describe. All the machines made thus far are very expensive, and even at that cannot make such thick pieces. The cheapest method requiring the least first outlay for machine is perhaps that patented by Dr. Vander Weyde, of this city, and now being introduced in the Southern States. He uses a liquid he calls chimogene, but which really is nothing but petroleum gas condensed by a pressure of some six to ten atmospheres, the evaporation of which produces a cold of some 40° below the freezing point. But even the smallest of these machines require several hundred dollars first outlay. Small pieces of ice of some 10 lb. weight are easily made by freezing mixtures, or by a good air pump and a stream of sulphuric acid to absorb rapidly the rising aqueous vapors.

J. M., of S. C., asks what is meant by putting the "gags" on a low-pressure, American, marine, beam engine; also what is the best work published on the beam engine. "Gagging" means putting in operation a device attached to the Stevens' cut-off by which the point of steam cut off may be changed; so that if the engine is built and arranged for cutting off at any given point it may be made to cut off at any other point or to work full stroke the change being made while the engine is running. We cannot intelligably explain the construction and operation of the contrivance without diagrams. The information you desire may be found in Bourne's "Catechism of the Steam Engine," Bourne's Hand Book of the Steam Engine," or "King's Notes on the Steam Engine."

H. M., of Ontario.—"Which is the more efficient feeder for the common high-pressure engine, a force pump with the feed water heated by the exhaust steam, or simply the Giffard injector? I have often observed that when steam is high and there is a full supply of water in the feed pump that by placing my hand on the boiler I felt it tremble and throb at every stroke of the feed pump. Is not the action of the feed pump similar to that of the hydraulic press, and if so is there not an enormous strain on the boiler?" The Giffard injector is a very convenient auxiliary, but it is an expensive mode of feeding a boiler aside from the fact that it does not work hot water. The trembling of pipes and boiler by the action of the force pump is always noticed. The force pump is a hydraulic press so far as it goes. We think, however, you are unnecessarily alarmed about its effect on your boiler, so long as you have the usual steam space in it.

Business and Personal.

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

Wanted—A second-hand caloric engine of small capacity. Address, stating size and price, Jno. Q. Everson, lock box 69, Pittsburgh, Pa.

For Sale—A 12-horse engine and boiler, complete. Been run 3 days only. Address H. P. J., Cheelybes, Conn.

Manufacturers of blacking boxes please send address to J. T. Fenneman, cor. Lombard and Poppleton sts., Baltimore, Md.

Important to Somebody.—For sale, at decided bargains, one hand lathe, 2-foot bed, ratchet foot motion, leading screw, sets to taper, etc., etc.. one Florence sewing machine ($75,) for $50. Address, for particulars, Jos. D. Brown, Edinboro, Erie county, Pa.

Parties desiring fine and light machinery, models, etc. Also, machinery for specific purposes, requiring superior workmanship, will call on or address Henry Feyh, care Bissell and Fay 510, West 24th st. Best Manufacturers' references.

Rare chance—the whole or a part of Brooks' improvement in carriage wheels, patented Oct. 15, '67, will be sold low if applied for soon. Send for circular. R. Brooks, Jr., Rockport, Mass.

Burr & Wise, of Gainesville, Hancock county, Miss., desire to communicate with parties who furnish machinery for making matches and round wooden boxes.

Funston's electric toy.—See advertisement.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

Bartlett's machine and needle depot, 569 Broadway, New York. Needles for all machines. Hackle, Gill Pins, etc.

Engineering facts and figures for 1867, mailed on receipt of $3. John Penington & Son, 127 S. 7th st., Philadelphia, Pa.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

First class lock makers wanted. Address Jones & Nimick Manufacturing Co., Pittsburgh, Pa.

Incrustations removed without injury or foaming, by Winans' boiler powder, (11 Wall st., N. Y.) 12 years standard and reliable.

EXTENSION NOTICES.

Benjamin Bray, of Salem, Mass., having petitioned for the extension of a patent granted to him the 5th day of September, 1854, for an improvement in spring rollers for window curtains, etc., for seven years from the expiration of said patent, which takes place 5th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day of August next.

Bradford S. and Charles M. Pierce, of New Bedford, Mass., having petitioned for the extension of a patent granted to them the 1st day of August, 1854, for an improvement in molds for cement, or earthen tubes, for seven years from the expiration of said patent, which takes place on the 1st day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

NEW PUBLICATIONS.

THE WORKSHOP. E. Steiger, 17 North William street, New York.

Has commenced the publication in numbers, 30 cents each, of a very interesting and useful work, adapted to all the higher ornamental arts and industries. The first three numbers are out, and each contains a large number of finely executed engravings of the most ornamental articles at the Paris Exposition, consisting of carved cornices, furniture, cutlery, carpets, designs, stucco ceilings, jewelry, porcelain ware, vases, chandeliers, ornamental iron work, etc. The work will be found advertised in another column.

PRACTICAL GUIDE FOR PUDDLING IRON AND STEEL. Edric Urbin. H. C. Baird & Co., 406 Walnut st., Philadelphia.

A pamphlet of 45 pages on the above subject, including a comparison of the resisting powers of iron and steel, by A. Brüll, comprising 30 pages more, and 23 pages of advertisements of scientific books published and sold by Baird, making a volume, including preface, index, and advertisements, of 100 pages. Price $1.

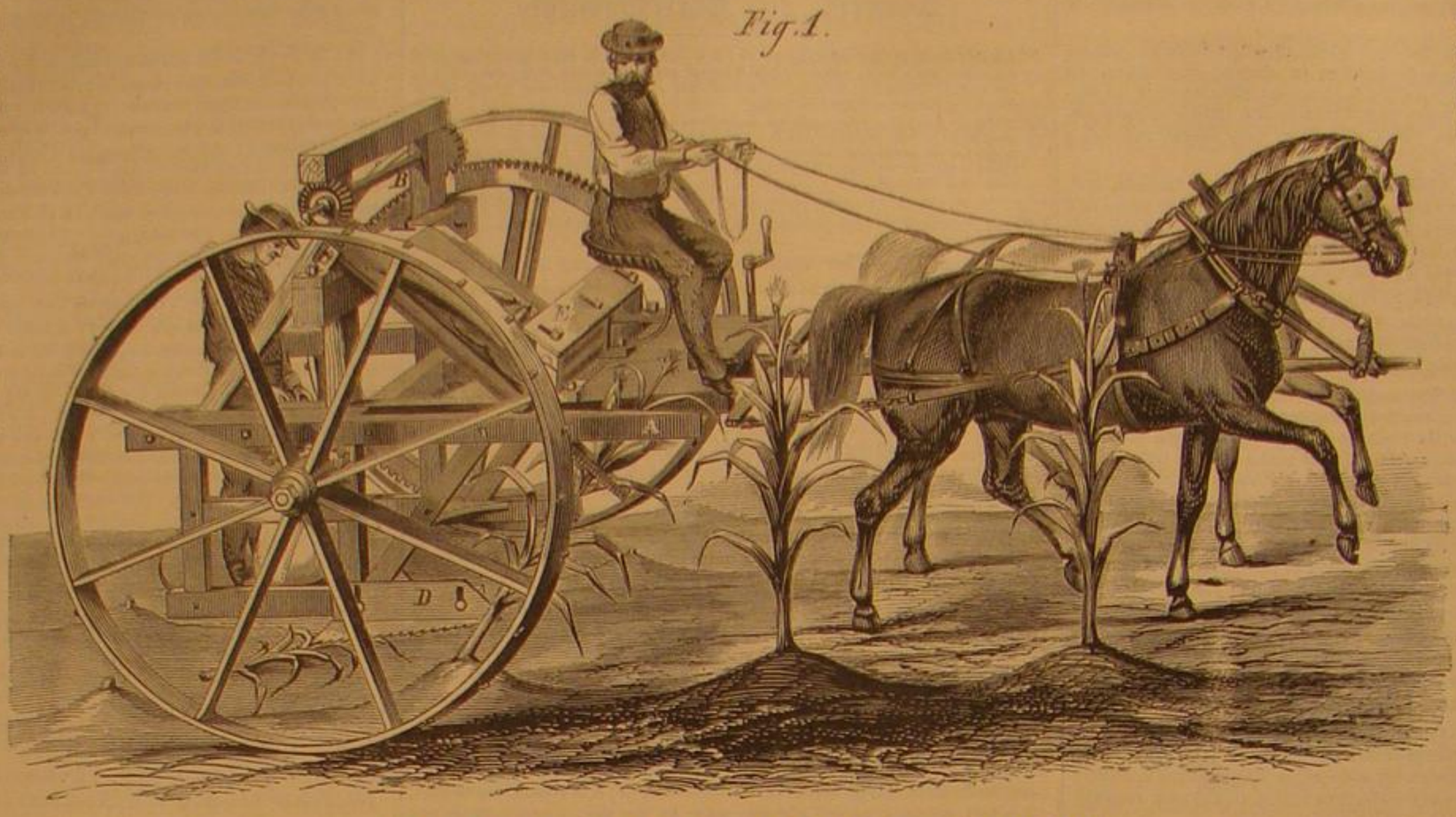
Improvement in Machines for Harvesting Corn.

The object of the implement shown in the engraving is to gather and husk standing corn, at the same time cutting down the stalks. The labor of harvesting corn by hand is onerous, and a machine that will do it properly must be a valuable implement for the farmer. That exhibited in the engraving is a strong frame mounted on two wheels, and supporting a seat for the driver, a platform for his assistant, and the appurtenances necessary to the working of the machine. The front of the platform of the machine is beveled, so as to pass easily between the rows of corn, and a spring beam, A, projects forward on one side of the platform, forming, with the inclined edge of the platform, a V-shaped opening for the reception of the stalks as the implement is driven along. By means of a gear wheel fastened to the shaft, motion is given to the machinery: the driving wheels turn loosely on the axle and give motion to it, when the machine is driven forward, by means of a rachet and pawl, the wheels turning free on the shaft when the machine is backed.

A horizontal counter shaft, B, receives motion from the large gear on the axle, and, by means of bevel gears, rotates two inclined fluted rollers, seen plainly in Fig. 2, the ends of which project down into the angular space between the spring beam, A, and the edge of the platform. These rollers are held together at their lower ends by the spring beam, and receive the stalks of corn, by their rotation cutting the ears from the stalks, and passing them on to the incline, C.

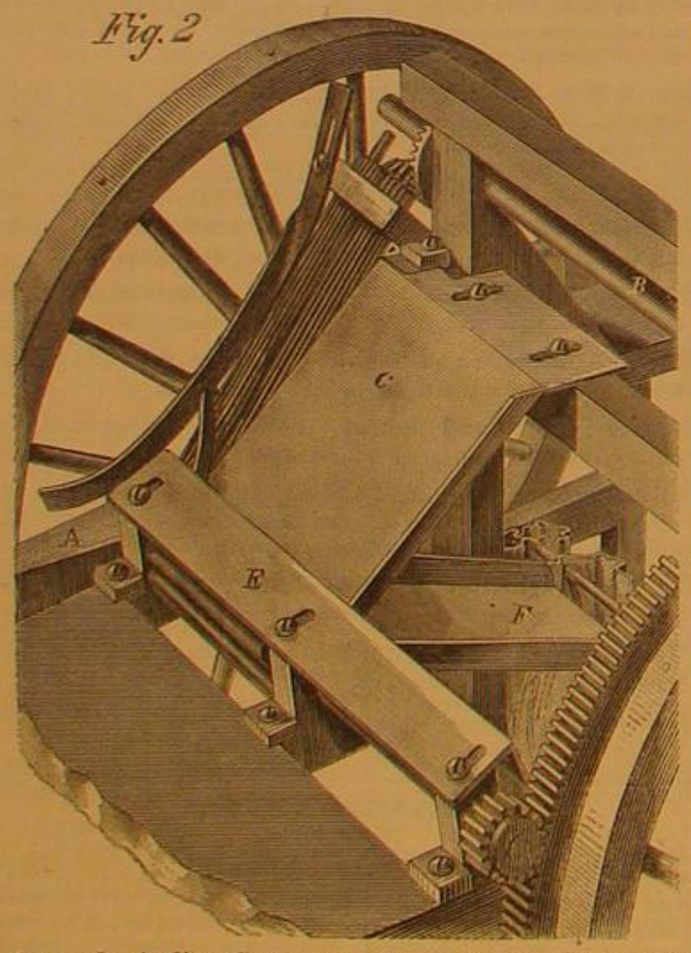
The ears are prevented from escaping after passing on to the rollers by two springs, seen in Fig. 2. The stalks pass between the rollers—having been severed near the ground by a triangular serrated knife, D, Fig. 1—and fall upon the ground.

Fig. 1.



CHASE'S PATENT CORN HARVESTING MACHINE.

Fig. 2



From the incline, C, the ears pass to a pair of horizontal rollers under the cap, E, by which they are husked, when they drop on the platform, F, Fig. 2, and are delivered into bags, or other suitable receptacles at the rear, the husks, as they leave the rollers, dropping to the ground, or, if desirable to save them, to any proper receptacle under the machine.

Patented by Otis N. Chase, who may be addressed relative to the machine at 81 Washington street, Boston, Mass.

Manufacture of Meat and other Biscuit.

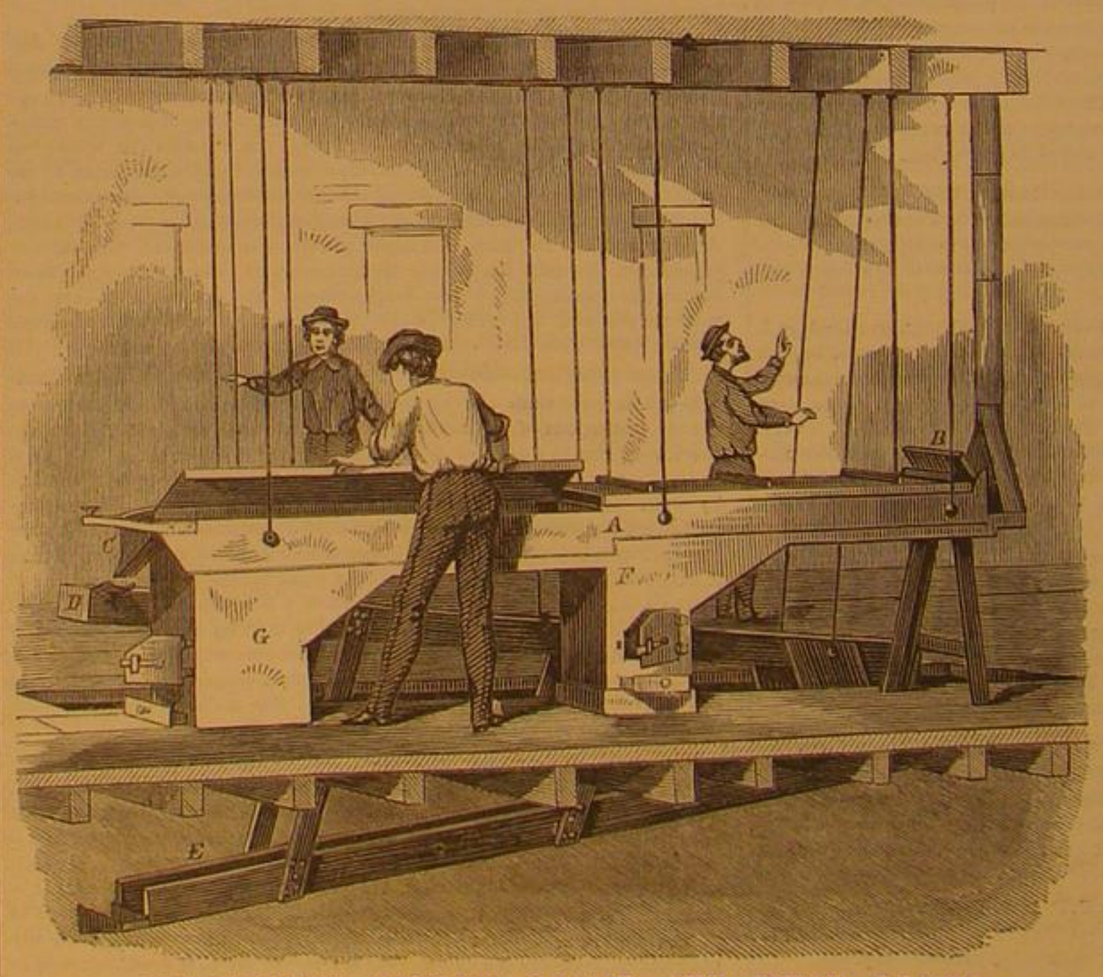
John Carr and Charles Lucop, of England, have obtained an American patent. "We make plain biscuit, and bake it as usual, then we grind it to powder, and we mix the extract of meat with the powder. Afterwards, we mold the powder, which is hardly moistened by the extract, into a biscuit by heavy pressure or by stamping it in a suitable mold. Although we prefer to mix the extract of meat with powdered biscuit, other materials, such, for example, as baked flour, may be substituted for the biscuit, but less advantageously. This method of making biscuits is also applicable advantageously when extract of meat is not employed, but where it is required to incorporate in the biscuits other materials which might be injured by the heat of the oven.

"We employ the same method when making biscuits with preserved fruits, the materials which require baking going into the ovens by themselves, and afterwards in a powdered state being mixed with the jam, or jelly, or other preserve, and formed into biscuits by pressure and without injurious heat.

"Cheese may be employed in a similar manner; and with cheese we operate in the following manner: We finely powder the biscuit, and also the cheese, but without mixing them. We place about half the biscuit powder required to make a biscuit into the mold; we then compress slightly in a small cylinder the requisite quantity of cheese, grated or otherwise, and afterwards place it on the powder in the biscuit mold. The remainder of the biscuit powder is put into the mold, and the pressure is applied, as before. In this way a biscuit is made with the cheese enclosed in the center."

Improvement in Device for Drying Grain.

This invention relates to a method of drying grain and meal by artificial means, and the device is simple in construction, and appears to be effective in operation. It is the subject of two patents obtained through the Scientific American Patent Agency, by John R. Evertson, and dated Nov. 29, 1866, and Oct. 15, 1867.



EVERTSON'S PATENT GRAIN AND MEAL DRYER.

The slide or pan, A, is suspended by rods from joists, or a frame overhead, the object being to allow of a vibrating or oscillating motion to the pan. The pan is on an incline, and the grain is fed into it at its upper end, B, from thence being carried down, by the inclination and motion of the pan, to the delivery spout, at C. Thence it passes into the inclined conductor, D, shown above the floor, and through a similar conductor, E, shown below, passing from its end into any receptacle provided for it. The object of this length of travel is to allow the grain or meal to become cooled after leaving the dryer.

The heat is artificial, being provided by the furnaces, F, the heated products of combustion in G passing under the pan to mingle with those in F, and thence passing under the rear portion of the pan, to be ultimately delivered to the smoke stack. It will be seen that the grain is first passed in at the point, B, nearest the chimney, where the heat is greatest, and that as the grain passes down to the delivery, at C, it is subjected to less and less heat.

The pan, A, has an offset at the furnace, F, the object of which is to turn and mix the grain, drying every portion alike. At these offsets the lids have apertures to permit the escape of the heated vapor developed by the process, thus aiding the process of drying.

It is evident that instead of two furnaces, or subdivisions of the dryer, three or more may be employed. Orders should be addressed to John R. Evertson, Mount Vernon, Ind.

Iron Stone.

At a point in the Thames, where an eddy accumulates a shoal of sand, agglutinating iron springs rise from beneath and progressively convert the sand into rock, which has to be removed, from time to time, by blasting. Bourne, the engineer, conceived from this circumstance the idea of turning quicksands to firm foundations by a similar process, and actually proposed to do this for the railway bridge over the Soane, in India. Quicksands, at this point, as deep as borings had been made, were to be converted into rock by injecting them, through perforated pipes, with sufficient iron water from a hill of iron pyrites near at hand, to stick together the whole mass. The line of the road was eventually altered, and the bridge was built at another point; but Mr. Bourne still believes that an expedient of this kind will become a valuable feature in engineering.

Quick Depilatory.

We recommend neither the dyeing or removing of hair, but if it must be done, it is best that the ingredients should be as little objectionable as possible.

Septimus Piesse makes the following statement in regard to a depilatory:—

As the ladies of this country consider the growth of hair upon the upper lip, upon the arms, and on the back of the neck to be detrimental to beauty, those who are troubled with such physical indications of good health and vital stamina have long had recourse to rusma or depilatory for removing it.

This and analagous preparations were introduced into this country from the East, rusma having been in use in the harems of Asia for many ages.

Best lime slacked, 3 lbs.; Orpiment, in powder, ½ lb.

Mix the material by means of a drum sieve; preserve the same for sale in well-corked or stoppered bottles.

Directions to be sold with the above:

Mix the depilatory powder with enough water to render it of a creamy consistence; lay it upon the hair for about five minutes, or until its caustic action upon the skin renders it necessary to be removed; a similar process to shaving is then to be gone through, but instead of using a razor, operate with an ivory or bone paper-knife then wash the part with plenty of water, and apply a little cold cream.

Dr. Redwood says that the best and safest depilatory consists of a strong solution of sulphuret of barium made into a paste with thick starch; it must be applied immediately it is made, as it rapidly spoils.

The precise time to leave depilatory upon the part to be depiliated cannot be given, because there is a physical difference in the nature of hair. "Raven tresses" require more time than "flaxen locks;" the sensitiveness of the skin has also to be considered. A small feather is a very good test for its action.

To make silk which has been wrinkled and "tumbled" appear exactly like new, sponge it on the surface with a weak solution of gum arabic or white glue, and iron it on the wrong side.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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VOL. XVIII., No. 21....[NEW SERIES.].. *Twenty-third Year.*

NEW YORK, SATURDAY, MAY 23, 1868.

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TRANSMISSION OF POWER BY HYDROSTATIC PRESSURE.

Much interest has of late been manifested in England, in the subject of transmission of power by hydrostatic pressure. It is proposed to substitute this method for the old system of shafting, pulleys, belts, and gearing. It is claimed that it is more economical, costing less in the first instance, and losing less power from friction. All expense attendant upon the the proper aligning of the main shaft, and lubrication of the bearings, as well as the cost of hangers, etc. is obviated. Any direction may be given to the primal force by a curve in the pipes through which the water column passes. Reciprocal motion is obtained by the aid of a cylinder and plunger, which is precisely the same as that used for the well known hydrostatic press, if we except some slight modifications which do not affect the principle to any great extent. It is also claimed that motion can be transmitted at great distances without increasing the cost, except by the expense of lengthening the pipes, the multiplier of course to be stationed as near as possible to the point where the power is to be applied to work. The reciprocal motion of the piston is converted into a rotary motion, by the old method of crank and fly-wheel.

We know of no attempt to practically apply this principle in this country. The Hydraulic Cow-Milker, described in No. 18 of the present volume, indeed uses it so far as the transmission of a reciprocal motion is concerned, but no attempt has been made to convert it into a rotary motion. Many attempts, and some successful ones, have also been made to construct engines to be driven by hydrostatic pressure, but nothing like transmitting motion derived from other sources, by means of water columns, for the purpose of impelling shafting at a distance, has come under our observation.

For ourselves, we have but little faith in the ultimate adoption of this method. For long distances, the power required to impart a reciprocating motion to the column must be very great, and we think that the loss from friction would probably be more than is anticipated. The inelasticity of water, its great weight, and the difficulty of adjusting the first motor to changes, in amount of power required, which take place at distant points, on account of the momentum of the column, seem to us to be great obstacles. The subject is, however, one of great interest, and we shall watch its development in the hope that our fears in regard to its success may prove unfounded.

DOCKS AND WET BASINS FOR EAST RIVER, NEW YORK.

Whoever has visited and spent any time in the great commercial cities of London and Liverpool must have had his attention arrested and his wonder excited by the extent, solidity, and magnificence of the docks. They constitute one of the greatest attractions of either city. The contrast between these commercial facilities and those which serve the purposes of New York is painful to every thinking American. With a harbor unsurpassed in beauty and in value for commercial purposes by any other on the globe, our dock accommodations are of the most meager and rattletrap description.

We have been shown drawings made by Mr. G. W. Dow of New York city, proposing the construction of causeways extending from the Brooklyn to the New York shores, the spaces between the causeways forming immense water basins and the causeways themselves sustaining a double row of warehouses divided by a spacious roadway. The causeways are to be in sections allowing passageway for vessels, the connections between the sections to be made by drawbridges. Each section is to have flanking wharves on each side for the accommodation of vessels and their cargoes.

These are, in brief, the salient points of Mr. Dow's plan, and it looks beautifully on paper. It is, however, open to very serious objections, or, at least to very adverse criticism. Its provision of docking facilities is unquestionable, but whether it will, with its necessary draw bridges, accommodate the pedestrian and vehicular travel between the two cities may be somewhat problematical. The obstruction to the tide and currents and delay to vessels passing in or out are also considerations affecting the value of the project. However, we believe this plan worthy the attention of our engineers and business men and it should be thoroughly investigated and discussed. Certainly there is room for improvement to our harbor facilities, and other means than ferry-boats are required to connect New York and Brooklyn.

HYDROCARBONS---THEIR INFLAMMABILITY AND EXPLOSIVENESS.

The very general and rapidly increasing use of hydrocarbons for illuminating purposes, and the frequent deplorable accidents happening, either from careless use, or ignorance of their properties, necessitate a presentation of every item of knowledge concerning them that we can gather. We have written often, and sometimes quite at length, on this subject, but there still seems to be, on the one hand, an almost criminal neglect of proper precautions in their use, and, on the other, as foolish confidence in their perfect safety under all circumstances. The first can be remedied by a knowledge of their nature and qualities, and the second by instructions as to their use. Probably the disinclination to take the trouble to test the quality of the liquid, and a desire to get the best article for the price of the poorest and most dangerous, is an indirect, if not a proximate, cause of some of the serious and even fatal accidents our journals record. On pages 180 and 217, current volume, we gave directions for ready and reliable tests of the quality of hydrocarbons; to those we refer our readers.

The use of different terms to designate similar substances are calculated to befog and confuse the public, and we are pleased to see that the Boston Institute of Technology have thought the matter of sufficient importance to appoint a committee on the subject, a portion of whose report we herewith reproduce. The committee say that, "after careful examination they find that the term naphtha is a general term, and covers both the other terms, gasoline and benzine. The word naphtha is one of great antiquity; it has long been applied to certain springs in Persia from which is obtained a volatile, limpid, bituminous liquid, having a strong, peculiar odor, and generally a light, yellow color.

"When the art of distilling coal tar became known, the same term was applied to the more volatile products of such distillation; the heavy products being called dead oil and asphaltum. The term was next applied to the most volatile products from the distillation of coal for oil. When petroleum took the place of coal for this purpose, the term naphtha was again used to distinguish the more volatile, so called 'light' products from the heavier ones. This is still its use, and in our market all volatile products of petroleum lighter than illuminating oil (or what is known among our dealers as 'kerosene,' which has a specific gravity of 8-10, or 45 degrees by Beaume's Hydrometer), are designated by the general name of naphtha.

"Of the naphthas, those of a gravity from 45° to 80° Beaume are often, though improperly, called benzene or benzole. True benzole is a product of coal tar, and differs essentially from any liquid obtained from petroleum. The term 'gasolene' is applied to all naphthas having a specific gravity lighter than about 80 deg. Beaume, the lightest known being about 90 deg.

"This committee find, however, by reference to Prof. C. M. Warren's unpublished determinations, that none of these products are simple bodies. All of them are mixtures, in indefinite proportions, of at least twelve hydrocarbons, distinguished from each other by their boiling points, which vary from 32 to 318 deg. Fah., and are nearly as follows: 32, 47, 86, 99, 142, 156, 195, 208, 247, 261, 303, and 318 degs.

"While gasolene contains mostly those hydrocarbons whose boiling points are low, kerosene is composed chiefly of those whose boiling points are comparatively high. The isolation of any one of these products being a matter of great difficulty, few have attempted it, and your committee have had to rely on the labors of a fellow member for much valuable information on the subject. To completely separate the constituents of any sample would be the labor of many months.

"Your committee also report that there is great danger from the careless use of naphtha—1st, on account of its great inflammability; and 2d, from the liability of forming explosive mixtures of the air and vapors. The liquids are not in themselves explosive, neither are the vapors; but both are highly inflammable. If the liquids escape by any means and form pools, or saturate porous substances, the near approach of flame may cause the vapor to ignite and set fire to the whole exposed surface of the liquid.

"The vapors, it is true, are not explosive, but they become so when mixed with air in certain proportions, and this committee would particularly call the attention of the society to the fact that such mixtures are more likely to be formed in what are called empty cans, which have contained hydrocarbons, and from their supposed emptiness are imagined by ignorant people to be free from danger. A light may be applied with but little or no danger to a vessel full of gasolene or gasolene vapor, or even such a mixture of vapor and air as would produce lighting gas; but in case the vapor be mixed with a sufficient quantity of air, it would instantly explode."

The statement in the above that "the liquids are not, in themselves, explosive, and neither are their vapors," should not be understood as an assurance that there can be no danger in the use of these liquids. We have seen, repeatedly, a lighted match dropped into a lamp or other vessel full of naphtha, benzine, gasoline, or whatnot, sometimes not lighting the the liquid, but if so, the flame being easily extinguished by a blast of the breath. In our opinion such a test proves simply nothing. The vapor from any hydrocarbon requires the admixture of oxygen to render it explosive, and a certain quantity to make it even inflammable. If this vapor should be confined in an air-tight vessel it would neither explode nor burn. To burn, it must have oxygen; to emit light, a larger proportion of oxygen, and to explode, a still larger proportion. Many will, undoubtedly, as many have, be deceived by these so-called tests; but, after all, more danger is incurred by the inflammability of hydrocarbon and its vapors than by its explosive qualities. Care in storing, care in handling, and the use of a proper lamp for burning these liquids are what are needed to render their employment safe.

FOREIGN MATTERS IMBEDDED IN GROWING TIMBER.

An exchange relates that on sawing a white oak log at a saw mill the saw struck a "hard substance, which, on investigation, proved to be a stone. The log was some eighteen inches in diameter at the part where the saw had penetrated, and the stone, which weighed about a pound, was found imbedded in the center of the log. The wood was found to be sound and solid, with no cavity or space in which a stone could be placed. It was found that the saw had made an incision in the stone of about half an inch before it could be stopped. The stone at present lies imbedded in the wood in the same position in which it was found, no effort having been made to remove it, and in fact the wood had grown round the stone so closely that it cannot be removed."

How that stone became imbedded in the wood we are not prepared to explain. It might have been lodged in a crotch or cleft, which afterward closed up. It being in the center of the log would seem to give some plausibility to the supposition, as it might have been placed among the clustering branches of the growing shrub and gradually closed in until it became seated in the very heart of the tree.

Appropos to this is a fact of which we are cognizant, partially. Thirty one years ago in company with a youthful companion we stuck a common pin in a young white pine at the intersection of the lower branches with the trunk. We took the bearings of the tree and marked those adjacent so it could be identified after the lapse of years. One year ago the tree was felled and our companion happened to oversee the clearing of the ground. He identified the tree, and it was brought to the mill and sawed up. Strange enough, the pin, perfect in form and very slightly corroded, was found by a carpenter in planing the stock, and there could be no mistake about its identity as the lumber sawed from the tree was watched through every stage by one of the parties to this boyish experiment.

JUDGE FISHER ON REISSUES, SUSPENSION OF A GOOD RULE.

The Patent Office has abrogated its recent rule in respect to suspending action upon applications for reissues for thirty days. The recent decision of Judge Fisher pronouncing this rule of the Patent Office not justifiable under the statute, may be legally correct, although we differ from him on this point.

It has never been questioned but that the Commissioner has discretionary power to adopt rules and regulations for the management of the Office not expressed in the Patent Laws, and this rule, for suspending Reissues for a limited time and publishing the proposed new claims that parties interested might advance evidence to the Office showing cause why such claims should not be allowed, was one of the best and most practical that have been recently adopted. Of course the sewing-machine interest and some other large monopolies were opposed to this rule, for it prevented their slipping through broad claims unbeknown to the public; but all honest inventors approved of the plan of publishing claims for reissue before official action upon them, and we have never known of any detriment arising to any one in consequence, who was justly entitled to the claims asked for under a reissue. But Justice Fisher's decision sets aside this rule, and hereafter reissue cases will be acted upon immediately on their receipt, and no notice is to be taken by the examiner of testimony adverse to the application.

LECTURES ON THE ANIMAL KINGDOM.

The talented naturalist Mr. Waterhouse Hawkins, of London, is now engaged in delivering, in Plymouth Church, Brooklyn, the course of popular lectures on natural history which he lately delivered with such acceptance in Cooper Institute, this city. The familiar, yet spirited style with which the speaker treats his subject, has attracted large, attentive, and, what is still more difficult of accomplishing, thoroughly interested audiences. The wonderful faculty which Mr. Hawkins possesses, of being able to draw upon the blackboard, with the greatest ease and rapidity, sketches illustrative of the subject under immediate consideration, is an invaluable gift, by the exercise of which he is enabled to control the attention of his hearers to a far greater degree than is possible with the best executed of ordinary lecture room diagrams. The most indifferent of listeners cannot fail of being entertained and instructed when ear and eye are both engaged in following the animated description, and watching the skill with which the structure of the animal is shown in detail, until finally, when the framework is sur-

rounded by the appropriate outline, the creature appears faithfully delineated before him.

From the nature of the lectures it is plain that no report can do them justice. So, without attempting either to present a faithful synopsis or to confine ourselves to following out the speaker's design of showing the unity of plan running through the animal kingdom, we shall endeavor to give our readers a general outline of the lectures, and report some of the many curious facts and observations brought forward by the lecturer.

History is divided into two great sections; the one division records the works of man, the other, concerning which we know too little, is natural history—the history of the works of God. The animal kingdom is properly named a kingdom; all human beings are kings and queens over the lower creatures, power of life and death, by Divine decree being given them over the beasts of the field, the fowl of the air, and the fish of the sea, and therefore it is but right that we should know something of the conditions of our subjects. In taking a general survey of the animal kingdom, the simplest form of life should first engage the attention, then we may rise to the higher forms. Yet the terms high and low, the speaker wished his audience to distinctly understand, simply had reference to the grades of complication in structure, for the very simplest forms are entirely perfect in themselves, the idea of a development of types running through the animal kingdom being a theory which the speaker utterly repudiated. Beginning with the lowest or simplest forms, Mr. Hawkins drew on the blackboard and explained the character of the coral animal, crinoids, and jelly fish.

While describing the sea-anemone the speaker mentioned a fact that would indicate that this polyp is possessed of far more intelligence than is usually accredited to his family. One of the animals kept in confinement was regularly fed by its owner with small pieces of meat, by means of a pair of forceps. On one occasion Mr. Hawkins attempted to give the animal his customary food supply, but the creature refused to recognize his kind attentions, and stubbornly drew in its arms until its owner appeared, when, after the usual flourishing of the forceps had been executed, the creature received and disposed of its food with considerable avidity. Here was plainly an exhibition of remembrance and recognition, faculties not generally believed to belong to this low order of beings.

Passing to the higher division of the articulates, the structure of various orders of this group of the animal kingdom was finely illustrated. The vertebrates were treated in the same manner. Beginning with the fish, the position of the brain was indicated, the nervous and circulatory systems were sketched, the organs of sense placed in the relative position they occupy in the fish, the rib structure and fleshy parts added, and finely the outline drawn, much to the gratification of the audience. Retaining the general structure of the fish, by a slight modification of the feet, the head and tail, an alligator was shown; by a still further modification and erasure, a well formed pig appeared upon the blackboard, which, in turn, was skillfully converted into an ostrich.

The second lecture of the course was devoted to a consideration of the structure and habits of the extensive family of fishes. The speaker reminded his audience that on the previous occasion he had endeavored to put before them the relationship which existed between the four great divisions of vertebrates, beasts, birds, reptiles, and fishes, and to show the wonderful similarity in their structure, showing also the various modifications in form which qualified them for existence in water, air, or on the earth. As a class, fishes are constituted for existence under the water; but in some instances limbs are furnished, by which they are enabled to leave the water, and even to sustain their bodies in air while seeking their prey. Beginning with the egg, the various successive stages of development, and the internal arrangement of the matured fish, were fully illustrated, and the peculiarities of several curious species of the finny tribe described at length. Speaking of the whale, the lecturer described a chamber existing in the upper part of the head, and forming a part of the breathing apparatus of the animal. Acquainted with this fact, new interest is added to the story of Jonah, and the objections on the ground that the throat of the whale being only a few inches in width, the passage of a man's body would be a physical impossibility, is easily explained. There is no necessity for supposing him swallowed, we need only imagine him taking up his abode in this commodious room, where he could well be accommodated for several days. With a head the third of the length of the entire body, the place we suppose the prophet to have been in might well be called the belly, and the story throughout be consistent with natural facts. And this shows the use of a fuller and more accurate knowledge of natural history than is generally attained.

MANUFACTURING MINING, AND RAILROAD ITEMS.

The Sheffield steel works, at Pittsburgh, Pa., are among the largest in this department of manufacture in the country. They run night and day, employ 250 hands, and have a capacity of fifteen tuns of steel per day. The works are now building the largest sheet mill in the Union for rolling steel, which will contain the largest chill rolls in the world. This new mill will be used for rolling circular saws from four to six and one half feet in diameter; plate, slab, and sheet steel.

A corresponent thinks it not a little singular that in view of the number of appalling accidents resulting from the plunging of cars down railway embankments, the idea has not been suggested of providing a third elevated rail running over the center of the track, to be grasped by extra horizontal wheels, and thus effectually prevent the cars from leaving the track, should a rail or axle break. The idea, although not new, is an excellent one, but economical considerations always appear of such paramount importance in the eyes of railroad corporations whenever any such life-saving plans are suggested, that we presume there is little prospect of so sensible a device being speedily adopted.

We have before us a statistical table showing the earnings of thirteen leading railroads of the land, for the past year as compared with the same for the year 1863. These figures indicate that in four years the roads have increased their earnings nearly eighty per cent, a fact of great importance for those political economists who read in these figures gratifying evidences of increasing national wealth and prosperity.

We are in receipt of an interesting description of the largest bolt works in the world, that of Messrs. Lewis, Oliver & Phillips, located at Pittsburgh, Pa. By the aid of machinery invented and perfected by a member of the firm, eighty thousand bolts are manufactured per day, worked up from a daily supply of twenty three tuns of iron, and furnishing employment to 364 hands. The rapidity with which the various operations of bolt making are performed is surprising, the iron being driven through a score of machines, fashioned into bolts and nuts, and packed ready for shipment in the short space of three hours.

At Glascow, Scotland, the Garnkirk Railroad passes by means of a tunnel four hundred feet long, under the Moreland Canal, and over the tunnel of the Edinburgh and Glascow railroad. The two tunnels stand secure, tier over tier. A similar feat was performed by Stephenson, in Derbyshire, England, a railroad being carried over a bridge which there spanned the river Amber, and at the same point, under the aqueduct of the Crawford canal. River, bridge, railroad, and canal were thus piled one above the other, four stories high. Such another curious complication in railroad engineering probably does not exist.

The New Haven Clock Company are said to be the largest manufacturers of clocks in the United States. They employ 250 hands, and produce about 150,000 clocks per annum. So perfect is the system now adopted in this business, and the facilities for manufacturing, that an ordinary one-day brass clock can be made at a first cost of less than fifty cents. In regard to the rapidity of work, some of the workmen can take brass in the sheet, press out and level under the drop, then cut the teeth and make all of the wheels for five thousand clocks in one day. There are eight to ten wheels in every clock, and in an eight-day clock, more. If the separate parts were not made for almost nothing, the clocks could not be sold so cheap when finished.

The Mexican silves mines, particularly those in the district of San Luis Potosi, seem to be in a very prosperous condition, if we may judge from the report of the State Inspector of Mines for that district. It appears that one mine in the neighborhood of Charcas, worked at an expense of $170,000, since the first of January, 1862, has yielded silver during that time to the value of $5,460,000. The Santa Rosa Mining Company is drawing out $95,000 worth of ore per week. Its works employ 460 hands, at the rate of thirty-seven cents per day, and the expenses amount in the aggregate to about five per cent of the value of the silver taken out.

We were at fault in announcing the passage of the Arcade underground railroad bill in the New York Legislature, the statement being made on the authority of several daily papers, whom we supposed to be well posted on the subject. It now appears that the bill was lost in the Senate, Trinity Church corporation having the credit of killing it. Several engineers in their interest testified that if Broadway was excavated in front of the church, the steeple—275 feet high—would topple to the ground. The Central underground company have now the entire field to themselves.

The New Haven railroad company, after a three months' trial of the English system of taking up and delivering the mail bags without stopping their trains, pronounce the plan an utter failure.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING MAY 5, 1868.

Reported Officially for the Scientific American.

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

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On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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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.*

77,433.—Draft Attachment.—M Adsit, Forrest, N. Y.
I claim the plates, b b, sliding in grooves upon the top and bottom of the double tree, B, in front of the band, D, said plates, b, secured together at their ends and centers by the bolts, c e, which slide in the slots, d f, of the double tree, all constructed and arranged to operate as herein described for the purpose specified.

77,434.—Splint Plane.—D. E. Aiken and A. A. Aiken, Adrian, Mich.
We claim the wedge, C, of the plane provided with a longitudinal groove in its under side, in which is secured one end of the spring, E, whose free end is adjusted to regulate the thickness of the slat to be cut by the screw, G, passing through the wedge, all constructed, arranged, and operating as described for the purpose specified.

77,435.—Sheep Holder.—C. Albert, Harrisville, Ohio.
I claim the adjustable standards, E, arms, F, in combination with the socket stays, D, and rollers, C, in the manner as and for the purpose set forth.

77,436.—Cue Trimmer.—David Aldrich (assignor to Phelan & Collender), New York, N. Y.
I claim, 1st, The hollow hand piece and cue holder, with its table or slide holder, b, in combination with a reciprocating carriage, provided with a cutter, substantially as and for the purposes set forth.
2d, The employment, in combination with the hollow cue holder and hand piece, of a reciprocatory cutter carriage and the driving lever, D, the whole arranged to operate in the manner and for the purpose substantially as described.
3d, The removable cutter, g, in combination with the cutter carriage and table, b, substantially as and for the purpose described.

77,437.—Thimble Puller.—A. F. Allen, Providence, R. I.
I claim the combination of the expansible catches or jaws, E E E, or their equivalent, the expending wedge, F, the sleeve, M, and the screw mandrel, H, and nut, P, constructed substantially as described for the purpose set forth.

77,438.—Car Spring.—Oliver E. Allen, New York City.
I claim, 1st, A spool for a car or other spring, composed of an India rubber center, surrounded by woollen yarn or other exterior elastic covering, substantially as described.
2d, A car spring, composed of vulcanized rubber, and wound around by woollen yarn or other exterior elastic covering, and placed and used in a metallic case or exterior, substantially as herein described.

77,439.—Saw.—Solomon Anderson, West Burlington, N. Y.
I claim the perforations, c', in the saw plate, A, having upper and lower cutting edges, d e, and used either with or without the cutting edges, f g, of the holes, b, substantially as and for the purpose set forth.

77,440.—Clothes Dryer.—Charles Bange, St. Louis, Mo.
I claim the fixed cylinder, D, revolving perforated cylinder, E, uprights, 1 2 3 4 &c., hoop, s, chains, d d' d", and collar, c, all in combination with the wheels, H K p b and F, and their respective shafts, when arranged in relation to each other and the framework of the machine, substantially as and for the purpose specified.

77,441.—Open Ring.—Andrew H. Bixler, Carlisle, Pa.
I claim the elliptical parts, A A and B B, joined by the hinge and pin, C, and the trapezoid extension, D, of the part, A A, all constructed and combined in the manner and for the purpose herein set forth.

77,442.—Soap Stand.—J. D. Blake, Laconia, assignor to himself and J. A. Sanborn, Holderness, N. H.
I claim the base plate, A, provided with stationary clips, B B, movable clip, C, and clamp lugs, m m, together composing a soap stand, substantially as herein specified

77,443.—Button.—Ernst Bredt, New York City. Antedated April, 25, 1868.
I claim a button shell, formed of stiffened woven or fibrous material, pressed up to the required shape between dies, as specified, in combination with a base or shank, substantially as set forth.

77,444.—Base Burning Stove.—Willis S. Bronson, Hartford, Conn.
I claim, 1st, The double ventilated top, c, which covers the combustion chamber, b', and forms a support for the magazine or reservoir, d, substantially as and for the purpose described.
2d, In combination with the double ventilated plate, c, and magazine, d, the conducting tubes, l, and double movable damper, and dividing flue plates, g, substantially as and for the purpose described.
3d, The arrangement of the oven, k, directly over and in combination with the double movable damper and dividing plates, g, substantially as and for the purpose described.
4th, The double movable damper and dividing flue plate, g, arranged in and forming the smoke and hot air flues, e e, substantially as and for the purpose described.

77,445.—Fire Grate.—Willis S. Bronson, Hartford, Conn.
I claim the hollow stationary hub, b c, constructed and arranged upon the supporting bar, a, substantially as and for the purpose described.
The grate, f, as constructed, in combination with said supporting bar, a, substantially as and for the purpose described.

77,446.—Harness Frame for Looms.—Darius C. Brown, Lowell, Mass.
I claim the improved harness or heddle frame, as made with elastic connection bars, C C, substantially as and for the purpose specified.
Also, the combination, with the bars, A B, and brackets, and string bars supported in such brackets, of the elastic connection bars, C C, substantially as herein shown and described.

77,447.—Device for Soldering the Lids of Cans.—Frederick W. Brown, Philadelphia, Pa. Antedated April 21, 1868.
I claim the combination, substantially as described, of the block, A, instrument, D, and chain, C, for the purpose specified.

77,448.—Stop Valve.—Silas H. Brown, Troy, N. Y.
I claim, in combination with a valve, B, and actuating stem, D, a movable or sliding lever brace, C, so attached to and operating with the valve, that when said valve is closed, said lever braces it tight on its seat, and when said valve is open, said lever moves with it, so as to leave an entirely unobstructed passage way within the pipe, in manner substantially as herein described, and for the purpose as set forth.
Also, in combination with said valve, B, its stem, D, and sliding brace lever C, the grooves or shoulders, E E, of the valve chamber, A, said grooves or shoulders being inclined relatively to the valve seat, H, substantially as and for the purposes described.
Also, the combination and arrangement of the valve, B, its stem, D, the sliding, movable brace lever, C, and the grooves or shoulders E E, when applied in manner substantially as described, and operating for the purposes as set forth.

77,449.—Machine for Sawing Lath.—Theodore Bruno, Saginaw, Mich.
I claim the gage, M, working in the longitudinal slot in front of the guide, L, and resting upon the spring, N, operated by the lever, O, whereby the number of strips to be cut from the board at one operation is regulated, as herein shown and described.

77,450.—Door Directory.—Lewis Burger, Springfield, Ill., assignor to himself and Isaac L. Hamburger, Albany, N. Y.
I claim, 1st, A door directory, consisting of a box, with perforated dial plate, A, and of various rollers, aprons, and hands, to indicate time and date of return, and other notes, substantially as herein shown and described, the rollers, aprons, or hands only being adjustable, by means of a suitable key, as described.
2d, The combined cover and slate, G, when the same is arranged on a door indicator, substantially as herein shown and described.
3d, The letter box, H, card holder, I, and pencil holder, J, when arranged in combination with the door indicator, all made and operating substantially as and for the purpose herein shown and described.

77,451.—Combined Low Water Detector and Safety Valve.—Daniel Burns, Bay City, Mich.
I claim the arrangement of the within described box, G, filled as specified, with the levers, D I K, the valves, A H, the weight, T, and the crotcheted slide, E, substantially as and for the purpose set forth.

77,452.—Rack for Billiard Cue.—Victor H. Buschmann, Baltimore, Md. Antedated April 25, 1868.
I claim so constructing a billiard cue receptacle, that the weight of the cue, when placed therein, shall close it, and when the cue is withdrawn the receptacle will open, and remain open, for the return of the cue.

77,453.—Machine for Tapping and Drilling.—George Cahill (assignor to Isaac G. Johnson, J. F. Hunter, and Peter P. Keller) New York, N. Y.
I claim, 1st, The combination of the collar, C, friction band, c, forced lever, D, fingers, e e, shoulder, a, jointed arm, E, or their respective equivalents, all constructed and arranged in the manner and for the purpose specified and set forth.
2d, The system of levers, G, cam, H, and pin, I, when constructed, combined and applied to the forked spindle of a tapping machine, in the manner and for purpose specified and set forth.
3d, The forked lever, D, movable collar, C, slotted strap, L, the lever arms, K K, rods, M M, arms, N N, shaft, O, disk, P, all constructed and combined, and all applied to and used upon the forked spindle of a tapping machine, in the manner and for the purpose specified and set forth.
4th, The improved tapping machine, consisting of the several parts hereinbefore specified, all constructed and arranged substantially as described.

77,454.—Feed Water Heater for Steam Generators.—George Candee, Berlin Hights, Ohio.
I claim passing the feed water or air through successive chambers, (heated as described,) of a lower to a higher temperature, in the manner and for the purposes herein set forth and described.

77,455.—Implement for Sharpening Watch Wood.—Charles P. Carter, Poughkeepsie, N. Y.
I claim the block, a, knife, b, and screw, c, when arranged and combined to operate substantially the same as shown and described.

77,456.—Railroad.—John B. Christian, Mount Carroll, and John Gunn, Salem Township, Ill.
We claim 1st, The construction and arrangement of a railroad track, composed of hollow rails, A A, placed inside of the usual T-rails, substantially as and for the purposes set forth.
2d, The construction and arrangement of railroad cars, having two or more pairs of broad flanged wheels, B B, substantially as and for the purpose specified.
3d, The lever, H H, in combination with the spiral springs, O O, moving in the periphery of a circle, for the purpose substantially as set forth.

77,457.—Bedstead Fastener.—John C. Cline (assignor to himself and J. Moore Hendricks), Philadelphia, Pa.
I claim the device, consisting of the bolt, C, and tenon block, D, in one piece, and screw cap, E, in combination with the rails and parts of a bedstead, for fastening said rails and parts together.

77,458.—Grate Bar.—Henry Collinson, Boston, assignor to himself and Samuel Vance, South Boston, and Samuel Vance, assignor to James O. Boyle, Boston, Mass.
I claim a grate bar, as made, with its air passages extended entirely across it.
Also, the arrangement of the transverse passages obliquely in the bar, in manner as specified.
Also, the grate bar, as made, with air passages extending across it, and to increase in width from their upper to their lower parts, as specified.

77,459.—Water Closet.—George Conron, New York city.
I claim the valve chamber, E, pipe, D, pan, I, overflow pipe, C, and valve, A, all constructed and operating together substantially as shown and described and for the purpose set forth.

77,460.—Churn.—A. L. Converse, Springfield, Ill.
I claim the outer gear wheels, I, central gear wheels, J K, beveled gear wheel, L, plates, G, bearings, N, and shaft, M, when arranged to operate upon the hinged rectangular central lid, C, as herein shown and described.

77,461.—Potato Washer.—O. H. Cooke, Morrisville, Vt.
I claim the combination of the perforated bottom, B, with or without the metal ring around its periphery, with the sharp-edged float, E, crank, D, and wooden cross piece, C, made, arranged and operating substantially as and for the purposes above set forth.

77,462.—Churn.—Alpheus B. Corby, Binghamton, N. Y.
I claim, 1st, The escapement apparatus, consisting of the pallets, v v', cam, F, shafts, g G, and guides, m n, when used for the purposes described.
2d, The arrangement and combination of said escapement apparatus with the spur-wheels, W W', drum, R, ratchet-wheel, t, pinion, l, weight, T, pendulum, P, and frame, A B C D, substantially as and for the purpose set forth.

77,463.—Extension Step Ladder.—Lewis B. Covert, New York city.
I claim, 1st, A step ladder formed with the two part steps, b, extension pieces, c, and their steps, substantially as specified.
2d, The swinging steps, b, supported by the castings, g, in the manner specified, in combination with extension step ladder aforesaid.
3d, The extension legs, l o, in combination with the extension step ladder, provided with the swinging steps, as and for the purpose set forth.

77,464.—Mechanical Movement.—J. P. Davis, Stiles, Wis.
I claim, 1st, The recessed friction pulleys, D, and racks, a, operating substantially as shown and described, and for the purpose specified.
2d, The gear wheels, G G' H, substantially as shown and described, in combination with the friction pulleys, D D, as and for the purpose set forth.
3d, The pulley, I, belt, b, and fly wheel, substantially as shown and described, in combination with the recessed friction pulleys, D, and cross head, F, for the purpose of accomplishing the more perfect working of the parts, all as set forth.
4th, The cross head, F, cogs, a, friction racks, a, substantially as shown and described, in combination with the friction pulleys, D, all as and for the purpose set forth.

77,465.—Cement Water Pipe.—Edwin Dayton, Meriden, Conn.
I claim, 1st, The short pipe, E, of tapering shape, fitting into the adjoining ends of the pipes, A B, to form a water tight joint, and coated upon the inner and outer sides equally with cement, substantially as herein shown and described.
2d, The packing ring or band, a, applied to the pipe sections, substantially as and for the purpose described.

77,466.—Chimney Cleaner.—Thomas H. Donohue, Washington, D. C.
I claim, 1st, The combination of the fixed and sliding collars, B C, and their connecting arms, a b, with the bars or segments, c, pivoted together and supported on the shaft, A, for operating together, substantially as set forth.

2d, In combination with the bars or segments, c, connected and supported as described the braces, d, and sliding collar, E, all arranged and operating substantially as described.

3d, In combination with the adjustable expanding frame, constructed substantially as described, the detachable brushes, F, or scrapers, G, as and for the purposes set forth.

77,467.—WAGON BRAKE.—Claude Decreux, New York city.

I claim the adjustable rings, C C, on the hubs of the wagon wheels, when provided with lugs, b b, in combination with the oscillating bar, D, having lugs, d, all arranged and operating substantially as herein shown and described.

77,468.—MACHINE FOR CLEANING GRAIN.—Milton Eckley, Olney, Ill.

I claim, 1st, The arrangement of the fans, G, riddle, K, and compound cylindrical screen, D, substantially as described, for the purpose specified.

2d, The construction and arrangement of the fans, G, riddle, K, spouts, I J, compound cylindrical screen, D, and shafts, B F, substantially as described for the purpose specified.

77,469.—PROCESS OF CONVERTING CAST IRON INTO CAST STEEL AND MALLEABLE IRON.—Francis Ellershausen, Montreal, C. E.

I claim, 1st, Converting cast or pig iron into cast steel or malleable iron by bringing it in a liquid state in contact with hot or cold solid oxides, substantially as herein specified.

2d, Bringing to an instantaneous uniform contact, at a sufficient heat, on a sufficiently large hot or cold surface of pure oxide, the carbon contained in molten cast iron, so as to cause a rapid, violent combustion of the carbon, substantially as described.

77,470.—MATERIAL FOR PURIFYING AND DECOLORING PETROLEUM.—John Ellis, New York city.

I claim, 1st, The method of preparing bones, animal charcoal, "Navassa phosphate of lime," and other phosphatic deposits, in the manner described in the foregoing specifications, as materials for filtering and bleaching petroleum and other fluids.

2d, For the purpose of filtering and bleaching petroleum and all the fluids produced from it, including residuum and the heavier oil, after the lighter fluids have been separated from it, the use of pure phosphate of lime and the commercial article, and also either and all, separately or combined, of the materials or substances, which result from treating bones, animal charcoal, Navassa phosphate of lime, or other phosphatic deposits, in the manner described in the foregoing specifications.

77,471.—MACHINE FOR THRESHING AND CLEANING GRAIN.—Wm. B. Emery, Albany, N. Y.

I claim, 1st, Combining with a self-cleaning threshing machine (in which the shoe and separator vibrate in opposite directions), an endless straw elevator, having an apron between it and the threshing cylinder, arranged substantially as and for the purpose specified.

2d, Deflecting the edge, S, of the apron upwards, substantially as and for the purpose specified.

3d, The beater, N, in combination with the elevator, D, and apron, b b, substantially as specified (whether the shoe and the separator vibrate in opposite directions or in unison).

4th, The lever, Y, of the bonnet, whereby the bonnet may be adjusted from the outside of the machine, substantially as and for the purpose specified.

77,472.—VISE.—Isaac Fisher, St. Louis, Mo.

I claim the improved vise, A, the same having two axes or centers of adjustment, arranged substantially as described.

77,743.—BEEHIVE.—W. A. Flanders, Shelby, Ohio.

I claim the honey comb foundation, B, when provided with a passage, x, and constructed substantially as and for the purposes herein specified.

77 474.—DOUBLE SHOVEL CULTIVATOR.—Simeon B. Forbes, New Cumberland, W. Va.

I claim, 1st, The combination of the sole, D, double winged point, E, and double mold board, F, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the adjustable brace, G, with the curved rear parts of the beam, A, and with the sole, D, substantially as herein shown and described, and for the purpose set forth.

77,475.—PAINT BRUSH.—Wm. H. Forker, Meadville, Pa.

I claim the solid wooden handle, A, of full length, with its conical ferrule, F, which in combination with the nut, C, operating on the cap, D, from above, hold all the parts firmly together, when constructed as and for the purpose set forth.

77,476.—NUT MAKING MACHINE.—Matthew H. Foster and Hubert C. Hart, Unionvile, Conn.

We claim, 1st, Sliding bed, B, having button, G, and pivoted lever, I, thereon, with cam wheel, F, provided with studs, k k', all constructed and arranged substantially as described.

2d, Arranging the cams, a b c d e s s', so as to operate the cutter, n, slide, m, and punch, p, substantially as set forth.

3d, The improved nut machine, consisting of mechanism constructed, combined and arranged substantially as herein set forth.

77,477.—WHIP.—James R. Gillett, Westfield, Mass.

I claim interposing a metallic lining, B, between the core, A, and covering, C, of a whip, substantially as and for the purpose herein shown and described.

77,478.—VELOCIPEDE.—O. T. Gleason, Farmington, Me.

I claim, 1st, The combination of four traction wheels, each having a friction boss, A, with the friction driving wheels, P, shaft, J, double crank, I i, and treadles, H H, all substantially as shown and described, and for the purpose set forth.

2d, The lever bearings, L, rods, N, and steering levers, E, all constructed and operating together substantially as shown and described and for the purpose set forth.

77,479.—FURNACE FOR MELTING GLASS.—Lyman B. Goodhue, St. Louis, Mo.

I claim, 1st, The sheif, D, of a furnace for melting glass, as shown and specified.

2d, The combination of a furnace for melting glass with immovable pots, as specified.

3d, The employment of reverberatory arches in a furnace for melting glass arranged as specified.

4th, The packing of a furnace for melting glass with sand as specified.

5th, A furnace for melting glass when constructed substantially as shown and specified.

77,480.—PORTABLE BATH HOUSE.—John Gourlay, Escanaba, Mich.

I claim the general combination and arrangement of the tank, I, slides, H H, pulleys, K K, J, cord, U, drum, X, gate, M, lever, n, crank, P, with house, A B C D E F G, substantially as set forth.

77,481.—LAMP BURNER.—John Gracie and Robert H. Boyd, Pittsburg, Pa.

We claim, 1st, A wick tube, m m', partially closed at its lower end by an indentation, z, or other equivalent device, substantially as and for the purposes above set forth.

2d, An opening or openings leading from the globe or oil receptacle of a lamp to the inside of the burner, each opening being covered with wire gauze, finely-perforated plate, or provided with a gas trap, and arranged within the burner, substantially as and for the purposes described.

77,482.—SUSPENSION RING.—H. S. Griffiths, Brooklyn, N. Y.

I claim the suspension ring for business cards, constructed and employed substantially as and for the purpose herein described.

77,483.—FUR CUFF.—Edward H. Hart, New York city.

I claim a fur cuff, provided with a connecting elastic band, E, in combination with the elastic fastening band, F, the whole arranged substantially as shown and described.

77,484.—MACHINE FOR SAWING LATH.—Isaac A. Hedges and Joseph M. Story (assignors to Lane & Bodley), Cincinnati, Ohio.

We claim, 1st, The pivoted weighted lever, L', and pulley, I, in combination with the belt, e, and pulleys, I, upon the feed rolls, all arranged and operating as described, whereby the belt is tightened, and the feed rolls held in their bearings, as herein shown and described.

2d, The journal boxes, j, for the shaft, K, secured by pivots, k, in the holders, l, having the vertical shafts, m, which are adjusted higher or lower in the framing, as herein described, for the purpose specified.

77,485.—STREET CAR.—John I. Herrick, Milwaukee, Wis.

Antedated April 28, 1868.

I claim, 1st, Runners, D, constructed and connected substantially as and for the purposes set forth.

2d, In combination with said runners, the attaching apparatus, E G and H, and the hooks and supports, substantially as and for the purpose set forth.

3d, Platform or bottom, A, wheels, B, and runners, D, in combination substantially as and for the purpose set forth.

77,486.—REAPING MACHINE.—Reuben Hoffheins, Dover, Pa.

Antedated April 22, 1868.

I claim, 1st, A "forward-cut" harvesting machine which has its finger-beam or cutting apparatus hinged to a frame, which articulates on the axle of the driving wheels, without materially affecting the position of the draught frame and tongue, and to which finger-beam is attached a platform carrying a circularly-moving sweep rake, said harvesting machine also having a device for adjusting the cutting apparatus, and a seat for the driver, such seat being in such relation to the adjusting device that the driver can raise and lower the cutting apparatus, platform, and rake, while the machine is in operation, and while he is seated substantially as set forth.

2d, The combination of a forward-cut hinged cutting apparatus, a frame articulating on the main axle, a quadrant platform, a sweep rake, and a reel moving in harmony with the platform and cutting apparatus, a driver's seat on the draught frame, and a device for raising and lowering the cutting apparatus, platform, rake, and reel, while the machine is in motion, and while the driver is seated, substantially as set forth.

3d, A circularly-moving sweep rake, a hinged platform of quadrant form, and a hinged finger-beam, all connected together and moving in harmony with one another, as the platform and finger-beam are caused to rise and fall by the undulations of the ground, in combination with a draught frame of a "forward-cut" harvester, which has two supporting wheels applied on a single axle, and which also has a frame and tongue hinged so as to articulate independently of the frame to which the finger-beam is hinged, and which articulates on the said axle, substantially as set forth.

77,487.—DITCHING AND GRADING MACHINE.—Francis M. Howard and Daniel W. Avery, St. Paul, Ind.

We claim, 1st, The adjustable slotted guides, m, in combination with the plow or cutter, c, substantially as and for the purposes set forth.

2d, In combination with the above, and with the toothed wheel, g', and shaft, G, the jaws, a, riveted to the belt, B, and the pivoted carrier-beam, b, all constructed, arranged, and operating as and for the purposes set forth.

77,488.—COMBINED COAL HOPPER AND PLATFORM SCALE.—Frank E. Howe, New York city, and Lindsay I. Howe, Boston, Mass.

We claim the arrangement of the hopper, F, in the frame, E, supported upon the scale platform, D, when such hopper is adapted to discharge the coal into the hopper, I, passing directly through the scale platform, D, as herein shown and described.

77,489.—BOOT FORM.—Jarvis Howe, Milford, Mass.

I claim, 1st, As an article of manufacture, a boot form, having a metal edge, substantially as and for the purpose specified.

2d, The combination of the parts, A B and C, substantially as and for the purpose specified.

3d, The thimble, when combined with a plate, having lugs and the notches, substantially as and for the purpose specified.

4th, As articles of manufacture, the parts, A and B, when constructed and arranged for use on the part, C, each substantially as described.

5th, The arrangement of the piece, D, in the chamber, substantially as shown.

6th, A boot form, the leg and foot parts of which are separate pieces, united together by a third piece, substantially as described and for the purpose specified.

77,490.—GRAIN SEPARATOR.—Sidney S. Hurlbut, Cordova, Ill.

I claim, 1st, The combination of the screening shoe, constructed and operating substantially as described, with an elevator, which leads back into the hopper, and with a cleaned-grain discharge passage, substantially as described and for the purpose set forth.

2d, The employment of an elevator, which will return that portion of the wheat which escapes from the screens in an unclean state back to the hopper to be re-screened, substantially as specified.

3d, The combination of the screens L p and r', the short screens, s t, the cut-off, T, and the gage, V, with means for conveying the clean wheat out of the machine, and also for conducting back to the first screen, L, the wheat which is mixed with foreign substances, substantially as described.

77,491.—BEDSTEAD FASTENING.—Joel C. Jackson, Rochester, N. Y., and Frederick J. Jackson, Danbury, Conn.

We claim the bedstead fastening, formed of the inclined hooks, c, with their threaded shanks, c', screwed into the ends of the rail, as set forth, and entering corresponding holes in the posts, as specified.

77,492.—FENCE GATE.—Jasper S. Jewett, Ottawa, Ill.

I claim the two gates, C C, the rods, I I, the levers, J J, the levers, M M, the hollow casting, L, the ropes, O O, and the ropes, O' O', when combined with each other in a double fence gate, and constructed substantially as and for the purpose described in the foregoing specification.

2d, The catches, Q Q, the ropes or chains, S, the lumbers, H H, the springs, R R, and the springs, U U, when combined with each other in a double fence gate, and constructed substantially as and for the purpose described in the foregoing specification.

77,493.—BOSOM PAD.—Albert H. Johnson, Hartford, Conn.

I claim, in combination with an inflated elastic bosom pad, the supporting springs, a a, arranged as herein shown and described, and for the purposes specified.

77,494.—CORN HUSKER, SHELLER, ETC.—Martha Jones, Amelia county, Va.

I claim, 1st, A machine, so constructed as to be capable of husking the ears of maize or indian corn, and, at the same operation, cutting up the husks, for the purposes set forth.

2d, A machine, so constructed as to be capable of husking and shelling the ears of maize or indian corn, and, at the same operation, cutting up the husks, for the purposes set forth.

3d, A machine, so constructed as to be capable of husking and cutting up the husks of maize or indian corn, and, at the same operation, separating the cut husks from the ears, for the purposes set forth.

4th, A machine, so constructed as to be capable of husking, shelling, and cutting up the husks of maize or indian corn, and, at the same operation, separating the cut husks from the corn, for the purposes set forth.

5th, The knives, c c, arranged spirally on the wheel, in combination with the projections, b b, substantially as described.

6th, The knives, c c, in combination with the projections, b b, for tearing and giving a rotary motion to the ear, and the projections, d d, for shelling the corn, substantially as described.

7th, The knives, c c, arranged spirally on the wheel, in combination with the projections, b b, and separator, substantially as described.

8th, The knives, c c, in combination with the projections, b b, for husking, and projections, d d, for shelling, and separator, substantially as described.

9th, The knives, c c, arranged spirally, and attached separately to the face of the wheel, as and for the purposes set forth.

10th, The wheel, B, provided with the projections, b b and d d, and spirally arranged knives, in combination with the spout, s, and separator, substantially as described.

77,495.—WOOD TURNING LATHE.—S. U. King, Windsor, Vt.

I claim the combination of the centralizers, their levers and centrifugal weights, with one or more cutters, and a wheel having tubular journals, or the equivalents thereof, the whole being arranged substantially in manner and so as to operate as and for the purpose hereinbefore described.

77,496.—HORSE HAY FORK.—Hack Krafft, Mulberry, Pa.

I claim, 1st, The centrally-arranged vibrating cross head, C', transverse connecting rods, m m, rocking links, d d, vertically-sliding pivoted legs, c c, and the forks, b b, in combination with the frame, A A', the whole arranged and operated in the manner shown and described.

2d, The latch lever, D, and pin, g, applied to the frame, A A', in combination with a lever, C C', connected to vibrating points, b b, substantially as described.

77,497.—TRAVELING BAG.—Jacob Lagowitz, Newark, N. J.

I claim, 1st, An automatic device for closing traveling bags, consisting of the links or rings, a a, to which the ends of the chain or strap handle, B, are secured, and which carry the arms, b b, that fit over the sides of the bag, substantially as herein shown and described.

2d, The above in combination with the spring, c, made as set forth.

77,498.—LOOM FOR WEAVING GARMENTS.—Samuel Leather, Dalton, England.

I claim, 1st, The combination of the sliding cams, H, shaft, b, gear, G', and worm wheel, G, with the needles, d, and guide rods, c c, for weaving the necessary pattern, substantially as herein shown and described.

2d, In combination with the above, the shaft, a, screw worm, G, and pinion, G', substantially as and for the purpose herein shown and described.

77,499.—CURTAIN FIXTURE.—J. D. Legg and I. W. Legg, Long Eddy, N. Y.

We claim, 1st, Connecting the roller, B, through the medium of tapes, c c, to springs, C C, secured to the upper part of the window frame, in connection with the hooks, l l, and loops, m m, or other suitable fastening for securing or holding the lower end of the shade, and the cord, D, on the pulley, h, of the roller, all being arranged to operate substantially as and for the purpose set forth.

2d, The clamp, E, when used in connection with the cord, D, of the shade roller, B, connected to the springs, C C, substantially as and for the purpose specified.

77,500.—FARM WAGON.—Charles Mahan, Grand Island, Cal.

I claim, 1st, The frame, consisting of the cross pieces, J J', and central rail, K, as arranged, in combination with the box, I, axle tree, D, wheels, C, and reach, H, in the manner and for the purpose substantially as set forth.

2d, The sliding hook, A', when constructed in the manner and for the purpose specified.

3d, The box, A, when the sides of said box are provided with cleats, C', notches, b, and spring catches, c, in the manner and for the purpose set forth.

77,501.—GRAPPLE FOR SUNKEN VESSELS.—Joseph T. Martin, New York city.

I claim a marine grapple, consisting of a solid beam, A, to which the levers, C, carrying the grappling jaws, B, are pivoted, when said bars are adjustable toward or away from each other, on the beam A, and also up and down adjustable on the same, substantially as and for the purpose herein shown and described.

77,502.—MACHINE FOR FORMING PASTEBOARD BOXES.—C. A. Maxfield, New York city. Antedated April 23, 1868.

I claim the former, c, in combination with the folders, 2 3 4 5, substantially as specified, so that the folding of a box or box envelope is effected by driving the previously-cut sheet of material through between said folders, as set forth.

77,503.—EXTENSION PIPE COUPLING.—James McCarthy, New York city.

I claim, 1st, An extension pipe coupling, made by connecting the tubular pieces, A and B, substantially in the manner set forth.

2d, The above in combination with the jam nut, C, made as herein shown and described.

77,504.—ATTACHMENT FOR PENDULUM CLOCKS.—O. P. McDonald, Carondale, Ill.

I claim the combination of the rods, A B, of different metals, having unequal expansibility, with the pendulum rod of a clock, substantially as and for the purpose specified.

77,505.—RAILROAD TRUCK.—David McFarland, Worcester, Mass.

I claim, 1st, The combination, with the axle or journal of a set of car wheels, of an axle protector or guard, substantially as and for the purposes set forth.

2d, The combination, with the axle of a set of car wheels, of a tubular protector, for the purposes set forth.

3d, The combination, with the axle of a set of car wheels, of a guard piece, E, or its equivalent, on each side of the journal or axle, for the purpose of preventing the deflection of the axle, in case of it breaking.

4th, The combination, with the axle, B, and wheels, A A, of the tube, D, clamping pieces, E E, and cross supporting pieces, F F, substantially as and for the purposes set forth.

5th, The combination, with the truck and wheels, of a wheel protector, shield, or cover, H, substantially as and for the purposes set forth.

77,506.—BLACKING BRUSH.—Wm. C. McGill, Cincinnati, Ohio.

I claim, 1st, In combination with the spreading brush, the cover, made and operating substantially as and for the purpose herein described.

2d, The spring standards, D D', serving the double purpose of journaling the said brush and of holding while permitting the adjustment of the blacking box, operating substantially as herein shown and described and for the purpose set forth.

77,507.—COFFEE AND TEA POT.—Shannon McGuffin, Rising Sun, Ind.

I claim providing a coffee or tea pot, with a swinging and adjustable strainer, substantially as and for the purpose herein specified.

77,508.—HARNESS.—Adam McMullen and John H. Rock, Sterling, Ill.

We claim the tugs, B D, brace, C, straps, H and F, and collar, A, when the various parts are connected together and operating in the manner as herein set forth.

77,509.—SAND SCREEN.—Robert McMurray, Brooklyn, N. Y.

I claim the combination with the frame and straight vertical rods, of cross wires, formed with equidistant eyes or loops, through which the vertical rods pass, and by which they are retained laterally, all substantially as and for the purposes described.

77,510.—RAILROAD SWITCH.—Edward Mercier (assignor to himself and Henry W. Bailey), Springfield, Mass.

I claim, 1st, The combination of the fixed guides, f f', with the sliding safety pieces or inclines, a a', substantially in the manner described and for the purpose specified.

2d, The supporting plates, e e', arranged and combined with the fixed guides, f f, and sliding inclines or safety pieces, a a', substantially as described and for the purpose specified.

77,511.—WASH BOILER.—J. C. Merrill, Medina, N. Y.

I claim the boiler, provided with the tube, B, and slides, C, and having the auxiliary tube, D, and grate, F, arranged for use in connection therewith, for the purpose of adapting the boiler to use either with or independent of the stove, substantially as described.

77,512.—DAMPER FOR HOT AIR FURNACES.—Albert H. Mershon, Philadelphia, Pa.

I claim the chain, B, pulleys, D D, door, F, horizontal flue, I, and damper, M, when combined and constructed substantially as and for the purpose herein described.

77,513.—SPRING HORSE.—Henry F. Metzler, New York city.

I claim, 1st, The adjustable foot rest, vibrating with the horse, substantially as described.

2d, The cross bars, J and J', to secure the ends of the spiral spring, and as a means of attaching the same to the screw, I, and bracket, E, substantially as described.

77,514.—LAMP BURNER.—Charles M. Miles and George W. Remsen, Lincoln, Del.

We claim, 1st, The chamber, H, and annular slide, I, having openings, and outlets, d, when the said outlets, d, are protected by guard, e, all constructed and arranged to operate in the manner and for the purpose set forth.

2d, The combination in a lamp burner of the perforated turret, D, provided with slide, F, dead air chamber, A, perforated chamber, H, and annular slide, I, when said chamber, H, is provided with outlets, d, which are protected by a guard, e, all constructed, arranged, and operating as described for the purpose specified.

3d, The lamp burner constructed as described, and consisting of the cap E, wick tube, B, perforated turret, D, having slot, b, perforated annular slide, F I, having pins, a, dead air chamber, A, perforated chamber, H f, having outlets, d, guard, e, and ring, G, all constructed and arranged to operate as set forth.

77,515.—TRACE HOOK.—G. L. Miller, Pontiac, Mich.

I claim the herein described trace hook, when constructed in the manner as set forth, as a new article of manufacture.

77,516.—BASKET.—Sarah P. P. Miller, Beaver, Pa.

I claim as a new article of manufacture a cloth basket made of strips of cloth braided or twisted together and coated with varnish or sizing inside and out, to preserve the form and render it water proof, substantially as described.

77,517.—STEAM GLOBE VALVE.—Albert Moore and A. D. Howes, South Adams, Mass.

We claim, 1st, The shell formed of the parts, A A', with the valve chamber, B', substantially as described.

2d, The block, D, and the valves, C C, in combination with the shell and valve stem, B, when arranged substantially as shown and described.

77,518.—MANUFACTURE OF ELASTIC ROLLS.—Joel Moulton, Boston, Mass.

I claim, 1st, As a means of more securely fixing the body of an elastic roll to its shafts, the employment therewith of a metallic wire or string.

2d, The mode herein described of applying the strands of fibrous material to a sheet, or between two sheets, of vulcanized rubber.

77,519.—COAL STOVE.—Edwin A. Parker, Horseheads, N. Y.

I claim, 1st, The arrangement of the annular chamber, E, around the tubular downward extension, C, of the fire box, said chamber communicating with the fire box and with the atmosphere in the room, so that a supply of fresh air entering it may be caused to enter the fire box and also the room, substantially as herein shown and described.

2d, The chamber, H, arranged in the bottom of the stove base, B, and close above the floor, and communicating with the draft chamber, E, as set forth, so that it will serve to distribute fresh warm air around the base of the stove, close above the floor, as specified.

3d, The chambers, E and H, when arranged as set forth, in combination with the chamber, I, through which the products of combustion can be made to pass, so that thereby the fresh air passing through the chambers, E and M, will be warmed, substantially as herein shown and described.

4th, The damper, k, connecting the chambers, E and I, for the purpose of allowing the introduction of fresh air from the draft chamber, E, to the smoke pipe, J, substantially as herein shown and described, for the purpose of checking the draft.

5th, The S-shaped partition, L, in the chamber, I, in combination with the partition, a, horizontal partition, f, pipes, K K, and smoke pipe, J, as herein described, for the purpose specified.

77,520.—RAILROAD CAR TRUCK.—J. R. Perry and D. W Perry, Wilkesbarre, Pa.

We claim the combination of the sliding and pivoted boxes, C D, upon each side of the wheels, friction rollers, e, connecting bar, E, attached to the axles upon each side of the car, and the oscillating bar, F, as herein described, for the purpose specified.

77,521.—MEASURING AND REGISTERING GRAIN.—Wm. H. Pfrimmer, Lanesville, Ind.

I claim the tilting platform, A, in combination with the scale beam, E, the hooper, B, and the recording apparatus of the dials, the whole constructed, arranged, and operating substantially as and for the purpose herein described.

77,522.—TOOL HOLDER.—Frederick A. Potter, North Providence, assignor to Fales, Jenks & Sons, Smithfield, R. I.

I claim the arrangement of the holder, A, the tool bar, B, and the holding pin, b, with reference to each other substantially as described, for the purposes specified.

77,523.—FIELD ROLLER.—D. R. Prindle, East Bethany, N. Y.

I claim the jointed axis or pivot, a b, for two or more sections, A B, of a roller, substantially as and for the purpose herein specified.

Also, the vertically oblong or upright bearing, d, between the sections of the roller, substantially as set forth.

Also the combination of the jointed axis or pivot, and the vertically slotted or oblong bearing, so as to produce a roller which will adapt itself up and down to the unevenness of the ground, but will be rigid in a horizontal direction, substantially as herein specified.

77,524.—HARVESTER.—Jo. Ramsey, Milford, Texas.

I claim, 1st, The pin wheel, J J, constructed of two light disks, with pins, l l, in their periphery, and with an endless bracing or staying wire, j, passed diagonally from one disk to the other around the pins, l l, in combination with the device, G h, which drives the sickle of a harvester such as described, all substantially as described.

2d, The guard fingers, g, constructed as shown in figs. 5 and 6, with a narrow, straight slot terminating in an elliptical or circular eye, for the purpose set forth.

77,525.—HARVESTER.—Amos Rank, Salem, Ohio.

I claim in combination with a vibrating lifting lever, K, and its pawl, O the construction of the ratchet plate, J, with spaces, v, between the teeth, p thereof, substantially as described.

77,526.—HARVESTER.—Amos Rank, Salem, Ohio.

I claim, 1st, The combination in a belt tightener of the angular lever, m, spring, l, and the grooved wheel, k, substantially as and for the purpose described.

2d, Applying the inside divider, P, to a bracket, T, upon the reel post, H, and making this divider adjustable, substantially as described.

77,527.—GUIDE GAGE FOR PRINTING PRESSES.—Oliver H. Reed, Washington, D. C.

I claim the use of a folding pin or side guide, for paper upon a printing press, substantially as set forth.

77,528.—KING BOLT FOR CARRIAGES.—John Reiber and John Schrader (assignors to themselves and W. M. Lewis), Bridgeport, Ill.

We claim, 1st, The jointed bolt, d, in combination with the clip, B, and head block, d, substantially as and for the purpose shown and described.

2d, The brace, D, having joint, b, in combination with the clip, B, jointed king bolt, d, axle, A, and coupling, E, all substantially as and for the purpose shown and described.

77,529.—BOOT HEEL.—Frederick Richardson, New Bedford, Mass.

I claim the reversible plate, c, formed substantially as described, in combination with the flange, a, and the filling, d, and applied to a boot or shoe heel as set forth and specified.

77,530.—SCREW CUTTING MACHINE.—J. H. Richardson, Chicago, Ill.

I claim the combination of neck, I, face plate, C, cams, m n, pulley, F, friction band, G, collar, H, treadle, y, dies, s, and die head, D E U, the whole being constructed and arranged to operate substantially as herein specified.

77,531.—CARRIAGE STEP SCREEN.—A. Q. Ross, Cleves, Ohio.

I claim the carriage step screen, B, operated by means of bars and spring, or cord and pulleys, or by other equivalent manner, by means of the carriage door, substantially as and for the purposes above set forth.

77,532.—PISTON PACKING.—Frank J. Roth, Schenectady, N. Y. Antedated April 22, 1868.

I claim the side rings, E E, and packing rings, D D, when combined substantially in the manner set forth.

77,533.—PISTON PACKING.—Frank J. Roth, Schenectady, N. Y. Antedated April 22, 1868.

I claim the central ring, c, break joints, , and packing ring, d, when combined substantially in the manner herein set forth and described.

77,534.—STUFFING BOX PACKING.—Frank J. Roth, Schenectady, N. Y. Antedated April 22, 1868.

I claim the employment of cock, g, or its equivalent, when used in connection with stuffing box, a, substantially as herein set forth and described.

77,535.—PLANTER AND CULTIVATOR.—Casper Rubbles, Lowville, N. Y.

I claim, 1st, The V-shaped shares, H, applied to the machine through the medium of the rods or bars, c c, which are connected by joints, d, to the rear bar of the frame, A, and connected at their front ends by chains, I, to wheels or pulleys, F, on shaft, E, substantially as shown and described.

2d, The tubes, K, provided with the slides, g g', attached to the levers, L, which are connecting to the reciprocating rod, M, operated through the medium of the spring, N, and the projections, i, on wheel, O, substantially as set forth.

77,536.—SOAP HOLDER.—Mark Safford, Boston, Mass.

I claim the combination with the soap dish and one or more projections or legs, e e, thereon, of a bolt or clamp, and spring for actuating the same, arranged and operating in connection with the said legs, substantially in the manner and for the purposes shown and set forth.

77,537.—CEMENT.—Charles Saffray, M. D., New York city. Antedated April 25, 1868.

I claim the preparation of oil as above described, for making cements, and an improved cement made of the above named materials, bound together by the chemical action upon them of the oil so prepared, said cement to be applied to the uses specified.

77,538.—PUMP PISTON.—Oliver Salgee, New York city. Antedated April 25, 1868.

I claim the forked link, k, in combination with the ring piston, m, that is formed with sockets, receiving the joints, l, of said link, k, and with the valve, o, applied between the forked link, as and for the purposes set forth.

77,539.—INSTRUMENT FOR TREATING PILES.—H. Schevenell and S. S. Rembert, near Memphis, Tenn.

We claim the electrode, A B, composed of different metals, a a b, substantially as shown and described, for the purpose set forth.

77,540.—CLOTHES PIN.—Ebenezer Seaver, Boston, Mass.

I claim the beveled contact surfaces of the parts, A and B, as shown at fig 2, in combination with the teeth, C C', as and for the purpose specified.

77,541.—Derrick.—John Sheldon, Chicago, Ill.

I claim the general combination and arrangement of standard, A, arm, D, braces, C and M, with brace, S, substantially as and for the purpose set forth.

77,542.—Water Meter.—Gerard Sickles, Boston, Mass.

I claim, 1st, Effecting the entire motion of the valve by shifting the bearings of the foot of the prop, o, attached to the under side of the valve piston, substantially as set forth.

2d, Extending the prop of the valve piston down into the cylinder, so that it can be operated upon by the direct motion of the cylinder piston.

3d, The combination of the valve piston, k, the movable prop, o, and the connecting bar, d, substantially as and for the purpose described.

77,543.—Mop Wringer and Brush.—William S. Simpson, Berea, Ohio.

I claim the combination of the frame, A, having arms, g, brush, B, rollers, D F, levers, f, adjustable spring bolt, h i, and mop cloth, J, all constructed and arranged as described, for the purpose specified.

77,544.—Portable Fence.—H. D. Smalley, New Baltimore, Ohio.

I claim the peculiar arrangement and combination of the panel, A2 D2, with projecting rails, D2, the panels, A D, with projecting rail, D, and the braces, F, with notches, d and e, the several parts being arranged in the manner and for the purpose specified.

77,545.—Advertising Frame.—Josephus Sonnedecker, Cincinnati, Ohio. Antedated April 28, 1868.

I claim the frame or cage, A B, having grooved panels for the reception of advertising cards, and being adapted to be secured to each other and to a lamp or other post, substantially as set forth.

77,546.—Polishing Machine.—John Satckhouse, West Pittsburg, Pa.

I claim, 1st, The guide, B, for introducing the metal to be polished in a line parallel to the axial lines of the rollers, C C', the guides, I I, for holding said metal longitudinally between said rollers, and the guide, m, for receiving the polished metal in the line of its passage from between the rolls, as herein described, for the purpose specified.

2d, The guides, B I and m, in combination with the polishing rolls, C C', and head blocks, A A', substantially as described, for the purpose specified.

77,547.—Plow.—P. H. Starke, Richmond, Va.

I claim, 1st, The double beams, Nos. 6 and 7, attached to the standard as described, for the saving of power and prevention of choking.

2d, The standard or frame pieces, No. 5, having no vertical connection with the beams, to which the other parts are attached, as described.

3d, The point, No. 4, indented with a succession of points, in place of a share, each of its cutting parts presented nearly square to the front, to prevent the plow from being wedged or pressed so hard against the land as to wear the land side, and cause considerable loss of power thereby.

77,548.—Barber's Chair.—John Stock and Jacob Stock, New York city.

We claim the movable back, D, hinged to the stationary back, B, of a barber's chair, arranged with suitable mechanism to fix this movable back, D, in any desired position, in the manner and for the purpose substantially as set forth.

77,549.—Base Burning Stove.—David Stuart and Lewis Bridge (assignors to Stuart, Peterson & Co.), Philadelphia, Pa.

We claim, 1st, The chamber, F, between the fire pot and casing, G, when the said chamber has in front openings for the admission of cold air, and communicating at the rear with openings for the passage of another current of cold air, all substantially as and for the purpose herein set forth.

2d, The above in combination with the air chamber, K, at the rear of the fire chamber.

3d, The plates, J and H, between which is a passage forming a communication between the lower crescent-shaped chamber, K, and upper chamber, Q, as described.

4th, The air opening, q, communicating with the space between the plates, J and H, as set forth.

5th, The cresent-shaped air chamber, Q, open in front for the passage of the products of combustion from within the space enclosed by the inner casing of the said chamber round to the rear of the same, as set forth.

6th, Openings for admitting cold air at three different points to the within described chambers or their equivalents, in which the air is heated, and by which the heated air is delivered in one volume to a receiving chamber, T.

7th, The coal reservoir, S, suspended within, but at a distance from the chamber, Q, as set forth.

77,550.—Mode of Attaching Knobs to Screws.—Charles H. Thurston, Marlboro, N. H.

I claim the construction of the attaching screws in a wooden knob, by the formation of a slotted screw and key, causing it to remain in place, substantially as herein shown and described.

77,551.—Needle Book.—Joseph F. Umpleby, Albany, N. Y.

I claim, 1st, The needle book, A A', constructed with cushion, K e f, and with gage plate, g, substantially as and for the purpose described.

2d, The gage plate, g h, applied to the needle book, as described.

3d, Providing a needle book constructed as shown and described, with the oil-stone, e, which is arranged to bear against the cushion when the book is closed, as set forth.

77,552.—Combined Knob Latch and Lock—John H. Vickers, Norwich, Conn., assignor to Norwich Lock Company. Antedated April 22, 1868.

I claim the employment of one or more tumblers, M, in combination with the latch lever, D, in the Tyler lock, and adapted to operate relatively to the key, N, and stop, A', or their equivalents, substantially as and for the purpose herein specified.

77,553.—Hemp Brake.—Daniel F. Wallace, Ripley, Ohio.

I claim the beating wings, C, in combination with the rest, D, operating in the inclined slots, I, and provided with the springs, E, when arranged substantially as described and shown.

77,554.—Rotary Scrubbing Machine.—Charles E. Wareham, Port Washington, Wis. Antedated April 23, 1868.

I claim the arrangement of the box, A, mounted on wheels, B B, in combination with the bevel gear, c c', for operating a rotary brush or mop, substantially as and for the purposes herein described.

77,555.—Fruit Jar.—John Weidig, Philadelphia, Pa., assignor to Wm. W. Lyman, West Meriden, Conn.

I claim the combination of the stopper, B, elevations and depressions, d d, recess, k, rim, c, clamp, e, fulcrum or center, h, packing and seat, b b', notched ring, g, substantially as and for the purpose described.

77,556.—Grain Rake.—Marcus M. Wells, Hartwick, N. Y.

I claim the jointed lever, D, in combination with the curved tines, A, cross bars, C B, connection, G, and handle, E, as described.

77,557.—Windmill.—John A. Wheeler, Freeborn, Minn.

I claim, 1st, The false arms, I I, secured by means of adjustable eyebolts, N N, to the band rods, G H, so that the sectional sails, J J, can be pivoted between the radial arms, F F, and the false arms, I I, all arranged substantially as herein shown and described.

2d, The rods, K, eyes, c, and lugs, b, in combination with the sectional sails, J J, false arms, I I, eye bolts, N N, band rods, G H, and radial arms, F, all arranged and operating substantially as herein shown and described.

77,558.—Car Coupling.—Nathan Whitten, Etna, Me.

I claim the combined lever, F, bar, F', and sweep, E, secured to the draft bar, B, to the car floor, and to the plunger rod, D, for the purpose of giving a forward rectilinear and increased motion to the plunger, C D, when the draft bar is forced backward, all for the purposes and in the manner as shown and described.

77,559.—Fruit Jar.—Leonard Worcester and Jos. S. Brown, Lowell, Mass.

We claim the elastic cover, A, and the perforated disk or washer, B, applied to the mouth or opening of a fruit or preserve jar, in the manner and for the purpose substantially as described.

77,560.—Toy Safe with Puzzle Lock.—Abram Wright and George F. Wright, Clinton, Mass.

We claim the application of a puzzle lock, when constructed as herein shown and described, or any other mechanical device which will produce the same result, to miniature or toy safes substantially as and for the purpose herein set forth.

77,561.—Cherry Stoner.—Rufus Wright, Brooklyn, N. Y.

I claim, 1st, The intermittingly rotating feed wheel, C, when operated by the lever, B, or other device, which carries the stone ejecting needle, G, substantially as and for the purpose set forth.

2d, The pendent projection or guard, c, attached to the needle bar or lever, B, in connection with the intermittingly rotating feed wheel, C, for the purpose specified.

3d, The yoke or band, K, attached to the hopper, I, in connection with the feed wheel, C, arranged to operate substantially as and for the purpose set forth.

4th, The spiral plate, D, ratchet, E, pawl, F, and lever, B, or its equivalent, for operating the wheel, C, all arranged substantially as and for the purpose, specified.

77,562.—Corn Harvester.—Peter C. Yost, Hamilton, Ill.

I claim, 1st, The form and configuration of the knife, C, as applied to a carriage or shed for reaping, substantially as described.

2d, The slotted adjustable beam, B, carrying the knife, C, and hooks, D d, substantially as and for the purposes described.

3d, The apron, E, to catch the corn or grass, as applied to a carriage, or sled for reaping or mowing, substantially as described.

77,563.—Construction of Meter Safe.—A. W. Adams, New York city.

I claim a safe of cast or wrought metal, provided with an opening, M, arranged as described, and a door or side which when closed becomes permanently locked by means of the devices herein above described, or their equivalents, so that the safe cannot be opened except by violence, the whole being adapted to enclose and protect a meter, as and for the purpose set forth.

77,564.—Gate.—John Adams, Pontiac, Mich.

I claim, 1st, The bar, h, when used in combination with a gate, for the purpose of automatically detaching the teeth of the brace, D, and thereby dropping the front end of said gate, as herein fully set forth.

2d, The combination of the bar, K, provided with a catch or pin, x, with the lever, L, when both are arranged as and for the purpose specified.

3d, The arrangement of the brace, D, catch, g, bars, h and K, lever, L, and a farm gate, the several parts being constructed and operating substantially as and for the purpose set forth.

77,565.—Asphalt Pavement.—Charles P. Alsing, New York city.

I claim an improved pavement formed of the ingredients and prepared and applied in substantially the proportions and manner herein described and set forth.

77,566.—Spindle.—Eugene Atwood, Mansfield, Conn.

I claim the combination with the spindle, A, proper, of the head or cap, B, tube or sleeve, C, and whirr, D, made separate and distinct from each other, and fitted and secured together for joint operation, substantially as shown and described.

77,567.—Lamp Chimney Cleaner.—Loring J. Baker, Machias, assignor to Samuel D. Leavitt, Archibald McNichol and Frank Fowler, Portland, Me.

I claim the tottle joint levers, b b b b, operated by the sliding sleeve, c, upon the rod or shaft, d, substantially as and for the purpose as described.

77,568.—Metal Hub.—Wm. W. Ball, Edinburg, Ind.

I claim the annular flanges, B B, made tapering from the hub to their edges and cast of one piece with the hub, in such a manner as to form springs that are contractible, and made to firmly secure the spokes by the bolts, C, as specified.

77,569.—Slide Valve for Steam Engine.—John S. Barden, Providence, R. I., assignor to Union Steam Valve Company, Mass.

I claim, 1st, The arrangement of the valve, B, constructed as described, in respect to the three bearing surfaces, as and for the purpose set forth.

2d, The passages, f, so arranged as to connect and communicate between the recesses, e', and the passages, a a, as and for the purpose described.

77,570.—Fruit Jar.—T. E. Batterson, Rochester, N. Y.

I claim the combination, with the cover, B, of the wire clamp, C, resting loosely in bearings, e, so as to have a free turning and longitudinally movement, the whole arranged as described, and operating in the manner and for the purpose specified.

77,571.—Machine for Cleaning Feathers.—Henry James Beckwith, Chicopee, Mass.

I claim, 1st, The new combination of the head pieces, H I I, secured on the flange, t t, in connection with the box, A B C D, and the slide valve, r, and the steam pipe, P S S S S, arranged to operate together substantially as described.

2d, The use of the head piece, L M N, combined with the branch tubes, X X, and the "heater," E E, and the waste pipe, O, arranged to operate together substantially as described.

77,572.—Gas Governor.—Eugene Beggs, San Francisco, Cal.

I claim, 1st, In a gas governor, the metallic or other diaphragm, B, and the levers, G and I, together with the valve, M, the whole constructed and operated substantially as and for the purpose herein described.

2d, The regulating weight, S, moving upon the lever, G, and the sliding rod, T, operating substantially as and for the purpose herein described.

3d, The equalizing lever, c, with the weights, g, for increasing the weights on the diaphragm, and to overcome friction when the valve is opening, substantially as described.

77,573.—Collar and Cuff.—John Blakey, Liverpool, and Howard Busby Fox, Oxton, England, assignors to themselves and James Turner Hall.

We claim a frame or holder, A, of leather, silk, or other similar flexible and durable material, when combined with an enclosed detachable leaf or slip of paper, calico, or other similar delicate material or fabric, C, to form an article of wearing apparel, substantially as herein set forth.

77,574.—Flexible Harrow.—Chas. D. Blinn, Port Huron, Mich.

I claim 1st, The double links, C, when operated in connection with the bars A, in the position herein described.

2d, The solid link, D, in connection with the above mentioned parts, when constructed and operating substantially as and for the purposes herein set forth.

77,575.—Draft and Shaft Tug.—Henry Bowers, Albany, N. Y.

I claim 1st, The shaft clasp, B, substantially as shown and described.

2d, The tug, A, substantially as shown, and for the purpose set forth.

3d, The combination of shaft tug, A, with saddle, F, breast collar, G, and shaft, C, substantially as and for the purpose set forth.

77,576.—Boiler for Heating Purposes.—John Bradley, (assignor to D. L. Bartlett and Horace W. Robbins) Baltimore, Md.

I claim two or more sectional cast metal water or steam chambers, intersected by transverse air tubes or passages, and enclosing or encompassing a central fire space, in combination with two or more similar chambers, formed without such fire space, when all of said chambers are connected by continuous direct water and steam channels, and intersected by transverse smoke-flues, and are also separated by intermediate air spaces, the whole being arranged and made to operate substantially in the manner and for the purpose herein, set forth.

Also the formation and arrangement of continuous smoke and hot-air flues in and through a sectional heating boiler and radiator, by means of tubular openings in the several sections, fitting and connecting with each other, substantially in the manner and for the purpose herein set forth.

77,577.—Printing Press.—Wm. Braidwood, Mount Vernon, N. Y.

I claim 1st, The arrangement and combination, with the card drop, P, of the cam, U, lever, S, and weighted arm, R, substantially as described.

2d, The supplementary roller, E, lying on roller, D, and so arranged therewith that their peripheries on the side towards the roller frame, F, are in the same vertically moving roller-frame, F, substantially as described and shown.

77,578.—Barrel Sifter.—Chas. Breasted, Chicago, Ill.

I claim an ash sifter or screener, consisting of the box, A, provided with the concave inclined slide, C, and laterally moving frame, D, having the inclined screen, E, and mouth, b, attached, and protected by the cover, c, all constructed and arranged to operate substantially as herein described.

77,579.—Watch Case Spring.—E. H. Buckland, Springfield, Mass.

I claim 1st, The spring, A, formed of one piece, and reaching over half the circumference of the case and forming both catch and throw-up at each end respectively, substantially as and for the purpose shown.

2d, The stud, E, with the catch, d, formed upon it substantially as and for the purpose shown.

77,580.—Spring for Watch Case.—E. H. Buckland, Springfield, Mass.

I claim the independent catch, D, formed upon the strip, C, in combination with the spring, S, and push-pin, A, substantially as herein described.

77,581.—Oven.—Esek Bussey, Troy, N. Y.

I claim 1st, In combination with an oven attached to stoves, hinging or pivoting therein a division or rack plate, K, so that it may, when not used, be folded therein close to the oven side, in manner substantially as and for the purpose set forth.

2d, In combination with a stove, a drum oven, having a slotted or open back or side, and arranged or placed directly beside and against the exterior wall or shell of the combustion or fire-chamber of said stove, in manner substantially as and for the purpose herein set forth.

3d, In combination with a drum-oven, having an open back or side, and placed against the shell or plate of a stove, the employment therein of a series of slats or plates, L L, arranged in manner substantially as and for the purposes herein described.

77,582.—Burglar Trap.—Wm. Carr, Yellow Springs, Ohio.

I claim 1st, A burglar trap, consisting of a chamber, A, trap door or doors, C C', rods, L L', and suspended platform, K, the whole being arranged to operate substantially as herein described and set forth.

2d, The combination and arrangement, substantially as described, of the chambers, A a a', partitions, B B', trap doors, C C', platform, K, and rods L, L', together with the shafts, D D', and their accessories, E E', e e', F F', f f', G G', H H', I I', and J J', for the object explained.

77,583.—Biscuit Cutter.—S. E. Clapp, Cambridge, Mass. assignor to himself and J. J. Ridgeway.

I claim as a new article of manufacture, the biscuit cutter, either with or without the center piece, D D' D'' substantially as described and for the purpose set forth.

77,584.—Register for Steam Engine.—Geo. P. Clarke, N. York and Marmont B. Edson, Brooklyn, N. Y.

We claim 1st, The semi-circular recess, G, in combination with the pins, H H, and roller, F, substantially as and for the purpose set forth.

2d, The construction and application of the spring pad, P Q, in combination with the recess, G, pins, H H, and roller, F, substantially as described.

3d, The construction and application of the movable journal box, L, for the purpose set forth.

4th, The application of square piston rod, W, in combination with the pencil holder, for the purpose herein shown and described.

5th, The application of the hour wheel, 12, in combination with the crooked lever, I, substantially as herein described and set forth.

6th, The productions of the delineations on the charts, O, fig. 10, by the combined action of the motion of the engine, and the direct pressure of the steam from the boiler, and the action of the clock movement, the conjoint action of these several agencies producing the desired result, substantially as and for the purpose set forth.

77,585.—Skein and Box for Axles.—Greville E. Clarke, Racine, Wis.

I claim the skein, B, having a recess on its under part filled with box metal C, and provided with a groove, x, and tongue, and used in combination with the box, D, as constructed, and the rod, E, connected through the axle, as specified, all constructed and used substantially as set forth.

77,586.—Waste Gate.—Joshua R. Clarke, Cohoes, N. Y.

I claim the water gate, B, constructed substantially as described, in combination with and connected to a follower or piston, M, moving in an open cylinder or well, C, substantially as shown.

77,587.—Bag Fastener.—Levi H. Colborn, Chicago, Ill.

I claim the combination of the tie chain, A, of the lock plate, B, having a hole, D, and notch, E, with cross notch, E', all constructed substantially as and for the purpose herein set forth.

77,588.—Water Wheel.—James P. Collins, Troy, N. Y.

I claim a water wheel in whole or in part coated or enameled with a silicious or vitreous substance, when having a surface or surfaces of cast metal, so as to prevent oxidation and to reduce and lessen the friction of the water upon such parts or surfaces of such water wheel, as and while the water is passing into and through such wheel, so as to give it rotating motion, for the purposes and in the manner substantially as herein contained, set forth, and described.

77,589.—Portable Fence.—Wm. F. Converse, Harrison, O.

I claim, 1st, The headed wedge-form key, D, constructed and applied, substantially as and for the purpose set forth.

2d, The paired hooks, B B', in the described combination with two contiguous pannels.

77,590.—Steering Apparatus.—Wm. H. Conway, Harrison, assignor to himself and H. J. Rutter, Baltimore, Md.

I claim a side rudder for steamboats when hinged to the under side of the guards in such a manner that when not in use it can be drawn up out of the water, substantially as and for the purpose set forth.

77,591.—Collecting Gold, Silver, and other Metals from their Ores.—John Corson, Washington City, D C.

I claim, 1st, The mode herein described of collecting gold, silver, and copper from their ores, by the action of independent currents of electricity, in crystallizing the metals in an insulated pan.

2d, The amalgamating process, with mercury or any other suitable substance, in an insulated pan or barrel, or other amalgamator.

3d, The mode herein described of forming and applying the battery in the pan, or any other substantially equivalent.

4th, The mode of amalgamation of gold and silver with mercury in an insulated vessel, pan, barrel, or any other, substantially equivalent.

5th, The stationary battery in the cisterns, in the form described, or any other substantially equivalent.

6th, Using for the purposes herein named the aforesaid machinery and appliances, or any other substantially the same, in which the same principle is used or involved.

77,592.—Furnace and Condenser for Collecting Quicksilver.—Joseph C. Coult, San Francisco, Cal.

I claim, 1st, The arrangement of the panes, d' d' d', in the ore chambers, C C, instead of the vapor chamber, D.

2d, The arrangement of the grating, d d, placed on the inside of the ore chambers, C C, to be used with or without the water linings, f f, as may be desired, as and for the purposes set forth.

3d, The arrangement of making or lining the insides of the condensing opening or pipes, H H H, with copper, silver, or other material that can be coated with quicksilver, as and for the purposes set forth.

4th, The arrangement of placing in any part of the condensing openings, H H H, leading from the furnace to the final escape into the open air, a series of punched copper, silver, or plate made of other material, that will or can be coated with quicksilver, for the purpose of amalgamating the fumes of mercury thereto, and saving all that would otherwise escape, as and for the purposes set forth.

77,593.—Register for Railroad Fare.—Samuel F. Covington, Cincinnati, Ohio.

I claim, 1st, In combination with the seat of a railroad car, a box, so constructed that it may receive check plates, showing the names of the station to and from which the passenger has paid his fare, and so arranged that the plates can only be withdrawn by unlocking the box, substantially as and for the purpose set forth.

2d, The combination of the box, B, false bottom, D, glass plate, F, pins, G, and check plates, H, substantially as set forth.

3d, In combination with the arm, A, and box, B, the lock plate, C, arranged to operate substantially as and for the purpose set forth.

77,594.—Spittoon.—Frank E. Darrow (assignor to the Darrow Manufacturing Company), Bristol, Conn.

I claim the use or employment of raw hide in the manufacture of spittoons.

77,595.—Water Wheel.—Nathan Dewey and Geo. W. Fosdick, Dowagiac, Mich.

We claim the wheel, A, composed of the rims, B C, and their buckets D and G, the buckets, D, being curved and inclined from the upper portion of the inner rim to the lower portion of the outer rim, all constructed and operating substantially as specified.

77,596.—Wood Turning Lathe.—David Dick, Corning, N. Y.

I claim, 1st, The weighted lever, D, provided with the slotted arm, F, in which the end of the lever, G, works, said lever adapted to operate the curved arm, H, as herein described, whereby the tool heads and spindle are operated simultaneously, as and for the purpose specified.

2d, The weighted lever, I, attached to the rock shaft, C, and provided with the segment arm, K, fitting in the spindle, B, all operating as described, for the purpose specified.

77,597.—Rock Drilling Machine.—Frederick B. Dœring, London, England. Patented in England Jan. 7, 1867.

I claim, 1st, The combination of the following elements or parts, viz: first an ordinary cylinder provided with a piston and piston rod, suitable for supporting a boring tool; second, a distributing cylinder, provided with ports and pistons, actuated from the rod of the ordinary cylinder, the combination being substantially as described.

2d, The combination of the following elements or parts, viz; first, an ordinary cylinder provided with a piston and rod suitable for supporting a boring tool; second, a distributing cylinder provided with ports and pistons, actuated from the rod of the ordinary cylinder; third, a cylinder actuating a pawl, the combination being substantially as set forth.

3d, The combination of the following elements or parts, viz: first, an ordinary cylinder, provided with a piston and piston rod suitable for supporting a boring tool; second, a distributing cylinder provided with ports and pistons, actuated from the rod of the ordinary cylinder; third, a cylinder actuating a pawl, the combination being substantially as set forth.

4th, The combination of these elements or parts, viz: first, an ordinary cylinder provided with a piston and rod suitable for supporting a boring tool; second, a distributing cylinder provided with ports and pistons, actuated from the rod of the ordinary cylinder; third, two cylinders actuating each a pawl, the one to revolve the tool, the other to advance the boring tool towards its work, the combination being substantially as described.

77,598.—Clothes Pin.—Wm. M. Doty, New York city.

I claim, 1st, A clothes pin composed of a stock, hook, and spring, combined as herein specified, the hook having a play at right angles, or transverse to the stock, in the manner described.

2d, The arrangement of the hook and stock so that the former shall pass through the body of the stock or be supported upon the exterior of the same, as and for the purpose herein set forth.

77,599.—Straw Cutter.—Geo. A. Edwards, Centralia, Ill.

I claim the arrangement of the pivoted box, B, upon the coil spring, h, and its shaft, K, having the rakes, r r, that are operated by the lever, l, and cord, m, and used in combination with the sliding head, F, inclined knife, L and the angular knife, C, on the frame, A, all constructed and used as specified.

77,600.—Fruit Parer.—Levi D. Farwell, Lancaster, and Artemus W. Goddard, Clinton, Mass. Antedated April 25, 1868.

We claim the slide, a, the lever, b, and the foot, g, with cam, e, or any other mechanical device, substantially as and for the purpose specified.

77,601.—Churn.—John E. Finley, Memphis, Tenn.

I claim the combination of the flanged wheels, H H, thimble, G, key, I, tube, E, rod, d, frame, J, drive wheel, A, and cog wheels, B C, arranged and operated substantially as described.

77,602.—Railroad Track Cleaner.—George P. Floyd, Quincy, Mass.

I claim the nozzles, K, attached to the pipes, D, when constructed and operating substantially as and for the purpose set forth.

77,603.—Window Safety Guard.—John F. Ford, Boston, Mass. Antedated April 28, 1868.

I claim as my invention the window guard as composed of the bars, A B C D, arranged and connected by screws and having spurs, substantially as described.

Also the combination and arrangement of the springs, d d, in the sockets of the middle projections of the bars, A B, with such bars and their spurs, and the bars, C D, applied to the bars, A B, substantially as specified.

77,604.—Nail Machine.—Royal C. Grant, Middleport, Ohio.

I claim, 1st, The horizontally rotating cylinder, B, provided with a series of cutters and headers, in combination with clamp, h, all constructed and arranged to operate substantially as described.

2d, In combination with a series of cutters, a, arranged as described, the laterally reciprocating plate holder, g, arranged in such relation to the rotating cylinder as to present the nail plate alternately to the two circles of cutters, as set forth.

3d, The combination of the clamp, h, and the sliding rest, d, with the headers, r and w, when arranged to operate substantially as described.

77,605.—Clothes Line Hook.—Elijah H. Gray, Winchester, Ill.

I claim the hook, A, provided with jaws, b b, in combination with cam lever, d, spring, g, and pulley, C, all arranged substantially as set forth.

77,606.—Sawing Machine.—J. P. Grosvenor, Lowell, Mass.

I claim, 1st, The frame, A, carrying the saw arbor, S, sliding in the inclined guide frame, B, shaft, C, screw, x, and bevel gear, C C, all constructed and arranged to operate in the manner substantially as described.

2d, The employment of the connecting rod, a, combined with the rocking rest, b, and the tail, g, thereof, constructed and operating in the manner and for the purposes substantially as described.

3d, The reversible rest, h, combined with the pivoted bar, k, projection, n, notch, e, slide table, D, spring, m, or its equivalent, all constructed and operating substantially as described.

77,607.—Shoemaker's Bench.—John A. Hahn and Charles Volger, Degraff, Ohio.

I claim, 1st, The clamp, C, when constructed with the vertically adjustable jaw, c, the vertically and laterally movable jaw, c', the spring, s, and the combination of the cam lever, D, rod, E, and treadle, F, for the purpose of operating it, the whole being constructed, arranged and operating in the manner described.

2d, The combination and arrangement on a shoemaker's bench of the clamp C, constructed and operating as above described, and the apparatus consisting of the plate, I, blocks, M and N, screw, O, strap, r, and treadle, T, all constructed and operating in the manner and for the purposes set forth.

77,608.—Rein Shackle.—Joseph Hale, Somerville, and Wm. Hall, Brookline, Mass.

We claim as a new article of manufacture a rein shackle made substantially as described, as and for the purposes set forth.

77,609.—Water Wheel.—Alonzo J. Hall, Derry, N. H.

I claim, 1st, The apertures, c, and circular groove in flange, O, in combination with the chambers, C, and hub of the outer wheel, B, when arranged to operate in the manner and for the purpose specified.

2d, The valve, V, in combination with the weight, W, and gate, T, substantially as and for the purpose specified.

77,610.—Floor Clamp.—Edgar A. Hall, Sugar Branch, Ind.

I claim the arrangement of dog, A B B' a, eccentric cam, C, and reversible lever, E e e', substantially as set forth.

77,611.—Seaming Machine.—Walter Haslem, New Britain, Conn.

I claim the combination with the brackets, e, and stop, g, of the slotted plate, d, provided with its loop holding points, and a thumbscrew for the ready tightening and releasing of the plate, substantially as and for the purpose set forth.

77,612.—Vapor Burner.—Samuel B. Hopkins and Edward H. Anderson, Easton, assignors to themselves and J. M. Satterfield, Baltimore, Md.

I claim the burner above described, having the central cone, A, pierced with four holes, a a a' a', at the points specified, when used in combination with a plate, B, bent up at the ends, and having ears, c c, projecting upward from its side, substantially as and for the purpose described.

77,613.—Mileage Register.—Benjamin Horn, Sergeantsville, N. J.

I claim, 1st, The spring crank or pin, B1, carried on the hub, B, and adapted to act on the wheel, D, so as to yield when necessary, and avoid fracture, substantially as and for the purpose herein specified.

2d, The ringing mechanism, P G, arranged to operate in combination with mechanism for receiving motion from the wheel of a carriage, and thus indicating to the ear each mile or other unit of distance travelled, substantially as and for the purpose herein specified.

3d, In combination with mechanism, substantially as herein described, for receiving motion from the rotation of the wheel of a carriage, the striker, R, operated by such mechanism at uniform distances traveled, and arranged to mark on a surface uniformly traversed across its path, substantially as and for the purpose herein specified.

4th, In a mileage register having provision for striking a bell, or marking on a moving surface by a blow, as described, so forming and arranging the elastic parts, P R, or either of them, that while allowing for a reasonable amount of backing without derangement, fraudulent turning of the carriage wheel backward will break or permanently set one or both of the striking parts, substantially as and for the purpose herein specified.

77,614.—Lamp Burner.—Wm. H. Horton, Providence, R. I.

I claim the chimney supporter, D, consisting of the ring with its studs, E, and perforations or air holes, arranged as specified.

Also, the combination as well as the arrangement of the guard, E, the per

forated annull, C and F, and the flange, k, with the body, A, and wick tube of the burner.

77,615.—FRAME FOR STRETCHING HIDES AND LEATHER.—Theodore P. Howell and Charles P. Oliver, Newark, N. J.

We claim the arms, A and B, constructed, combined and operating substantially as and for the purposes specified.

77,616.—PLOW COLTER.—Horace S. Hoxie, Adrian, Mich.

I claim, 1st, In combination with the coulter, A, the braces, a, b and D, mold board, B, tenon h, all constructed in the manner set forth and described.

2d, The combination of the mold board, B, and coulter, A, when both are made in one piece, or welded together in the manner set forth and described.

77,617.—SULKY PLOW.—Leavitt Hunt, Weathersfield, Vt.

I claim, 1st, The hinged beam, D, and the plow beam, E, provided with and connected by the oval axle, c, and the chain, or its equivalent, substantially as described and set forth.

2d, The combination of the iron lever, l, with the bar, k, and the beam, D, substantially as and for the purposes set forth.

3d, Providing the beam, E, and the hole, C, with the slots, S and d, to act in conjunction, thereby giving the plow some longitudinal play, when the beam, E, is connected to the whiffletree or bolt, t, by the chain, F, or its equivalent, substantially as described and for the purposes specified.

77,618.—MANUFACTURE OF ZINC.—A.G. Hunter, Flint, Wales.

I claim the process of extracting zinc from its ores by the direct application of heat to the said ores without the use of crucibles or retorts to contain the said ores, the heated gases and flame being, previously to their contact with the zinc, carefully deprived of free oxygen, and the subsequent condensation of the zinc vapor to the metallic state, all substantially as herein described.

77,619.—LOOM.—W. H. Jackson, Brooklyn, N. Y., and Geo. Merrill, Newburyport, Mass., assignors to Merrimac Loom Company, Boston, Mass.

I claim, 1st, The mechanism substantially as described, for operating a weft carrying needle, so that its point shall pass through the wider part of the shed and return near the point of weaving, substantially as and for the purpose set forth.

2d, A loom having a weft carrying needle, arranged and operated substantially as described, so as to pass its eye through the shed obliquely, or near the beater, when the latter is thrown back, then around a stationary bobbin located at the opposite edge of the shed, and thence back through the shed to the place of starting, substantially as set forth.

3d, The combination of the shuttle holder, y, the reciprocating fingers, 21 and 22, bobbin, x, and the weft carrying needle, when said parts are constructed and arranged for joint operation with the mechanism of a loom, substantially as herein described.

77,620.—LAMP BURNER.—Melvin Jincks, Dansville, N. Y.

I claim, 1st, The sliding springs or holders, b b, for the purpose of adjusting the same to different sizes of chimneys, substantially as described.

2d, In combination with the above, the burner, A, cone, B, spring clips, e e, and flange or knob, h, when all are constructed and arranged substantially in the manner and for the purpose set forth.

77,621.—COMBINED TWEEZERS, WATCH KEY, ETC.—David A. Jones, Springfield, Mass. Antedated April 22, 1868.

I claim the combination of the tweezers, A A', ear spoon, f, and watch key, g, arranged and constructed substantially as and for the purpose shown.

77,622.—ANIMAL TRAP.—P. W. King, Lowville, N. Y.

I claim the combination of the members, C, E, F, G, H and S, for the purposes intended.

77,623.—PERMUTATION LOCK.—Jacob Klein, Williamsburgh, N. Y.

I claim, 1st, The oscillating hinged ward, e e, as constructed, in combination with the catch or arm, d, operating with the disk, E F, and bolt, D, by means of the acute angle lugs, f f', on the shaft of the knob, B, substantially as herein described.

2d, The double acting spring, P P, the brake keys, q q, operating reversely against the ring plate, M, for holding it in position, when set to a given number, as set forth.

77,624.—COOLER AND REFRIGERATOR.—August Koch, Baltimore, Md.

I claim the combination of a detachable selve or perforated ice pan, L, with the upper part of a ventilated water cooler, A, and with a ventilated refrigerating box or vessel, E, placed centrally therein beneath said pan, and surrounded by a water space, F, all substantially as and for the purpose herein set forth.

77,625.—HAME.—E. F. Lacy and D. K. Woodbury, Danville, Ill.

We claim the adjustable metallic plate, C, provided with L-shaped ears, x x, which project beyond and under the stationary plate, B, and work in vertical grooves in the wooden hames, A, all constructed, arranged and operating as set forth.

77,626.—SHAFT COUPLING.—James Lamb, Aurora, Ind.

I claim the movable taper, d, and movable socket, e, secured between the arms, C C, and used in combination with the straight bolt, E, thill, F, and clips, B B, substantially as set forth.

77,627.—SELF-SEALING BURIAL CASE.—Peter F. Lawshe, Rochester, Minn.

I claim, 1st, A self-sealing burial case, constructed and arranged to operate substantially as described.

2d, A metallic burial case, constructed substantially as herein described, and provided with the rubber packing, as and for the purpose set forth.

77,628.—FISHING TACKLE.—Llewellyn D. Lothrop, Dover, N. H.

I claim the swivel, as made with the eye, c, and slot, d, arranged in it, substantially as and for the purpose hereinbefore specified.

77,629.—HOISTING AND TRANSFERING PULLEY.—Almon D. Manley (assignor to himself and Lewis H. Cantine), Washington, Mich.

I claim the arrangement of the block, B, drum, K, pulley, R, and lever, L, in combination with the car, D, and its pulleys, levers, N and I, sliding bar, g, pulley, P, and cords, E C F, adjustable collar, H, and weight, w, the various parts being constructed and operating substantially as set forth.

77,630.—SIDE-HILL PLOW.—D. A. Manuel, Napa City, Cal.

I claim, 1st, Dividing the plow between the share and mold board, F and J, and hinging the two parts to the land side and standards, so that by swinging them to the right or left, and joining the two said parts, they will form a perfect plow, substantially as described.

2d, Construction of the land side, A, wider in front than at the heel, so that the line of draft will incline toward the land, substantially as described.

77,631.—RAT TRAP.—Wm. C. Marquis, Burgettstown, Pa.

I claim the tilting platform, F, when hung on a bent rod, g, in combination with the pendulous weight, h, and spout, C, the several parts being constructed and used as and for the purpose specified.

77,632.—KNIFE AND FORK SCOURER.—D. S. Marvin, Watertown, N. Y.

I claim the combination of the adjustable slat, C, with the bars, A and B, rods and coil springs, b b, as and for the purposes set forth.

77,633.—SAFETY DOOR KEY GUARD.—W. K. Marvin, New York city.

I claim the combination of the plate, A, with a slide or tongue, mounted in or upon said plate, and a spring to hold said tongue in position, substantially in the manner described, the whole constituting a key fastening device, hinged to the door or other part where the key is located, so as to operate in connection with the said key, substantially as and for the purposes shown and specified.

77,634.—MOWING MACHINE.—Nathan F. Mathewson, Barrington, R. I.

I claim, 1st, The spring pawl, 3, when combined and arranged with the pedal, 5, the spring trap, 6, the wedge key, 4, and ratchet wheel, I, substantially as described and for the purposes specified.

2d, The curved elongation of the shoe, m, in combination with the strap, o, for the purpose specified.

3d, The rods, z z, when used in connection with the wheel, x, the rods, W, the chucks, u, and the gears, E, for the purpose specified.

4th, The double wedge key, P, when performing the double office of journal box and key.

77,635.—GAS HEATER.—S. T. McDougall, Brooklyn, N. Y.

I claim, 1st, The ironing apparatus constructed and operating substantially as shown, in combination with the case or cabinet, A.

2d, The auxiliary chamber, R, combined with the ovens, Q and S, when the same shall be constructed and combined substantially as shown for the purposes set forth.

3d, The air-supply pipe, O, in combination with the downward burner, I, constructed and operating substantially as and for the purposes specified.

77,636.—APPARATUS FOR DISTILLING PINE WOOD.—Dustin F. Mellen, Manchester, N. H.

I claim, 1st, In combination with the cylindrical retort, A, and the furnaces, B, the segmental flues, b and b1, with the upper and lower main flues, B2 and B3, constructed and arranged substantially as and for the purpose set forth.

2d, In combination with a retort for the destructive distillation of resinous wood, the pitch-basin, C, with water space under the same for conveying a current of cold water to modify the heat of the pitch-basin, substantially as described.

3d, In combination with the cylindrical retort, A, and wood-holding perforated cylinders, A', or their equivalents, the pitch-basins, C, located within the main cylinder, A, substantially as described.

4th, In combination with the retort, A, a water pipe or pipes, so arranged as to convey a current of water into and through said retort, to prevent the pitch from being vaporized therein.

5th, In combination with the retort, A, and pitch-tank, C', or their equivalents, a cock or gate, or the equivalent thereof between the retort and the pitch-tank, for the purpose of closing the connection between them while the wood is being charred, substantially as and for the purpose set forth.

6th, In combination with the still and furnace, the angular fire-chamber, j', the annular flue, L', with connecting flues, l, constructed and arranged substantially as and for the purpose set forth.

7th, In combination with the annular fire chamber, j', the fire flues or tubes, L, passing from the furnace, through the still, to said annular fire chamber, substantially as described.

8th, In combination with the rotating agitator, the cog wheel, g, and pinion, g', or equivalent gearing, enclosed in the cylinder, F, substantially as and for the purpose described.

77,637.—BOLT CUTTER.—Frank Miller, Indianola, Ill.

I claim the tool herein described, when its several parts are constructed and arranged substantially as and for the purposes set forth.

77,638.—WINDOW CURTAIN FIXTURE.—G. L. Miller, De Witt, N. Y.

I claim the guide rods, g, and swivels, f, in combination with the vertically adjustable roller, A, as and for the purpose set forth.

77,639.—MOP WRINGER.—Wm. R. Mills, Hartford, Mich.

I claim the combination of the sleeve, B, the crank and shaft, C, the bevel gear wheels, D and E, the hangers, G, the head, J, when arranged with the mop handle, A, the head, I, and the web, H, when constructed and operating substantially as and for the purpose herein described.

77,640.—EXTENSION LADDER.—Jas. F. Morse, Montgomery, Ill.

I claim, in combination with the members, A B, of the ladder, the arrangement of the pulleys, E, cords, m m, shaft, D, and gearing, F G, whereby the operator can raise and lower the upper member of the ladder when standing upon the same, substantially as specified and shown.

77,641.—HAY RAKER AND LOADER.—Sam'l K. Morse, Commerce, Mich.

I claim the slotted semi-circular plates, H H, and curved standards, f f, by means of which the belt frame is adjusted to any desired elevation, as described.

77,642.—RAILWAY CATTLE GUARD.—Peter Mougey, Marshallville, Ohio.

I claim the peculiar arrangement and combination of the platforms, D D D, rock shaft, F, with the arms, H H and I, connecting rod, J, arm, K, and gate L N, the several parts being arranged substantially in the manner and for the purpose herein specified.

77,643.—BLANKS FOR BODIES OF SHEET-METAL TEA AND COFFEE-POTS.—Wm. A. Munn, Milwaukee, Wis.

I claim, as a new article of manufacture, tin-blanks to form the bodies of tea and coffee pots and similar articles, when stamped or pressed with fancy and ornamental designs, substantially as herein described.

77,644.—SCRAPER.—D. B. Nelson, and Morgan Dyer, Elmira, N. Y.

We claim the combination of the bowl, A, movable point, B, beam, C, braces, c c, and lever, E, all arranged and operated as and for the purpose specified.

77,645.—HAME.—Daniel M. Nixon, Danville, Ill.

I claim constructing hames with a staple, D, and sliding plate, F, having opposite projections, E E', said parts being arranged to adjustably attach the trace, substantially as described.

77,646.—MACHINE FOR GRINDING FILE BLANKS.—Edward Norton, Boston, Mass.

I claim 1st, The employment of a pendulous or oscillating hanger or stand in combination with the axis of a grinding stone, arranged parallel to its own axis of oscillation, or equivalent device, substantially as described.

2d, The arrangement of the oscillating grindstone stand or hanger, with an inclination from its supporting and oscillating axis toward the work to be ground, so that the weight of the stone and hanger may be employed to effect all movements of the stone in the opposite direction, substantially as shown.

3d, In combination with inclined arrangement of frame for moving the stone in one direction, the arrangement of a weight, c, or spring to move it in the opposite direction, substantially as set forth.

4th, The frame, I, or its equivalent, operating substantially as and for the purposes set forth.

5th, The employment of the adjustable connecting rod, l, in combination with the crank, m, and carriage, k, and operating substantially as and for the purpose set forth.

77,647.—MACHINE FOR CASTING EYELETS.—Jas. M. Osgood, Somerville, Mass.

I claim 1st, Making eyelets from cast metal, by the means substantially as described.

2d, The fixed pins or rods, d, in combination with the sliding tubes, f, as and for the purpose set forth.

3d, The combination of the fixed pins or rods, d, the sliding tubes, f, and the cylinder, B, as described.

4th, The combination of the cross bars, e, the sliding tubes, f, and the cam plates or disks, C C' as and for the purpose specified.

5th, The cylinder, G, provided with the projections, y, as and for the purpose set forth.

6th, The chamber, i, formed in the plate, H, in combination with the cylinder, B, as described.

7th, A cast-metal eyelet, constructed by the means substantially as above described.

77,648.—BAG HOLDER.—John H. Park, White House, N. J. Antedated April 24, 1868.

I claim the metallic levers, D D, pivoted as described, and forming a hoop at the forward end, when provided with rack bar, e, and used in connection with the block, B, with its spring, a a, all constructed and operating in the manner and for the purposes set forth.

77,749.—COFFEE MILL.—Chas. Parker, and Edmund Parker, (Assignors to Chas. Parker) Meriden, Conn.

We claim 1st, Attaching the stationary grinding bed, a, on to the top board b, by means of lugs, e, in combination with the rim, d, or a part thereof, the lugs entering above and the rim below the top, b, or vice versa, substantially as set forth.

2d, Forming a cracker within the hopper, by extending the side pieces or supports, g, up into the hopper, and so as to form open spaces directly from and within the hopper to the runner, between the said supports, g, and when the said supports are inclined to the runner as described, and the under and inside of the supports, g, provided with teeth, so as to operate in the manner specified.

77,650.—REVERSIBLE KNOB LATCH.—J. E. Parker, Meriden, Conn.

I claim hinging the face plate to the lock case, so as to be turned therefrom, substantially in the manner and for the purpose herein set forth and described.

77,651.—DOOR FASTENER.—G. F. Perkins, and S. F. Gibbs, Holyoke, Mass. Antedated, April 28, 1868.

We claim a combined adjustable door fastener and match safe, consisting of the case, B, cover, A, and bar, C, the whole constructed and operating substantially as described.

77,652.—GAGE FOR WEATHER BOARDING.—Hiram Preston, Orfordville, Wis.

I claim 1st, The plate, B, and screw, i, as also the spring, h, in combination with the bar, A, substantially as described, and for the purposes set forth.

2d, The scribe, D, with the slotted arm, m, and pin, p, constructed to operate in connection with the bar, A, substantially as and for the purposes set forth.

77,653.—CHANNELLING TOOL.—G. W. Pruyne, Mexico, N. Y.

I claim the slide, B, so constructed as to serve the double purpose of holding the knife and forming a shoulder or guide for the tool, in connection with the part, A, substantially as described and set forth.

The handle, C, forming a set screw, and acting in combination with the part, A, and slide, B, substantially as described, and for the purposes specified.

77,654.—ELEVATING FLOUR, FEED, GRAIN, &C.—James Raney, Newcastle, Pa., assignor to himself, Leander Raney, and Bostic Raney.

I claim the arrangement of the fan, F, spout, G, and chamber, H, with the spouts, I, K, and D, as and for the purposes herein set forth.

77,655.—FALL LEAF TABLE.—J. S. Rankin, Detroit, Mich.

I claim 1st, The slides, C, in connection with the screws, D, the plates, H, the slots, G, and the hinges F, and the spiral springs, N, when operating substantially as and for the purposes described.

2d, The combination of the above named parts with the arm, I, hinge, J, guide, K, pin, L, spring, M, leaf, A, top, B, and side rail, E, when arranged and operating substantially as and for the purposes herein set forth.

77,656.—WAGON SKEIN.—C. F. Ravn, Milwaukee, Wis.

I claim skein, B, center iron, D, bolt, E, linchpin, F, nut, G, and cap, H, in combination, substantially as and for the purpose described.

77,657.—ANIMAL TRAP.—Jas. H. Reisinger, Vinton, Ohio.

I claim the trap, A, having the pivoted platform, B, of shape described, doors, C C, blocks, D, rods, d', bait hook, E, arranged as described, passage-way, G, gates, I I', and rod, J, the whole being constructed and operated substantially as described.

77,658.—FARM GATE.—Christian Rich, Marshallsville, Ohio.

I claim the peculiar arrangement and combination of the gate, G I H, gate-post, B, gate latch, K, wheel, R, latch plate, D, sliding bar, E, rack and pinion M N, levers, F F, and lever posts, A A, the several parts being arranged and combined in the manner and for the purposes specified.

77,659.—FAGGOT FOR RAILROAD RAILS.—Harrison Rowe, Marietta, Pa.

I claim the manner of making and applying my wider top and bottom plates, A E, in combination with the intermediate filling, B C D, when made into a pile or faggot for being rolled into rails for railroads, substantially in the manner specified.

77,660.—CORN HARVESTER.—David Sarver and Rob't Coons, Greensbutgh, Pa.

We claim 1st, A cut-off, N, having an endwise movement parallel to the path of the machine, substantially as set forth.

2d, The combination, substantially as set forth, with a tilting platform, of a cut-off, vibrating endwise at a right angle to the axis of the platform, and parallel to the path of the machine.

3d, The combination, substantially as set forth, with a tilting platform and a cut-off, of a guide or deflector, supported at the grain end only.

4th, The combination and arrangement, as set forth, with the reel revolving on a vertical axis, of the tilting platform.

5th, The combination, substantially as set forth, of a laterally projecting cutting apparatus, a reel, revolving on a vertical axis, a guide, a cut-off, and a tilting platform.

6th, The combination, substantially as set forth, of the main frame and supplementary frame with the roller arm, F, and bracket, F', for the purposes set forth.

77,661.—REED ORGAN BELLOWS.—John Schatz, New Haven, Conn.

I claim the arrangement of the two chambers, I and K, or either of them, upon one side of a fixed partition, B, in combination with the chamber, H, and bellows, F and G, upon the other side of the said partition, and all of the said partitions connecting with the passage, A, and constructed so as to operate together, in the manner and for the purpose herein set forth.

77,662.—TREE BOX.—Stephen Scotton, Richmond, Ind.

I claim a band or belt, constructed of the various sections, A B and C, formed substantially as described, and for the purpose set forth.

2d, The braces, E, in combination with the band, substantially as and for the purposes specified.

77,663.—WASH BOILER.—I. D. Seeley, Hudson, Wis.

I claim, in a washing boiler, the combination of the plates, B, forming vertical compartments, the transverse and diagonally-placed plates, B2, forming a continuous flange in extension of said plates, B, and the perforated plate, C, placed above the flanges, B2, substantially as and for the purpose set forth.

77,664.—BEER COOLER.—Henry Shlaudeman, Decatur, Ill.

I claim, 1st, The pyramidal cooler, C, when the same is formed of either plain or corrugated sides, C' C', and the whole is so constructed and arranged as to leave an open chamber for the reception of water, substantially as described.

2d, The independent base trough, A, when the same is constructed and arranged substantially as described, and for the purpose specified.

3d, The pyramidal cooler, C, when the same is formed of either plain or corrugated sides, C' C,' and the whole is so constructed and arranged as to leave an open chamber for the reception of water, in combination with the base trough, when the whole is constructed and arranged substantially as described, and for the purpose specified.

77,665.—SEWING MACHINE.—George Slater (assignor to George Washington Belding), London, England.

I claim a simple rocking shaft, K, and an incircling, tubular rocking shaft, J, combined with each other, and respectively, at one end, with a cam, Y, operating the feed plate, X, and lever, N, operating the shuttle carrier, O, and at the other, with the eccentrics, G H, upon the driving shaft of a sewing machine, all substantially in the manner and for the purpose herein set forth.

77,666.—AUTOMATIC FEEDER FOR EVAPORATORS.—Jonathan Smead, East Wallingford, assignor to himself and Thomas Steward Clarendon, Vt.

I claim, 1st, The perforated casings, arranged within the pans, in relation with the floats operating the sap or liquid-supplying mechanism, substantially as and for the purpose specified.

2d, The arrangement of the chamber, E, the case, F, valve, c, with its stem, d, and bent lever, D, in relation with each other, and with the stem, b, of the float, C*, the pipe, f, and the reservoir pipe, G, substantially as and for the purpose set forth.

3d, The valves, m, arranged upon the stems, l, of the floats, J, and in relation with the funnel-shaped mouth piece, z, surrounding the orifices, c', of the reservoir pipe, G, substantially as and for the purpose specified.

4th, The elastic diaphragm, c, arranged in the end of the case, F, and in relation with the valve stem, d, operated by the float, C*, and the pipe, f, substantially as and for the purpose specified.

77,667.—FERTILIZER.—Amor Smith, Cincinnati, Ohio.

I claim, as a new article of manufacture, cracklings, reduced to a powder, for use in combination with phosphates as a fertilizer.

77,668.—SUGAR EVAPORATOR.—W. C. Smith, Warrensburg, Mo.

I claim, 1st, The air-heating chambers, B1 B2, when combined with the fire box, B, in the manner and for the purpose herein set forth and described.

2d, The dampers or slides, D D1 D2, when arranged and operated as and for the purpose shown and described.

77,669.—COOLING AIR AND LIQUIDS, AND MAKING ICE.—Daniel E. Somes, Washington, D. C.

I claim, 1st, Atomizing liquid over and over in a chamber or vessel, without removing it from said chamber or vessel, substantially as and for the purpose set forth.

2d, Atomizing liquid in a vacuum, or partial vacuum, over and over again, without removing it from said vacuum or partial vacuum.

3d, Generating and using gas, substantially in the manner and for the purpose set forth.

4th, A small portable cooler, constructed and operated substantially as set forth as an article of manufacture.

5th, The atomizers and chamber, in combination with the pump, or its equivalent, substantially as described.

6th, The atomizers and chamber, in combination with pipes or channels and means for conducting away heat, substantially as described.

7th, The atomizers and chamber the receiver, the pump, and means for cooling or freezing, substantially as described.

8th, The atomizers and chamber, the gas generator, and pump, or its equivalent.

9th, The atomizers and chamber, the gas generator and receiver, the pipes, and means for cooling, substantially as described.

10th, The atomizers and chamber, the pump or its equivalent, and the gases, air, or liquids, substantially as set forth.

11th, Means for regulating the supply of gas, air, or liquids, in combination with the atomizers and chamber, substantially as set forth.

12th, The chamber and apartments with non conducting substances, and double or multiple walls, substantially as and for the purpose set forth.

77,670.—STEAM GENERATOR.—Obed Spencer, Jacksonsburg, Ohio.

I claim the combination and arrangement of the boilers and tubes with the furnace, F, whereby the entire surface of the boilers, A, and tubes, B C, is subjected to the action of the heat, substantially as and for the purpose specified.

77,671.—APPARATUS FOR RECTIFYING SPIRITS.—Jacob Springer (assignor to himself, A. C. Flinn, and H. B. McNeal), Lancaster, Pa.

I claim the construction and arrangement of the doubling tub, with its three chambers, D E F, copper or metallic heating dome, H, or its equivalent, in combination with the pipes, 5 6 11 and 12, arranged substantially in the manner and for the purpose specified.

77,672.—LATHE REST.—Edward Stahlbrodt, Rochester, N. Y.

I claim the combination of slotted apron, B, knot, g, screw, d, plate, f, and tool carriage, A, when constructed and arranged substantially as described.

77,673.—GLAZING AND COLORING TOBACCO PIPES.—John H. Starck, Milwaukee, Wis.

I claim, 1st, The process of glazing tobacco pipes by the use of milk, gelatine, water and shellac, substantially as described.

2d, The process of glazing tobacco pipes by the use of the whites of eggs and gum shellac, substantially as described.

3d, The process of coloring tobacco pipes by the use of the dye wood solution, substantially as described.

77,674.—APPARATUS FOR PRODUCING MOTIVE POWER.—Edward Stockton and William O. St. John, Folsom, Cal.

We claim, 1st, The combination and arrangement of the springs, I I, weights, P P, and gears, J J, said gears being so connected with their respective shafts that they remain stationary, while the shafts are turned to wind up the springs and weights.

2d, The ratchet wheels, L L, for connecting the gears with the shafts, in combination with the couplings, E E, substantially as and for the purposes described.

77,675.—HARVESTER RAKE.—Ole O. Storle, North Cape, assignor to himself and Isaac N. Mason, Milwaukee, Wis.

I claim, 1st, Tilter, I, levers, M and N, rake frame, F, and pin, O, in combination, substantially as described.

2d, Rake, B, chain, C, spur wheels, D and D, and rake frame, F, and lever, G, in combination, substantially as and for the purpose described.

3d, Rake, B, tilter, I, shaft, K, rake frame, F, lever, G, levers, M and N, and pin, O, in combination, substantially as and for the purpose described.

77,676.—SHELF REST.—G. L. Swett, Leominster, Mass.

I claim the standard or shelf rest, B, when the same consists of a series of truncated cones, the larger base of each being upward, when the same is combined with and used for supporting adjustable shelves, substantially as described and for the purpose set forth.

76,677.—CATTLE GUARD FOR RAILROAD.—Hugh Tagart, Jacksontown, Ohio.

I claim the combination of the case, A, shaft, H, and weight, B, with the shaft, C, provided with a series of vertical rods, D D, when constructed substantially as described, and operated as and for the purpose specified.

77,678.—LIFTING JACK.—R. M. Thompson, Coshocton, Ohio.

I claim, 1st, The lever, C, and standard, B, in combination with stirrup iron, G, substantially as described.

2d, The base, A, standard, B, lever, C, guard piece, D, rod, E, box, F, and stirrup iron, G, the whole being combined and arranged substantially as described.

77,679.—POTATO WASHER.—S. H. Tift, Morrisville, Vt.

I claim the arrangement of the vessel, B, provided with perforations, x x, and legs, h h, with the arms, C C, agitator, D, and outside vessel, A, the several parts being constructed and operated substantially as and for the purpose specified.

77,680.—MODE OF CONSTRUCTING CARRIAGE WHEELS.—Samuel Toomey, Wilmot, Ohio.

I claim the method of constructing bent-rim carriage wheels, with the ends of the rim abutting together, and with spaces between the rim and the shoulders of the spokes, before putting on the tire, and then closing the rim and spoke shoulders together by the shrinking on of the tire, substantially as and for the purpose herein specified.

77,681.—HANDLE FOR SMOOTHING IRONS.—Robert W. Towle, Searsport, Me.

I claim the combination of the handle, a, spring, c, lever, d, connecting rod, e, uprights, g and j, with the iron, b, constructed and operating substantially as described, and for the purpose specified.

77,682.—GATE.—G. W. Tucker, Elba Township, Ill.

I claim the ball, E, socket, D, hooks, F, and roller, G, in combination with the gate, A, for the purpose substantially as herein set forth.

77,683.—PEA SHELLER.—Stephen Ustick, Philadelphia, Pa.

I claim, 1st, The combination and arrangement of the longitudinal strips, e, with the hopper, E, substantially in the manner above described, and for the purposes specified.

2d, The combination of the roller, B, with the hopper, E, when said roller has annular depressions, i, which coincide with the spaces, f, substantially as and for the purpose set forth.

77,684.—RETURN FLUE STOVEPIPE.—Henry Vatter, Lawrence, Mass.

I claim, 1st, A return flue stovepipe, constructed and arranged for operation as and for the purpose substantially as described.

2d, The damper, C, constructed as described, in combination with the partition, A, and the pipe, for the purpose and substantially as described.

77,685.—ACID POWDER AS A SUBSTITUTE FOR YEAST.—W. J. Walker, Brooklyn, N. Y.

I claim, 1st, Producing a powder, which is an admirable substitute for yeast, by combining with a dry farinaceous substance a certain quantity of hydrochloric (commercial muriatic) acid, when the same is prepared substantially as described and for the purpose specified.

2d, Mixing with a powder, composed of a dry farinaceous substance and muriatic acid, a certain quantity of argal, cream of tartar, or other like acid powder, substantially as is described, and for the purpose specified.

3d, The mixing the powder with an alkaline carbonate, in such proportions with flour or meal, as to make a self-raising bour or meal, for the purpose of bread, pastry, etc., substantially as described.

77,686.—HITCHING POST.—Bartholomew Walther and Peter Walther, New York city.

We claim a hollow hitching post, A, covered by a perforated metallic cap, and provided with inclined water-escape channels at the bottom of its cavity, B, substantially as and for the purpose deterbed.

77,687.—SHAFT ATTACHMENT TO WAGONS.—Walter Ward, Mount Holly, N. J.

I claim a carriage shaft, or thill connection or coupling, made of the pieces, A B C D, interlocked or breaking joint with each other, and firmly united, so that the shaft or thills cannot become detached, substantially as herein described and represented.

77,688.—COOKING STOVE.—E. D. Weston, Taunton, Mass.

I claim the arrrugement of the air heating flue, G, the fire place, A, the smoke flue, K, the oven, E, and the air flue or flues, M, provided with one or more openings, I, to lead air into the oven, as set forth.

Also, the arrangement of one or more openings, J, with the flue, G, the fire place, A, the oven, D, one or more openings, I, the flue or flues, M, and the air flue, G.

Also, the arrangement of the air flue, G, and its induction openings, H, so as to extend over and in front of the front plate of the fireplace, as represented.

Also, the arrangement of the air flues, G M, the oven, E, the fireplace, A, the smoke flue, K, and flues, F, underneath and in rear of the oven, the oven being provided with the air induction and eduction openings, I J, as set forth.

77,689.—DEVICE FOR PREVENTING AND CURING CRIB BITING IN HORSES.—George H. White, Huntington, N. Y

I claim the device herein shown, attached to the manger or any place where the horse may be fastened, and to operate by the motion caused by the biting of the horse, substantially as and for the purpose herein shown.

77,690.—CHECK VALVE.—Peter White, St. Louis, Mo. Antedated April 22, 1868.

I claim, 1st, The combination of the shaft, K, thumb screw, I, shaft, N, valve, A, valve seat, B, socket, P, and cylinder, E, substantially as herein set forth.

2d, The arrangement of the valve, A, and seat, B, as herein set forth and described.

77,691.—HARVESTER.—W. N. Whiteley, Springfield, Ohio.

I claim, 1st, The shell main frame, A, cast in a single piece, with a recess fitted to receive the gearing, and another recess, L, to serve as a receptacle for tools, in connection with the cover or platform, M, likewise cast in a single piece, so as to enclose the gearing and cover the tool box with the same piece, substantially as set forth.

2d, The drag bar, R, constructed and attached to the frame and shoe in the manner described, in connection with the brace, Y, and the standard, Z, and coupling arm, U, as set forth.

3d, The lever, W, attached and operating as set forth.

4th, The drop latch, l', constructed and located as described.

77,692.—DUMPING SLED.—E. R. Whitny, Plattsburg, N. Y.

I claim, 1st, The sliding bars, B, when used in combination with a cord, F, for the purpose of elevating the front part of a body, D, of a sled or wagon, and operated as and for the purpose specified.

2d, Operating a dumping body, D, by means of the same team which draws the same, without detaching and reattaching said team, substantially as and for the purpose specified.

3d, The arrangement of the posts, C, pulleys, h and j, with the cords, F, when operated by means of sliding bars, B, as and for the purpose herein set forth.

77,693.—SHEEP SHEARING TABLE.—George Wiggins, (assignor to himself, Charles Herrington, and Hiram Maxfield), Ortonville, Mich.

I claim the sliding bar, C, in conjunction with the slots, D, grooves, F, the sliding fastening blocks, G' and G'', the strap, I, shaft, J, crank, K, ratchet, L, and pawl, M, when arranged and operating substantially as and for the purposes specified.

77,694.—PUMP.—Julius Wilcke, Newark, N. J.

I claim, 1st, The combination, with the pump barrel, A, having within it a reciprocating piston and valve cylinder or chamber, C, connected with the pump barrel by end passage, a a', of a loose or independent valve, F, constructed with an intermediate diaphragm, e, and separate suction and delivery ports controlling separate suction and delivery ports or passages in the valve chamber, as the valve is shot by the pressure of the fluid at the commencement of the return stroke of the piston, substantially as specified.

2d, The intermittently reciprocating valve, F, with its dividing diaphragm, e, and side inlets and outlets, controlling suction and delivery ports in the valve cylinder by the pressure of the fluid in the discharge stroke of the piston, as specified, when said valve is of tubular or cylindrical form, and made with splits or divisions to give to it an elastic character, essentially as shown and described.

77,695.—MODE OF HANGING SIGNS OR BANNERS.—Simon Wing, Boston, assignor to himself and Eli F. Southward, East Boston, Mass.

I claim making the ground of signs or banners of an open work or network of twine, thread, silk, cord, wire, or other material that will allow the free passage of air, substantially in the manner and for the purpose set forth.

77,696.—CORN HARVESTER.—James F. Winchell, Springfield, Ohio.

I claim, 1st, The swinging lever or rest, I, in combination with the cam, K, or its equivalent, for imparting to it the movements, substantially as described.

2d, The corrugated roller, G, arranged in rear of the cutters, for delivering the stalks to the platform, substantially as set forth.

3d, The combination of the roller, G, and the platform, H, substantially as set forth.

4th, Providing the groove, a', in the cam, K, with the projection, e'', for holding the lever, I, in position, until operated by driver, as set forth.

5th, The combination of the lever, I, connected by the arm, a, to rock shaft, J, with the weighted arm, m, or its equivalent, for automatically returning the lever to its position, substantially as set forth.

77,697.—CHAIR AND LOUNGE.—Torwald Winter, Boston, Mass.

I claim the combination and arrangement of the rotary chair seat and back and the lounge frame, substantially as shown and described.

Also, combining with a rotary chair seat, rollers, k, supporting the seat upon a bed piece, h, and enabling the chair to be rotated upon said bed piece substantially as described.

77,698.—HORSE COLLAR.—Christian Wolf, Danville, Ill.

I claim the arrangement of a wooden collar, A, having the straps or plates, B F and H, rim guide, E, and holdback rings secured to it, as described, with the ratchet bar, K, guide, I, pawl, j, and spring, h, all the parts being constructed and used as and for the purpose specified.

77,699.—VEGETABLE WASHER.—U. A. Woodbury, Morrisville, Vt.

I claim the combination of the slotted bucket, A E, with the revolving frame, a b b d, as described, which can be used in any water vessel of suitable size, for the purposes specified.

77,700.—SPUR WHEEL.—C. F. Woodruff, Newbern, Tenn.

I claim, 1st, The rim of a spur wheel, as constructed and cast in sectional segments, A A', united and bound together by the double dovetail shanks, a a, of the cogs, B B, in the manner herein described.

2d, The double dovetail shanks, a a, of the cogs, B B, in combination with the sectional segments, A A', constructed, arranged, and operating substantially as and for the purpose described.

3d, The combination of the arms, C C, the shanks, a a the pins, b b, and the sectional segment rim, constructed, arranged, and operating substantially as and for the purpose described.

77,701.—HORSE COLLAR.—William Youngblood, New York city.

I claim, as a new article of manufacture, an india-rubber horse collar of tubular form, when said collar is divided longitudinally by the thick india-rubber partition, a forming an increased bearing surface for the hames, as herein shown and described.

77,702.—CULINARY APPARATUS.—Heinrich A. Zoff, Milwaukee, Wis.

I claim the tight bottom or shell, D, containing a recess, F, to catch the condensed steam, and the raw, ill-tasting vegetable water, and prevent this liquid from falling into the water below, with cover, G, and strainer, H, substantially as and for the purpose described.

77,703.—PORTABLE PIPE ORGAN.—A. B. Felgemaker and S. L. Derrick, Buffalo, N. Y.

We claim a compound wind chest, D, having two or more divisions, e1 e2, each division having distinct air passages to supply a distinct set, row, or rows, of pipes, for the purpose and substantially as described.

77,704.—MEASURING AND LAYING OUT GARMENTS.—Herman Mengel, Philadelphia, Pa.

I claim, in combination with an instrument having laterally and vertically-adjustable scales, B B' C D E, the scales, n, vertically adjustable in the instrument, for laying out, on cloth or other fabric, measures for upper garments, operating substantially as described.

77,705.—CEMENT FOR ROOFING, ARTIFICIAL STONE, COATING Iron, Wood, etc.—Antonio Pelletier, Washington, D. C.

I claim, 1st, The chlorides of the alkaline earths, true earths, and heavy metals, in combination with the corresponding oxides of these, for the purpose of producing insoluble oxichloride compounds, substantially as described and set forth.

2d, In combination with the oxides and chlorides, organic substances, such as vegetable and animal fiber, glue, hair, shoddy, substantially as described, and set forth.

3d, In combination with oxichlorides and organic substances, finely divided granulated fibrous or pulverized mineral ingredients of any kind, substantially as set forth.

4th, The above mentioned composition, with or without the incorporation or external coating with silicate of soda, either by itself, or ground together with mineral colors, substantially as described and set forth.

5th, In combination with the cement-composition, for preventing its too rapid solidification, solutions of starch, gum, dextrine, sugar, gelatine, borax, or sulphate, substantially as described and set forth.

77,706.—CAR ELEVATOR.—Henry Arden, Cincinnati, Ohio.

I claim, 1st, The combination of the frame, A, shafts, C, and arms, G, with the links, e, and rod, I, substantially as and for the purpose set forth.

2d, The shafts, C, and pulleys, D, in combination with the ropes or chains, E, and beams, F, or their equivalents, all as shown and described.

3d, The combination of the beams, F, and lifting hooks, b, or their equivalents, all as shown and described.

4th, The combination of the arms, G, shafts, C, and pulleys, D, all as shown and described and for the purpose specified.

5th, The combination of the shafts, C, pulleys, D, and ropes or chains, E, all as shown and described and for the purpose specified.

REISSUES.

2,923.—DITCHING MACHINE.—David Whisler, Union Township, Ohio. Dated Dec. 31, 1867.

I claim, 1st, The adjustable feature 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, screw, h, and spring, t, substantially as set forth.

6th, The 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.

2,924.—HEAD BLOCK FOR SAW MILL.—Simon F. Stanton (assignee of J. M. Stanton and S. F. Stanton), Manchester, N. H. Dated May 1, 1866.

I claim the combination arrangement of the pinions, D D D, and double sets of racks, b b b c c c, for moving the uprights by the turning of the shaft, E, substantially as herein set forth.

Also, the arrangement of the shaft, E, in sections, coupled together by clutches, F F, so as to be connected or disconnected at pleasure, constructed and operating substantially as and for the purpose herein specified.

Also, the notched guide, R, in combination with the lever, Q, which actuates intermediately the pawl, P, ratchet wheel, O, shaft, E, pinions, D D D, and racks, b b b, or the equivalent thereof, for moving the uprights different and determinate distances, constructed and operating substantially as herein specified.

Also, the clamp hooks or dogs, M M M, arranged and operated substantially as and for the purpose herein set forth.

DESIGNS.

3,009.—STAKE TO MARK GRAVES.—Gustavus Arnd, New York city.

3,010.—TRADE MARK.—John Fahnestock, Astoria, N. Y., Assignor to B. E. Barker, Indianapolis, Ind.

3,011.—STATUETTE OF W. E. CHANNING.—T. R. Gould, Boston, Mass.

3,012.—MEDALLION HEAD OF GENERAL GRANT.—W. M. Marshall, Philadelphia, Pa.

3,013.—WEATHER GLASS.—C. F. Martine, Boston, Mass.

2,014.—TINMAN'S STOVE.—D. W. Pepper (assignor to N. G. Taylor & Co.), Philadelphia, Pa.

3,015.—FIRE CYLINDER CAP FOR A STOVE.—J. R. Rose and E. L. Caley (assignors to Cox, Whiteman & Cox), Philadelphia, Pa. Antedated April 7, 1868.

3,016.—BOX.—W. H. Savournin, Philadelphia, Pa.

3,017.—TRADE MARK.—Carl Schultz and Thomas Walker, New York city.

3,018.—CHURN BODY.—A. D. Smith, Grafton, Ohio.

EXTENSIONS.

TURNKEY.—Melvin Jinks, Dansville, N. Y. Letters Patent No. 10,312. Dated Dec. 13, 1853.

I claim the adjustable claw, E, constructed and arranged substantially as described, in combination with the claw, b, and the rolling fulcrum, having a limited motion.

HINGE FOR INKSTAND COVERS.—Joseph Nock, Philadelphia, Pa. Letters Patent No. 10,310. Dated Dec. 13, 1853.

I claim the application of the stamped round past, and the solid part, or the moving lid or cover, filled together as a hinge, which forms a rounded smooth turned face, and the manner in which the pin is connected with both parts, as herein described, using for that purpose the aforesaid two pieces to form a regular curvilinear or round-turned hinge, made of any materials which will produce the intended effect.

PROCESS OF VULCANIZING CAOUTCHOUC COMPOUNDS.—L. Otto P. Meyer, Newton, Conn. Letters Patent No. 10,339. Dated December 20, 1853.

I claim the producing of smooth and glossy surfaces upon the hard compounds of caoutchouc and other vulcanizable gums, by means of the use of oil, or other equivalent substance, applied to the surface of the prepared gum, and between the gum and the plates of metal, or the molds, substantially as herein described.

CLEANSING HAIR AND FEATHERS FROM INSECTS, ETC.—William Wisdom, Brooklyn, N. Y. Letters Patent No. 10,347. Dated Dec. 20, 1853.

I claim purifying hair and feathers by destroying all noxious insects or infectious matter contained therein, by subjecting the same to a vapor bath of chlorine gas, after the material has been cleansed by a bath of sal soda, in the manner and for the purpose specified.

MACHINE FOR HULLING AND SCOURING COFFEE.—Robert P. Walker, New York city.—Letters Patent No. 10,328. Dated Dec. 20, 1853.

I claim the combination of the springing rubber flaps, or scourers and polishers, e e e, with the angularly-set hullers or beaters, c d, the whole being constructed and arranged in any equivalent manner to that herein described, and operating as set forth.

SHUTTER HINGE.—Harvey Lull, Hoboken, N. J.—Letters Patent No. 10,477. Dated Jan. 31, 1854. Antedated Jan. 2, 1854.

I claim the so forming of a self-locking shutter hinge, cast in two pieces, as that the blind or shutter hung thereon may swing open or shut on a horizontal plane, and lock when opened to its limit, and so that, also, when locked open, the strain shall be taken off from the spindle and thrown on to cam arms, and thus effectually relieve the spindle from the weight or strain of the shutter, substantially as described.

HOT-AIR REGISTER.—Edward A. Tuttle Brooklyn, N. Y. Letters Patent No. 10,371. Dated Jan. 3, 1854. Reissue No. 1,412. Dated Feb. 17, 1863.

I claim so combining the connecting rod, or arrangement, which transmits motion to the fans with the thumb piece, or attachment, by which it is actuated, and with the fans themselves, that it shall rest and ride upon anti-friction bearings, o o, formed on the fans, substantially as above described.

GUIDE FOR SEWING ON BINDING.—William H. Sweet, Foxborough, Mass., administrator of Henry L. Sweet, deceased.—Letters Patent No. 10,344. Dated Dec. 20, 1853.

I claim the doubling-guide as not only made with a flat mouth, or one capable of receiving the ribbon, tape, or binding in a flattened state, but with a bent channel or sides, such as shall gradually bend or double it, and discharge it at the other end in a doubled state, ready to be applied to any article conveniently placed to receive it, and leave it sewed therein, as stated.

FLOOR PLATES OF MALT KILNS.—Mathew Stewart, Philadelphia, Pa.—Letters Patent No. 10,370. Dated Jan. 3, 1854.

I claim, 1st, The characteristic mode in which I construct the plates with downward edges at right angles with the surface of the plate, substantially as and for the purpose herein described and illustrated.

2d, I claim the bearing and combining block, with the peculiar arrangement of the slots or grooves, or its equivalent, substantially and for the purpose as herein described.

3d, I claim the combination of the plates with the bearing and combining blocks, or their equivalents, and the peculiar manner of securing the plates and blocks down to the wrought iron bars by means of the wire holes in the vertical edges of the plates, or their equivalents, substantially and for the purpose as herein described and illustrated.

OPERATING CUT-OFF VALVES OF STEAM ENGINES.—William Wright, New York city.—Letters Patent No. 10,398. Dated Jan. 3, 1854.

I claim the employment of a rotating eccentric hub, on which the toes, or their equivalents, of the lifters rest when the valves are closed, substantially as specified, when this is combined with a cam connected therewith, and which turns eccentrically thereon, for the purpose of opening and closing the valve, and regulating the period of closing the same, substantially as specified.

And I also claim combining with the said hub and cam a slide within them, and acting on an oblique groove within the cam, and a straight slot in the hub, substantially as specified, to determine the period of closing the valve, while the period of opening remains the same as specified, and this I claim whether the said slide be operated by a governor or by other means.

MORTISING MACHINE.—H. B. Smith, Smithville, N. J.—Letters Patent No. 10,422. Dated Jan. 10, 1854.

I claim the afore-described combination for reversing the chisel by power, applied by friction, with band or otherwise, and stops, operated so as to stop the chisel when reversed, in the manner essentially as set forth.

ARRANGEMENT FOR CUTTING SCREWS IN LATHES.—Joseph Nason, New York city.—Letters Patent No. 10,383. Dated January 3, 1854.

I claim, 1st, The mode of constructing and combining the stud, the tube, and the guide screw, by which guide screws of the various patterns used in screw cutting may be put on or taken off expeditiously.

2d, The mode of constructing the tool bearer generally, particularly as regards placing the slide rest behind the work, whereby the cutting tool is brought into such relative position with the shaft and the mandrel, that the operation of raising the tool bearer from the rail removes the tool from the work.

3d, The tool lifter, constructed substantially as described, and employed for the purposes and in the manner herein specified.

4th, The combination of the guide screw, the threaded block, and the tool bearer, with the shaft, substantially as set forth, by which (1) the requisite traversing motion is imparted to the cutting tool; (2) the operation of releasing the block from the guide screw, and removing the tool from the work are simultaneously performed; and (3) the tool bearer may be turned back out of the way when not in use.

GRAIN HARVESTER.—Aaron Palmer, Brockport, N. Y., and Stephen G. Williams, Janesville, Wis.—Letters Patent No. 10,459. Dated Jan. 24, 1854.

We claim the method of transferring motion to the rake on the platform from the driving wheel, by means of the double curved rack and pinion on the axle of the driving wheel, the iron arm, c, latch, p, and spring, m, as herein described.

Also, the method of hanging the reel so as to dispense with any post or reel bearer next to the standing grain, as herein described, thereby preventing the grain from getting caught and being held fast between the divider and reel supporter.

AIR-HEATING FURNACE.—C. R. Harvey, New York city. Letters Patent No. 10,457. Dated Jan. 24, 1854.

I claim constructing the bonnet or top of the fire chamber with a depression at the center, into which the smoke or exit-pipe enters, so that the heat is equalized all around, and the expansion and contraction are made uniform, as above specified.

ROLLER FOR SCARFING THE EDGES OF SKELPS FOR LAP-Welded Tubes.—James McCarty, Reading, Pa.—Letters Patent No. 10,478. Dated Jan. 31, 1854.

I claim a pair of rollers, constructed, arranged, and adjusted substantially as herein described, so as to bevel the opposite edges of skelp plates of different widths on opposite sides of the same.

MACHINE FOR CLEANING AND ASSORTING BRISTLES.—Geo. E. Burt, Harvard, Mass.—Letters Patent No. 10,498. Dated February 7, 1854.

I claim the combination of machinery for combing or straightening the bristles, and machinery for separating or assorting them, as specified.

I claim the combination of the two movable combs or rakes, T U, and the two lifter wheels, G G, and their carrying endless belts, E and L F and M, so arranged as above described, the whole being for the purpose of first holding the mass of the bristles by one part or portion of it, and lifting and combing the remainder of it, and subsequently seizing and lifting it by such combed part or portion, and combing the part previously seized, all as specified.

And, in combination with the machinery for combining or straightening the bristles, and machinery for assorting or separating them, I claim the endless guide belt, l', the spring board, p', and rapping apparatus or hammer, r', as applied and made to operate substantially in manner as specified.

I claim the combination and arrangement of the two endless brush belts, V W, and two series of draft rollers, and their two sets of endless bands, as made to operate together and assort the bristles, substantially as hereinbefore specified.

I claim the combination of the combs, u2 v2, and their grooves, t2 t2, etc., with the delivery rollers, so as to operate substantially in the manner and for the purpose specified.

MAKING THICK PAPER.—Samuel G. Levis, Kellyville, Pa.—Letters Patent No 10,519. Dated Feb. 14, 1854. Reissue No. 2,789. Dated Oct. 22, 1867.

I claim, 1st, Passing or carrying a sheet of paper pulp through or between the press rolls, and expressing the water therefrom between two endless felts so arranged that the water may pass through the felts and run off freely in front of the rolls.

2d, Running or operating two or more forming cylinders in connection with the press rolls, by means of or in combination with two endless felts, so arranged that the water passes through the felts and runs off at the end of the rolls.

3d, The combination of the two forming cylinders, C and D, the two endless felts, E and G, and the two squeeze rollers, F F, arranged and operating substantially as described.

USE OF FUSIBLE DISKS IN STEAM BOILERS.—Wm. Burnett, San Francisco, Cal., and John Absterdam, New York city. Letters Patent No. 10,573. Dated Feb. 28, 1854.

We claim placing in a pipe, which is connected with a steam boiler, a fusible plug or disk, said plug or disk being so far removed from said boiler, but so connected with the water therein, that when the water is sufficiently high, the plug or disk will be in contact, or so surrounded with water cooler than that in the boiler as to prevent it from being fused, but when the water in the boiler shall fall below a proper height, the steam will enter and come in contact with said plug, or so surround it as to cause it to melt, the same being for the purpose specified.

VULCANIZING INDIA-RUBBER AND OTHER GUMS.—L. Otto P. Meyer, Newton, Conn.—Letters Patent No. 10,586. Dated February 28, 1854.

I claim the heating or curing of the material commonly known as the hard compound of vulcanized caoutchouc, or other vulcanizable gums, by means of the immersion of the material in or under water, or other suitable liquid during the process of heating or curing, substantially as herein described.

COTTON-PICKER CYLINDERS.—James Pitts, Clinton, Mass.—Letters Patent No. 10,578. Dated Feb. 28, 1854.

I claim the constructing the screw so that the periphery of the metal intervening between any two immediately adjacent orifices shall be of a length equal to or greater than that of the staple of cotton or other fibrous material to be picked, in order that the fiber shall not lap around the said periphery and become connected, attached, or tied by its ends, as stated.

I also claim the improvement of constructing the cylinder screw of a hollow perforated metal cylinder, without arms or ribs, and with open hollow cylindric journals at its two ends, as stated, in order that the cotton may be drawn out of one journal by the suction draft, and any obstruction removed by a person's hand and arm introduced through the other journal, as specified.

DERRICK.—J. B. Holmes, New York city.—Letters Patent No. 10,544. Dated Feb. 21, 1854.

I claim, 1st, The combined arrangement of the collar upon the mast, the revolving platform supported upon it and clamped below it, and the tension rods from said platform to the revolving masthead cap, in the manner and for the purposes described.

2d, Pivoting the heel of the derrick boom upon the revolving platform in the locality, substantially such as is herein represented and described, that is, upon that portion of the platform which is beyond the center of the platform when measuring from the point of suspension of the weight.

STRAW CUTTER.—Warren Gale, Peeksville, N. Y.—Letters Patent No. 10,592. Dated March 7, 1854. Reissue No. 2,393. Dated June 26, 1866.

I claim, 1st, The fixed pivot, F, on which the moving knife works, provided with a flange for fastening to the cutter box, and made adjustable thereon by means of slots and bolts, or their equivalent, substantially as and for the purpose herein specified.

2d, I also claim the arrangement of the adjustable gage plate, G, in front of the fixed knife, in proportion to the increased distance at which it is adjusted away from the knife, to give a longer cut, and *vice versa*, substantially as herein set forth.

SUSPENDING EAVES TROUGHS.—C. D. Woodruff, Toledo, O.—Letters Patent No. 10,606. Dated March 7, 1854.

I claim the mode of suspending and fastening eaves troughs, as herein described.

MACHINE FOR SPLITTING RATTANS.—A. M. Sawyer, Athol, Mass.—Letters Patent No. 10,614. Dated March 7, 1854.

I claim the employment of a tubular spurred cutter, or its equivalent, in combination with a guide for holding and guiding the stick thereto, substantially as hereinbefore described.

HANGING OF THE GRIPING JAW OF SPIKE MACHINES IN Weighted Levers.—J. H. Sweet, Pittsburgh, Pa.—Letters Patent No. 10,645. Dated March 14, 1854.

I claim the so hanging of the griping jaw in weighted levers, or their equivalents, as that when two spikes, or a spike and a blank, come in between the griping jaws at one time, the said jaw may rise and yield to the excess of metal between the dies, and prevent the breaking of any of the parts, substantially as herein described.

MACHINE FOR MAKING SHOVEL HANDLES.—L. L. Bartlett. Bangor, Me., administratrix of Russell D. Bartlett, deceased. Letters Patent No. 10,631. Dated March 14, 1854.

I claim the combination and arrangement of the bed, M, the rotary holder, O, one or more vertical movable cutters, V W H', and one or more stationary cutters, I' K', as made to operate together and from the D or head part of the shovel handle, substantially as specified.

And I claim the combination of the curved knife knife, o, and the arc knife p, so applied together as not only to allow them to be separated for the purpose of being ground, but to enable them to cut out the opening of the shovel handle, as specified.

And I claim the combination, applied to the shaft of the rotary holder and gear wheel' A', for the purpose of operating the holder, as specified, the said combination, consisting of the cam blocks, C' M', the arm, L', the spring bolt N', its cam, P', and the two studs, e' and h', the whole being constructed and made to operate together, substantially as specified.

HARVESTER.—W. H. Seymour, Brockport, N. Y.—Letters Patent No. 10,707. Dated March 28, 1854.

I claim the combination of the shaft, E', for rotating the pinion, the shaft, I, for turning and carrying the rake, and connecting mechanism, constructed and arranged as described, whereby the rake is turned up and down and firmly held in either position in a simple and convenient manner, without producing an undue strain upon any part of the driving gear.

I also claim the adjustment of the rake at varying nights from the platform, in its elevated and depressed position, by means of the device herein described or the equivalent thereof.

SELF-FASTENING SHUTTER HINGE.—Ambrose Nicholson, Poland, N. Y.—Letters Patent No. 10,673. Dated March 21, 1854.

I claim the eccentric extension, a', and recess, E, of the plate, A, in combination with the pin, c', of the plate, C, by which, in connection with the elongated eye, b', and cylindric pin, d', I am enabled to move the shutter and catch it or release it, without giving it any upward or downward motion, as herein set forth.

MACHINE FOR CUTTING VENEERS.—Carmi Hart, Bridgeport, Conn.—Letters Patent No. 10,739. Dated April 4, 1854.

I claim, 1st, Cutting veneers, or other thin stuff, by giving to the shaving knife a rectilinear movement toward and through the log, at the same time that a rectilinear movement is given to the log either traversely or diagonally to the movement of the knife, so as to produce a long continuous drawing cut, as described, whether the said movements of the knife and log are produced by the precise arrangement of mechanical means described or any other substantially the same.

2d, Making the ways, N N, upon which the log carriage moves, adjustable, as described, relatively to the ways in which the knife and cutting table move, for the purpose of giving more or less of a drawing action to the cut, as the nature of the stuff to be operated upon may require.

3d, Attaching all the necessary appendages for holding the log and feeding it to the knife to a turn table, L, capable of being adjusted circularly within the main frame or part, K, of the log carriage, as described, for the purpose of presenting the grain of the stuff at any desired angle to the edge of the knife or direction of the cut.

4th, Suspending the log or block above the knife, by griping it with clamps Y Y, which form part of a suspending head which supports the weight of said log or block, and prevents it dragging over the edge of the knife during the backward movement of the latter, and only allows it to be lowered under the control of suitable feeding mechanism.

5th, Setting the lever handle, x, which holds the clamps upon the log, free from the notched bar, 12, by which it is secured for that purpose by means of the bar, 32, and the inclined block, 35, of which the former is attached to the suspending head and the latter to some fixed point on the turn table of the log carriage, and the former is made to slide, by coming at a proper time in contact with the latter, in such a way as to raise the lever handle, as herein described.

6th, Making the slots in the clamps which receive the bar, m, and screw, n, of such length, that after the clamps are arrested by coming in contact with the proper part of the log carriage or turn table, the motion of the follower and the other parts of the feed motion may continue till it is desirable to stop them, as herein described.

7th, The mechanism, herein described, for rendering the pawl of the feed motion imperative, and thereby stopping the descent of the suspending head and the feed of the log at the proper time, to wit, the bar, 24, pin, 26, spring, 27, rod, 28, arm, 29, shaft, 30, feather, 31, and angle piece, 32, the whole being combined and applied substantially as herein set forth.

SAFETY VALVE.—Henry Waterman, Hudson, N. Y. Letters Patent No. 10,343. Dated November 15, 1853. Reissue No. 2,675. Dated July 9, 1867.

I claim, 1st, The piston, F, attached to the weighted end of the valve lever within the cylinder, G, and immersed in the liquid in the cylinder, combined and operating in the manner and for the purposes herein described.

2d, I also claim the concentric rim or ledge, l l, and the overhanging part of valve, k k, constructed, combined, and operating in the manner and for the purpose herein set forth.

TREATING CAOUTCHOUC AND OTHER VULCANIZABLE GUMS.—L. Otto P. Meyer, Newton, Conn. Letters Patent No. 10,741, dated April 4, 1854. Reissue No. 797. Dated August 16, 1859.

I claim the mode of operation or mode of procedure, substantially such as herein described, which said mode of operation consists in the employment of a pliable or flexible envelope, substantially such as herein described, or the equivalent thereof, applied by pressure to the hard compound of vulcanizable gum, while in the green or plastic state, so as to insure the contact of such covering with the surface of the compound, and while thus covered or protected subjecting it to the vulcanizing heat, and when vulcanized stripping off such covering, the whole process being substantially such as specified.

ENEMA SYRINGES.—Morris Mattson, New York, N. Y. Letters Patent No. 10,742. Dated April 4, 1854.

I claim, 1st, The combination of the thumb or finger rest, d, with the barrel and piston, and for the purpose substantially as specified.

2d, I claim the upper ring valve seat, i, and the perforated tube, k, in combination with the disk or valve, h, and its seat and chamber, the same being made to operate substantially as described.

PROCESSES FOR TREATING INDIA RUBBER.—Ellsworth D. S. Goodyear, North Haven, Conn. Letters Patent No. 10,689. Dated March 28, 1854.

I claim the introduction of water or any other liquid into the interior of articles which require expansive force for their perfect formation to the interior surface of molds, said liquid to be converted into steam, substantially as described and for the purposes specified.

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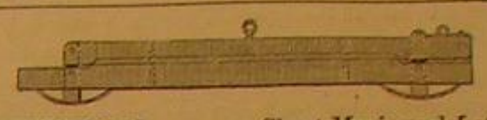

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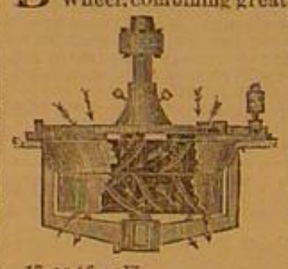

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A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XVIII.—No. 22. [NEW SERIES.]

NEW YORK, MAY 30, 1868.

$3 per Annum [IN ADVANCE.]

Improvement in Feeder for Wool Breakers.

This machine supplies what has long been a great want of the woolen trade, and will doubtless be received as such by those interested. It feeds the wool on to the first breaker card evenly, thus saving a large amount of labor and insuring uniformity of work, which has been impossible by hand feeding. In the accompanying engravings, A is a box into which the wool is loosely thrown, B is an ordinary slat apron, carrying the wool forward toward a vertical apron, C, which is furnished with spikes or forks, which continually lift the wool from the apron, B, to the shorter apron, F, which carries it forward to the feed rolls, H. G is a picker roll, which performs the double function of preventing any large locks of wool from passing on to the apron, F, unopened, and also of keeping the fan, D, clear of wool. I is a movable plate of sheet iron, which with the apron, F, forms a throat for the reception of the wool, and the size of this throat can be enlarged or reduced by raising or lowering the iron plate, I, which is readily done. The operation of the machine is briefly as follows: The wool thrown into the box is carried forward and upward by the two aprons, B and C, to the short apron, F, and is delivered in larger quantities than is required by the card. At this point it is blown by the fan, D, into the "throat," which is thus always kept full, and the surplus is returned to the box, as shown in Fig. 2. It will be manifest to all who examine the subject that the size of the throat will regulate the quantity of wool delivered to the card, which has hitherto been entirely controlled by the speed of the feed rolls. This can still be governed in the same way if preferred, so that any weight of roping can be produced.

Fig. 1.

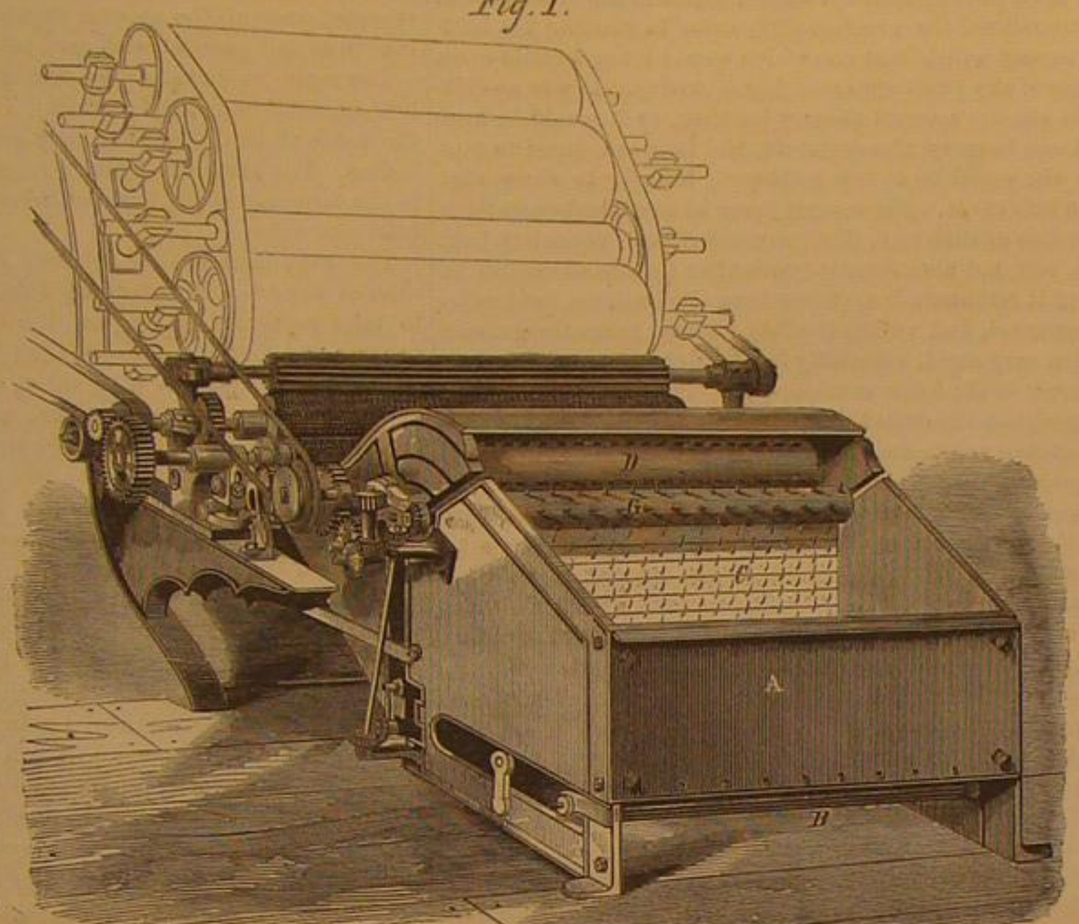
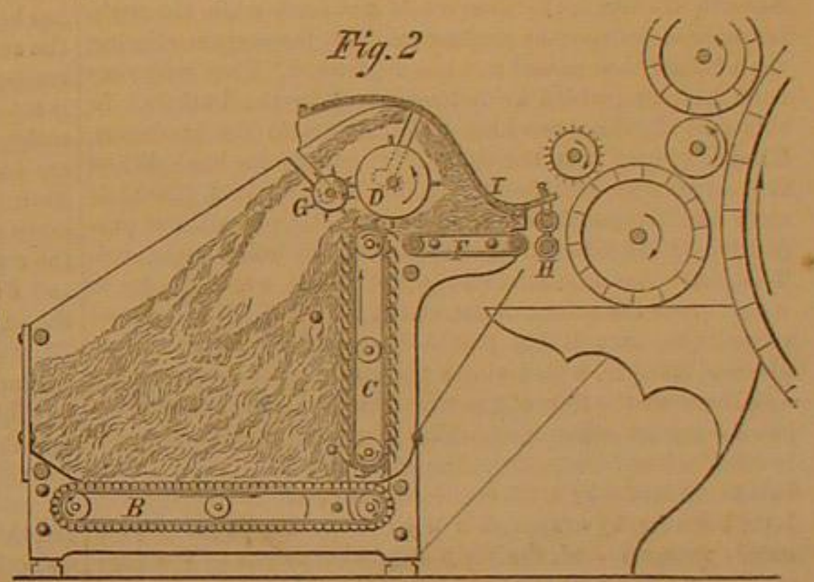


Fig. 2.



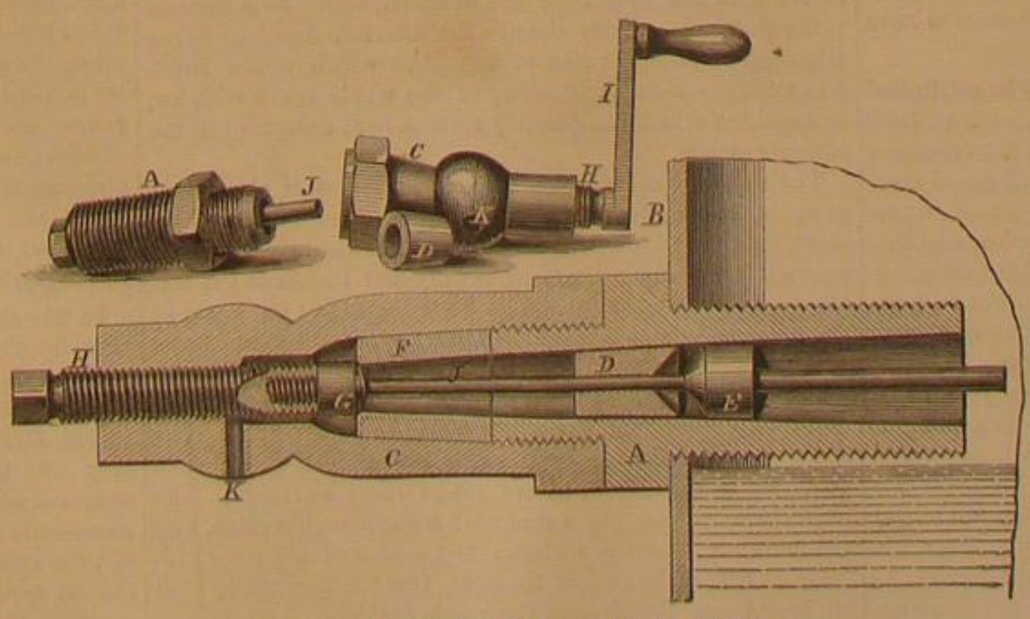
THE BOLETTE FIRST BREAKER FEEDING MACHINE.

This machine was patented August 23, 1864, and is offered for sale by Harwood & Quincy, 25 Bromfield street, Boston, Mass., who will supply all information regarding it.

Improvement in Steam Boiler Gage Cocks.

Sometimes the gage cocks of a boiler become worn and leaky, and it is necessary to re-seat their valves. This can be done only when the steam is down. The object of the peculiar construction of the cock shown in the accompanying engravings is to allow this necessary work to be done at any time, when there is a full head of steam on as well as when the boiler is cold. This is effected by forming the cock in two parts, both of which are furnished with valves, one opening outward and the other inward.

The part, A, has a threaded stem with nut formed on it for seating it in the boiler head, B. The outer end of A is of reduced size and also threaded to receive the part, C, the shoulders of A and C coming together when the parts are united. The bore of A is slightly conical and receives a valve seat, D, in which fits the inward opening valve, E. The part, C, has also a valve seat, F, in the outer end of which is seated the valve, G, operated by the screw, H, and handle, I, in the usual manner. The valve, G, is seated in the screw, H, by means of a thread, as seen. The inner valve, E, is provided with a stem, J, of such a length that its end bears against the inner surface of the valve, G, except when the latter is moved out much further than is necessary to try the steam or water, or the part, C, is wholly removed from the fixed portion, A. In such a case the pressure of the steam closes the valve, E, preventing the escape of steam or water from the boiler. This allows the removal of the part, C, for repairs or re-seating the valve, when the remaining valve, E, can be operated as a try cock by pressing on its projecting stem, J. In ordinary use, when the parts are joined, this stem prevents the closing of the valve, E, and allows the steam or water to escape through the opening, K.



THOMAS' BISECTED GAGE COCK.

The advantages of this gage are sufficiently apparent without further description. We consider it to be a valuable improvement.

Patented January 21, 1868, by William G. Thomas, who may be addressed relative thereto at Centralia, Pa.

GAS MEASUREMENT.

In the entire range of articles in ordinary use, there is probably not one that is measured with greater average accuracy than illuminating gas, and probably there is not another, in the accurate measurement of which the public at large have so little confidence. There are many reasons for the origin of such doubts, most of which must be charged to the consumers, some of them to the gas-manufacturing companies, and the balance to the defective method of selling gas, at a given rate per thousand cubic feet, as is generally the case, without regard to quality.

Most people who use gas do not take any pains to inform themselves in regard to the manner of its measurement, do not understand even the fundamental principles of a gas meter, and have not the least idea of its construction. Some might, no doubt, be found who can not even read the ordinary dial correctly.

The effect of such ignorance is suspicion and doubt. In vain may meter inspectors test, and meter manufacturers labor to convince the public of the accuracy of gas meters while it exists. The dissatisfaction engendered by want of information is increased by the irregularity of amounts consumed in different periods of time without (to the consumer) any apparent cause. Were the bills constant in amount, or only increased as the nights lengthen, to be again diminished as the demand for artificial light decreases with the approach of summer, many would be content to believe in the justness of the measurement without further question; but such is not the universal experience. A merchant, perhaps, having paid a bill for gas used in his warehouse in January, is surprised and indignant to find that it is as large, or nearly as large, for April. An individual complains that the gas bill last presented to him is as large as the one for the previous month when "he had sickness in his family and gas was kept burning all night for a week." Indeed the opinion of many sufficiently intelligent to judge fairly about ordinary business transactions, is that gas meters are a humbug and a blind, used only to give a show of fairness in assessments, and that gas bills, like doctor's bills, are made out upon the principle of about how much, from the apparent character of their residences, and other indications of wealth or poverty, people will submit to without protest. These opinions are erroneous, as we shall proceed to show: the fact being, that the errors of gas meters, when errors exist, are mostly in favor of the consumer. In order to corroborate our statement, it will be necessary to explain the construction and operation of gas meters. In doing this we shall, as much as possible, avoid technical terms, and shall use the simplest illustrations, our object being not to enlighten those who are already informed upon the subject, but to show, in the plainest manner, to those who have not correct ideas of gas meters, the principles upon which they are constructed.

Gas meters are of two kinds—wet and dry. Wet meters are so called because it is essential to their operation to keep a certain level of some liquid (water or glycerin), within the case. Dry meters do not require any such appliance, hence the name applied to them. Dry meters are the more commonly used on account of their requiring less attention than wet meters, which have, when water is used, to be kept supplied with it and protected from frost. The use of glycerin obviates the replenishing and care to prevent freezing, as that liquid is non-volatile, and not liable to be frozen.

To understand the principle of the wet gas meter, it is only necessary to imagine a wheel, having buckets attached to the perimeter, the top of each bucket placed toward the bottom of the next one in order, forming a series entirely around it. Imagine, further, the wheel immersed in a tub of water to somewhat more than half its diameter, its axle being supported by bearings attached to the sides of the tub. Let a pipe pass through the side of the tub near the bottom and turn up under the series of buckets on that side where the buckets are bottom side up. Now invert another tub of equal size to the first one, over it, close the joint air-tight, and insert a tube in that, and you have a rude wet gas meter. If gas is forced into the lower tube, the upper one being left open, it will bubble up through the fluid and fill the inverted buckets of the series, which, being thus rendered buoyant, will rise to the surface, and in so doing, revolve the wheel to which they are attached, and bring other buckets of the series over the mouth of the pipe. Thus a continuous rotation would be kept up provided that the buckets could be so arranged that less power is required to force the buckets under the surface of the fluid than their buoyancy upon the opposite side is able to overcome. In actual practice this is accomplished by a very ingenious arrangement. The pipe in the upper inverted tub permits the discharged gas to escape from the meter. Now, the number of buckets in the series being known, and the amount which they will each hold, it is an easy matter to determine the amount of gas discharged at each revolution of the wheel, or for any number of revolutions. Suppose it to be a cubic foot for each revolution: then a pinion of six teeth, attached to the axle of the bucket wheel, working upon a wheel of sixty teeth, would, in revolving once, move the latter one tenth of a revolution. If to this wheel a pointer and dial were attached, and upon the dial the nine digits and zero were placed at equal intervals, this

pointer would mark units of cubic feet. If to the axis of the units wheel a pinion of six teeth were attached, working into another wheel of sixty teeth, the latter would be a wheel of tens, and so on. The level must be kept at a constant point, and in wet meters there is generally a device for stopping the flow of gas the instant the level becomes too low.

Dry meters consist of a series of bellows inclosed in a case, and so arranged that they are alternately filled and discharged, the filling of one furnishing the necessary power for the discharge of another, and so on, each being successively filling and discharging. The reciprocal motion thus obtained is converted into a rotary motion by cranks set at right angles to each other and so arranged that a rotation is made for every time that the bellows are filled and emptied once. The cranks alluded to perform two offices, the first of which is to open and shut the valves which direct the flow of gas into the different bellows, and second, to give motion to a system of wheels and pinions having the number of their teeth in a tenfold ratio to each other, and impelling pointers over dials, precisely as described, for wet meters.

Now let us notice the obstructions to which the two kinds of meters are liable, and we shall see that their effect is against the producers of gas and in favor of the consumers. We premise, of course, that the meter is a perfect one when it is connected with the service pipe, and we will here state that the apparatus for testing meters is as certain and reliable as any used for sealing weights and measures, and that the sealing is performed by an officer bound and sworn to perform his duty faithfully, not in the employ of any company, and that his seal, according to law, must be upon every meter before it is used. The inspector's seal is evidence that, either himself or one of his deputies have tested the meter upon which it is placed and found it to be correct in its measurement. Wet meters may vary in their measurement by the axle (spindle) becoming fixed. In such case the gas would bubble up from beneath the fluid, the flow would not cease while the registering would stop—the producer, and not the consumer, losing the amount thus passed and not registered. They may vary from leakages, which sometimes occur in the buckets. In this case all the gas which leaks is lost to the producers. They may vary from the water level getting too low. When this occurs, the construction of the bucket wheel (drum) is such that the gas does not pass under the buckets, but gurgles up by the side and passes out without being registered. This fact alone would render a wet meter worthless (as it would place the sellers of gas at the mercy of the honesty of consumers), were it not provided against by an apparatus above alluded to, which closes the mouth of the service pipe and shuts off the flow of gas whenever the level becomes too low for correct registering. This apparatus consists of a hollow ball which floats upon the surface of the water. The ball is connected by a wire with a plug (valve), and when the level becomes, by evaporation or other causes, too low for accurate measurement, the plug stops the mouth of the pipe and obliges the consumer to supply the requisite amount of liquid to restore the level. The wire attached to the plug may sometimes stick in its guides. When this takes place the effect is evidently in favor of the consumer. Another cause of error may be the sticking of the axle of the bucket wheel, caused by tarry deposits from the gas. This must also favor the consumer, as the harder the meter works the more compression of the gas takes place in the buckets, so that more gas of a given density is required to rotate the drum than would otherwise be required. Of course, leaks through the outer case, or through pipes, cocks, or burners, which are supplied through the meter, are losses to the consumer, but he is solely to blame for such losses, and ought to sustain them. Dry meters are subject to variations from all the causes which we have enumerated, except those which depend upon the maintaining of the water level. Both may vary on account of temperature, and this is probably the only way in which the consumer can lose by their irregularities, as the gas, at an elevated temperature, will measure more for the same amount of illumination, than it will at a low temperature. It is therefore for the interest of the consumers to have meters set up in cool places.

The differences in the amount of gas bills may be attributed partly to the consumers. Burners which have been used long will generally pass more gas than new ones, as the apertures are frequently enlarged; and unless the flow of gas is stopped through the day, and at such times as the gas is not required, more or less leakage is liable to take place, and this leakage will be registered by the meter along with that which is burned. The great source of difference in gas bills is, however, the fault of the producers, who can vary the quality of the gas at pleasure. More poor gas, that is such gas as is poor on account of its deficiency in illuminating power, can be passed through burners without "blowing," than rich gas, or gas of high illuminating power. When such gas is furnished, the consumer unconsciously uses more volume for a given amount of light. In Europe, gas companies are obliged by law to supply gas of a specified richness; but in this country, if any such law exists, it is practically a dead letter, as the gas furnished by most companies is not kept up to any standard quality. This is the prime cause of the trouble. The meters are not to blame—they only measure quantity, and they do that well. If you purchase a quart of ostensible milk which has been diluted by a gill of Croton water, you do not blame the measuring cup.

The selling of gas by quantity only is an anomaly in domestic commerce, rendered possible simply because people in general cannot test its quality; other than by the effect it produces upon their pockets, after it is used, and the demand for payment cannot be evaded. The preventive is in the yet uninvented gas meter that shall register for quality as well as quantity, or in stringent laws that shall compel gas companies to make gas of a standard quality.

ICE---ITS COLLECTION, STORAGE, AND DISTRIBUTION.

This substance, from time immemorial, in the countries of the Eastern Hemisphere, an article of luxury, has become one of prime necessity the world over. It enters into almost every house and place of business, contributing its grateful coolness to the water, rendered insipid and tasteless by the fervid heats of summer; it operates by its antiseptic power in the preservation of meats, vegetables, and fruits in a fresh condition, unchanged by the action of salt or brine; it freezes the creams and cools the mineral water of the confectioner, and aids the pharmaceutist in the condensation of distillates, the preparation of freezing mixtures, and the cooling suppositories and ointments, and furnishes a substitute of no mean value for distilled water. So varied and important are its uses, and so valuable is it in the operations conducted in the laboratory of the chemist and pharmaceutist, and so extensive the business and capital concerned in its collection and distribution, that a few notes respecting it have not been deemed as misplaced in this journal.

Fifty or sixty years ago Mr. Frederic Tudor, of Boston, entered upon the enterprise of exporting ice to the West Indies. He encountered the greatest difficulties in starting the business, among which was one which would bring a smile upon the face of any twelve-year-old boy of to-day. It was as difficult to charter a vessel to carry ice then, as it would be now to get one to carry nitro-glycerin, and he was obliged to purchase the vessel he at first employed, in order to show that ice is a safe cargo. For several years he continued operations in the face of difficulty, discouragement, and pecuniary loss, and it was not until twenty years after that he succeeded in making it remunerative. Since then the business has gradually increased, and within the last twenty years the growth has been very rapid, especially in that department devoted to the supply of the home consumption. The amount of capital employed, and the extent of the ice trade in the United States is something enormous. Full statistics are lacking, but occasional notices appear in the current news of the day which are extremely suggestive. A communication in the New York *Commercial Advertiser*, written by one who appears to know whereof he affirms, estimates the amount laid up for the consumption of the city trade in 1866, at 580,000 tuns, and during the past winter a statement appeared in some of the papers that there was stored for the consumption of 1868, 750,000 tuns. The writer is informed that the Knickerbocker, the largest ice company of New York, has a million of dollars invested in the business; and from the statements contained in the communication quoted above, the demand for ice will make room shortly for a dozen more like it. These amounts are independent of all that is invested in this trade and the ice that is laid up in Philadelphia, Baltimore, Boston, and other large cities of the Union, and a little consideration will show that the ice business in the United States ranks in importance with almost any one that can be named.

In dealing with the subject on the present occasion, it is proposed to offer a few succinct remarks upon the mode of collecting and storing this commodity, arranging it on board ship for export, leaving the question of statistics to a future opportunity.

Ice houses vary in size and capacity from two to fifty thousand tuns. Allowing forty cubic feet of ice to the tun, the smaller size mentioned would require internal dimensions of one hundred feet in length, fifty feet in width, and twenty-four feet in hight to the eaves. Houses for ten to thirty thousand tuns are often built in several sections, of these, or even increased dimensions, giving one the idea of half a dozen large barns cemented together at the sides, each section having its own individual roof, reminding one of the board fences one sometimes sees, where the upper edge of the fence is sawn out into pickets, looking like saw teeth. The capacity of the houses is of course determined by the amount of business the proprietor has or anticipates. As a general thing they are entirely clear in the interior, no space being taken up by beams or ties, or anything which would interfere with the regular filling up of the whole space with ice, or anything which can possibly act as a heat conductor in the summer season.

The walls are constructed with a double row of stanchions or studs, the interior ones being perpendicular and the exterior slightly inclined, so that the space between the boarding may gradually diminish from twenty-four inches at the bottom to sixteen at the top. The boarding is put on between the inner and outer stanchions, to secure it from being burst off by the pressure of the filling, and the inner and outer shells are bound together at regular intervals by iron bolts, to prevent them from spreading from the same cause. The space thus left is filled with spent tan preferably, but sawdust may be used, or what are called short shavings. The whole is surmounted by a roof with a steep double pitch, and the building is often whitewashed, roof and all, more perfectly to reflect the rays of the sun. One *sine qua non* is, that all round the foundations the whole building shall be perfectly air tight; not, as one would at first imagine, to prevent the access of air, but to prevent the cold air at the bottom from rushing out, and giving up its place to the comparatively warm air at top, which would endanger the whole stock stored in the house. This, with the requisite doors, and hoisting and storing apparatus, may be taken as the general type of a well-constructed ice house.

Ice houses are constructed preferably entirely above ground; the underground construction having been abandoned, as a general thing, for the reason that during the summer days the earth absorbs the heat of the sun, and does not yield it up at night, so that, continually absorbing heat in this manner, it is believed that the ice wastes more rapidly by underground than above-ground stowage.

When the season has been favorable, and the ice has attained the requisite thickness—the thicker the better—the ice men proceed to work. As horse power is much employed, and as ice less than five inches in thickness will not bear the weight of a horse, in an open winter it is sometimes late before the ice cutters can commence operations. If there is loose snow upon the surface of the ice, this is removed for any desired distance by means of a scoop. A space of 66 feet square, will give 108 dozen cakes. If good, clear ice is reached, the work of marking and cutting commences. If the surface of the ice is in that granular condition known as snow ice, the ice plane is required. Previous to its use the hand plow is run along one side of the space in a straight line, to form a groove, which acts as a point of departure, and regulates the motions of all the implements subsequently employed in cutting the ice.

The preliminary groove having been made by the hand plow, the swing guide marker is brought into use, and, the guide taking the groove, the marker makes a second one parallel with it. Upon turning around at the end of the course the guide is swung over so as to take the groove last made, and on the return trip a third is made. This process is repeated until all the grooves required are made, equally distant from and parallel with each other.

The right ice having been reached, the process of cutting now commences in good earnest. The large ice plow extends the depth of the grooves already made to twelve or fourteen inches. The same operation is repeated now at right angles to the former grooves, and the cakes are ready for separation from each other.

The rows thus cut are slightly bevelled, narrower below than at the top. Before doing this, however, it is necessary to take measures to prevent the water from entering the grooves and freezing therein, thus filling them up. This is done by calking them with snow, and this is done by an instrument called the calking bar, a bar with a broad chisel like end, and so made as to enter the grooves, and drive the snow to the very bottom. The two outside rows having been sawed out, the blocks lifted upon the adjacent ice, and the grooves behind the next row of blocks having been caulked as before, a bar called the breaking bar is used, generally in pairs, to pry the blocks apart, giving double the purchase attainable with a single one. The calking process must be used behind every row of blocks to be separated, else the plow would, on one of our freezing days, prove a Sysiphæan labor, having to be repeated again and again *ad infinitum*. The blocks are now floated, through a channel cut in the ice, to the ice house, which brings us to the storing and packing.

The blocks once arrived at the house, which is, whenever it is possible, built so that the ice can be floated up to it, is then seized by a huge pair of tongs made specially for the purpose, as the cakes are heavy, weighing three or four hundred pounds apiece, and hoisted up at once where they are wanted. The ice is disposed in regular tiers, the blocks being placed as closely together as possible, though no particular pains is taken to fill up the interstices. This proceeds until the house is filled. One of the most important particulars relates to the covering over all. The material preferred before all others is the long pine shavings of the carpenters. These are cleanly, durable, and not subject to decay, are easily handled by a common pitchfork, and may be used for more than one filling of the house. The objection to hay or straw is that it is liable to decay, or becomes musty. Sawdust is disagreeable, from constantly sifting down and covering the cakes of the successive tears, as the upper ones are removed.

The houses being filled, the proprietors await the summer demand for their commodity, or else proceed at once to load up for tropical markets. The ice which is stored commences to melt at the upper tier, and here is where the greatest waste occurs. The resulting water, percolating through the interstices of the ice, reaches the lower tiers, and, finding a temperature below its freezing point, congeals again, cementing the cakes together in the lower tiers so as finally to form a solid mass, if left undisturbed for a sufficient length of time. An ice house in this city was filled, and left undisturbed for four years. During the fifth year the proprietor, finding his stock of ice running low, examined this house, and found that, by melting, the ice had lowered from twenty feet to four feet in hight, and was one solid cake. He was compelled to employ his plows, and get the ice out of it in such pieces as he could; but it carried him through the season.

In the first part of the present paper allusion has been made to the difficulties encountered in the earlier efforts to transport ice to southern and eastern markets. The first cargo was despatched by Mr. Tudor in February, 1806, to St. Pierre, Martinique. He shipped about 130 tons, and of this only five tons arrived at its destination; and this trip was attended with a loss of about $4,500. Details of the different expedients resorted to, to avoid this loss would be interesting, but the mention of one must suffice. On one occasion he purchased several large cases of flannels, and endeavored by winding the pieces in and out around the ice, to protect it from its natural enemy, a high temperature; but this expedient proved unsuccessful. At length, as ice houses were erected, and the correct principles for their construction were gradually developed, it became apparent that the same principles must obtain in preparing a ship to carry a cargo of ice, converting it, in fact, into a floating ice house; and this is the way it is now done.

The first thing is to make an even floor in the hold of the ship, by filling up the furrows, so to speak, each side of the keel, with what sailors term "dunnage," consisting of fragments of lumber or ballast of some kind. This gives a toler-

ably wide floor for the lower tier of ice, which (the floor, not the ice) is covered with a layer of straw or hay, and this again with a thin layer of coarse sawdust or wood turnings. This allows the water from the melting ice to trickle down, and to be removed by the pumps. But as the space at the bow and stern of the ship is necessarily narrow, and would admit of the packing of but one cake of ice in the extreme parts of it, which would be attended with great loss and waste without any compensating advantages, it has been found necessary to erect partitions, or bulkheads, across such parts of the vessel as its particular model shall render advisable, so that from half to two-thirds of all the available space in the ship shall be occupied by the cargo, equidistant between bow and stern. This done, the ship is prepared to receive her cargo.

Moored at the wharf where the ice is to be delivered, the main hatch is thrown open, and a slide or chute is constructed from the landing to the hatch. Over the hatchway a windlass is erected, the drum extending entirely across it lengthwise. To this are suspended two iron frames intended to receive the cakes of ice from the chute, in such a manner as that, while the loaded one descends, the empty one rises. As the cakes of ice come rushing down the chute, they are dexterously directed by the ice hooks in the hands of the workmen to one side or the other, so as to enter the gigs, which descend with them into the hold. As the lower tier is completed, it is packed all round the sides of the vessel with sawdust. This gives additional space for the next tier, which is wider than the first, as the sides of the vessel recede from the keel; and the tiers, increasing in width until the whole breadth of beam of the ship is attained, are successively packed as described.

In the shipping of ice immense quantities of sawdust are used, so that what the owners of saw mills used to be bothered with to get rid of, now yields them a handsome revenue. It is estimated that the ice trade of Boston alone consumes sawdust, shavings, and rice chaff to the value of $30,000 a year, an item which used to be thrown away.

To deliver a cargo of ice to India involves a voyage of sixteen thousand miles, occupying four or five months, during which the equator is crossed twice; and if one half the cargo is delivered it is regarded as a success. The loss, is, however, sometimes much greater, even amounting to 75 per cent. On shorter voyages, such as the West Indies, and the southern part of the United States, the loss will not often exceed 33 per cent of the amount shipped.

It would seem that ice, costing nothing for the raw material, might be furnished at lower rates than is demanded for it; but when the amount of capital and labor employed, in houses, men, teams, horses, tools, and machinery are taken into the account, together with the greatly advanced cost of every item which enters into the business, it will be at once seen that only the utmost care and the most perfect appliances can render operations remunerative enough to induce capitalists to invest their funds, and allow them to continue thus appropriated.—*Journal of Pharmacy.*

A 6000-pounder Gun.

One of our most successful inventors and engineers has lately patented, and the specification has been published, of an enormous air-gun of 32-inch bore, to throw a 6000 lbs. shot. The bore of the gun is to be upwards of 30 feet long, and the inventor asserts that he can compress and retain air at a working pressure of 10,000 lbs. per square inch. The sectional area of a 32-inch bore is 804¼ square inches, and the total initial pressure would thus be 8,042,400 lbs., or nearly 3,600 tuns. It would, of course, be next to impossible to pump in air fast enough at this enormous pressure to keep up the velocity of the shot, so the high pressure air is to be contained in a huge casing or jacket formed around the bore of the gun, and having the same capacity of say 165 cubic feet. Thus, instead of the pressure being reduced almost to *nil* at the muzzle, the air would have been expanded but two-fold on the discharge of the shot; and if we disregard the influence of rarefaction, and consequent cooling by expansion, and its effect on the pressure, we should have 5,000 lbs. per square inch still left. If we take the average pressure at 7,500 lbs. throughout the length of the bore, we shall have 2,400 tuns exerted through 30 feet, or say 72,000-foot tuns, and this, were the air to follow fast enough, would send a 6,000-lb. shot at a rate of more than 1300 feet per second. As no ordinary valve could be opened quickly enough to admit air under such pressure, and in such quantities, the shot itself forms the valve. The high-pressure air in the air casing or jacket enters the chamber of the gun through ports, like those by which steam enters a steam cylinder. The shot—a short cylinder with hemispherical or pointed ends—is so packed as to close these ports while the jacket is being pumped full. To discharge the gun a little high pressure air is separately pumped in behind the shot, so as to start it on and past the ports, when the stored-up air does the rest of the work.

Although there may be certain practical difficulties in carrying out this scheme, it possesses great interest, and we shall look with much curiosity to its practical realization.—*Engineering.*

To Coat Iron with Copper or Brass.

The copper or other coating is to be melted in a suitable vessel, and a stratum of borosilicate of lead placed on its surface: the iron is then to be plunged into the molten metal, and retained there until a coating is deposited on it. Iron coated with the tin or lead may be treated in a similar manner. Another method of coating iron with copper is to place in a crucible a quantity of chloride of copper, upon which is laid the iron to be coated, and over that a quantity of charcoal. The crucible is then submitted to a red heat and the chloride of copper fused, and a coating of copper deposited on the iron; or the vapor of chloride of copper may be employed for the same purpose. The coating of copper thus obtained, may be converted to one of brass by exposing the sheet of metal to the vapor of zinc in a closed vessel.

Correspondence.

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

The Giffard Injector.

MESSRS. EDITORS:—In your paper of the 2d of May, you intimate that the principle of the Giffard Injector is not well understood, and present your readers with an explanation, given by Mr. John Robinson, of Manchester, Eng., as the best elucidation of the puzzle. I am of the opinion that Mr. Robinson himself does not show a very clear perception of the thing. At any rate, he fails to make it plain to any ordinary comprehension. With your permission, I will endeavor to do so myself.

The operation of the Giffard Injector is dependent on the laws both of pneumatics and hydrodynamics, and its secret lies in the fact that under any given pressure aeriform bodies are propelled with a very much greater velocity than liquids. Thus, if we would communicate to water a velocity far above any thing that could be accomplished by hydraulic machinery, let us first convert it into steam, then set it in motion and suddenly reconvert it into water by condensation; the water will retain the velocity of the steam.

To illustrate by example: We have a steam boiler in operation, under 90 lbs. pressure. If we run a pipe from the steam chamber into the boiler, under or above the water level, equilibrium will exist. But if we open the pipe into the air, steam will flow in a jet. I have no means at hand to ascertain the velocity of a jet of steam under 90 lbs. pressure—about 6 atmospheres—but a table before me gives the velocity under one atmosphere at 650 ft., increasing in a constantly diminishing ratio to 1,600 ft. under 20 atmospheres. Perhaps under 90 lbs. a velocity of 1,000 ft. would be a fair estimate. At any rate, I will assume it for the purpose of this illustration.

Suppose now that the steampipe is of just such length and caliber as to contain, under 90 lbs. pressure, the product, in steam, of one cubic inch of water. Remember it is moving 1,000 ft. per second. Suppose again, that it is suddenly and perfectly condensed, and we have a cubic inch of water flowing with a velocity of 1,000 ft. per second. Now if we open an orifice in the boiler below the water level, a jet of water will be projected from it with a velocity of about 114 ft., which is due to a pressure of 90 lbs. If, again, by means of outside machinery, we throw a jet of water of the same diameter with the orifice, and directed at it, with a velocity of 114 ft., there will evidently be equilibrium; because, as pressure and velocity are convertible into each other, the force of the jet will exactly counterpoise the jet seeking to flow from the orifice, and no water will pass into or out of the boiler. But if the jet, by additional pressure, attain a velocity of 115 ft., then the equilibrium is destroyed, and water will pass into the boiler through the orifice.

To recur now to the cubic inch of water in the steampipe, with its velocity of 1,000 ft. per second. How much more easily and rapidly will it penetrate, where even a velocity of 115 ft. is sufficient to overcome the resistance. And suppose, now, that it comes in contact with another cubic inch of water in a state of rest. It will part with half its velocity to the latter, and both commingled, will move on at the rate of 500 ft. Let these two come in contact with other two at rest, and again, the weight being doubled and the velocity halved, they will move 250 ft. per second. Still again, let these four strike four others in a state of rest, and we shall have eight cubic inches moving with a velocity of 125 ft. per second, which, as we have seen, is sufficient to effect an easy and rapid penetration into the boiler. Of these eight, one is the cubic inch that was condensed out of the steam in the pipe, and here we behold it commingling with and carrying along seven others, by which, in fact, it was condensed, with a velocity much greater than that of a jet projected from below the water level of the boiler under the existing hydraulic pressure of 90 lbs.

I have taken for illustration a given amount of steam and water. In fact, however, there is a constant flow of steam, a constant condensation by an uninterrupted stream of water, and an unbroken jet into the boiler.

It may be asked, if the steam jet itself were directed at an orifice in the boiler, would it penetrate? It would not. It must be remembered that force is a product of weight and velocity, and here the weight of steam being so insignificant—it requiring 1,700 cubic inches under the pressure of one atmosphere to weigh as much as one cubic inch of water—the force would be insufficient to penetrate. But it is a very different thing when water moves with so great a velocity.

The principle of the Giffard Injector is applicable to other purposes than feeding boilers. It makes a good pump for shallow reservoirs. It would make a very powerful fire engine. It could be used to drive light machinery, by throwing its jet into a turbine wheel running at a high speed. I have used it to propel a toy boat—not very satisfactorily, however—having a small copper boiler heated by a spirit lamp, and throwing its jet back under the stern.

Nothing has been said, in this discussion, of the construction of the apparatus, nor was it necessary, as I presume that is familiar to all engineers. I have aimed only to develop the principle. It is a very beautiful invention.

Tuscaloosa, Ala. H. S. WHITFIELD.

Size and Capacity of Millstones.

MESSRS. EDITORS:—J. W. H., of Minn., on page 39, current volume, asks if it will take any more power to grind eight bushels of wheat in the same time on a four-feet run of stones than one of three feet. A very practical question, and one that all millers ought to be interested in, as it touches the absorption of power in all mills.

"H. M.," of Minn., page 263, attempts an answer, but gives no proofs. He says; "I think it will take less power to do the work on the four feet stone, as the velocity required to make the smaller stone equal in capacity the larger absorbs a large proportion of the power." If H. M. means that the larger stones absorb a large proportion of the power to do the work given, I agree with him; but if he claims that it is necessary to run a three-feet stone to equal in area of feet a four-feet stone to grind the given amount, then I beg to differ. Example: The usual motion given to a four-feet stone is 180 revolutions per minute, and some run them to 200 revolutions per minute, but I have stated the minimum. Now let us see what figures tell us about the frictional surface or area of face of a 4-feet stone running at 180 revolutions per minute. Area of stone, 1,809·56 inches multiplied by the velocity and divided by 144, equals the area in feet per minute—a trifle over 2,261·94 feet. A 4-feet stone at that motion, with proper power applied, is able to grind 16 to 18 bushels of wheat per hour and do its work well, and many even greatly exceed that amount if their burrs are heavy.

Some millers might ask: "What is the use of running the stones so fast if they will grind 16 to 18 bushels per hour when we only want to grind 8 bushels?" I answer, because experience says that is about the proper motion for a 4-feet stone to run at to discharge the flour and meal properly, the draft in furrow being one inch to the foot.

Now let us see the capacity and friction of a 3-feet stone running at 240 revolutions per minute. The peripheries of the 3 and 4-feet stones would travel at the same rate, but their areas differ greatly. The area of a 3-feet stone is 1,017·87 inches, multiplied by the velocity and divided by 144, equals 1,696·44 feet per minute, a difference in favor of small stones of 565·50 feet per minute. Experience proves that a 3-feet run of burrs, at the above motion and proper power applied, is capable of grinding 10 to 12 bushels of wheat per hour, and do its work well.

Again, if you would grind 16 to 18 bushels per hour on a 3-feet run of stones, it would be necessary to run them to 320 revolutions per minute. Then they would be equal to a 4-feet run, if they are heavy enough; but as a general rule it is impossible to run at that motion, on account of the grain choking in the eye of the stone. Therefore to grind 16 to 18 bushels per hour with one run, the 4-feet run at 180 revolutions is preferable on that account.

A 3-feet burr running at 220 revolutions, with proper power applied, is capable of grinding 8 to 10 bushels of wheat per hour and do its work well; if that is the case, then let us see where we have saved power. The area of a 4-feet stone running at 180 revolutions is 2,261·94 feet per minute; the area of a 3-feet stone at 220 is 1,555·07; difference in favor of small stones of 706·87 feet per minute. What are these extra feet unless rubbing surfaces?—friction. These extra feet cost more in the first place, have to be kept in order, take longer to dress, absorb power, and generate heat, a great detriment to good grinding.

If I have proved that the 3-feet burrs will grind the stated amount (8 bushels), then throw the 4 feet out and save power; if your power is light it will pay. I have one run of 3-feet burs running in my mills at 220 revolutions; it grinds 8 to 10 bushels of wheat per hour, and does its work as well as a larger stone, and saves power. At one time I thought a 4-feet burr just the thing for any power or amount, but experience has taught me differently. Now I use the size of stones and number of runs best adapted to the work and power.

In erecting new and overhauling old mills, the first thing in order is to ascertain the amount of power you have at command; then you can determine the size and number of runs you can use. The next thing in order will be the cleaning and bolting apparatus, ever remembering to have enough.

GEO. RULE.

Wheatland, Iowa.

The Moon As an Inhabited Planet.

MESSRS. EDITORS:—On page 280, current volume of the SCIENTIFIC AMERICAN, you have an article under the heading "Lunar Vegetation," which is good as far as it goes, for it verifies to a certain extent the writings of a philosopher who lived nearly one hundred years ago, namely, Swedenborg. He claims that the moon and all the planets are inhabited, and meets the objection "that the atmosphere surrounding the moon is too light to support man," by the answer, "that things are created for their conditions," and that the men of the moon have lungs constructed for their especial needs.

By referring to Swedenborg's work on the "Planetary System," you will gather my meaning as I may not have been explicit enough.

A. W. W.

New York.

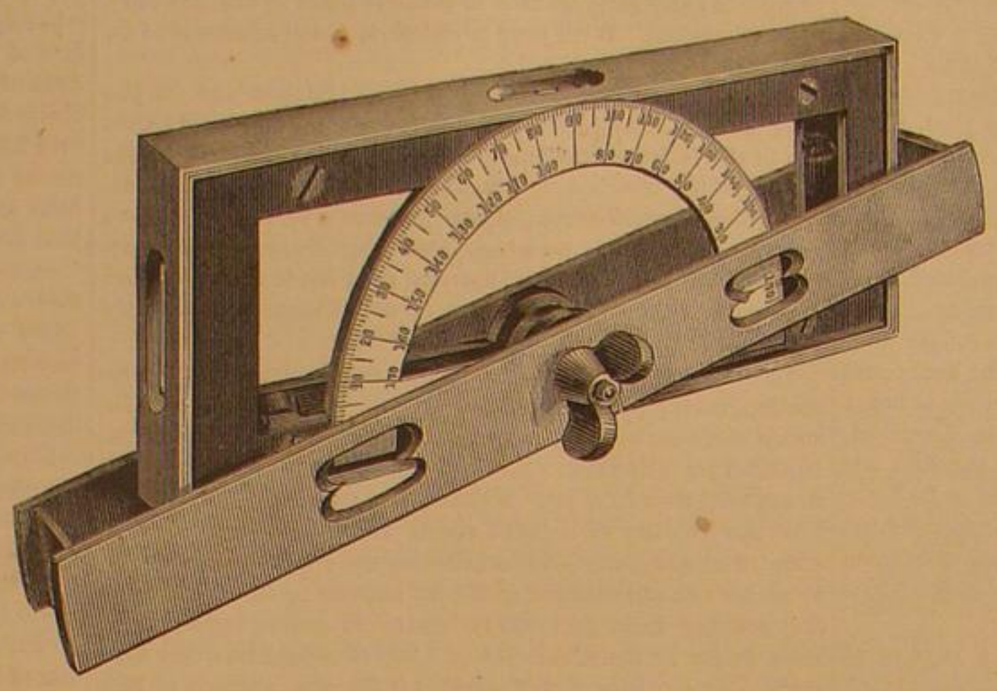
GENERATING STEAM BY GAS.—Illuminating gas has been employed in England, in heating steam boilers and generating steam for working the hoisting apparatus of warehouses, or other purposes where steam power is only required at intervals of time. With a vertical tubular boiler of three horse power, steam at 60 pounds pressure is generated by twenty-three burners, consuming 100 feet per horse power per hour in full work. The compactness, economy, and efficiency of the gas heated boilers is highly recommended by those who have used them. The first cost and expense of maintenance is small, and the insurance companies have decided to require no heavy risk premiums on buildings furnished with boilers heated by this plan.

Improved Combination Tool for Machinists and Other Mechanics.

The object of the inventor of this instrument is to supersede a number of separate tools usually required in the shop. It may be used as a spirit level, plumb, try-square, bevel protractor, clinometer, etc., and is adapted to the wants of the machinist, woodworker, draftsman, and surveyor.

The implement is a metallic rectangular frame, having seated in its top and one of its ends spirit glasses for leveling and plumbing work. To the bottom bar of the frame is pivoted a steel frame, held in any position desired by means of a thumb nut. The bolt with which the nut engages is not the pivot upon which the swinging steel frame turns; its object being merely to hold the frame fixed in place. The center of the swing frame has on either side an inward projecting cone fitting into a corresponding recess in the stock of the implement. This gives the frame a large bearing and one always perfectly tight without danger of wearing. A graded semicircle guides the position of the frame, through holes in which the operator can readily see the degree at which he desires to fix the frame. The whole being built strongly of metal, there is very little danger of breaking or wearing out.

It is the subject of one patent obtained through the Scientific American Patent Agency, Jan'y 1st, 1867, and application for another on improvements by A. F. Ward is now pending. All inquiries should be addressed to W. S. Batchelder & Co., Pittsburgh, Pa.



WARD'S IMPROVED COMBINATION LEVEL.

Whitewashing.

A correspondent of the *Germantown* (Pa.) *Telegraph* furnishes the following:

As the house cleaning time will soon be here, it may not be amiss to say a few words in regard to whitewashing. There are many recipes published, but we think the following to be the best that can be used: White chalk is the best substitute for lime as a wash. A very fine and brilliant whitewash preparation of chalk is called "Paris White." This we buy at the paint stores for three cents a pound, retail. For each sixteen pounds of Paris white we procure half a pound of the white transparent glue, costing twenty-five cents (fifty cents a pound). The sixteen pounds of Paris White is about as much as a person will use in a day. It is prepared as follows: The glue is covered with cold water at night and in the morning is carefully heated, without scorching, until dissolved. The Paris White is stirred in with hot water enough to give it the proper milky consistency for applying to the walls, and the dissolved glue is then added and thoroughly mixed. It is then applied with a brush like the common lime white wash. Except on very dark and smoky walls and ceilings, a single coat is sufficient. It is nearly equal in brilliancy to zinc white a far more expensive article.

A Locomotive struck by Lightning.

On Friday last, during the hail storm that visited this section, the eastward-bound train on the Toledo, Peoria and Warsaw Railway, George Boies, conductor, and C. A. Martin, engineer, had just left El Paso when the storm struck it. When about a mile and a half east of that city, the lightning struck a telegraph pole. Instead of shattering it and going to the ground, it burst the insulator, making a blaze of light, passed on the wire to the next insulator, and burst that, with another blaze of light, as intense, a looker-on informs us, as a thousand gas jets, and so on for five poles. It then ran down one pole and leaped to the track, and ran back without doing any damage until it struck the engine. It ran up one of the drivers, and burst a section of two feet out of the solid tire, and passing along the boiler, without doing any damage, it reached the lever and went upward with a blaze of light similar to that on the telegraph wire, and with a detonation like a small cannon. So intense was the light, and so violent was the shock, that the engineer was nearly blinded, and almost stunned. Our informant says that the appearance of the light on the track was brilliant beyond conception. It looked as if there was an immense lake of fire ahead, into which the train was about to plunge, and the contrast between the light and the ordinary daylight that followed seemed as great as that between the brightest day and the darkest night.—*Peoria (Ill.) Paper.*

Venom of Toads.

The toad, formerly considered as a creature to be feared, does in reality possess a venom capable of killing certain animals and injuring man. The *British Medical Journal* says that this poison is not, as in generally thought, secreted by the mouth; it is a sort of epidermic cutaneous secretion, which acts powerfully if the skin be abraded at the time of contact. Dogs which bite toads soon give voice to howls of pain. On examination it is found that the palate and tongue are swollen, and a viscous mucus is exuded. Smaller animals coming under the influence of the venom undergo true narcotic poisoning, soon followed by convulsions and death. Experiments made by MM. Gratoilet, Cloez and Vulpian, show that the matter exuding from the parotid region of the toad become poisonous when introduced into the tissues. A tortoise of the species "Testudo Mauritanicae," lamed in the hind foot, was completely paralyzed at the end of fifteen days; and the paralysis lasted during several months. Some savages in South America use the acid fluid of the cutaneous glands of the toad instead of the curara. The venom exists in somewhat large quantity on the toad's back. Treated with ether it dissolves, leaving a residuum; the evaporated solution exhibits oleaginous granules. The residuum contains a toxic power sufficiently strong, even after complete desiccation, to kill a small bird.

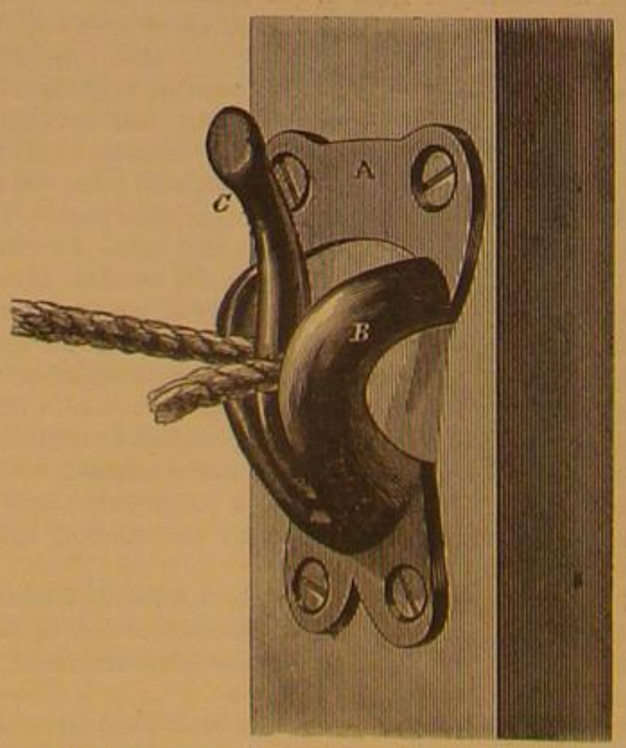
Weldless Steel Tires.

Weldless steel tires are now manufactured in England by rolling. The mill which is used for this purpose consists of two sets of rolls supported by the same framework, but each set working independently of the other. Hydraulic power is employed to press the rolls together. The first set of rolls consists of a single pair. The operation of making a tire consists in placing a hammered ring containing enough metal to form the tire between the first pair of rolls in such a way that the ring incircles one of the rolls. It is then enlarged by rolling, and its section formed in the same manner as a straight bar would be drawn and shaped in ordinary rolling mills.

The second set of rolls is similar to the first with the addition of two side rolls mounted upon a pair of jaws which can be opened and closed by toothed segments operated by a worm having a right and left-hand thread. These rolls finish the tire. Seventy to eighty horse-power are required to drive this mill and the entire operation is completed at a single heat. The same process has been in use for years in this country in the manufacture of weldless iron tires.

GLADDING'S CLOTHES LINE HOLDER.

The engraving shows a neat device for securing clothes lines to any support without the necessity of tying or knotting. It allows the line to be attached or detached instantly, and is adapted to hold not only the ends but to support the line at any intermediate point. It is a simple frame, A, of



cast or malleable iron, with two bows, B, spreading from the bottom up, and having their inner surfaces beveled from the outside inward. Between these is a tongue, C, pivoted at the bottom end and shutting in between the jaws, B. This tongue is also beveled, its lower edge being the thickest.

In use the line is passed over the tongue or looped in between the jaws, and the tongue pressed upward and backward, the bevel of the jaws and tongue firmly holding the line, which can be removed only by depressing the tongue by the hand, thus disengaging the line.

A patent for this device was obtained through the Scientific American Patent Agency April 28, 1868, by James W. Gladding, who may be addressed for state rights, etc., at Normal, Ill.

Deficiency of Mechanics in California.

There seems from all we can gather to be a great dearth of mechanics in California. Wages are ranging at from three to four dollars per day in gold for carpenters, and it is said that at least one thousand more might at once obtain employment there. There is a scarcity of hatters, shoemakers, machinists and workers in all branches of mechanical art. Ten thousand mechanics, it is stated, would readily find employment. Much of the machinery used there is made in England and eastern cities of the United States. Leather is sent to Philadelphia and elsewhere to be made up and returned. It would seem from these statements which are gathered from California papers, as though many young men might better themselves by going there. We understand rates of passage are extremely low this season from New York to San Francisco, on account of the strong opposition existing between the lines of steamers which run between the two ports, via Nicaragua and Panama.

SCARCITY OF FIRST CLASS WORKMEN.

The abolishment of the system of apprenticeship in this country, and the introduction of planers, engine lathes, and other labor saving machines into the machine shops has produced a scarcity of good workmen. The effect of the former has been to encourage a class of half trained mechanics, who, having gained sufficient knowledge to enable them to perform certain kinds of work, and at that to obtain living wages, are content to remain without further effort at improvement. The introduction of machinery to perform what was formerly done by hand has obviated the necessity for that skill in manipulation and nice training of the eye, which in former times were essential for all kinds of work. It is a common thing to find men who can attend a lathe, or run a planer, who are utterly incapable of doing work with a file, and who, if they were set to constructing any machinery requiring nice fitting throughout, would utterly fail. The exceptions to this are rare, and we are afraid they are becoming more so. Mechanical engineers are frequently troubled to find workmen who can properly execute their designs. Especially is this so where new forms are introduced into machinery, when a general lack of resources and expedients will most probably manifest itself. We know of one engineer who could only find at the third trial a shop where he could get work done to his full satisfaction.

We feel satisfied that the training of the eye, in which most deficiency is probably found, owing to the substitution of engine lathe work for hand turning, and planing for the old time chipping and filing, might easily be obtained by practice in drafting, which demands both skill of hand and eye, and to most mechanics would be found a pleasant recreation as well as a valuable accomplishment. At a future time we may say more on this subject.

A New Era in Steam Navigation.

A company has just been formed in New York city, and the necessary capital paid in, for the immediate construction of a new steamboat, 216 feet long, specially designed to run *forty miles an hour*. The boat is to be operated on the plan patented by Stephen I. Gold, a man of science, the inventor of many valuable improvements, among which are Gold's steam-heating devices, now very extensively used. His present invention consists in a new mode of applying steam power to the paddle wheels, by which he is enabled to make use of machinery having great effective force, with but little weight. This results in a reduction of the immersed cross section of the vessel, and a consequent increase of speed over ordinary boats. The new vessel is to be provided with 25-horse power for each square foot of immersed cross section. If this enormous force can be successfully applied to the paddle wheels, the vessel must move at the intended velocity, or something will break.

It has been ascertained that about 1-horse power per square foot of cross section will move a boat at the rate of 10 miles an hour; 4-horse, 20 miles; 16-horse, 40 miles; 64-horse, 80 miles, and so on. But up to the present time no engineering skill has been able to devise a method of augmenting the driving power without also increasing, proportionately, the area of the immersed cross section. Although we have many large and powerful boats, they do not travel much faster than the smaller craft. The fastest of our river boats, such as the *Mary Powell, Bristol,* and *St. John*, have between 3 and 4-horse power per square foot of immersed cross section, and they run from 16 to 21 miles an hour when not affected by wind or tide.

We heartily wish success to the projector of the new boat, and to the enterprising gentlemen who have united to furnish the necessary pecuniary assistance. Whatever the final result, the project is most laudable, and cannot fail to be fruitful in engineering experience.—*The Wheel.*

A Sub-Aqueous Entertainment.—Boston, capital of the land of notions, proposes to introduce into its 4th of July celebration this year a new feature—a submarine race, or walking match under water. The distance is a mile, from Long wharf to the Cunard wharf in East Boston, and it is proposed that three practical submarine divers shall enter the race. A wag says this is a plan of the cold water men, who wish to show what can be done in their favorite element.

Black Varnish for Iron Works.—Dr. Lunge distils gas tar until nearly all the volatile products are got rid of, the residual pitch being then dissolved either in the heavier oils, or, if a quick drying varnish is required, in the light oils or naphtha. The advantages of varnish so prepared over the original tar, is that by the above process we get rid of the ammonia, water, carbolic acid, and other constituents that give to tar its disagreeable odor, and make it so long in drying.

THE WATCH---ITS HISTORY AND MANUFACTURE.

BY H. F. PIAGET.

No. 4.

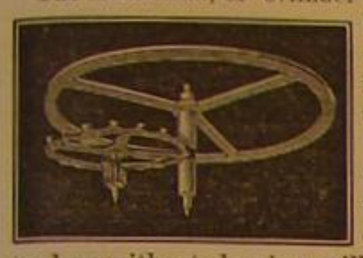
MERITS AND DEFECTS OF THE WATCH.

The Vertical or Verge Watch.

The vertical or verge watch requires to be made thick, but on account of the frequent expense of a new verge which will wear from continual friction and action of the escape wheel on the pallets, also from the fashion of wearing flat watches, there are but few verge watches worn now, and those that are made are generally of an inferior quality; but there are still some few good ones, and when in order, will keep tolerably good time.

Horizontal or Cylinder Watch.

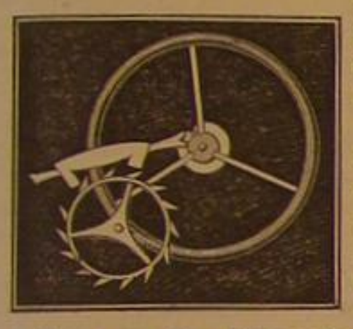
The horizontal, or cylinder watch, has the impulse given by the teeth of a horizontal wheel acting on a hollow cylinder, which forms the axis of the balance.



The horizontal or cylinder watches, when well made, will perform with considerable accuracy, and if not suffered to go too long without cleaning, will continue serviceable for many years. There is, however, much friction in the escapement, and a great wear takes place if they are allowed to continue in motion after the oil has become dry. When they commence varying more than two or three minutes a day, they should be submitted to the inspection of a good watchmaker, and cleaned if necessary. If they have been recently repaired, it may be only the oil that is worn off the cylinder, and by putting fresh oil to it the watch will frequently regain its motion and perform for some time with accuracy if it was well made.

Patent Detached Lever, or Anchor Escapement.

I find there is a mistaken idea about this escapement, and that its action is but little understood in this country. I shall endeavor, however, to explain this escapement, and its action, in such a manner, that every reader can understand them.



Nearly a century ago, the first lever escapement was invented as an improvement upon the verge, vergule and horizontal then in use. The lever was first made with a rack placed on the pallets, where the fork or lever now is. This rack acting with teeth or cogs, on a pinion, as an axis to the balance. (See engraving of balance and axis.)

By this means one wheel to the train was saved; the escapement wheel acting as the seconds wheel, but that arrangement not working well, another wheel was added, and is continued to the present time. The continued friction of the teeth of the rack upon the pinion, caused a magnetism in them, so that to keep the watch in running order it became necessary to frequently apply oil to the affected parts, and this had to be remedied.

There are yet many of the old rack levers in use, both with and without the extra wheel. They are generally found in the old fashioned double cased watches that we meet with occasionally. I have altered several in this country, which can be done by putting in a good fork or lever, instead of the rack and by making a new staff or axis, with a table or roller for the ruby pin. In some cases it is necessary to make all the escapement new, especially in very old styles.

Messrs. Roskells, of Liverpool, England, were, I believe, the first to obtain a patent for the detached lever escapement, the difference being that instead of a rack, a fork or lever was attached to the pallets or anchor (so called by the Swiss), and instead of a pinion to the balance, as an axis or staff, have a plain staff made, with a roller and ruby pin as at present. (See plate of lever escapement.) The lever or fork having the impulse given to it from the wheel, and then striking against the ruby pin gives the motion to the balance from which it was disengaged, till brought back by the hair spring, the ruby pin then strikes the fork, and disengages the wheel, thus allowing it to go on.

This causes the two distinct beats we hear in a lever watch. This improvement being patented, watches constructed on this principle were called patent detached levers, and in this manner originated the detached lever.

This patent obtained in England first for seven years, was afterwards renewed a further term of seven years, at the expiration of which period a further renewal was refused, and detached levers were then made by nearly all the watchmakers, it being far superior to the rack lever and all others commonly made at that time, chronometers excepted.

The horizontal, however, continued, and is still made, but when it was desired to make a very good watch, it was made with ruby cylinders, this, however, was more expensive than a lever.

I well remember the time when a detached lever was very scarce in England, and quite unknown in Switzerland. Some few years after the Swiss commenced making them, and finding the fashion was for flat watches, they made them on the plan of the lepine movements, (see plate) instead of the clumsy looking old fashioned lever, but without the fusee. By this method detached levers could be made much thinner and smaller, and thus constructed, they were named anchor watch.

It was about this time, that the double power watch was first introduced, (as described in another part.) It was made absurdly thin and small; but that style did not continue long, as it was found to be too great a tax on the patience and eyesight.

The anchor watches were also made with full and half plates, to make them pass for English watches, but the makers finding that the name of anchor was not well understood, called such watches detached levers.

Now, I wish my readers to understand, that a patent or detached lever, and an anchor escapement, in the principle of action are precisely alike, the name anchor being used by the Swiss, for what the English call pallets.

The lever is called the same in both countries. American watches have an anchor escapement, yet are called patent detached levers.

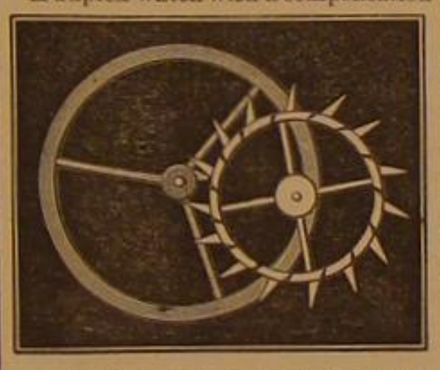
The English watch has a patent detached lever escapement yet it is an anchor. The Swiss have an anchor escapement yet it is like both the above, in action and principle, and in whatever form these watches may appear in your eyes, they are the same in action.

There have been many improvements made in lever watches of late years, particularly in Swiss watches, one of which is, the straight line, to which I give the preference; this improvement is now adopted in the best American watches. I doubt if many more improvements can now be made to this escapement, as I believe perfection has been nearly reached, still I may be mistaken, as nothing seems certain, except taxes and death. These escapements have stood the test fifty years, and unlike many others, (the chronometer excepted) have not been found wanting, but have continually improved in quality, still after all it is the detached lever at the root. Therefore, remember, and if you are puzzled, read this part over again. If you get an English patent lever, an American watch of any make or quality, a Swiss detached lever, or a Swiss anchor watch, you are getting the same kind of escapement, although they are constructed in innumerable styles, yet I repeat the principle is the same. If there is any choice get a straight line one, and if well made, and with an isochronal hair spring, I think you will be satisfied. Should I attempt to describe the different shapes that are made, it would fill the paper with a mass of matter, that would be useless to the general reader, for whom this is written.

The technical names are to be found in larger and more expensive works than this; prepared for the use of manufactnrers. For to know all things well, we should know them in detail, and as that is in a manner infinite, our knowledge becomes almost superficial and imperfect.

Duplex Watches.

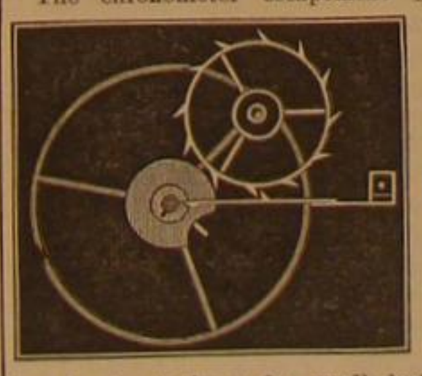
A duplex watch with a compensation balance, when well constructed, will, with ordinary care on the part of the wearer, keep time with the greatest accuracy. These watches are, however, delicate, and should not be worn when violent exercise is intended, such as riding on horseback, jumping, etc.



Another reason is, except that in large cities, there are but few workmen who understand the principle of this escapement properly, and who can repair them as they should be. A bad watch on this principle is (the chronometer excepted) worse than any other, and more expensive to correct and repair.

Chronometers.

The chronometer escapement is the most perfect for the measurement of time, and one with the least friction. It is the only one that is employed in marine chronometers. The term chronometer is applicable to all timekeepers, but it is now more usually applied to marine timekeepers only; those being large, their several parts approaching in size to those of a small clock, require less delicacy of workmanship than pocket watches of the same construction. The high office which marine chronometers have to fulfill, demands an accuracy far beyond what can be attained by a machine as small as a watch. A marine chronometer is always in one position, being placed in two boxes made and fitted in such a manner that whatever the rolling or pitching of the vessel is, the dial is always uppermost, which accounts for its accuracy, and which could not be obtained in a watch, as no matter how well the escapement is made it will be liable to set or stop by some external motion.



Half and Three-quarter Plate Watch.

Some watches are made with the half and three-quarter plates on the English principle, with chain and fusee. The idea first originated with Mr. Dent. The balance is there placed at the side instead of being in the middle of the upper plate as in ordinary watches. By this arrangement they are enabled to make them considerably thinner. They are made with cylinder, lever, duplex, and even chronometer escapement. They sometimes have a cap, and open from the front, like other capped watches, but I prefer them without the cap, and to have the case made to open similar to most of the Swiss watches, as otherwise they are more liable to accidents in opening the movements or caps. If well made, they are equal for timekeepers to those on the old plan, and not more liable to get out of order.

Swiss watches are sometimes made on this plan, but they are usually without the fusee, but either kind will perform well if properly adjusted.

The Lepine Watch.

The watch usually called Lepine, was made in Paris about fifty years ago, and I believe that Lepine, a celebrated maker at that time, was the inventor, from whom they are so called. The object of having the wheels held by bars and screws, which any person having opened one has seen, was to make the watch flatter than the English could make theirs. Breguet, the celebrated maker of Paris, made all his flat watches after that fashion. He was also the inventor of an improved manner of fitting the going barrel on the bar of the ratchet, and also of the key named after him, to prevent winding the watch the wrong way.

Watches made now in that style are frequently called Lepine Watches, although they are made with every kind of escapement. Like the half and three-quarter plate, if they are well made, the bars properly fitted, and the spring well adjusted, they will go equal to any other kind of watch made without a fusee, with the same escapement, except the chronometer, which requires more solidity than there is usually to this kind of watch.

The Chinese, or Center Seconds Watch.

The center seconds or Chinese watch is so called on account of first being made for China, so that they could see the watch go plainer than by having a small seconds hand. They are made with the duplex escapement, and having a very large balance. The inner back of the case is generally glass, through which all the works can be seen. The brass works are ornamented with engraving, which with the bright and blue steel screws, has quite a showy appearance. I have seen many with the plates made of steel, and all the other works in all kinds of variegated colors, to make as much show as possible. Thirty-five years ago I worked on them altogether, and I see no difference with those now made. I cannot recommend them strongly as time keepers, in particular now when they are made so cheap. One very great fault about them is, that the beat is too slow, beating a second at a time. It having been ascertained by practice and experience, that quick motion watches regulate better than slow ones, and are not so likely to be affected by external motion.

The Chinese always had them made in pairs, and every part, even the screws, had to be so exactly alike, that you could not tell one from the other, only by the numbers of the watch; even in regulating, the hands of both watches had to move together. The reason was that the Chinese wore two watches, which they carried in a pouch or pocket, fastened on each side. They say when a watch stops, it is dead, and cannot be set going again, and if one stops, they still have the time by the other; but if they both stop, they get others, as they never think of having them repaired. I suppose this idea originated with them on account of not having watchmakers convenient to repair them.

Independent Seconds Watches.

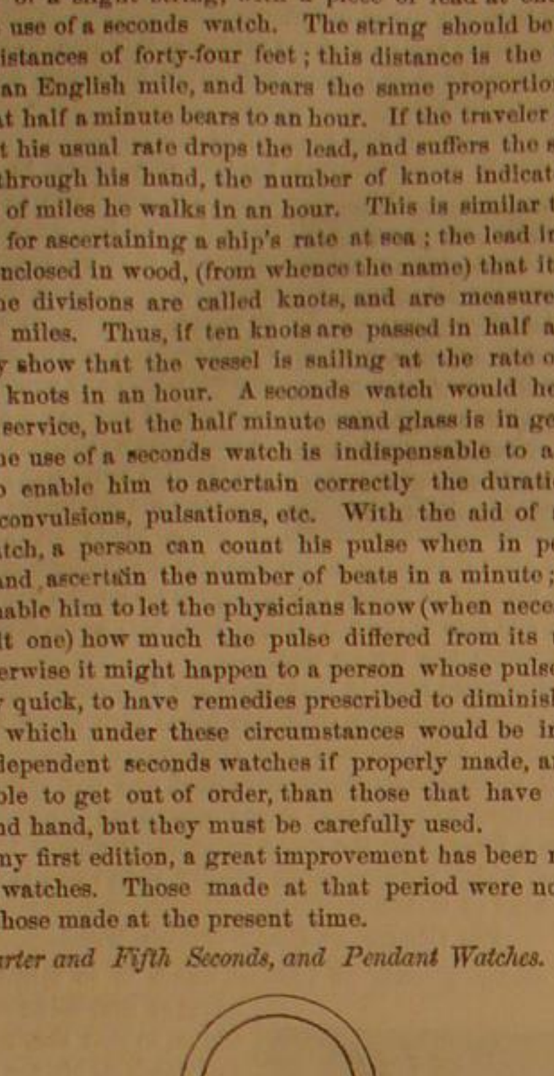
Watches with a long second hand in the center were made many years ago chiefly in England, for the use of physicians, and persons wanting to measure time very accurately. But they did not move one second at a time, their motion was only as the vibration of the balance was one third of a second at a time. By further improvement, they were made to beat one second, but still there was a great defect, as in the Chinese watch; when you stopped the seconds, you had to stop the going of the watch altogether, and thereby lose the time. As a further improvement, you can stop the long seconds hand in the center without altering the regular time, and see when or at what time you stopped them. They are made, now that there are two separate trains of wheels, two springs, and two sets of hands, by stopping the center seconds, which is done by a piece placed outside the case; you stop one set of hands while the others keep going, and you still maintain the regular time. When you wish to set them again together, you do it by a square at the back of the case, without any injury to the watch, nor does it interfere with the regular time, as they are independent of each other, more particularly when the center seconds are stopped. For those interested in an operation performed in small portions of time, some being made to show one fifth of a second; these are very useful, such as timing horses, etc. With the assistance of a seconds watch, and some slight calculations, many interesting facts may be ascertained. If a gun be fired by a vessel at sea, the distance may be known by observing the number of seconds which elapse between the flash and the report. In mild weather, sound travels at the rate of 1123 feet in a second; if therefore the report of the gun was heard five seconds after the flash had been seen, the distance of the observer from the gun would be 5615 feet, or rather more than a mile. This

is merely approximation, for the velocity of sound varies according to the density of the atmosphere. In dry frosty weather, sound travels at the rate of only 1080 feet per second.

A person traveling may ascertain his rate of walking by the aid of a slight string, with a piece of lead at one end, and the use of a seconds watch. The string should be knotted at distances of forty-four feet; this distance is the 120th part of an English mile, and bears the same proportion to a mile that half a minute bears to an hour. If the traveler when going at his usual rate drops the lead, and suffers the string to slip through his hand, the number of knots indicate the number of miles he walks in an hour. This is similar to the log line for ascertaining a ship's rate at sea; the lead in this case is enclosed in wood, (from whence the name) that it may float; the divisions are called knots, and are measured for nautical miles. Thus, if ten knots are passed in half a minute, they show that the vessel is sailing at the rate of ten miles or knots in an hour. A seconds watch would here be of great service, but the half minute sand glass is in general use. The use of a seconds watch is indispensable to a physician, to enable him to ascertain correctly the duration of spasms, convulsions, pulsations, etc. With the aid of a seconds watch, a person can count his pulse when in perfect health, and ascertain the number of beats in a minute; this would enable him to let the physicians know (when necessary to consult one) how much the pulse differed from its usual rate, otherwise it might happen to a person whose pulse was naturally quick, to have remedies prescribed to diminish the rapidity, which under these circumstances would be injurious. Independent seconds watches if properly made, are no more liable to get out of order, than those that have only one second hand, but they must be carefully used.

Since my first edition, a great improvement has been made in these watches. Those made at that period were not so good as those made at the present time.

Quarter and Fifth Seconds, and Pendant Watches.



These watches were used principally for "timing" at races, etc. By their use the time can be taken to a great nicety. This is done by means of a small thumb piece, at the side of the case, which either starts or stops the one quarter or one fifth seconds instantaneously, without disarranging the true time of your watch, no matter how often you stop or start it.

It is a great improvement to the old-fashioned watch with which you could only time to one second, besides not starting nor stopping so quickly, neither being so detached from the going part of the watch, as by the present mode.

Another advantage over some old kinds, is having only one set of hands to set.

The Pendant Winders are very useful in not requiring a key to wind them up or set the hands, and they have also lately been much improved. When the hands are being egulated it is not necessary to open them, thereby preventng small particles of dirt from getting into the movement from the key or winding-up holes. Both of the above are made in different ways, some watches have only the pendant winding arrangement added, while others have both the winding part and the seconds added to the going part. No one need be afraid that it will disarrange the time part; it will not interfere with it. (See engraving of pendant watch,)

The winding is accomplished by means of a fluted knob at the end of the pendant, which is furnished with a click work, so that it is impossible to wind it the wrong way, it working similar to the old-fashioned "Breguet" or click keys. Where the watch has the independent seconds, which requires two movements to be wound up; by turning one way, you wind the watch or time part, and by turning the other way, the seconds part is wound up. In the engraving these pins are represented; one is used to start or stop the seconds, and the other to set the hands, which is done with the same knob at the pendant; this represents a fifth seconds watch.

Where there are no independent seconds, there is only one pin at the side, but the arrangement of the pendant is the same. In the plain watch there are only two wheels connected with the winding part, while in the "Seconds" there are three, as represented in the engraving, for the purpose of winding both springs.

Be very careful if you purchase a "Winder" to get one of good quality, for if the winding part is not well made, and gets out of order, it is difficult and expensive to repair. If you get an inferior quality, you had better get a watch to wind with a square and a key. I have had several common ones to alter from winders to the old-fashioned square and key. This is done by making new barrel arbors, etc. With a well made watch of this kind, there is no more danger of its getting out of order than by the old method of winding.

These watches are certainly very handy, for wherever you may be there is no occasion either to open your watch, or fumble for the key. Be careful if the watch winds too hard to have it attended to immediately by a competent watchmaker. The difficulty in winding sometimes occurs through want of oil on the winding wheels, these being made of steel require oil to prevent too much friction. Should you force the wheels, some of the cogs or teeth may be broken, or injured, and it will then be difficult to replace them, especially in country places.

Most of these remarks apply to the fifth or quarter seconds, purchase of the best quality, and of well-known and respectable makers, of which I know several who would not allow an imperfect article to go out of their establishments. The possession of a watch of inferior quality, either quarter or fifth seconds, or pendant winder, will be a continual source of trouble and expense.

When your watch requires repairing or cleaning, be careful to put it in competent hands, for these watches, like chronometers, repeaters, and duplex watches, are not to be trifled with. Being complicated in their construction they are easily spoiled by persons who do not fully understand them. Should you require a cheaper or less complicated watch, read my remarks on other kinds, and make your selections according to your taste and means. I feel certain that if you follow my advice in this matter, you will be pleased with the choice you make.

Remember that a little neglect may breed great mischief. There is an old story that runs something like this: "For want of a nail the shoe was lost, for want of a shoe the horse was lost, and for want of a horse the rider was lost, for he was overtaken and slain by the enemy." All this misfortune through neglecting to have a nail put into a horseshoe.

Repeating Watches.

Repeating watches are expensive both in the first instance, and in the subsequent repairs, and the same objection may apply to them as to the chronometer and duplex watch—that is, the difficulty of getting them repaired. They are, however, a luxury to those who can afford them, and are as capable of accurate performance as ordinary watches of the same quality, the repeating part not in any way interfering with the general works of the watch. Minute repeaters are difficult to execute, and uncertain in the continuance of their proper actions, as the small space afforded in a pocket watch is insufficient for the greater number of pieces. The same may be said of musical watches now nearly out of date. These watches are principally valuable as specimens of art. The musical and repeating watch together as they were made, may be fairly regarded as one of the triumphs of mechanism, which unfortunately can only be appreciated by a watch maker. The apparently complicated notion of a Jacquard loom, when seen may be understood, for although composed of innumerable pieces, yet it has to repeat but few actions, which on being seen are easily understood.

Much ingenuity is required for the construction of engines of various kinds, but frequently the first element of mechanics are sufficient to produce them, while in their execution space can generally be obtained, and power produced at will. But the complicated motions of a repeating watch requiring to be produced in so small a space, and with such perfect accuracy, must be considered as one of the highest specimens of mechanical art. The writer when he first arrived in New Yoek in 1832, had with him a repeater with duplex escapement; this watch was made by himself, each separate part having been made as he had learned the different branches. He brought it for the purpose of having a specimen of his work. The first watch which he repaired was a musical repeater, which had lain by some time, on account of the want of workmen to undertake it. It was given to him by Mr. S. W. Benedict, Wall street, to ascertain if he really understood the construction; he succeeded in putting every part in good order. They have now become nearly extinct, and he has had but few of that kind of watch to repair since that one, although he frequently has repeating watches to do.

Alarm and Clock Watches.

Alarm and clock watches lose their effect from the ear becoming accustomed to them. More noise in striking is geuerally required than can be produced by a watch, while useful alarms and clocks can be had at much less cost. The writer, when apprenticed, worked at a watch in London, made for Arnold, which contained a clock that struck every quarter of an hour, and repeated the hours and quarters also at pleasure, and an alarm, all striking on different spiral springs. Thus with the watch part, it had four distinct sets of wheels and springs, and the escapement, which was a Duplex; it had also five spiral springs for the striking. Although the size did not exceed that of an ordinary English watch, the cost when finished in gold cases was four hundred guineas (two thousand dollars). But few such watches were ever made, neither ought they to be.

Double Power Watches.

About thirty years since there was a great demand in England for flat and small watches, but the difficulty was the want of power to the spring. After a great amount of labor, my uncle succeeded in inventing a movement with two barrels and two springs, both winding by only one square at the same time, hence the name of this watch. The invention he sold to Messrs. Dwerrihouse, Carter & Co., of London, who patented it. For many years after they were all the fashion, as by this plan English watches could be made as thin as Swiss, and perform better. They being very expensive, and the patentees having a store for retailing in the best part of London, found customers for all they could make—therefore they were not made for the trade, nor for exportation. This is also the case with the watches made in Paris by many of the celebrated makers, such as Breguet, Le Roy, Lepine, and many others, having made but few and at great expense, they are only found in the possession of the wealthy.

Watches of Fancy.

Watches of fancy, such as those showing the hour through a dial, changing with a start, were absurd, and should be used as toys only—they are now out of date. Some very good watches are made to mark the days of the week and month. There is frequently much skill and ingenuity displayed in their construction, but the purposes can better be accomplished by a well made clock of sufficient power. Fancy has certainly placed watches in most inappropriate places—in the lids of snuff boxes, in shirt studs, breast pins, etc. The Elector of Saxony had a watch in the pommel of his saddle. The writer worked at the making of a repeating watch for George the Fourth (who was a great patron of the art), to be worn on the finger ring; he had a cabinet containing specimens of every kind of new watch produced, and used to amuse himself by keeping them going, to see which performed the best. Watches made for ladies' bracelets may however, be so constructed as to be serviceable. I might describe other kinds of watches, such as those that wind up and set the hands by the pendant. Repeaters which strike the hour on a pulse piece at the side of the case for the use of the deaf; others with the figures raised on the dial, for the use of the blind, but as most of these watches are extinct, it will be useless to describe them.

American Watches.

This watch recommends itself for the simplicity of its construction, and will be continually improving in quality, if the manufacture remains in the hands of persons who will make it of a good quality, without regard to price. In case of accident it is easily repaired. But I would suggest to any of my fellow craftsmen having them to repair, to be particular to use none but the very best main springs, should new ones be required for them. There are many manufactories of watch cases, dials, etc., in this country; in fact, any part or parts of a watch can be made here, and by applying to any good watchmaker, he will make them or get them made.

MANUFACTURING MINING, AND RAILROAD ITEMS.

A report of the Connecticut Railroad Commissioners, just submitted to the Legislature, represents the condition of the several roads in the State to be in a high degree satisfactory. A large increase in passenger traffic the past year is noted, the aggregate amounting to an excess of nearly a million and a quarter over the previous year. The whole number of passengers carried over the various lines was only a trifle under seven millions, with the loss of but one life by any casualty. Few States can show so clean a record and this fact speaks well for the management of the roads in the "land of steady habits." The gross earnings show an increase of over half a million dollars as compared with the previous year.

The United States Geological survey of Nebraska demonstrates the existence of extensive deposits of coal west of the Mississippi, on the lines of the projected railways to the Pacific. In the Laramie plains, the coal beds are from five to eleven feet in thickness, and occupy a basis of about five thousand square miles. Along the eastern base of the mountains in Colorado north of the Arkansas river, beds of solid lignite, or coal of more recent formation than either anthracite or bituminous, extend over many thousand miles of territory. These beds are the remains of extinct forests, and the forms are still distinguishable of oak, hickory, linden, maple, buttonwood, poplar, and magnolia trees.

At Ferry Hill, near Birmingham, Eng., is a new iron manufacturing establishment, which has nine blast furnaces just finished, and about commencing operations. Of these, seven are 82 feet high by 22 feet diameter, and two measure 105 feet in hight and 28 feet in diameter. The supply from these monster furnaces, it is estimated, will amount to at least 180,000 tuns of pig iron annually.

During the present month, the famous Mount Cenis railway is promised to begin operations, for although we have no reason to doubt that the trip over the mountain, so graphically described by our exchanges, and reprinted in our columns some months since, actually took place, there has been some hitch somewhere, preventing the satisfactory operating of the railroad. But every arrangement now having been made, the announcement is made on the best authority that trains will run regularlarly before the close of this month. Twelve new engines have been ordered of Gouin & Co., of Paris and seven of them, at last accounts, were at St. Michel ready for action We await with interest for news of the successful working of the road.

The value of the yearly product of the scale establishment of Messrs. Fairbanks, at St. Johnsbury, is now over $2,000,000. The consumption of iron at the factory averages fifteen tuns per day, while there is a yearly demand for nearly two million feet of lumber. Four hundred men have found employment, and one thousand scales, large and small, are sent out from the establishment every week. From twenty to thirty per cent of this product is exclusively for foreign countries, excluding France, Spain, Germany, Turkey, China, and all the South American States, and curious it is to compare the divisions and symbols of graduation peculiar to these nations, which are marked on the scale beams of each.

The vast empire of Brazil boasts of but a single coal mine in working order, almost the entire supply for the imperial and merchant navy, gas works, railways, private and industrial purposes being derived from England. One of the great steam lines running to Southampton has a depot on an island in the Bay of Rio Janeiro, and here resort the steamers of all the English, French, American, and Brazilian lines plying to the ports, to obtain their supplies. Coal forming such an important article of importation, such places as Cardiff and Newcastle are placed in the first rank of ports which maintain commercial relations with the capital of the Brazilian empire.

By a new and simple process invented by a gentleman of Pottsville, Pa. rolled iron of any kind, rails, rods, bars, and sheets are produced from the ore with only one heating. The apparatus consists essentially of a series of vertical retorts with movable bottoms communicating with a puddling chamber. The retorts are charged with the broken ore and charcoal, and the molten iron, after reduction, is drawn off into a puddling chamber where the surplus carbon is burned out and the metal is piled into balls for the rollers. The fuel used in the operation is anthracite coal, through which a blast of steam is driven; the vapor of water is decomposed by the heat, the hydrogen, released, gives out an intense heat, and the liberated oxygen powerfully supports the combustion.

Black oxide of manganese has recently been found in great quantity in a mine on the Coast range of mountains in California. Several hundred tuns are ready for shipment at San Joaquin City.

Recent American and Foreign Patents.

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

SEAT FOR VEHICLES.—Lewis Pray, Portland, Me.—The object of this invention is to provide a movable folding seat for buggies and other light vehicles where it is frequently desirable to economize space.

FURNACE.—T. J. Leigh, London, England.—This invention relates to certain improvements in furnaces, and in effecting the combustion of fuel therein, whereby several advantages are obtained over the ordinary furnaces in use.

AUTOMATIC CROSS-FEED FOR LATHES OR BORING MACHINES.—Lewis Griscom, Mahanoy Plane, Pa.—The object of this invention is to accomplish the cutting of tapers on shafts and the boring of the corresponding tapering hole for the reception of the tapered shaft in a simple, accurate, and automatic manner.

FRUIT BUTTER STIRRER.—M. G. Collins, Baltimore, Md.—The frame which supports the stirring apparatus, and to which the lids are hinged, is attachable by thumb screws to the rim of the kettle. The stirring devices consist of a crank shaft, bevel pinions, and a vertical revolving shaft with arms.

CAR AXLE BOX.—A. H. Nathans and M. Thornton, Macon, Ga.—This invention is an improvement upon the axle box patented by D. H. Dotterer, April 3d, 1866, and consists in so constructing the spring packing plate used in his invention, that the oil cannot escape from the box, whereby the value of the whole device is greatly enhanced.

PLOW.—Thomas P. Warren, Norfolk, Va.—This invention relates to the plow patented by Warren and Woodhouse, on the 18th day of June, 1867, and consists in a new form and construction of the guide used in connection with the landside, and in a new method of attaching the moldboard to the standard, by which the parts are rendered more completely adjustable and the cost of construction is greatly reduced.

HAY AND COTTON PRESS.—Grey Utley, Charlotte, N. C.—In this invention the form of the press box and platen is the same as that now in common use, but by a new arrangement of guide rods for the platen in connection with a novel clamp and hand levers, the press may be operated by hand more rapidly and with greater advantages in regard to the application of the power and its full utilization than any of the hand or power presses now in use.

CORN PLANTER.—John Ellbertson, Kirksville, Mo.—In this invention the corn is planted by an instrument which can be carried in one hand and used in the manner of a cane. The device is intended to facilitate the work of planting or dropping the seed, and to obviate the necessity of stooping for that purpose.

APPARATUS FOR MAKING CARBONATE OF LEAD.—Otto Jacobi, Philadelphia, Pa.—This invention relates to an apparatus for converting, by the action of acetic and carbonic acids, lead into carbonate of lead. The invention consists in combining with a converter in which the lead is contained, a vinegar making apparatus and a furnace, all acting in conjunction with each other, the heat of the furnace causing the vapors to arise from a vessel containing vinegar mash, and to travel to the vinegar apparatus, whence the acetic acid arises into the chamber or chambers that contain the lead, converting the lead or its outer faces into acetate of lead. Carbonic acid is then conducted into the converter to transform the acetate into carbonate of lead.

FLOUR SIFTER.—Johann Nowak, New York city.—This invention relates to a flour sifter to be especially used by bakers, its object being to facilitate the process of sifting the flour and to economize labor.

LINIMENT.—William P. Hamlin, Exira, Iowa.—The object of this invention and discovery is to provide an effective and sure remedy for wounds and bruises, and for most of the pains with which mankind are afflicted.

PROCESS IN MANUFACTURING BILLIARD BALLS.—William H. Lippincott Pittsburgh, Pa.—This invention relates to the manufacture of balls used in playing billiards, baggatelle, and other games where globular balls are employed, and the invention consists in forming such balls of vulcanized india-rubber.

AMMONIAIZING SUPERPHOSPHATE OF LIME.—John S. Ramsburgh, New Market, Md.—This invention consists in ammoniaizing superphosphate of lime in such a manner that its tertilizing qualities will be preserved when the same is exposed to the atmosphere.

FINGER FOR SHUTTLE STOP MOTION FOR LOOMS.—E. S. Laney, Waterloo, N. Y.—The nature of this invention relates to improvements in fingers for shuttle stop motions for looms, whereby the same are made less liable to get out of proper position on the oscillating rod which actuates the touch off fingers, by reason of the sudden shocks and strains to which they are exposed rom the action of the shuttle.

MACHINE FOR MAKING PAPER PULP.—Warner Miller, Herkimer, N. Y.—This invention relates to an improved mode of operating the followers, whereby the wood to be ground is pressed against the periphery of the stone, a positive mechanical device being used in the original patented machine, but in this springs or weights are employed, so arranged and applied that the machine is greatly simplified, and made to operate in a more perfect manner. It also relates to an improvement in the screening apparatus, whereby the pulp is not only deprived of all coarse, foreign substances, but also separated or divided into two or more different qualities with respect to the length and diameter of its fiber, whereas the original machine separated the pulp with respect only to the diameter of its fiber, and the different parts thus separated discharged from the machine at separate points, so that they cannot mingle with each other.

LAMP BURNER.—Wm J. Ross, Worcester, Mass.—This invention relates to a lamp burner, and it consists in the application of vents or tubes to the burner or socket thereof, for the purpose of admitting external air into the lamp and preventing explosions, now due to the accumulation of vapor or gases in the lamp, above the oil. It also consists in a novel and improved means for raising and lowering the wick, and in an improved fastening for securing the chimney to the burner; and finally, in an air guide constructed in such a manner as to prevent or conduct the air to the flame, and cause the latter to burn in the most favorable manner, both as regards form or shape and illuminating power.

LOADING HAY AND GRAIN.—S. R. Higgins, Parma, Mich.—This invention relates to a machine to be attached to a wagon or cart for the purpose of loading the same with hay or grain as it is drawn over the field.

WHEAT DRILL.—James W. Davidson, Mount Auburn, Ill.—This invention has for its object to furnish an improved machine for sowing wheat or other grain in drills, which shall be convenient and accurate in operation, and which shall cover the grain at a sufficient depth beneath the surface of the ground to protect it from the winter.

CHART OR MAP ROLLER.—E. L. Hagar, Empire City, Col. Ter.—This invention relates to a roller for maps or other similar charts, and it consits in arranging the roller therefor within a case, that is suitably constructed to allow the map or chart attached thereto to be rolled up or unrolled at pleasure through and by means of cords and tassles, or other suitable devices, the case encasing the charts when rolled, and protecting them from becoming soiled or injured.

STUMP MACHINE.—Isaac J. Bogert, Fayette, Iowa.—This invention has for its object to furnish an improved machine for pulling stumps, raising and moving heavy weights, etc., which shall be simple in construction, easily operated, and powerful in operation.

PALLET FOR WATCHES, ETC.—Charles E. Mason, Elgin, Ill.—This invention relates to a novel manner of inserting the jewels or pallets in the block or stud provided for them.

COMBINED BEDSTEAD, CHAIR, SECRETARY AND WARDROBE.—Wm. Reckards, New York city.—This invention relates to a combination of a bedstead, chair, secretary and wardrobe, and it consists in a novel constructio and arrangement of parts, whereby the device may, by a very simple manipulation, be converted into any of the articles above mentioned, and when not in use be capable of being adjusted or folded up to represent a book case, or other similar piece of furniture.

ANNUNCIATOR FOR HOTELS, ETC.—N. A. Patterson and H. T. Carr, Winchester, Tenn.—This invention relates more particularly to an annunciator for hotel purposes, though the same mechanism and principle may be applied to other buildings, as large publishing houses, manufactures and stores. It consists of two corresponding dials, on which are written, engraved, raised, printed, or painted, the wants or orders common in whatever building or business the annunciator is designed to be used.

LAMP BURNER.—Gilbert Lavere, Bridgeport, Conn.—This invention consists in the combination of two chambers forming an essential part of a burner for petroleum lamps, together with other devices perfecting the whole.

POLE TIP.—Alonzo Benedict, Albany, N. Y.—The object of this invention is to provide a metallic tip for the tongues or poles of carriages, which will not strain the leather of the neck yoke to so great a degree, nor distort the same to so great an extent as the pole tips heretofore used, and which will enable a lighter and neater neck yoke leather to be used.

APPARATUS FOR OPERATING HORSE HAY FORKS.—George M. Robinson, New Wilmington, Pa.—This invention has for its object to furnish an improved device for supporting and holding the fork while carrying a fork-load of hay to the mow and while returning empty for another load.

EXTENSION TABLE.—De Lance Cole, Marshall, Ill.—This invention has for its object to furnish a simple, inexpensive, convenient, and substantial means for enlarging or extending an ordinary breakfast or dinner table to any desired size or extent.

SPRING SEAT FOR SADDLES.—Robert J. Steele, Jr., Rockingham, N. C.—This invention has for its object to furnish an improved spring seat for saddles, which shall be so constructed and arranged as to be easy and comfortable to the rider, however rough may be the horse's gait.

PERPETUAL CALENDAR.—Charles T. Pooler, Deansville, N. Y.—This invention relates to a calendar which is so arranged that it can be used continually to record the days of the week or month, and that the days of the week can be set over the figures of each month in such a manner that the device is applicable for each year.

TOBACCO PIPE.—Henry G. Dayton, Maysville, Ky.—This invention relates to a tobacco pipe which consists of an outer bowl, without a bottom, and of an inner bowl that is fitted into the outer bowl, and that is, by the tube projecting through a perforation into the inner bowl, held in place.

ADJUSTABLE COUCH.—Godfrey Widmer, New York city.—This invention relates to a couch which is provided with an adjustable head rest, so that it can be adapted to any desired position of the body. The invention consists of a longitudinally and transversely adjustable frame, upon which a sheet of canvas or other fabric is stretched, and of a frame swinging within a fixed frame and projecting above the same, so as to elevate the canvas and to form the head rest of the couch.

WATCH.—Charles Springer, Newcastle, Pa.—This invention consists in applying about and around the standing collar surrounding the winding arbor, a center square which moves the hands, or both, of a watch movement, for instance, of that class known as the "American," an adjustable grooved collar, having a suitable packing medium, to form a tight and close joint when the watch is shut, with the case thereof, and thus exclude the entrance of dirt to the interior mechanism of the movement.

BAIL EARS FOR PAILS.—Jonathan Walton, Brooklyn, N. Y.—This invention relates to an improvement in bail ears for wooden and sheet metal or tin pails, and it consists in constructing the ears of wire bent in proper form and attaching them to the pail either by clinching or by soldering.

CORN PLANTER.—A. J. Going, M. D., Clinton, La.—This invention relates to a machine for planting corn and other seed, such as peas, rice, etc., and is an improvement on that class of seeding machines in which a rotating wheel provided with seed cells in its periphery is used for a discharging device. The invention consists in a peculiar application of a small metallic plate, whereby the seed cells of the wheel, as they rotate and pass from underneath the hopper, are cut off from the grain or seed contained in the latter, so as not to have the seed cut, bruised, or injured in the least.

AERIAL NAVIGATOR.—Zaphna Stone, Kinsman's, Ohio.—This invention relates to a device for navigating the air, and it consists in constructing a balloon in a novel way, whereby it may be made to rise and descend at the will of the operator or navigator, and be under the complete control of the latter.

CORN PLANTER.—Wm. H. Fish, Scarsdale, N. Y.—This invention relates to a device for planting corn and other seed in hills, and it consists in a novel construction and arrangement of certain parts, whereby the seed may be dropped regularly at proper intervals.

WATER INDICATOR AND ALARM ATTACHMENT TO STEAM BOILERS.—Thomas Flinn, Brooklyn, N. Y.—This invention relates to a device for indicating the hight of water in steam boilers, and for sounding an alarm if the quantity of water should rise or fall in the boiler beyond the required limits. The invention consists in the use and combination of a cylindrical vessel, which is screwed or otherwise secured upon the boiler, with a rod which is supported by a float above water, and which fits into the cylindrical attachment, having a pin by means of which the hight of the water will be indicated on a graduated scale arranged on the cylindrical vessel.

SUSPENSION BRIDGE.—Edward M. Carpenter, Middletown, N. Y.—This invention relates to a suspension bridge which is so arranged that it can always be held tense, and that it does not depend upon the construction and strength of the top and bottom cord. The invention consists in making each of the uprights of the bridge of two pieces, which are not at all connected with each other, and between which from above a wedge is inserted, which drives the upper ends of each pair of uprights apart, thereby stretching all parts of the whole bridge frame, and producing the desired arch.

SPOOL HOLDER.—A very neat contrivance for holding spool cotton is the invention of G. A. Pridham, Newark, N. J., patented Jan. 28, 1868. Spools of various numbers of thread are placed in a row inside a plated holder, the size being engraved on the outside of the case, so that any required number may be tried by the seamstress without taking the spool from the case till the thread is used up.

DOOR BOLT.—G. A. Pridham, Newark, N. J., patentee.—The advantages of this invention are that it is impossible for the bolt to be moved except by the knob on the inside of the door. This knob combines a screw fastening, which is forced against the bolt after it is operated, and holds it firmly in place, so that it cannot be forced back from the outside. J. H. Jillson, general agent, corner of Walnut and Mulberry streets, Newark, N. J.

THAWING OUT FROZEN WATER PIPES.—William Young, Easton, Pa.—The object of this invention is to provide means for readily thawing out the ice in water pipes when they become unserviceable from freezing, and also to be used for other purposes of a similar nature, and the invention consists in the use of steam for that purpose in the manner described.

FURNACE FOR THE MANUFACTURE OF CAST STEEL.—Francis Ellershausen, Montreal, Canada.—This invention relates to a furnace for the manufacture of cast steel from pig iron, in conjunction with wrought iron or iron ore, and for the purpose of smelting blistered steel in large quantities, and for re-smelting metals in general. The invention consists in the novel combination of two fire chambers, which are separated by a bridge; a large crucible being set up in one chamber, the fire in which chamber surrounds the crucible, while the other is a reverberatory fire chamber, by means of which the heat around the crucible is brought to an extreme degree.

VENTILATING COOK STOVE.—Luthur M. Parsons, Waukau, Wis.—This invention relates to a method of ventilating a room and of supplying the necessary air to the burning fuel, and it consists in arrangement of flues, dampers, and pipes, whereby the impure air in the upper portion of a room is made to supply the fire, thereby preventing the current of fresh and healthy air which flows toward the stove on and near the floor to supply the draft from being drawn off, but retaining it for purposes of respiration.

HEMP BREAKING MACHINE.—J. S. Hoskins, Spring Hill, Mo.—This invention relates to a hemp breaking machine, and consists of a main frame on which are set two rollers on the peripheries whereof are a number of sharp pins similar to the hackle teeth of hackling cylinders.

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.*

R. A. D., of Fla., asks the amount of feed per certain number of revolutions of a circular saw working in hard Florida pine. "Doctors disagree" in this matter. A good manual on sawing is Parson's "Sawyers Companion."

F. W. W., of Md., asks if "a small boat twenty feet in length, if built for the purpose, can be propelled with less exertion by a propeller wheel than by two oars, and what should be the pitch and number of blades." Experiment alone can determine the relative value of oars and screw under such circumstances. There are, however, several objections to the latter on a small boat, apart from the question of relative speed or ease of propulsion.

E. H. B., of Mich.—The Watt formula for horse-power of a steam engine can be found in Muirhead's "Life of Watt," and that and the difference between nominal and indicated horse-power has been repeatedly shown in our columns.

Business and Personal.

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

Two sets superior iron-frame cards, 48-in. breakers, 40-in. finishers, one 30-in. double-cylinder roll card, one 24-in. do., one 200-spindle jack. For sale cheap. Apply at Union Iron Works, Rhinebeck, N. Y.

Wanted—the address of every canvasser in the United States. Send two stamps to P. & K., Box 2339, Cincinnati, Ohio.

I desire to buy a popular patent for the State of New York. Address A. Roberts, Box 2961, Buffalo, N. Y.

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.

Broughton's graduating lubricators for steam engines cannot leak, and are the only reliable ones.

Manufacturers of W. H. Culf's patent pump send card and price list to R. C. Vanderford, Centralia, Nemeher county, Kansas.

Funston's electric toy.—See advertisement.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

First class lock makers wanted. Address Jones & Nimick Manufacturing Co., Pittsburgh, Pa.

Make your patents pay!—J. H. White, Newark, N. J., will make and introduce to the trade, all descriptions of metal goods.

Olmsted's oilers—the most durable and convenient made. Sold by all dealers from Canada to California.

H. F. Speer, Rockport, Ind., wishes to purchase a small locomotive similar to the one described in this paper April 4th.

Broughton's standard oilers are the only really first-class oilers.

Volumes, numbers, and entire sets of Scientific American for sale. Address Theo. Hagar, Box 773, New York city Postoffice.

Agents wanted for Allison & Co.'s iron cement. It will stick anything together, and is not affected by water. A sample bottle will be sent, postpaid, to any address, on receipt of 25 cents. Allison & Co., Box 118 Sing Sing, N. Y.

Joseph Anzer, Box 762, Ashtabula, Ohio, wants an endless screw 3½ inches long, and worm, 16 to 18 inches diameter, center bore 1¼ inches.

Winans' Incrustation Powder, (11 Wall st., N. Y.) A positive remedy for scaly boilers, warranted effective and uninjurious. 20,000 refs.

NEW PUBLICATIONS.

MAP OF THE UPPER PART OF NEW YORK CITY, including a Topographical View of the Central Park. Hamilton E. Towle, C. E., City Surveyor.

This is an elegant pocket map of that portion of New York extending from a point two blocks below the southern end of Central Park to Spuyten Duyvil Creek, the upper or northern boundary of the city, with a representation of the proposed "west side" improvements, and correct plans of the Central Park and other reserved territory, with a route of the avenues and the proposed new Boulevard, all made from actual surveys and drawn to scale. It is the clearest, most definite, and comprehensive map of that portion of the city, except the one attached to the Central Park Commissioners' Report, we have yet seen, and will give the citizen as well as the stranger a correct idea of different points, and serve as a valuable guide to persons desiring to purchase desirable lots in this Babylon of the Western Hemisphere. The map is produced in colors by the American Photo-Lithographic Company, and may be obtained of the publisher, 78 Cedar street, New York city.

CENTRAL PARK REPORT.

We are indebted to Andrew H. Green, Esq., Comptroller, for a copy of the report of the Board of Commissioners for the year, 1867. It comes to us copiously illustrated with cuts and maps, showing the progress made in various works in charge of the Board. The expenditures for the year in construction amount to $199,264.06. A statement of the works completed during the year comprises many details of interest to the visitor to the Park, but which we have no space to describe. Many structures of rustic work, harmonizing well with the natural surroundings have been completed. The children's shelter is the most extensive example existing of this class of wood work. Experiments have been made for several years with cement, asphalt, concrete, and pavements of various sorts, none of which have proved entirely satisfactory, though some have developed valuable qualities. Several pieces of work were laid in the Park during last fall with a composition of tar gravel, and cement. The materials have been put down in several different methods on the Park in various localities, and with a variety of substructures, for the purpose of testing their merits. On the whole the Central Park annual reports are the most comprehensive and neatly got up of any of the hundreds of reports, from corporations and associations, which are being constantly received at this office. The execution is exceedingly creditable to the compiler.

THE GALAXY. May. Sheldon & Co., 498 Broadway.

The new publishers have improved and enlarged this magazine, and it is now one of the handsomest and best of our numerous monthlies. Price $4 a year.

Improvement in Trunk and Door Locks.

A cheap lock, without complication of parts and not liable to get out of order, or easy to open by skeleton keys or temporary appliances, is a very desirable improvement. Such seems to be the one shown in detail and in several aspects in the accompanying engraving. Ordinary trunk and satchel locks are generally of such a plan and construction that they can be easily opened, even without their proper key, and are very liable to break, particularly when under the control of "baggage smashers"; and even door locks, on which night keys are used, do not always prevent surreptitious entrance.

The working parts of this lock are contained in a circular case, but they may be attached to a lock or case of any other form. The base or back of the lock—that portion permanently attached to the trunk or lid—is shown in Fig. 1, which gives the inside view. It is secured to a trunk, valise, or traveling bag by screws, passing through the holes shown, by rivets, or by any other sufficient means. Near its circumference is a raised circular flange, having on one side three or more parallel slots, A, and exactly opposite an equal number of drilled holes, B. Over this fits a cup-shaped disk, Figs. 2 and 3, having in its center a solid bolt, C, with a T-head, the end opposite the head being firmly seated in the body of the disk. When the part, A, and the disk, Fig. 2, are brought together, the head of C passes through an oblong slot in the central plate, D, and through a similar aperture in the base plate, A, when a quarter turn of the movable part, Fig. 2, brings the head of the bolt, C, across the slot, firmly uniting the parts, as in Fig. 2.

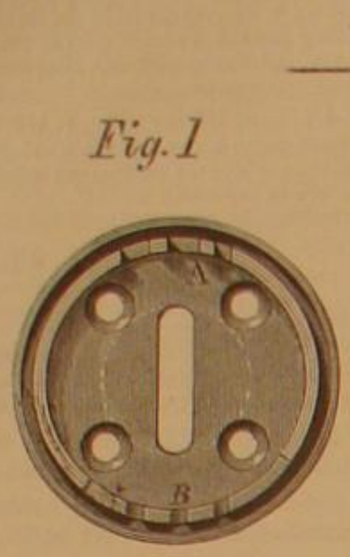


Fig. 1

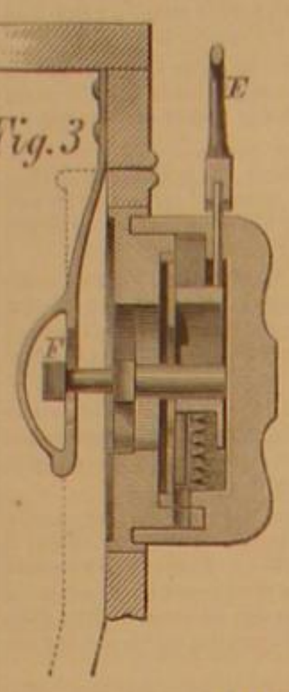


Fig. 3

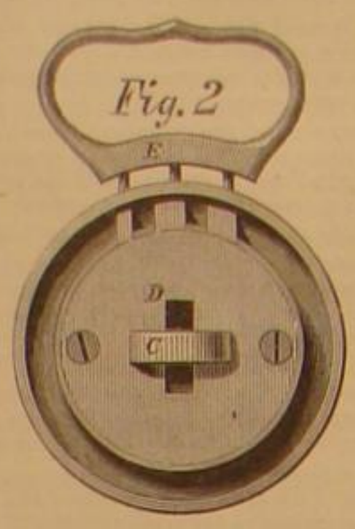


Fig. 2

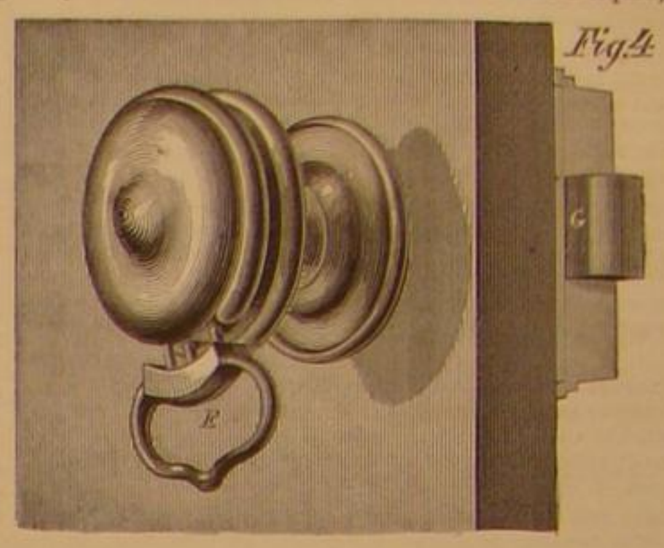


Fig. 4

RUPPEL'S PATENT LOCK.

Between the center plate, D, and bottom of the cup disk, is a recess containing two, three, or more bolts lying in parallel recesses. These bolts are actuated at one end by springs, which force them out against the inner part of the flange, and at the other end by the action of a key, E, having as many pins as there are bolts. The pins of this key, being inserted into holes in the rim of the cup disk and pressed against the bolts, force them inwards until their ends correspond with the circumference of the ring holding the plate, D, when the lock may be opened and the parts separated.

Fig. 3 is a vertical central section of the lock, attached to a trunk. In this case the central bolt is extended through the base plate, and has a secondary T-head, F, passing through a slot in a plate attached to the trunk lid.

Fig. 4 shows the attachment of the lock to the knob of a door lock—the whole lock being contained in the knob. When the door is to be opened, as by a night key, the key, E, is inserted, which allows the knob to be turned and at the same time furnishes a lever to assist in turning it. By turning the knob half way around when the key is in, so that the apertures of the knob are on the top, the door can be opened as by any ordinary knob, and at all times the bolt, G, may be moved from the inside. The key, E, is absolutely necessary for opening the lock to which it belongs, as its pins are adapted exactly, in their length, to the bolts of each individual lock; and if an attempt is made to open the lock by the insertion of separate pins or wires, one single bolt may be pushed in too far, which will effectually prevent the turning of the cup disk by the protrusion of the back end of the bolt through the holes, B, in Fig. 1.

Patented through the Scientific American Patent Agency, January 28, 1868, by George Ruppel, Harlem, N. Y., who is desirous to dispose of the patent, or the right to manufacture.

Fire-Proof Bronze Color for Copper and Brass.

One-sixteenth of an ounce of crystallized verdigris, and the same quantity of finely pounded muriate of ammonia, are to be dissolved in five-sixths of a pint of rain water, the solution left standing covered for three to four hours, and then 1½ pints more water poured into it. The copper vessel, which must be perfectly clean, is now to be held over a charcoal fire until it is equally heated throughout and becomes uniformly tarnished. The copper is now to be rubbed over with the mixture and then carefully dried.

After five or six repetitions of this treatment, the copper receives a brass color; after from six to ten repetitions, it acquires a fine yellow. If the copper is now to be changed from yellow to brown, it must no more be wetted while hot; if, however, it be desired to have it very pale brown, the process must be repeated twenty or twenty-five times. When the desired color is attained, the copper is to be laid in clean water, taking care to clean it or dry it rapidly after taking it out. This must be done carefully. The copper is then held over a weak charcoal fire, when the bronze becomes permanent and fire-proof. To give a fire-proof, brown, bronze color to brass, the following is the process:

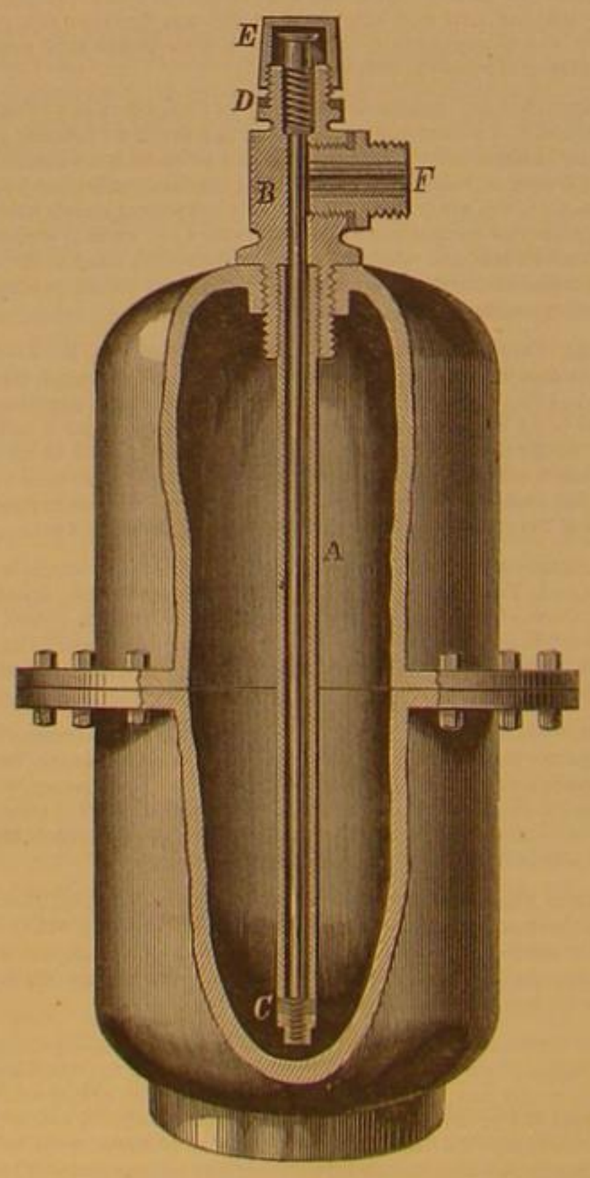
3/2 of an ounce of crystallized verdigris and the same quantity of sal-ammoniac are mixed with five-sixths of a pint of rain water, and left to stand from two to three hours. The brass is then to be rubbed over with it from two to three minutes, when it becomes green. 1½ pint of rain water is now to be added to the solution. The metal is now held over a charcoal fire, which must not be too strong, until it acquires a copper color. It is then again wetted, and left to dry by evaporation. When it has been treated in this manner four or five times, it becomes olive colored. The heat may now be somewhat increased, but it is necessary to be very careful that the metal does not become too hot. When it has been treated nine or ten times in this manner, it becomes brown. As long as any greenish places are to be seen, however, this treatment must be continued, in many cases twenty to twenty-five times before the required color is obtained.

If, however, the metal be strong, the materials are to be dissolved in hot rain water, and the metal rubbed with it immediately until it acquires a fine dark green color; it is then to be held over a strong charcoal fire, by which means it acquires a fine brown color after ten to twelve repetitions of the treatment. It is necessary to be careful that the metal is equally heated throughout. If spots appear, they must be bitten out during the work and polished with brick dust.—*Gewerbeblatt aus Wurtem.*

SCHNACKENBERG & ROSENKRANZ' IMPROVED FEED FOR SODA FOUNTAINS.

The object of this device, for which a patent is now pending through the Scientific American Patent Agency, is to furnish a ready means for preventing the flow of the carbonic acid solution into the delivery pipe from the fountain, to make the transportation of the filled fountains easier and more convenient, and to allow the attachment and detachment of the delivery pipe without annoyance, danger, or trouble.

The pipe, A, of india rubber or any suitable material is attached to the metallic head, B, which screws into one end of



the fountain. The pipe is of such a length as to reach nearly to the bottom of the fountain. Inside the tube is a metallic rod furnished with a nut and elastic washer, C, at its lower end, and at the upper end with a knob and spiral spring. Over this knob is screwed a thimble, E, which, being screwed down, depresses the rod and opens a space between its nut and washer at the bottom of the tube, to allow the passage of the gas charged liquid to the delivery plug, F.

In transporting the charged fountain it is necessary only to partially unscrew the cap, E, allowing the spiral spring, D, to act in conjunction with the outward pressure of the gas against the bottom of the rod, to prevent the escape of the liquid; and at any other time the outflow of the contents of the fountain can be prevented or regulated by the same means.

Address Schnackenberg & Rosenkranz, care of the American Mineral Water Co., President street, between Nevins street and Third Avenue, Brooklyn, N. Y.

Notes on Recent Scientific Discoveries and their Practical Application.

BOTTLING LAUGHING GAS.

The use of protoxide of nitrogen, or laughing gas, as an anæsthetic agent, is no novelty, and would require no notice here, but for a suggestion recently made in the *British Medical Journal*, which offers a problem to mechanics. It would be very inconvenient for surgeons to be driving about with large bags of gas for administration to their patients. There are inconveniences also in the preparation of the gas on a small scale which disappear when the manufacture is carried on in a moderately large way. Now laughing gas can, by great pressure or intense cold, be condensed into a liquid, and the suggestion of the journal we mention is, that liquid protoxide of nitrogen shall be sold, from which at any moment, by merely turning a tap, a bag of gas can be obtained for inhalation. To carry out this idea, bottles are required which will stand a pressure of at least 800 lb. The pressure at which the gas liquefies is about 30 atmospheres at the freezing point, so perhaps for a bottle to be perfectly safe at our ordinary temperature, it should be proved to 1,000 lb. There can be no difficulty, we should think, in producing such a bottle of cast steel, so light that a surgeon might take it with him on his rounds, and if there are all the advantages claimed for protoxide of nitrogen as an anæsthetic, there will probably be a considerable demand for such bottles. As regards the manufacture of the gas, and its liquefaction, these are very simple matters; the desideratum of to-day is a safe and portable bottle to hold the liquid, and we have little doubt that this will soon be furnished.

METALLIC CEMENT.

A very strong and durable metallic cement, we read in a German *Mechanics' Journal*, is formed when a mixture of equal parts of oxide of zinc, sulphate of lead, peroxide of manganese, and oxide of iron is made into a paste of proper consistence with boiled lineeed oil.

BRASS PICKLING.

Dr. Hiller writes that the brownish red color often obtained when brass work is pickled in the usual mixture of acids, may be avoided by making use of a mixture of equal parts of commercial nitric and sulphuric acids. Articles dipped in this mixture, and then well rinsed in cold water have, he tells us, a very beautiful deep yellow color.

A NEW OIL CAN.

A new can for applying lubricating oil is described in *Cosmos*. It is a cylindrical vessel of a size that can be grasped by the hand, and is much the same in shape as that in common use. The top, however is flexible, and there is a spiral spring in the interior. When oil is required the workman presses with his thumb on the top and forces just the amount necessary. On removing the pressure the spring restores the can to its shape, and the oil in the long spout is forced back by the influx of air. Thus there is no waste of oil by dripping.

EXPLOSIONS OF RED FIRE.

The frequent recurrence of such accidents as that at Nottingham—not often, however, so fatal in their consequences—justifies us in giving a general caution to any readers who may be disposed to amuse themselves with making colored fires. The ingredients for red fire should be powdered separately, and they should be mixed in a sieve, and never in a mortar by means of a pestle. With this precaution the mixing of the color is perfectly safe; but the liability to spontaneous combustion some time after it has been mixed is as great as ever. The spontaneous combustion, however, is not attended with explosion.—*Mechanics' Magazine.*

New Suspension Bridge.

The Legislature of New York has authorized the erection of a suspension bridge over the Hudson river, at the Highlands. The total length of the bridge will be 2,499 feet; between the towers it is 1,665 feet, and the clear span is 1,600 feet. Its hight above high water is 155 feet; it will bear a pressure of 5,280 tuns, and the breaking strain is 25,171 tuns. It could bear up at once 60 locomotives and 34,560 people; but 53 locomotives and 18,000 people would fill it. It will have twenty cables, each about fourteen inches in diameter, and these cables will contain 70,302 miles of steel wire. The towers will be 280 feet high. The iron and steel in the bridge will weigh 17,005 tuns.

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NEW YORK, SATURDAY, MAY 30, 1868.

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THE USE AND CARE OF EDGE TOOLS.

It is said that Yankees are the most inveterate whittlers in existence, and we once heard one of our Yankee friends remark that the most valued and indispensable of his personal possessions were a pocket knife, pocket comb, and watch, with true national or natural instinct placing the knife at the head of the inventory. We say "national" instinct, because no American thinks of going without his pocket knife, which is to him a *vade mecum*, applicable to a hundred purposes and continually in demand. Yet comparatively few who consider the pocket knife a necessary adjunct seem to understand its care. It is seldom one can borrow a sharp knife from an acquaintance. It is either left as it came from the manufacturer, or has its edge rounded so its cross section is a conical wedge, or it is abraded to tenuity by the action of the coarse stone of the street grinder's machine, one of the most ruinous contrivances for sharpening knives or razors. But beside the neglect of the edge of a knife blade, the heel, which acts on the back spring, and the rivet in which the blade turns are seldom oiled, and it requires an effort not only to open a blade but also to close it.

As the pocket knife comes from the manufactory or store its edge is unfit for use; it may cut butter or cheese, possibly soft wood, but it will not pare finger nails nor sharpen lead pencils. It needs the hone and strop to produce an effective edge. And in the proper use of the hone or oil stone many are quite ignorant. First, nothing but a good oil stone is fit for sharpening a knife blade. Ordinary "whet stones," mere sand stones to be used with water, or dry, are too coarse; they are but fixed grindstones and rapidly abrade the substance of the blade without giving it an edge. The Turkish oil stone is greatly affected by some, but it is quite hard, and fit only for giving the finishing touch to very delicate tools. The Wachita, or Ouachita stone we prefer for pocket knives and for ordinary tools. The philosophy of whetting or honing is a gradual and mutual abrasion of the particles of the stone with those of the steel. The oil, with its glutinous quality, holds these commingled particles so that by the movement of the blade they act on the steel and abrade it very gradually. If the stone is too hard it quickly glazes and the blade slips over a perfectly smooth surface, producing no action on the hardened steel; if too soft, the stone allows the edge of the blade to disintegrate its surface and heap up a ridge of quartz-like or flinty particles, which produce a round or "stunt" edge, that in time must be removed by the action of the grindstone. One accustomed to sharpening knife blades can easily tell when the operation of honing is going on properly, and only experience can fully teach the process. There should be a certain feeling of resistance in the operation. The motion for whetting or honing should be circular; not as in stropping a razor, merely back and forth. The educated fingers will readily feel when the blade bears properly on the surface of the stone, and will guard against the mere abrasion of the back and the cutting in of the edge. This art can be only acquired by practice.

Few can hone a razor. Some barbers have the happy faculty, but generally it is an art little understood. The stone should be a fine Turkish stone perfectly clean and the oil used should be purified porpoise or nice sperm oil; pure olive oil is good. The blade of a razor is concave. The wedge like edge extends in its bevel but a little way back. In honing a razor the fingers should feel the back as well as the edge of the blade bearing; the back protects the edge. The motion should be the same as in honing a knife blade, circular. Few can hone a razor properly on the first trial.

In stropping razors most people fail. They will use a too yielding medium which rises suddenly as the edge passes over it and undoes what has just been done. Many turn the razor or knife blade on its edge. Unless the blade is lifted clear from the strop, just before turning, the tendency is to strop off the edge already on. A blade should be drawn from heel to point, starting at the heel and drawing it diagonally to the point, and should be always turned on its back.

Oil stones, as seen in the shops, are frequently worn concave. It is unnecessary to say that stones in this form will not produce a true edge. If the workman has not acquired skill enough to wear the stone evenly, as much at the ends as in the middle, he should occasionally grind the oil stone and reduce its surface to a level.

In the machine shop and the carpenter's shop—wherever edge tools are used—the oil stone is invaluable. It should, however, be used with discretion. If the tool is soft a short bevel should be given to the edge; if hard, it will stand a very thin edge, but the practice of producing a temporary edge by honing or whetting will not give even the best present result, and will necessitate a frequent resort to the grindstone, the office of which is only preparatory to the production of a good cutting edge.

The use of rapidly abrading substances, as fine quartz, emery, etc., is ruinous to good tools; and the continual employment of the grindstone not less so; while a judicious use of a good oil stone will keep tools in order until they are almost worn out.

START RIGHT.

In the construction of newly invented machines there is difficulty found very often in the practical application of theory. Theory generally takes in the most important principles, but it is rare that it includes all of the minor details. Delays and disappointments are the results of these deficiencies. To avoid these evils entirely is perhaps too much to expect, nor would we be so bold as to assert that it is possible so to avoid them; but by a proper method of proceeding they may be greatly lessened, and the progress of the work proportionably facilitated.

We will here give what we think to be the best mode of working out a new mechanical idea, premising that the remarks we shall make upon the subject are intended for those of our readers who are novices in invention, and to whom they may be found the means of smoothing the path which has proved to so many a path beset with thorns.

After due consideration to the general principles which underlie a new invention, and where the subject will admit of it, a mathematical demonstration of their truth, or (if that should be through the want of educational qualifications, or from the nature of the case impracticable), an experimental demonstration of them; the machine should be drawn to scale. In this drawing all the parts should be represented in section and in elevation. If the inventor has not sufficient skill to do this accurately for himself, he should make a sketch of his invention and employ a good mechanical draftsman to do it for him. The drawing of a new device accurately to scale, will generally disclose most of the practical difficulties which will be met with in applying theory to practice. If any doubt exists in the mind as to difficulty in making any adjustment for want of space in any of the parts, full allowance should be made for it in the drawing, as it will be found much better to have a little room to spare than not to have enough.

The next step is the making of the patterns, and here the experience of a good pattern maker will be found necessary, if the castings are of complicated form, more especially if they necessitate the use of cores. Very few persons not accustomed to this kind of work would be likely to make patterns which would be of any service; they would probably be totally worthless.

After the castings are obtained the machine should be finished in a workmanlike manner. If it is intended to do work that requires nicety of movement, a rude construction will only prove a useless expenditure of time and money. The expression, "It will do well enough to test the principle," is often heard from young inventors, but the truth is, more frequently, that it will *not* do well enough, and the work has all to be done over again, because of the unsatisfactory nature of the test. In all machines built for the purpose of testing a theory, it will be found to be the most economical to have the work done from the outset in the most complete manner.

These remarks are applicable to those inventions which require a working model to prove their value, and as the most important and difficult inventions are of that class, it is in their construction that an attention to the method of proceeding which we have described will be found of the greatest benefit. We assure such as are making their first efforts in invention, that we have learned the lesson we here inculcate in the "dear school of experience," and that although it may cost more in the first instance to do the work well, in the end the great economy of the course will be fully apparent.

PRESERVATION AND RESTORATION OF PAINTINGS.

Many of the finest of the old paintings were executed on panels of wood. Wood is a perishable material, and as a consequence it became in years worm eaten, or rotten, threatening the destruction of the picture, which, of course, was but a coat of paint, more or less thick, on the wood. How to preserve the painting while removing its rotten base appeared to be a problem hardly susceptible of solution; but the ingenuity of man has triumphed over what would seem to be an almost insuperable obstacle. Modern paintings are on linen canvas, almost indestructible by the lapse of time and ordinary contingencies, except from intended violence or accident. The linen wrappings of mummies, some of them over 3,000 years old, are found of good texture and sound, and the use of linen will probably be a means of preserving our modern paintings in a more perfect state for the admiration and interest of our posterity.

Paintings may be copied by skillful artists by the square inch, but if the copy is done by another hand than that of the artist himself, it loses somewhat of its original force and character; and even the painter cannot always reproduce indefinitely his original painting so that the life and freshness of the first picture shall be found in the copies. This may appear to be hardly credible, but it is an acknowledged fact well known to artists, and it will hardly appear to be strange when we consider how difficult it is for the mechanic to duplicate a machine, making it in all respects precisely like another, even with the aid of exact gages and the almost perfect operation of tools specially designed for the purpose.

The preservation, then, of original paintings becomes a matter of great consequence. When painted on panels the operation of removing the back and substituting another, either of wood or canvas, is perfectly feasible and is largely practiced by experts. It consists of securing the painting, face downward, on a table and planing the wooden back down to as near the paint as is safe, then carefully scraping with suitable tools until the paint itself is reached. When the wood is completely removed there remains a coat of paint, which is the priming and the superstrata, together forming the painting proper. A sheet of canvas, or, if preferred, a a backing of wood, is prepared with some adhesive cement and carefully placed on the back of the painting, pressed to place, and allowed to dry perfectly before the picture is lifted from its position. This process is, of course, a work of time, requiring skill, patience, and good judgment. In this country we believe it is not practiced to any great extent, but in Europe it is quite a business, and is very successfully practiced in several of the art centers of the old world.

SUAVITER IN MODO.

"Would it not have been more prudent, as well as more becoming, to have left to our readers the task of forming their own judgments upon the evidence on both sides brought before them in the course of this discussion?"

The passage which we here quote is taken from the close of an article by David Forbes, F. R. S., it being one of a series discussing "Some Points in Chemical Geology," which have been published in late numbers of *The Chemical News*. It is a caustic though we must consider it, when we take into consideration the provocations under which it was written, a very patient reply to a paper contributed to the February No. of the *Geological Magazine*, by Dr. Sterry Hunt, and also a review of Dr. Hunt's system of Chemical Geology.

Without intending to here enter into the merits of the discussion, we have thought as we have followed it during its progress, with a pleasure which has been marred by its frequent discourtesies, that other instruction might be drawn from it than was intended by either of the disputants, and the pithy words with which we have chosen to begin this article, seemed to us an excellent text from which to indite a short homily to all public or private disputants.

One of the very first of modern English essayists is Matthew Arnold, and although he has been attacked, and his opinions have been made a mark for the shafts of keenest satire, it is absolutely refreshing to witness the good humor with which he defends himself, and the modest and courteous language in which he refers to, and characterizes the opinions of his opponents. With what weapon can the armor of such a man be pierced? The vituperation and the ill natured personalities in which too many are prone to indulge, fall upon his unruffled temper like rain upon the plumage of a water fowl. It does not even create temporary discomfort, much less wound. Mr. Arnold's method of conducting a discussion is all the more admirable because it presents such a striking contrast to that which we are so often pained to notice. If the sole object of discussion is not to arrive at truth, and by comparison of views to ascertain error, it had better be avoided altogether; and no discussion should be made public which does not contain elements of instruction. Those then who assume the character of public disputants may be fairly supposed to believe that the views which they set forth are such as will throw light upon obscure points, or otherwise instruct and improve those who peruse, or listen to their arguments. They are then public teachers, and should remember that it is no part of the duty of an instructor to mix with good mental food, the bitter and nauseating gall of personal spite and animadversion.

The annals of science are, alas! too often stained with such bickerings. The scalpel of ridicule, and the microscopical examination and exposition of personal character, are too apt to usurp the place of calm investigation, and dispassionate interchange of ideas. Who can remember without pain the bitter contentions of Newton and Halley, with Flamsteed; or other instances which might be mentioned of later date but no less intense in their bitterness, which have been and will remain a disgrace to the cause of science. All earnest seekers after truth are, and should regard themselves as the children of one family, and should remember that charity and humility are not more becoming than they are conducive to the progress of sound science and learning.

We have observed with pain the eagerness with which scientific periodicals seize upon trivial salient points, in the pages of their cotemporaries, to make invidious comparisons and to charge upon them ignorance and inefficiency. To such the quotation above cited is applicable. Is it truth we seek, or self-aggrandizement at the expense of others' mishaps? Are there not enough means at hand to display our wisdom, without laboring to prove that others are ignoramuses? If we answer these questions affirmatively, let us

throw the cloak of charity over each others' failings; the charity which suffers long and is kind, which envieth not, which vaunteth not itself, which is not puffed up. Let us leave to political journals the bespattering of each other and the coarse personalities of angry disputation, and, patient with differences in opinion and modest in self assertion, remember the words of Colton:—"We are more inclined to hate one another for points on which we differ, than to love one another for points on which we agree. The reason perhaps is this; when we find others that agree with us, we seldom trouble ourselves to confirm that agreement; but when we chance on those that differ with us, we are zealous both to convince and to convert them. Our pride is hurt by the failure, and disappointed pride engenders hatred."

GOLD IN NEW BRUNSWICK.

A few days ago we received a visit from Mr. Thomas W. Langstaff, of Woodstock, Carleton county, New Brunswick, who exhibited some specimens of gold obtained in that county from washings of alluvial deposits with specimens also of gold-bearing quartz, apparently very rich, whether examined by the naked eye or by means of a microscope. None of it has yet been assayed to test its actual value. The specimens compare favorably with those we have seen from California.

Last fall Mr. Langstaff and others associated with him, having discovered what they considered unmistakable indications of gold, and having purchased from the provincial government over thirty square miles of territory, made a test of one portion of the purchased territory. All of it is on the eastern branches of the St. Johns river in three counties, those of Victoria, Northumberland, and Carleton. The test was made in the latter county, about twenty-seven miles from Woodstock, on the Shicktehauk, a branch of the St. Johns. A party, of whom an experienced California miner was one, proceeded to the locality selected for the experiment, where a sluiceway made of boards, being twelve inches in width by nine inches in depth and about two hundred feet long, was erected "Riffles" had been fitted into the sluice at its lower end and about three cubic yards of sand and gravel were shoveled into the upper end. At the lower end which was between twenty and thirty feet below the upper, there had been placed a small quantity of quicksilver for collecting the minute particles of gold which might otherwise have been carried off with the sand by the force of the current. With these rude appliances there was produced nearly ten dollars' worth of gold, which we have seen. This gives a yield of over three dollars per cubic yard of earth, dug on the margin of the stream, the workmen not even wetting their feet. Beside this, a nugget was picked up worth some four dollars. One of the party, an old Pike's Peak miner, "panned" out in fifteen minutes a handsome show of gold, and declared that the deposit fully equaled any he had seen in his experience. The next day a boy of fourteen washed out his day's diggings, carrying home the commingled sand and gold and finishing the panning at home, which yielded over three dollars in pure gold.

Yet it is believed by experts who have examined and tested this locality on the Shicktehauk and others comprised in the purchase that the former does not present so favorable indications as those on the Muniac and Serpentine.

All this country is well wooded, the soil is fertile, and the streams never failing, in many cases affording excellent water power. Further information in regard to these deposits may be obtained by those who feel an interest in this matter by addressing T. W. Langstaff, Woodstock, N. B. or J. H. Lord, Box 773, New York city.

NEW PATENT BILL IN CANADA.

No little sensation and indignation is manifested in New Brunswick by an effort of the new Canadian Parliament to enact a new patent law, less liberal in respect to non-residents if possible than the existing one. The following extracts from an editorial in the Montreal *Evening Telegraph* give some facts relative to the new bill, which, if passed, will be one of the most illiberal and incongruous laws ever enacted. We are assured by private letters, that the bill cannot pass without such amendment as will allow the citizens of New Brunswick the rights they now possess to grant patents to non-residents, and to obtain patents in the States on the same terms as citizens of other countries which the proposed law would abrogate.

The writer in the *Telegraph* says of the proposed bill: "It contains provisions which are certain to embitter the relations between the Maritime Provinces and ourselves, and will by no means tend to remove the difficulties of the position of those who desire to see the Legislative Act of Union one in reality as well as in name. The object of the present bill is, no doubt, to enable the public to benefit by the inventions of foreigners, among whom, from the very terms of its provisions, are included all British subjects not residing in the Provinces, as no inventor can take out a patent here who has not resided in Canada for at least twelve months, and no one can take out a patent at all unless he is the *bona fide* inventor.

"That the law, as proposed, will have a prejudicial effect on the relations between us and the Maritime Provinces, must be apparent to every one who knows the facts of the case. In the United States, patents are issued on the same terms to citizens and foreigners, provided that, in the case of the latter, the country to which they belong grants equal privileges to all applying. In that case the charge is $35 in greenbacks. But if there are prohibitory laws, as is the case with us, then the charge for issuing a patent is $500. By the law in New Brunswick, no difference is made between residents or non-residents; any one is entitled to take out a patent who can comply with the rules of the Patent Office as to his right to the invention. Inventors in New Brunswick have been heretofore, therefore, entitled to patents in the United States at the lowest rate. When this bill passes, they will be at once cut off from this privilege.

"But, besides this, the patents issued for the separate Provinces under the old law are to cover only the same extent of territory as that for which they were issued. By one section, it is provided that every patentee must, under a penalty of $100 or two months imprisonment, have on the article patented by him, the word "Patented" and the year in which it was granted; and by another section, any person having on an article not patented, any word representing that it has been so, subjects himself to a fine of $200 or three months imprisonment. It is plain that if these two sections are enforced a patentee is on the horns of a dilemma. If he keep the patented articles for sale, without the mark, in the Province in which the patent is granted, he subjects himself to a fine of $100 or incarceration for two months. If, on the other hand, he send out of his own to one of the other Provinces to which his patent does not extend, articles marked as patented, he finds himself liable to a fine of $200, or three months in jail. That this is the absurd position the proposed law will bring us to, there can be no doubt, as any one may satisfy himself by examining the bill. There are other defects which are evident on a mere cursory examination. For instance, by Section 38, any one may file a caveat who has not yet perfected his invention, and is afraid of his idea being made use of by others. And this provision is only fair. But the caveat appears to have an effect in perpetuity, as no time is given in which it shall lapse; and it does not appear to be contemplated that any intimation shall be given to the applicant filing a caveat, when any one else applies for a patent to cover an invention of the same kind as that to guard which the caveat is filed. Without furthur discussing details, it is sufficient that the whole principle of the bill is false, and will work most mischievously. Canada stands alone in this prohibitive policy, which will not only prevent Canadians from reaping the advantage of their own inventive faculties, but will also throw the manufacture of the most important patents into the hands of others; as where expensive models and machinery are required, no man will be foolish enough to invest in them, at the risk of losing the whole fruits of his labor, even although he does obtain the invention by the simple method of robbery, since every one else may plunder him."

[P. S. We are happy to learn through Mr. Charles Legge, just as we go to press, that the proposed bill has been withdrawn, and that no new one will be presented during the sitting of this Parliament, so the old laws will remain in force another year. In the meantime, we hope with our correspondent, that a bill will be framed which will meet the ends desired. Patents will continue to be issued to American citizens in New Brunswick, as heretofore, on liberal terms. Persons desiring patents in that Province can obtain all information respecting the cost and other requirements by addressing this office.—Eds.

LECTURE ON FOOD.

The lectures on Food which have been delivered by Dr. Letheby, at the Society of Arts, are a valuable and permanent contribution to the literature of Europe on a very important subject. In noticing these lectures we shall confine our condensed extracts to those passages which every one can understand, taking it for granted that these competent to follow the scientific arguments will consult the original reports, either in the medical press, where the lectures were first published, or in the volume which Dr. Letheby will, no doubt, do the English-speaking world the favor of publishing.

Tables have been more than once issued, showing the proportions of different food required to yield a certain number of grains of nitrogen, or to show the nutritive value of certain foods; but these, although very proper subjects for the investigation of men of science, are of very little value in a popular sense—so much depends on various modifying agencies, on cookery, powers of digestion, climate and admixture of food. Dr. Letheby early observes that all foods are derived from the vegetable kingdom. In other words, "All flesh is grass," "for no animal has the power of associating mineral elements and forming them into food." It would be a curious question to raise to a party which had just consumed a prime sirloin—how much guano, superphosphate, and farmyard manure had gone, by the intermediation of grass, hay, turnips, and oilcake, to the construction of that beef. Whether the laboratory may eventually manage to manufacture meat is a question which we have not yet commenced to solve. "Man (at present) is a destructive, not a constructive animal." Dr. Letheby begins with the value of vegetable food. Wheat stands first in Europe. The attempts to restore the use of more bran in flour have not been successful, and it is not at all certain that they ought to be. At any rate, navvies believe that white bread is more easily digested than brown bread. Bran has frequently a very irritating effect on the intestinal organs. In practice, 100 lbs. of flour will make from 133 to 137 lbs. of bread; so that a sack of 286 lbs. should yield ninety-five 4 lb. loaves. The baker increases this quantity by hardening the gluten with alum, or with 3 lbs. or 4 lbs. of rice, which, boiled to a gummy mess, will make the sack of flour yield one hundred 4 lb. loaves. Scotch oatmeal is more nutritious than English; but oatmeal is not so economical a food as wheat flour. In 1695, before tea and coffee were common drinks, it appears, from an advertisement quoted in the lectures, that there was a large consumption of water gruel "at the Marine Coffee House, Birchin Lane, Cornhill." The value of barley and rye bread we need not stop to discuss. Philosophers recommend them to the poor, but the poor abandon their use as soon as they can get wheat bread. Maize, or Indian corn, on the other hand, has been established in Ireland as a staple of food ever since the potato famine. Yet, although rich in nourishing matter, it will not make good bread. When deprived of its gluten and harsh flavor by means of a weak solution of caustic soda, and then dried, it forms the expensive food called "corn flour." Peas, beans, and lentils are very nutritious where they can be digested. Nothing but the most prolonged cooking will serve to help in this particular. They are deficient in carbonaceous constituents, and therefore invariably eaten with fat. Thus beans and bacon, and butter with beans, are inseparable in this country, while in the backwoods of Canada, haricot beans boiled and then fried with salt pork are the standing dish of the wood cutters. Potatoes, according to their price, are the most economical food, but the nutritive value is not great. They are deficient in fat, and should be accompanied with dripping, or better still with milk, if meat or fish cannot be had. On potatoes and milk a family of children can be reared well. Potatoes are best cooked in their skins, for the waste is then only about three per cent, or half an ounce in a pound, whereas if they are peeled, it is three ounces in a pound. Mealy potatoes are the most digestible; late in the season, when they are waxy, they are best cooked by stewing. Potatoes are one of the best anti-scorbutics, and are therefore used fresh or preserved in all sea going vessels. There is little nutriment in the garden vegetables in common use. They are much less nutritious than the potato, and they are chiefly valuable for their antiscorbutic properties, for their quality of flavoring insipid food, and diluting strong ones. Cheese theoretically ranks high for nutritive power, being especially rich in nitrogenous matter, but it is extremely difficult to digest, and cannot therefore be taken in large quantities.

Almost all Europeans eat meat if they can get it. Although during the Irish famine it was found that the people preferred stirabout to meat soup, when Irishmen settled in England or America they became as great meat eaters as their neighbors. The amount of bone in beef is rarely less than 8 per cent; in the neck and brisket it is about 10 per cent, and in the shins and legs of beef it amounts to one third or even one half of the total weight. The most economical pieces are the round and thick flank, then, the brisket and sticking-piece. Horseflesh, Dr. Letheby says, is considered on the Continent superior to beef; and no doubt a steak from a fat horse is better than one from a lean milch cow or patriarchal bullock. Good bacon should not lose more than ten to fifteen per cent in in cooking. Experience has taught what science has proved—viz., that the large amount of carbonaceous matter in bacon makes it the best addition to substances rich in nitrogen, such as eggs, veal, poultry, liver, beans, and peas. Dr. Letheby remarks that "fish is not a favorite article of diet with the laboring classes, unless it is salted or smoked, perhaps because it does not easily satisfy hunger and is quickly digested;" but it is more probable that the cause rests in the necessity of more elaborate cooking and appliances for certain kinds of fish. All fish are in their best condition at the time of the ripening of the milt and roe; they are fatter, and have a better flavor. Eggs contain about twenty-six per cent of solid matter, of which fourteen per cent is nitrogenous and ten and a half carbonaceous, or fatty: the yolk contains the fat, while the white is richest in nitrogen. Eggs being very deficient in carbonaceous matter, go well with fat bacon, oil in salid and farinaceous food. Fat in some shape is universally consumed. Cocoa and chocolate owe their chief value to the fat they contain; Cocoa is composed of fifty per cent of fat. Of liquid articles of diet, beer and porter stand first in nutritive value. It is estimated that for the daily supply of London city there are distributed about 4,200 tuns of fish, over 4,000 sheep, nearly 700 oxen, about 90 calves, 4,000 pigs, (including bacon ond hams), 5,000 fowls, a million oysters, and nearly a million quartern loaves.

In Dr. Letheby's second lecture he refers to the artificial means of encouraging digestion. The functions of saliva are to lubricate the food for deglutition, to carry oxygen into the stomach, and to furnish a solvent for starch and tender cellulose. It has no chemical action on fat, or fibrin, or albuminous bodies. An artificial saliva may be obtained. Liebig's extract of malt is an example of this; also Mr. Morson's saccharated wheat phosphates. Both of these are aids to the digestion of farinaceous food. Pepsin is artificially prepared by several persons to assist digestion, by a preparation, as it were of gastric juice. The strongest pepsin is obtained from young healthy pigs, which are kept hungry, and are then excited by savory food, which they are not allowed to eat; while the influence of it is strong upon them, and the secretions are pouring out in expectation of the meal, the animals are instantaneously killed by being pitted. Pepsin, like diastase, is rendered inert by a temperature of from 120° to 130° Fah., and therefore hot drinks after a meal are hurtful. Cooking has an enormous influence on the digestibility of food. We cannot believe that roast mutton is less easily digested than ox liver or than goose or beef. It seems that of starchy substances, roast potatoes are more easily digested than boiled. Dr. Letheby sums the aids to digestion thus: First, proper selection of food, according to the taste and digestive powers of the individual; secondly, proper treatment as regards cooking, flavoring, and serving it; thirdly proper variations of it, both as to its nature and treatment, so that the appetite may not fail; fourthly, exercise, warmth, and a genial disposition. The last condition shows that those who give elaborate dinners should take care to provide one or more amusing guests. We have said enough to draw attention to these lectures, which condense in a popular manner, the latest scientific investigations in connection with the subject of food.—*London Journal of Gas Lighting.*

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING MAY 12, 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.*

77,707.—STOVE GRATE.—D. S. Baker, West Bloomfield, N. Y.

I claim, 1st, A rotating grate, h, having upright figures, m, in combination with the lower grate, i, constructed and operated in the manner substantially as shown and described, and for the purpose set forth.

2d, The combination of the fingered ring, C, with the fire box, A, fingered rotating grate, h, and the under supporting grate, i, constructed and operated in the manner substantially as shown and described and for the purpose set forth.

3d, The combination of a cylinder or fire box, or its equivalent, with a fingered ring or bar, C, as shown and described, and for the purpose set forth.

4th, The combination of rotating grate, o, with a fingered ring, n, constructed and operated in the manner as shown, and described and for the purpose set forth.

5th, In combination with said parts, as just described, the fingered ring, C, or its equivalent.

77,708.—CORN HARVESTER.—Moses Bales and Wm. P. Bales, London, Ohio.

We claim, 1st, The arrangement of gatherers, E E', spreaders, F F', curved bar, I, and central platform, O O', for the purpose set forth.

2d, The oblique sickles, J J', lips, j j', oblique tongue, N, and pivoted frames K K', combined and operating in the manner explained.

3d, The pivoted platform, O O', in the described combination, with the discharging lever, P, arranged and operating as set forth.

4th, The curved guide or rod, R, in the described combination, with the gatherers, E E', spreaders, F F', curved bar, I, and platform, O O', for the purpose specified.

77,709.—AUTOMATIC FAN.—Joseph Beck, New York city. Antedated April 25, 1868.

I claim, 1st, The employment of the fan, C, constructed with the protectors, b b and c c, operated and for the purpose substantially as herein described.

2d, The arrangement and combination of the clock work, G, the balance, V, with the crank, W, the rod, X, the arm, Y, the axle, 7, the gear, Z Z, and the fan shaft, C, operated and for the purpose as herein shown.

77,710.—MACHINE FOR THREADING BOLTS.—Benjamin D. Beecher, Plantsville, Conn., assignor to Luther Beecher.

I claim, 1st, Arranging the cutting threads on the surface of the dies, as herein described, that is to say, so that a portion of each of said die surfaces shall be left plain, for the purpose of gradually rounding the blank, as the operation of threading it progresses, and the initial or commencing portions of the several cutting threads shall follow one another in succession, all substantially as set forth.

2d, In combination with the threaded part of the die, the embossed surface, k k', substantially as and for the purpose set forth.

77,711.—FENDER RING FOR HEATING STOVES.—N. A. Boynton, New York, assignor to himself and Daniel E. Paris, Troy, N. Y.

I claim a fender ring situated at or near the bottom of a fire pot, with its outer edges turning upward, so that the ring and the pot shall form together an acute angle, with its point toward the base of the pot, substantially as and for the purposes described.

77,712.—DRYER.—Joseph Brakeley, Bordentown, N. J.

I claim combining with a dry-kiln both a condenser and an exhaust pump, substantially as and for the purpose set forth.

77,713.—MACHINE FOR MAKING WIRE HEDDLES FOR LOOM HARNESSES.—Darius C. Brown, Lowell, and John Ashworth, North Andover, assignors to D. C. Brown, Lowell, Mass.

We claim the combination of machinery for spreading the heddle eye lengthwise, as described, and also the combination of machinery for spreading the heddle eye lengthwise as specified, with mechanism for forming such eye from wire, in manner substantially as explained, such mechanism for spreading the eye consisting of the fingers, q3 q3, and mechanism for operating them, as set forth.

Also, the presser, R, as constructed, and provided with mechanism for operating it, substantially as described.

Also, the combination of such presser, R, (provided with mechanism for operating it, as described) with the eye former, P, made substantially as described, so as to form and spread the eye of the heddle, as specified, and with the next adjacent twisters, T U, to form the twists of the eye, as explained.

Also, the mechanism or combination for straightening the wire during its passage into the machine, the same consisting of the curved arm, I, and its pins, m n, and the slider, K, and its pins, o o, the whole being arranged and applied together and to the frame of the machine, substantially in manner and so as to operate as specified.

Also, the arrangement of the latch lever, k1, and the cam, m1, with the wheel, L, its notch, l1, and the shaft, N, such latch lever, k1, being for estopping the wheel, L, as set forth.

Also, the combination as well as the arrangement of the nipping and cutting levers, w x, and their operative mechanism, with the wheel, L, such operative mechanism being the plate, O, and its cams, z a1, and the springs, b1 c1, the stud, d1, the latch, e1, notches, f1 g1, the lever, n1, stud, o1, arm, p1, and stud, q1.

Also, the combination for operating the dog, S, or moving it lengthwise on the pinion, q2, such consisting of the cam plate, x3, and the studs, y3 z3, of the gear, a3, and in combination with the cam plate, x3, and its dog, S, the spring bolt, a4, and the notches, b4 c4, arranged as explained.

Also, the combination of the pinion, p5, the curved rack, q5, the lever, r5, the cam, s5, and the spring, t5, or their equivalents, with the retractor, t1, combined with mechanism for twisting wire, and having mechanism for operating such retractor in other respects, substantially as set forth.

Also, the combination of the auxiliary twister, V (provided with mechanism for operating it as described) with the two twisters, T U, to operate together and with the retractor, and provided with mechanism for operating them as specified.

Also, the twister, T, as composed of the head, d4, the jaws or slides, l4 l4, the flanged wheel, f4, the cammed lever or slider, K4, the studs, m4 m4, and slots, n4 n4, the whole being arranged substantially as described.

Also, the combination of the screws, p4 p4, with the twister, T, made substantially as described, the purpose of such screws being to adapt the twister to operate on wire of different sizes.

Also, the application or arrangement of the slide jaw, l5, the lever, m5, and its spring, n5, with the lever, d5, applied to the bar, c5, as and for the purpose specified.

Also, the combination and arrangement of the spring, f3, or its equivalent, with the mechanism for making the heddle, such spring, when the heddle may be resting on the inner stationary jaw of the bar, c5, being used to press the heddle down a little, as and for the purpose hereinbefore mentioned.

Also, the combination of the discharger, u5, (provided with mechanism for operating it as described) with mechanism for making the heddle, as specified.

Also, the conductor, W, made substantially as described.

Also, the combination for actuating the tongue, v1, of the retractor, t1, in order to enable a heddle to be removed from the retractor, and the tongue to close upon the next succeeding piece of wire introduced into the retractor, such combination consisting of the slider, w1, the spring, x1, the lever, m2, and the cam, o2, also their combination with the retractor and its tongue.

77,714.—HARVESTER.—Caleb Caldwell, Waukegan, Ill.

I claim, 1st, The double joint, T, in combination with the motion lever, R, and pitman, V, arranged to operate substantially as specified.

2d, The combination of the oscillating frame, Q Q, cam wheel, W, strap, i, motion lever, R, double joint, T, and pitman, V, all arranged as and for the purpose herein specified.

3d, The lever, a, attached to the tongue, J, in combination with the catch, c, chain, 23, and rod, 22, arranged to raise the front of the harvester, as described.

4th, The arrangement of the rods, C D, brace, G, lever, E, catch, F, and shoe, B', for raising the cutter bar, U, substantially as described.

77,715.—SEWING MACHINE.—C. Chabot, Philadelphia, Pa.

I claim, in combination with a removable and replaceable thread plate, a push piece that fastens, unfastens, raises, and holds up said plate, substantially as and for the purpose described.

Also, in combination with the shuttle and its bobbin, the spring, j, when pivoted to swing laterally, and embossed at both of its ends, for holding and allowing the bobbin to be removed by the side movement of the spring, as also for regulating the tension of the bobbin thread by means of the set screw, r, substantially as described.

Also, in combination with the latch, D, the concealed spring bolt, t, for holding said latch in either position, that is, open or shut, substantially as described.

77,716.—STORE WINDOW.—Henry Chamberlain, Dayton, Wis.

I claim the combination of the spring bar, A, the perpendicular bars, a b c and d, the plate, C and D, of a store window, when constructed and operated substantially as described and for the purpose set forth.

77,717.—BOOTS AND SHOES.—Edwin Chesterman, Boston, Mass., assignor to himself and Edwin A. Eaton.

I claim a boot or shoe, whether made of leather or other material, having a lining fabric, one of whose sides consists of a loose, shaggy or woolly material, when such shaggy side is placed towards the upper or outside of the boot or shoe, for the purpose of securing warmth and ventilation, as specified.

77,718.—CONDENSER FOR SPIRIT STILL.—Paxson Coats, Cincinnati, Ohio.

I claim the worm, B, having its lower end, b, terminating in the reservoir, C, from which extend the pipes, E and D, the one up and the other down, in combination with the vat, A, when the same are constructed and arranged in the manner substantially as and for the purpose specified.

77,719.—MOWING MACHINE.—Marcellus V. Cumming, Winthrop, Me.

I claim, 1st, The combination of a cutting apparatus, M, a wheeled carriage and a steam engine applied to both, so as to put them in operation under circumstances and substantially in manner and for the purposes as hereinbefore explained.

2d, The combination of an auxiliary wheel carriage, O, and mechanism as described (viz., the chain, R, and wheels, S S'), or its equivalent, for revolving its axle with the mowing machine, its wheel carriage and steam engine applied to both, so as to put them in operation, substantially as and for the purposes set forth.

77,720.—BED BOTTOM.—J. D. F. Dahl, Milwaukee, Wis.

I claim the combination of the frame, B, provided with the guide rods, C, and the frame, A, with the springs, D, cords, G, and pulleys, F, all constructed and arranged to operate as set forth.

77,721.—HAY RAKER AND LOADER.—Matin A. Dilley, Mendon, Mich.

I claim, 1st, The hinged box, e e, and universal joint, j, in combination with the frame, F, guide bar, K, and winding drum, H, the several parts being constructed and arranged substantially as and for the purpose herein specified.

The arrangement of the lever, l, rod, a, elbow lever, t, and rod, b, with the arm, m, and lever, M, for the purpose of automatically detaching the clutch, j, as herein fully described and for the purpose specified.

3d, The shaft, R, provided with the arms, L m m and n, in combination with the cords, b c and d, and winding drum, H, the several parts being constructed and arranged for the purpose of elevating the hay fork described, substantially as herein set forth.

77,722.—FURNACE AND PROCESS FOR THE MANUFACTURE OF IRON AND STEEL.—Francis Ellershausen, Montreal, Canada.†

I claim, 1st, The furnace, in its novel combination of two fire chambers, b and l, separated by fire bridge, m, as shown in the two modifications, one chamber being a crucible fire chamber, and the other a reverbatory fire chamber, both in connection with the crucible, i, all working together, substantially in the manner and for the purpose described.

2d, The process of smelting and refining metals in large quantities and in short time, by the employment of a large crucible with discharge hole.

3d, The puddling of cast iron in a crucible placed in my furnace, and surrounded by fire, the product being cast steel, substantially in the manner described.

77,723.—HASP LOCK.—Joseph S. Elliott (assignor to himself and A. B. Cooley), Philadelphia, Pa.

I claim the bolt, D, operated by a spring, f, and projecting pin, l', as described, and the tumblers, F and G, secured within, and arranged to operate in connection with the said bolt and with each other, in the manner and for the purpose herein set forth.

77,724.—SEAMLESS LEATHER STRAP AND TUBE.—Alois Eschenlohr, Munich, Pavaria.

I claim, 1st, The method of skinning the animal and cutting out the skin, as herein described and illustrated in fig. 1, sheet 1, of the accompanying drawings.

2d, The method of skinning and cutting out the skin of the animal, so as to form endless belts or straps of great length, in the manner herein described, and illustrated in fig 2, sheet 1, and figs. 1 and 3, sheet 2, of the accompanying drawings.

77,725.—CANDLE.—John Lyon Field, Kensington, Great Britain.

I claim a candle, having one or more ribs or projections near its lower end, substantially as and for the purpose described.

77,726.—PAN FORMER.—John Finn, Decorah, Iowa. Antedated April 24, 1868.

I claim, 1st, The recesses, E, and blocks, F, as herein specified.

2d, Extension block, D, and bolt and slot, J, substantially as described.

3d, Lever or cam, G, for the purpose set forth.

77,727.—MANUFACTURE OF VINEGAR.—Joseph Firmenich, Buffalo, N. Y.

I claim the process of making vinegar from grain and other starch producing substances as a whole substantially as herein specified.

Also, as a part of the process of making vinegar, the injection of steam into the digesting mass of meal or grain, as in the vats, G and I, substantially as herein set forth.

Also, as part of the process for making vinegar, the soaking and digesting of grain without grinding, as in the vat, I, substantially as herein described.

Also, as part of the process of making vinegar, the subjection of the soaked meal or grain to the smooth squeezing mill, J, substandally as herein specified.

Also, as part of the process of making vinegar, the method of applying the sulphuric acid, first with cold water and then with boiling water, and the injection of steam into the latter while adding the starch, and until it is converted into glucose, substantially as herein specified.

Also, as a part of the process, the method of conducting the vinous fermentation by successive additions of yeast, first weak and then strong, substantially as herein described.

Also, the arrangement of the sieves, K and L, substantially as and for the purpose herein set forth.

Also the gage valve, m n, for drawing off the clarified strupy liqaid, substantially as herein described.

Also, the construction of the acetic generator, substantially as herein set forth.

77,728.—ANKLE OR KNEE GUARD.—Henry A. Hall, Boston, Mass.

I claim, as a new article of manufacture, an ankle or knee guard, in which the band or belt is provided with a series of independent and separate feelers of vulcanized rubber, constructed or formed in the manner herein shown and specified, so that each feeler shall be uniformly flexible in various directions.

77,729.—LIGHTNING ROD.—William Hall, Dubuque, Iowa.

I claim a continuous convoluted cylinder, constructed of sheet metal, wherein the sheet of which it is composed shall extend more than once around the axis in forming the cylinder, whether the same shall be constructed over an iron wire or not, when the same is made substantially as and for the purposes herein set forth.

77,730.—IRON FURNACE.—Alexander Hamar, New York city.

I claim, 1st, The method, herein described, of injecting steam, superheated steam, or hydrogen into the oven, to mingle with the gases, and increase their heating effect on the hot blast pipes.

2d, The arrangement, in a large combustion chamber, of the hot air pipes, as and for the purpose described.

3d, The combination, substantially as set forth, of the hot air pipes with the interposed deflectors, r, for the purpose described.

4th, The combination, substantially as set forth, of the mixing chamber, the combustion chamber, and the hot air pipes.

5th, The arrangement, as set forth, of the superheating pipes, f, in the combustion chamber and above the air pipes, for the purpose specified.

6th, The arrangement of the steam pipe within the hot blast pipe, to maintain the steam at high temperature.

7th, The arrangement of the steam and blast pipes in sets, at different levels, for the purpose specified.

77,731.—CLOVER SEPARATOR AND HULLER.—David M Heikes, Franklin Township, Pa.

I claim the combination of the breaking device, e f, elevator, G, riddle, H, conveyor, J, platform or board, I, hulling device, K l, sieves, M N Q, fans, O P, and delivering spout, R, all arranged substantially as described.

77,732.—BEER COOLER.—Nicholas Hiemens, Buffalo, N. Y.

I claim a beer cooler, composed of an ice chamber, A, having an open inclined trough, C, formed upon the outside walls thereof, in the manner and for the purpose substantially as herein described.

77,733.—SCAFFOLD.—Edward R. Holzer, Philadelphia, Pa.

I claim, 1st, A scaffold, consisting of two or more posts, A, each hinged to a base, B, resting on the ground, and to each of which is secured an adjustable bracket, C, all substantially as described.

2d, The grooves, e, arranged in opposite sides of the post, for the reception of the bent ends of the plates on the brackets, as set forth.

77,734.—CHEESE VAT.—William Howard, Watertown, N. Y.

I claim, 1st, The combination, with outer and inner vats, of a fire chamber and heat and smoke conducting pipes, arranged about the sides of and between the vats, as and for the purposes set forth.

2d, The combination, with the heat and smoke conducting pipes and vat, of a damper, arranged as and for the purposes set forth.

77,735.—GATE.—H. Hunt, Delavan, Wis.

I claim, 1st, The combination of the levers, R R, pulley, O, and cords, F, arranged substantially as and for the purpose set forth.

2d, The combination of pulley, O, levers, R R, pivots, I J, and cap, P, arranged to operate substantially as herein set forth.

77,736.—TAX CALCULATOR.—I. S. Hyatt, Rockford, Ill.

I claim, 1st, In combination with tax table, A, constructed substantially as described, the adjusting bar, B, operating in the manner and for the purposes as set forth.

2d, Providing the sliding bar, B, with the projections, b b, as and for the purposes set forth.

3d, Rendering the sliding bar, B, adjustable in a direction at right angles to the carrier, E, by means of a slot and set screw or their equivalents, for the purpose substantially as set forth.

77,737.—HARROW TEETH.—Alvarado Jones (assignor to himself and A. A. Sage), Westford, Wis.

I claim the hollow body, B, in combination with the solid steel point, A, in the construction of a harrow tooth, substantially as and for the purposes set forth, as a new manufacture.

77,738.—BED BOTTOM.—Blinn D. Joslin, M. D., and Reuben A. Newhall, North Brownville, Mich.

We claim, 1st, The truss, D, provided with supporting springs, S, when attached to slat, C, and operating substantially as and for the purposes described.

2d, The combination of the trussed slats, C, with the rod, B, and hooks, J, upon the double coil spring, E, for the purpose described.

77,739.—HAY SPREADER.—G. G. Knowles, Wakefield, R. I.

I claim the combination of the eccentric plates, r r r r, with the triangles, t t t t, and bars, K V, as and for the purpose herein described.

77,740.—PADLOCK.—Frank F. Landis, Lancaster, Pa. Antedated May 7, 1868.

I claim, 1st, The rounded right-angled chamber or partition, I, with its wall, H, thickened and perforated, in combination with the hinged and winged tumbler, G E F, on its pivot, I, with a cylinder, J, revolving freely on the pin, O for the socket in the key, arranged and operated in the manner specified.

2d, In combination with said chamber or partition, I H, and tumbler, G E F, the arrangement of the lever, C, with its hook, D, in connection with the spring bolt, B, by the pin, b, when actuated in the manner and for the purpose set forth.

77,741.—BRIDGE.—George T. Lape, Summit, N. Y. Antedated April 28, 1868.

I claim, 1st, The construction of sections or voussoirs, consisting of abutting ends, flanges, rib, and cross plate with tongues, grooves, and dove tails, all arranged substantially as and for the purposes specified.

2d, The construction of bridges, arches, etc., by combining a series of sections or voussoirs, and securing them to each other, substantially as herein specified.

77,742.—TOOL POST FOR LATHE OR PLANING MACHINE.—William H. Leach (assignor to himself and Bradford Stetson), Uxbridge, Mass.

I claim the construction of a tool post, for a lathe or other machine, with the joint, A' B', in combination with the collar, C, and set screw, F, substantially as and for the purpose set forth.

77,743.—CASTER FOR FURNITURE.—Samuel N. Long, South Chatham, assignor to himself and Lincoln B. Bearse, Barnstable, Mass.

I claim the combination of the sleeve, D, with the spindle, A, with the plate, B, having the groove, c, and the opening, g, all constructed, arranged and operating as and for the purpose described.

77,744.—SAFETY HATCH.—Robert H. Martin, Staten Island, N. Y. Antedated April 25, 1868.

I claim, 1st, The combination with a hatchway-hoist to the several floors, or any of them, of a warehouse or other structure, of partially balanced or counterpoised safety guards, substantially as specified.

2d, The combination with rising and falling or opening and closing safety guards to a hatchway on any or all of the floors of a building, of self-shooting bolts on the hoist, operating automatically to open the guards, both in the ascent and descent of the hoist, essentially as shown and described.

3d, Providing the hoist with unshipping or back locking gear to its self-shooting bolts, for operation at pleasure, of the latter with any one or more of the safety guards without lifting the others on intermediate floors, or for running the hoist up and down the hatchway without stopping at or raising any of the guards, substantially as herein set forth.

77,745.—ATTACHING DOOR KNOBS TO SPINDLES.—Thomas Marvin, Middlesex county, Mass.

I claim the combination of the stationary escutcheons, the spindle, the spindle sockets, with the shoulder, h, and flange, i, the disks and the knobs, when constructed, connected, and relatively arranged substantially as described.

77,746.—PURIFYING SORGHUM JUICE.—Wm. Matthews, Troy Township, Ohio.

I claim the improved filterer herein described, composed of the vessels, b c d, or their equivalents, arranged and charged with filtering materials substantially as described.

77,747.—HUB FASTENING FOR ECCENTRICS.—Geo. W. Miller, and Julius D. Stevens, Scranton, Pa.

I claim the dies, C C, and which are secured within the hub of the eccentric, and made to clamp the shaft by means of a bolt with a tapering head, or other equivalent, as and for the purpose set forth.

77,748.—SHUTTER FASTENING.—W. J. Miller, Gettysburg, Pa.

I claim the arrangement and combination in a shutter fastening of the pull, P, bent arm or trigger, E, rod, J, spring, I, catch, b, and plate, a, with its projecting catch, operating in the manner as shown and described and for the purpose set forth.

77,749.—GAS BURNER.—Hypolite Monier, Paris, France.

I claim, 1st, The combination with a gas or other burner, such as herein described, of an internally fluted cone or chimney rest, of glass or other transparent material surrounding the same, and a cap, R, or its equivalent, the whole being constructed and arranged as specified, so that air shall pass to the flame through the interior of the burner between the burner and the cone, and between the cone and the chimney, as and for the purposes set forth.

2d, The combination with the burner of the internally fluted glass cone and chimney seat, and the corrugated and fluted glass tulip applied to the said cone, in the manner and for the purposes shown and specified.

77,750.—CLOTHES LINE HOLDER.—Henry Morgan, Springfield, Mass.

I claim the combination of the pulley, A, and cam, B, with the gear, c c when arranged upon a plate, C, substantially in the manner and for the purpose shown.

77,751.—COOKING STOVE.—B. L. Mott, Jr., Pawtucket, R. I.

I claim the combination and arrangement of the arched plate, H, with the soot drawer, G, so as to divide such drawer or the chamber, E, into two connected or return flues, as set forth, and be movable with the drawer.

Also the combination of the lip or flange, a, with the partition or arched plate, H, or the same and the drawer, G, to be applied to the chamber, E, and flues, D F, of the cover, as specified.

77,752.—MEAT POUNDER AND ICE PICK.—George Murray, Jr., Cambridge, Mass.

I claim as an article of manufacture a combined meat pounder, cleaver, ice pick, fish scaler, etc., composed of a rectangular shaped plate, of cast or malleable iron, A, one side of which is covered with pointed projections, while from the other side projects a handle, B, and having one edge, C, and end, D, sharpened, so as to produce cutting edges, substantially as herein set forth.

77,753.—CHURN.—Esau P. Newman, New Albany, Ind.

I claim the breakers, J J J J, and steel wire springs, K K, as used in connection with the paddles, I I I I, in churning butter.

77,754.—WAGON LOCK.—Chas. Noethlich, Muscatine, Iowa.

I claim the arrangement and construction of the angular lever, G G', link, and pivoted pawl, D, in combination with the bevel toothed rack, A, and vibrating lever, B B, the arrangement of the whole being such that the pivot, c, can be thrown to the right or left of the line, x x, and when in one position the pawl will be firmly locked without the aid of an auxiliary stop, and when in the other position the pawl will be unlocked, all substantially in the manner described and shown.

77,755.—OIL CAN.—James Ogden, Philadelphia, Pa.

I claim the combination of the frame, A, with the clasp, made detached, as shown at B, or hinged to said frame, as seen at C, when the frame, A, is made as show, so that its ends, when in use, pass up under the outer ends of the turn-down collar, with which it is worn, so as to hold it in its place, all substantially as shown and described and for the purpose specified.

77,756.—LIFTING JACK.—Samuel Perry, Seaford, Del., assignor to himself and John L. Coulborn.

I claim the arrangement of the standard, A, with its slotted arm C, through which passes the rack, F, and to which is pivoted a loop, d, said rack being operated by the lever, D, passing through the standard and kept in position by the bar, E, and block, e, all constructed and used as specified.

77,757.—SUSPENSORY BANDAGE.—W. H. Phelps, Boston, Mass.

I claim a suspensory bandage constructed and adapted for being used substantially as described and shown.

77,758.—MEDICINE.—Samuel Pitcher, Barnstable, Mass.

I claim the composition substantially as described, and for the purpose as explained.

Also the process hereinbefore described for compounding the ingredients of such composition, such process embracing the two operations of straining the liquor from the leaves, and subsequently obtaining, by pressure of them, one extract, not obtainable by simple infusion.

77,759.—STENCIL PLATE.—Wm. W. Potter, Buffalo, N. Y.

I claim, 1st, A slotted plate, A, attached to the stencil plate, B, at one end while the other end is free, substantially as and for the purposes set forth.

2d, The combination of the slotted plate, A, stencil plate, B, the C-formed letters sliding on plate, B, and the latch, D, substantially as and for the purposes described.

77,760.—HORSE HAY FORK.—S. H. Rhoads, Clyde, Ohio, and Wm. Carroll, Hillsdale, Mich.

We claim, 1st, The springs, b', in combination with prongs, E, for the purpose specified.

2d, The catches, a b, and springs, c d, as constructed and arranged to operate in combination with the shaft, C, for the purpose specified.

77,761.—COTTON PLANTER.—Charles Richmond (assignor to Gaynor, Stiles, & Co.), Memphis, Tenn.

I claim in the adjustable flanges whereby they can be separated or closed at will, for the proper distribution of seed, the separators to keep the seed disunited, in order to distribute equally and regularly, together with the hollow journals, allowing the whole to revolve and adapt itself.

77,762.—STRAW CUTTER.—James Riley, Detroit, Mich.

I claim the arrangement of the sliding frame, C, with feeder, A', when used in combination with the revolving cutter, D, and hopper, L, and operated in the manner substantially as and for the purposes herein set forth.

77,763.—PAINT FOR LIQUID COMPASSES, ETC.—Edward S. Ritchie, Brookline, Mass.

I claim the application to a compass card, or other article to be exposed to alcohol or an alcoholic mixture, as set forth, a paint composed of one or more pigments and coagulating material (such as albumen, for instance), and then, or subsequently, effecting coagulation of the vehicle, the whole being substantially as and for the purpose above specified.

77,764.—LAST AND SHOE HOLDER.—Andrew J. Rock, Union Village, Va.

I claim the arrangement and combination of the adjustable posts, C, screws D E and K, blocks, A and G, when adjusted and operated with the adjustable jaws, J J, as herein described and for the purposes set forth.

77,765.—FRAME FOR NECK TIES.—S. W. Rood, New York city.

I claim a wire gauze or perforated metallic case, of any shape, fastened permanently to the top of a lamp wick, of any material, or so constructed as to be joined on it and detached at convenience, for the purpose of guarding the wick from the carbonizing effect of the flame, thereby producing a clearer light and a saving of wick and oil, as herein set forth.

77,766.—SIDEWALK.—Samuel I. Russell, Chicago, Ill.

I claim, 1st, The construction and arrangement of sidewalks or other ways with frame work or supports or combined with and covered by a surface coating composed of coal tar, and grooved, substantially as specified.

2d, The construction and arrangement of the walk in sections, substantially as described.

77,767.—LAMP WICK.—Eilert O. Schartau (assignor to Frank S. Judd and John G. Powell), Philadelphia, Pa. Antedated April 28, 1868.

I claim a wire gauze or perforated metallic case, of any shape, fastened permanently to the top of a lamp wick, of any material, or so constructed as to be joined on it and detached at convenience, for the purpose of guarding the wick from the carbonizing effect of the flame, thereby producing a clearer light and a saving of wick and oil, as herein set forth.

77,768.—TRANSPORTING AND STORING GRAIN AND OTHER PRODUCTS.—S. F. Schoonmaker, New York city. Antedated April 28, 1868.

I claim, 1st, A close chamber or compartment rendered impervious to air and gases by a metal lining, so applied as to permit the free expansion and contraction of the metal, substantially as and for the purpose specified.

2d, In connection with a suitably inclosed 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.

3d, Providing an opening or inlet, in connection with an inclosed chamber

for the passage of exterior air, to maintain in the process an equilibrium of pressure within and without, for the purposes substantially as described.

77,769.—SHAFT COUPLING FOR CARRIAGES.—Anson Searls, New York city.

I claim, 1st, The shaft hook, A, with a recess, C, in the back part of it, and hole for bolt, I, as set forth.

2d, The curved T-head bolt, I, for the purposes described.

3d, The combination of the bolt, I, spring, R, washer, J, and nut, E, in combination with the hook, A, and pin, B, substantially as described and all for the purposes set forth.

77,770.—COTTON BALE TIE.—G. A. Seaver, New York city.

I claim the construction of the tie or fastening substantially as described.

77,771.—INSTRUMENT FOR LIGHTING GAS, ETC.—Amos Shipley and Wm. T. Merserean, Newark, N. J.

We claim in combination with a standard, a movable frame work supporting the corrugated lips, when the same shall be constructed and operate substantially as described, for the purposes set forth.

77,772.—TUBE WELL.—S. E. Skilling, Benton Harbor, Mich.

I claim the coil spring, G, provided with the rod, H, the collars, E and I, and the nut, J, within the pipe, A, substantially as arranged and for the purposes hereinbefore described.

77,773.—DENTISTRY.—Edward C. Smith and David F. Wilcox, Greenville, N. Y.

I claim, 1st, The introduction of air between the surface of the mouth and the material used in taking impressions for artificial bases for teeth, by means of air tuoes, T t, valve rod, V, and spring, S, substantially as set forth.

2d, In combination with the impression cup, C, the tubes, t T, valve rod, V, and coil spring, s, when arranged and operating substantially as and for the purposes set forth.

77,774.—SINKER FOR FISHING LINE.—William H. Smith (assignor to himself and Israel Hecker), New York City.

I claim making a sinker in two parts, and in such a manner that sections or disks may be added to or taken from it, for the purpose of increasing or diminishing its weight, substantially as herein set forth.

77,775.—HOP TRELLIS.—Lorenzo D. Snook, Barrington, N. Y.

I claim the horizontal poles, D and E, when supported at right angles upon the upper sections, B, of the stakes, as specified, by means of the hooks, K, and used in combination with the sectional stakes, A B, substantially as and for the purpose set forth.

77,776.—SHINGLE MACHINE.—George W. Southwick and John H. Gillett, Scott, N. Y. Antedated May 4, 1868.

We claim the arrangement of the bar, N, with its grooves, P P, through which pass the pins, S S, said bar being operated by the lever, q, for oscillating the bar, J, through its arm, K, substantially as and for the purpose specified.

77,777.—PROCESS FOR TREATING WOOD.—Edward Spaulding, Brooklyn, N. Y.

I claim the method of treating wood herein described, consisting essentially in subjecting it to sufficient pressure to change and compact the structure preparatory to the process of drying by artificial heat, substantially as set forth.

77,778.—CONSTRUCTION OF BLACKING BOX.—Thomas H. Spencer (assignor to Charles L. Spencer), Providence, R. I.

I claim a double hinge, when applied to a blacking box and cover, in connection with a handle, substantially as described, and for the purpose set forth.

77,779.—SAW HORSE.—Augustus Stanley, New Britain, Conn.

I claim the folding parts, A A B C, notched or recessed across, and adapted to lock into each other, and be rigidly confined at the proper angle by the aid of the screw brace, D d d', or its equivalent, substantially as and for the purpose herein specified.

77,780.—ROTARY STEAM ENGINE.—Albert I. Thunell and John M. Hedstrom, Buffalo, N. Y.

We claim the arrangement of the concentric steam grooves, f f', passage or passages, g, and blank, n, when combined with the piston head, B, and steam pipes, E G, in the manner and for the purpose specified.

Also, in combination with the wing, D, the spring slide, D', with right angled packing edge, a, arranged and operating as herein set forth.

Also, in combination with the valve C, the crank arm, H, connecting bar, I, rock lever, K, and cam pin, m, the whole arranged and operating as herein set forth.

77,781.—MODE OF LETTERING MARBLE.—Jules Turel, Kendalville, Ind.

I claim the process, substantially as herein described, for applying metallic lettering to marble or other stone.

77,782.—KING BOLT FOR WAGON.—John J. Waldron, East Durham, N. Y., assignor to himself, Timothy G. Palmer, and Henry Brown.

I claim the socket, l, projecting downwards from the plate, f, that unites the perch, e, and bolster or head block, d, in combination with the king bolt, i, that enters, at its upper part, said socket, l, and is retained by the nut, o, above said plate, f, as and for the purposes specified.

77,783.—BLOTTER.—David Walker, Newark, N. J.

I claim the thin strip of metal or hard substance, a, constructed, adapted, and attached to the blotter, in the manner and for the purpose specified.

77,784.—WAXING FLOORS.—R. B. Walker, Claremont, N. H.

I claim the combination of the beeswax, spermaceti, and paraffine, or its equivalent, in such proportions that the whole may be reduced to powder, substantially as and for the purpose set forth.

Also, the method or process, herein described, of waxing floors, by sprinkling thereon a waxing material, when the same is in a dry or pulverized or powdered state.

77,785.—MODE OF ATTACHING HUBS TO AXLES.—James Weathers, Greensburg, Ind.

I claim the thimble, B, and skein, E, cast of one piece, the former provided with a flange, b, and secured to the axle, A, by means of the bolt, f, and rod, g, all combined, arranged, and used substantially as specified.

77,786.—STOVE FOR RAILROAD CAR.—E. Z. Webster, Louisville, Ky.

I claim the slides, M and O, in combination with the hopper, N, for supplying coal to the furnace, substantially as herein described.

Also, the combination of the furnace, A, casing, H, valves, I and G, smoke and hot air flues, D and K, slides, M and O, and hopper, N, for the purpose, and substantially as herein specified.

77,787.—TRUNK LID SUPPORTER.—Samuel Wehrly, San Francisco, Cal.

I claim, 1st, The spring, B, having a hole, a, near its upper end, for the purpose of receiving the point, D, substantially as described.

2d, The catch, E, having a point, D, formed by making a slot on its top, substantially as and for the purpose described.

77,788.—FRAME FOR NECK TIE.—Patrick Welch, New York, N. Y.

I claim the neck tie frame, formed with a slot running from the upper part down the center of the body, for the purposes as set forth.

77,789.—CHURN DASHER.—John E. Williams and Michael Lemon, Binghamton, N. Y.

We claim the combination of the dasher, A, center hinged valve, F, hollow shaft or dasher rod, C, and oblique openings, E E, through the edges of the wings, all being constructed substantially as herein described and represented for the purpose set forth.

77,790.—BOILING AND PUDDLING FURNACE.—John I Williams, Etna, Pa.

I claim, 1st, The hollow cast iron water chill boxes, a a, of a puddling or boiling furnace, made with rounded back corners, and jambs, b, in front, substantially as and for the purpose hereinbefore described.

2d, The use of hollow water boshes or boxes, connected with a water reservoir or tank, of suitable capacity to keep up a circulation of warm water, as well between heats as when the furnace is in operation, substantially as hereinbefore described.

77,791.—SEAT FOR VEHICLES.—L. W. Wolfe, Jacksonville, Ill.

I claim the arrangement of the seat, A, with the hollow concavo convex metallic corners, B B, as herein described, all constructed and used substantially as set forth.

77,792.—FINISHING SKINS AND LEATHER.—George T. Woodbury and Thomas Burch, Newark, N. J.

We claim, 1st, A metallic or other roller, provided with such marks, prominences, and depressions as will produce, when passed over leather, under pressure, an imitation hog skin.

2d, The means of producing an imitation of the dressed skin of a hog upon leather adapted thereto, by the use of a roller, prepared and employed substantially as described.

3d, An imitation hog skin, when produced by the use of a metallic or other roller, having engraved, indented, transferred, or otherwise prepared upon its circumference, such marks, depressions, and projections as will secure a representation of the marks left by the removal of bristles and otherwise, when pressed upon and revolved over leather, the whole substantially as described.

77,793.—ALLOY FOR THE MANUFACTURE OF SPOONS AND FORKS.—Howell W. Wright (assignor to Reed and Barton), Taunton, Mass.

I claim the within described alloy, or composition of metals, or any other substantially the same, all as and for the purposes set forth.

77,794.—RAILWAY CHAIR.—Reuben Zider, El Paso, Ill.

I claim the arrangement of the clamps, B B, and key, D, with the chair, A, the several parts being constructed substantially as described, thus forming an improved railroad chair.

77,795.—CUPOLA FURNACE.—Federal C. Adams, Cincinnati, Ohio.

I claim, 1st, The general shape of the interior of a cupola furnace, as is described, that is to say, gradually contracted from the bottom to a point above the tweers, and thence gradually enlarged to the top, as shown.

2d, The heating chamber, A, above the cupola, provided with openings, B, and door, C, with the base wall, H, projecting over the lining, substantially as shown.

3d, The air heating chamber, F, under the wall, H, and between the lining and the outer case, with the openings for the introduction and discharge of air, substantially as described.

4th, The plate, J, in the chimney, with its smoke passages, substantially as shown, and for the purpose described.

5th, The outer case, L, forming a blast heating chamber, N, surrounding the cupola, substantially as described.

6th, The partitions, O O1 O2 O3, in the blast heating chamber, N, substantially as and for the purposes described.

7th, The space or chamber between the lining, E e, and the inner case, for the purpose of cooling the back of the lining, or heating the blast, substantially as described.

8th, The cupola lining, E e, composed of an iron plate or plates covered with fire clay or other non-conductor, as described.

9th, Arranging the tweers in a cluster, as shown by, P Q R S T.

10th, The arrangement of tweers on an angular or spiral line, as shown by the combination, P Q R S or R S U V.

11th, The tweers set at an angle to a radial line, as shown at W, for the purpose of creating a tangential or vertical blast, as described.

12th, The arrangement of tweers, having the same size at the outlet, one above the other, in regular or irregular order, substantially as and for the purpose described.

13th, The tweers, Y Y, projecting beyond the lining toward the center of the cupola, as described.

14th, The employment, in a cupola furnace, of slotted tweers for the admission of the blast.

15th, The slotted tweers constructed with the lower part of the outer end wider than the upper part, and projecting beyond the lining, substantially as shown.

16th, The horizontal slotted tweers, constructed substantially as shown.

17th, The upright center tweer, Z, surmounted by a can, Z', whether introduced through the bottom or from the sides of the cupola, substantially as described.

18th, So arranging the tweers of a cupola furnace, as to employ a greater number below than above, for the purposes described.

19th, The upper row of tweers, W W W, substantially as and for the purpose described.

20th, The combination, in the same cupola furnace, of tweers of different shapes and sizes, and located above and below each other, substantially as set forth.

21st, The inclined supports of the cap of the center tweer, Z, for the purpose of introducing the blast with a vertical motion, as described.

22d, In a horizontal series of tweers applied to a cupola furnace, constructing the inlets of unequal size, as described.

23d, In a series of tweers placed one above the other, making some of them with the outer end of a greater diameter than the others, while the inner end remains of the same diameter, as described.

24th, The horizontal line of tweers, R3 R2 P T S S2 and S3, increasing and diminishing, substantially as shown.

77,796.—CARRIAGE POLE TIP.—Alonzo Benedict, Albany, N. Y.

I claim the pole tip, A B, substantially as and for the purpose described.

77,797.—SHAFT FOR VEHICLES.—William L. Blaisdell, Port Byron, N. Y.

I claim, 1st, The hollow foot, B, of iron or other metal, when arranged as described, for the purpose of uniting the shaft and cross bar.

2d, The combination of the hook, D, and shoe, E, with the springs, c and F, and foot, B, all arranged and operating substantially as described for the purpose set forth.

77,798.—STUMP EXTRACTOR.—Isaac J. Bogert, Fayette, assignor to himself and S. C. Crosby, Manchester, Iowa.

I claim, 1st, The combination of the head block or frame, A, inclined legs, B and C, cylinder, F, and toothed wheel, G, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the above, the feet, N, pivoted to the lower ends of the supports, B, substantially as described, for the purpose specified.

3d, The combination of the lever, I, and hooked pawl, J, with the toothed wheel, G, substantially as herein shown and described, and for the purpose set forth.

77,799.—FLAME AERATOR.—C. L. Browne, Washington, D. C.

I claim the wedge shaped bar, a a a, grooved on its periphery or exterior edge, and so placed on the burner that the ends or mouths of the groove are below the lowest point of combustion, substantially as and for the purposes herein described.

77,800.—SUSPENSION BRIDGE.—Edward M. Carpenter, Middletown, N. Y.

I claim, 1st, The construction and arrangement of the frame of a bridge, of separate sections, B B and B', in combination with the wedges, F F, substantially as herein shown and described.

2d, The wedges, F F, combined with the screw rods, e, and nuts, g, substantially as and for the purpose herein shown and described.

77,801.—EXTENSION FOR TABLE.—De Lance Cole, Marshall, Ill.

I claim the combination of the extension leaf or leaves, F, provided with legs, H, dowel pins, G, and supporting bars, I, with the hinged leaf or leaves, L, and slotted side bars of the frame, A, of an ordinary table, substantially as herein shown and described and for the purpose set forth.

77,802.—WHEAT DRILL.—J. W. Davidson, Mount Auburn, Ill.

I claim, 1st, The seat, K, when its forward end is supported upon the adjustable cross bar, C, carrying the seed tubes by the bars, M, all arranged as described, for the purpose specified.

2d, The adjustable shoes, B, when provided with short vertical tubes at their rear ends to receive the flexible tubes, D, said shoes being held in place and connected to each other by means of the cross bar, C, secured to the short tubes, all arranged as described, for the purpose specified.

77,803.—TOBACCO PIPE.—Henry G. Dayton, Maysville, Ky., assignor to Richard H. Collins, Cincinnati, Ohio.

I claim, 1st, As a new article of manufacture, a bowl, D, with a perforated side, so that it can be inserted into the main bowl of a pipe.

2d, A tobacco pipe, consisting of a bowl, A, without a bottom, and with a socket, B, of a removable bowl, D, which is held in place by means of the tube, C, substantially as herein shown and described, and for the purpose set forth.

77,804.—THILL FASTENER.—Lyman Derby, New York city.

I claim, 1st, The combination of the slotted bolt, C, with the ear pieces, B, whether attached to the clip, A, or jack plate, for securing the clip upon the axle, as sometimes used, for the purpose hereinbefore set forth.

2d, In combination with the slotetd bolt, C, the tenoned or wedge shaped thill iron, E, having an oblong hole, F, in it, substantially as hereinbefore set forth, and for the purposes described.

3d, In combination with the tenon shaped thill iron, E, having a slot or hole, F, in it, the spring latch, G, substantially as described, and for the purose set forth.

77,805.—LIQUID EXTRACT FROM VEGETABLES.—Gustave De Villepoix, Abbeville, (Somme,) and Joseph Francois Bonnaterre, Paris, France.

We claim, 1st, As a new article of manufacture, the herein described liquid extract of vegetables, as and for the purpose described.

2d, The herein described process for preparing the said liquid extract of of vegetables, as and for the purpose described.

3d, The combination, with the said liquid extract of vegetables, of a solution of salt and sugar, substantially as and for the purpose described.

77,806.—PRESERVING THE WOOD OF COFFINS.—Jean Maurice Dufournet and Louis Clemendot, Paris, France.

We claim, 1st, Rendering the wood indestructible, by coating it over with any antiseptic matter.

2d, Covering the coated wood with metallic sheets or suitably prepared papers, so as to obtain perfect air and water tight surfaces, substantially as and for the purpose herein specified.

77,807.—CORN PLANTER.—John Elbertson, Kirksville, Mo.

I claim, 1st, The combination of the rack, e, gear, e', plate, l, and roller, C, having one flat edge, substantially as and for the purposes set forth.

2d, In combination with the parts above referred to, the slide, D, and tube, A, when all said parts are constructed and arranged so as to operate together in the manner and for the purpose set forth.

77,808.—CORN PLANTER.—W. H. Fish, Jr., Scarsdale, N. Y.

I claim, 1st, The valve, e, in the spout, I, when arranged in connection with the seed slide, H, so as to be operated therefrom, substantially in the manner as and for the purpose specified.

2d, The fitting of the small front wheel, D, in an adjustable frame, E, secured to the front part of the frame, A, in the manner substantially as and for the purpose set forth.

3d, The combination of the two frames, A E, when used in connection with a seed dropping mechanism, substantially as shown and described.

77,809.—WATER INDICATOR AND ALARM.—Thomas Flinn, Brooklyn, N. Y.

I claim, 1st, The arrangement of the rods, E and F, connected so that the upper suspended rod, F, will only be operated by the lower floating rod, when the water in the boiler is at too high or too low a level, substantially as herein shown and described.

2d, The rod, F, when operated as described, in combination with the levers G H, and with the valve, B, all made and operating so that the valve will be opened both when the rod, F, is raised and when it is lowered, as set forth.

3d, The above, in combination with the pin, I, or other indicator on the floating rod, E, whereby the apparatus is provided with an index, as set forth.

77,810.—BRIDLE BIT.—Wm. S. Ford, Clinton, Ill.

I claim the tubes, B B, when formed as described, in combination with the bit mouth, A, and cheek straps, C C, as and for the purpose set forth.

77,811.—CORN PLANTER.—A. J. Going, M.D., Clinton, La.

I claim the arrangement of the colter, D, furrow opener, E, and standard, F, with the beam, B, as herein described for the purpose specified.

77,812.—LATHE.—Lewis Griscom, Mahanoy Plane, Pa.

I claim, for operating the cross-feed screw of a lathe, the combination of the feed screw with the pulley, E, band, b, bar, J, or its equivalent, all substantially as described.

77,813.—CHART ROLLER.—E. L. Hagar, Empire City, Colorado.

I claim the chart roller, constructed as described, consisting of the case, C, having the hinged lid, H, and adapted to receive the chart rollers, B, said chart passing through the curved opening, E, their operating cords, F, passing through separate openings in front of the charts, as herein shown and described.

77,814.—LINIMENT.—Wm. P. Hamlin, Exira, Iowa.

I claim a liniment, formed of the ingredients, in the proportions, and in the manner substantially as herein described.

77,815.—HEMP BREAKING MACHINE.—Joseph S. Hoskins, Spring Hill, Mo.

I claim, 1st, The lifting frame, F F', carrying the swords, C, the swords, D, upon the frame, A, and the swords, E, upon the springs, G, secured at g to the frame, and passing beneath the rollers, B, all constructed and operating as described for the purposes specified.

2d, The lifting frame, F F', swords, C D, yielding swords, E, and springs, G, in combination with the whipper, Q, feed rollers, B, pawl, R, and oscillating bar, P, substantially as described for the purpose specified.

3d, The whipper, Q, substantially as above set forth and described.

4th, The oscillating bars, P, carrying the whipper, Q, in their forked extremities, in the manner and operating substantially as above set forth and described.

5th, The pawl, R, in combination with the ratchet, T, and oscillating bar, P, operating substantially as above set forth and described.

77,816.—FIRE-PROOF SAFE.—A. W. Herr, Chicago, Ill.

I claim the fire-proof box, consisting of case, A, and box, B, each constructed and arranged, and both combined as described, the spaces between the same being provided with water evaporators, arranged in the manner herein described, or in any other suitable manner, and filled with fine salt or other bad conductor of heat, substantially answering the purpose herein specified, all combined and operating substantially as herein shown and described and for the purpose set forth.

77,817.—HAY RAKER AND LOADER.—S. R. Higgins, Parma, Michigan.

I claim, 1st, The two rollers, B H, in combination with the endless carrier, D, guard, F, the adjustable frame, C, and the main frame, A, all constructed and arranged to operate in the manner substantially as and for the purpose set forty.

2d, The revolving rake or picker, G, in combination with the rollers, B H, arranged substantially as and for the purpose specified.

3d, Constructing the revolving rake or picker with movable rake bars, f, arranged so as to be operated by the curved plates, n, and their own gravity, substantially as shown and described.

77,818.—MANUFACTURE OF WHITE LEAD.—Otto Jacobi, Philadelphia, Pa.

I claim, 1st, An apparatus for producing carbonate of lead, consisting of the furnace, A, boiler, D, converter, G, and of the perforated boxes, I I, or their equivalents, all made and operating substantially as herein shown and described.

2d, The device set forth in the foregoing clause, in combination with the vinegar apparatus, F, arranged within the converter, as described.

3d, The pipes, B and J, in combination with the converter, G, all made and operating as described, the pipes being provided with dampers, c and d, respectively, as specified.

77,819.—COUNTERSINK.—C. Krebs, West Springfield, Mass.

I claim a countersink, having one or more bent lips, when constructed substantially as herein described and set forth.

77,820.—FINGER FOR SHUTTLE STOP ROD IN LOOMS.—E. S. Laney (assignor to himself and Enos Laney), Waterloo, N. Y.

I claim the improved finger herein described, when constructed substantially as and for the purpose specified.

77,821.—LAMP BURNER.—Gilbert Lavere, Bridgeport, Conn.

I claim, 1st, The combination of the central chamber, b, with the annular chamber, c, and wick tube, d, substantially as shown and described, and for the purposes set forth.

2d, The removable burner, substantially as shown and described, in combination with a rest, q, the said burner being so constructed as to be lifted off from the said rest, q, without unscrewing, all as set forth.

77,822.—FURNACE FOR BURNING FUEL FOR HEATING METALS, and for other Purposes.—T. J. Leigh, London, England.

I claim the combination of fuel in a bed of molten matter, and the construction and working of furnaces adapted to this purpose, as herein described.

77,823.—VULCANITE BILLIARD BALL.—W. H. Lippincott, Pittsburgh, Pa.

I claim forming billiard balls, and other balls of a similar nature, or for similar purposes, of successive layers of rubber, each layer being vulcanized as it is added, substantially as herein described.

77,824.—CRUTCH.—John A. Lobb, Independence, Mo.

I claim, 1st, The hollow staff, A, in combination with the hollow bar, a, the plug, d, and the spring, e, substantially as and for the purpose set forth.

2d, The hollow bar, a, in combination with the plug, d, the spring, e, and the clamps, c' c''.

77,825.—SAW SET.—A. Lyon, W. Shumard, and J. N. Robbins, Goshen, Ohio.

We claim, 1st, The chisel pointed punch, D d, so guided as to strike the teeth at their bases only.

2d, The tapering anvil, G g, adjustable to fit teeth of different widths, as explained.

3d, The combination of the anvil, G, supporting bar, I, punch, D, and stops or gages, F F', substantially as and for the purposes set forth.

77,826.—PAN FOR CONCENTRATING SULPHURIC ACID.—P. Marcelin and Joseph Saunders, Green Point, N. Y.

We claim providing sulphuric acid pans with elongated, downward-extending spouts, B, for the purpose of carrying the acid from the upper part of one pan to near the bottom of the next pan below, substantially as herein shown and described.

77,827.—PALLET FOR TIMEPIECE.—C. E. Mason, Elgin, Ill.

I claim the pallet block or stud, when slit or cut across from side to side, substantially as described, for the purposes specified.

77,828.—WASHBOARD.—Michael McGarry, Westfield, N. Y.

I claim the arrangement of the spring guides, B, and ways, b, connected by eyes, c, and bends, h, as described, when combined with washboard, A, and rubber, C C, as herein set forth.

77,829.—MACHINE FOR MAKING PAPER PULP.—Warner Miller, Herkimer, N. Y., assignor to National Wood Fiber Company, New York city.

I claim, 1st, The operating of the followers, E E', or, in other words, the feeding of the wood to the grindstone, by means of springs or a lever and weight, arranged substantially as herein shown and described and for the purpose specified.

2d, The particular application of the springs, I K, as shown, to admit of the followers being relieved of their pressure, whenever it is required to withdraw the followers for the insertion of the wood to be ground.

3d, The placing of two or more screens, P P', one above the other, in a shoe Q, placed in a suitable box, N, and having a shake motion communicated to it by means of a cam, R, or its equivalent, when such device is used in connection with or applied to a machine for making paper pulp, substantially as set forth.

4th, The curved spout or chute, T, attached to the upper screen, P, when said spout or chute is used in connection with a shoe containing two or more screens, and all arranged in such a manner as to admit of the dividing or separating of the pulp into two or more kinds or qualities of stock, substantially as set forth.

77,830.—REVOLVING SPADE PLOW.—J. W. Milroy, Galveston, Ind.

I claim, 1st, In a revolving spade plow, the hinged frame, D, operating substantially as and for the purposes set forth.

2d, The employment of one or more revolving plows or forks, arranged to operate substantially as described.

3d, The combination of the lower spade or forked wheels, R R, with the upper wheels, R' R', gearing therein, substantially in the manner and for the purpose set forth.

4th, The combination of the frame, A, roller, H, pawl, l, and cords, v v, all arranged and operating substantially as and for the purpose specified.

77,831.—CAR AXLE BOX.—A. H. Nathans and M. Thornton, Macon, Ga.

We claim the curbed packing, c, when arranged on the side of the plate, C, in the manner and for the purposes specified.

77,832.—FLOUR SIFTER.—John Novek, New York city.

I claim, 1st, A flour sifter consisting of the rotating cam shaft, B, levers, D E and F, and spring, G, in combination with the sieve, H, all made and operating substantially as herein shown and described for the purpose specified.

2d, In combination with the above, the support or supports, I, so arranged as to hold a barrel in an inclined position above the sieve, substantially as herein shown and described for the purpose specified.

77,833.—STONE-GATHERING MACHINE.—George N. Palmer, Greene, N. Y.

I claim, 1st, The broad shoe or scraper, formed with a series of grooves or channels, and having projecting points or fingers for gathering and conveying small stones, as herein described.

2d, The shoe, D, as constructed, in combination with a series of rakes, E, with spring teeth, e e, when secured to endless belts, F F, or chain gear, for loosening and picking up small stones from the surface of the ground, substantially as herein set forth.

3d, Hinging the grooved shoe or scraper, D, to the frame, A A, and controlling it by the springs, h h, in such a manner that it will adjust itself to the surface of the ground when in operation, substantially as herein described.

77,834.—MODE OF REMOVING METALLIC SCALE FROM GLASS and Molls.—Wm. P. Parrott, (Geo. Hughes', executor,) and J. J. Bordman, Boston, Mass.

We claim the employment of heat and a weak solution of sulphuric or muriatic and fluoric acids, in manner substantially as described, for removal of the metallic oxide or scale from the molls, or from the sand or silica used for making glass.

Also, for the purpose set forth, the combination of the vessel or tray, C, with the boiler, B, and the furnace, A.

Also, the combination as well as the arrangement of the acid generator, E, with the boiler, B, and the furnace, A, the said boiler and generator being connected, as described.

Also, the combination of the condenser, D, with the boiler furnace and the vessel, C, or the same and the generator, E.

77,835.—COOKING STOVE.—L. M. Parsons, Waukau, Wis.

I claim, 1st, The arrangement, as herein described, of the damper, K, with relation to the air passage, G, and oven, C, whereby the supply of cold air to the furnace, A, is cut off and directed through the oven to reduce the heat in the latter, and the supply of oxygen to the fire, as set forth.

2d, The arrangement of the air-supply flue, G, beneath the fire flue, a, of the stove, communicating with the furnace, A, through the ash pit when the stove is used with coal, and through the aperture, f, above the ash pit when used with wood, and whereby the cold air is heated by contact with the plate J, before reaching the fire, as herein shown and described for the purpose specified.

77,836.—VOTE REGISTER.—N. A. Patterson, Winchester, Tennessee.

I claim, 1st, The catching strips, G, or their equivalent, substantially as shown and described, in combination with the name blocks, B, and plate, A, or its equivalent, all as and for the purpose set forth.

2d, The springs, b, attached and operating substantially as shown and described, or the equivalent thereof, in combination with the name blocks or chases, B, all as and for the purpose set forth.

3d, The springs, s, of any suitable material, employed and operating substantially as shown and described, in combination with the strips, G, and plate, A, or the equivalent thereof, all as and for the purpose set forth.

4th, The device, consisting of the tablet, H, strip, I, and cross piece, J, or other equivalent mechanism, constructed and operating substantially as shown and described, in combination with the strips, G, all as and for the purpose set forth.

77,837.—PERPETUAL CALENDAR.—Charles T. Pooler, Deansville, N. Y.

I claim, 1st, A perpetual calendar, consisting of the bands, C and E, working respectively around horizontal and vertical rollers, substantially as herein shown and described.

2d, The perpetual calendar, when provided with the bands, C and E, of which the latter partly covers the former, in combination with the hinged portion, G, of the frame in which the device is held, as set forth.

3d, The band, H, and rollers, I, in combination with the device set forth in the foregoing clauses.

77,838.—SEAT FOR VEHICLE.—Lewis Pray, Portland, Me.

I claim the combination of the jump seat, A, upheld by crossed legs, a a, and pivoted, as shown and described, in combination with the sliding seat, D, of a vehicle body, all substantially as and for the purpose set forth.

77,839.—HORSE HAY FORK.—Emanuel Raber, Lake, Ohio.

I claim, in combination with the pivoted forks, A A, the trigger, C, hook, F, and lines or cords, g, connecting said forks with the bar, E, so that the forks may enter and hold and carry the load or charge of hay upon their tines, and drop it at the place of delivery, substantially as herein described and represented.

77,840.—FERTILIZER.—J. S. Ramsburgh, New Market, Md.

I claim the compound for a fertilizer, composed of the ingredients, mixed in the manner and proportions substantially as herein described.

77,841.—BEDSTEAD, CHAIR, SECRETARY, AND WARDROBE.—William Reckards (assignor to himself and Leonard Gattman), New York city.

I claim, 1st, The box, A, provided with a pendent hinged door, C, and a hinged portion, A x, as shown, in connection with the adjustable box, F, fitted in A, on a rod, G, all being arranged in such a manner that the box, F, may be adjusted in a vertical or a horizontal position, substantially as and for the purpose specified.

2d, The flaps, D D, fitted to the inner sides of the box, A, when used in connection with the hinged portion, A x, of the box, substantially as and for the purpose set forth.

3d, Dividing the box, F, into two compartments by means of a longitudinal partition, b, one compartment containing a mattress, G, and the other furnished to answer as a secretary or wardrobe, or both, substantially as and for the purpose specified.

77,842.—FENCE POST.—I. D. Richards and H. D. Snyder, Carbondale, Pa.

We claim the fence post, with cast iron bottom and wood top, as herein described and for the purposes set forth.

77,843.—HORSE HAY FORK.—George M. Robinson, New Wilmington, Pa.

I claim the combination of the bars, A and B, cutters, D D, slotted center bar, a, trip lever, f, having the notch, n, and cam surface, m, all constructed and operating together, substantially as shown and described and for the purpose set forth.

77,844.—LAMP BURNER.—Wm. J. Ross, Worcester, Mass.

I claim, 1st, The spring, G, secured within the burner, in combination with the pendent hooks, h, on the cone or deflector, for the purpose of securing the latter on the burner, as shown and described.

2d, The upright projections, h x, on the lower part of the cone or deflector, in combination with the hooks, h, and the spring, G, all arranged substantially as and for the purpose set forth.

77,845.—PIANOFORTE ACTION.—Herman Seidel, Roxbury, Mass. Antedated May 2, 1868.

I claim the arrangement of the weight pieces, G, provided with a guide pin b, or its equivalent, with respect to the damper, E, the key, A, the frame, I, and the rest block, F, the whole being substantially as hereinbefore explained.

77,846.—APPARATUS FOR MAKING CIGARS.—J. F. Shepard, Hampton Falls, N. H.

I claim the combination and arrangement of the several parts of the device viz, the hopper, A, the cylindrical tube, B, the plunger, C, the ferrule, D, the spring catch, E, the groove in the plunger, F, and the opening, G, in the bottom of the hopper, substantially in the manner and for the purpose above set forth.

77,847.—MACHINE BELT.—T. F. Snover, Oconto, Wis.

I claim the machine belt, constructed as described, by interposing between two layers of leather, or other flexible material, a series of longitudinal wires connected by transverse textile threads, all secured together as described for the purpose specified.

77,848.—WATCH.—Charles Springer, Newcastle, Pa.

I claim the adjustable collar, D, containing the packing in the annular recess, a, in combination with the back plate, B, cap, C, and post, A, of an ordinary watch, as herein described for the purpose specified.

77,849.—SPRING SEAT FOR SADDLES.—Robert J. Steele, Jr., Rockingham, N. C.

I claim, 1st, The bent springs, D, forming the support for the curved seat, E, each spring being secured at its ends to the horizontal cross bars, C C, at the front and rear end of the frame, A, as herein described for the purpose specified.

2d, Forming the support for the curved seat, E, of single springs, whose front and rear curved ends are secured to horizontal cross bars at the front and rear of the frame, A, as herein described for the purpose specified.

77,850.—AERIAL NAVIGATOR.—Zaphna Stone, Kinsman's, O.

I claim a balloon or aerial navigator, constructed with an upper part, A, having a flat or plane surface and an upper convex surface, and adapted to be filled with gas, in connection with a pendent car, C, having compartments, D D, which are also adapted to be inflated with gas, and a central compartment, E, for the passengers, substantially as herein shown and described.

77,851.—LUBRICATOR.—Hiram Taylor, Cincinnati, O.

I claim, 1st, Supporting the rod, D, by the lower end, c', of the hollow stem out of contact with the journal, substantially as set forth.

2d, The notched or grooved rod, D d, adapted by reversing end for end to change or graduate the freedom of delivery of oil, as herein explained.

77,852.—HAY AND COTTON PRESS.—Gray Utley, Charlotte, N. C.

I claim, 1st, Operating the platen, D, of a cotton or hay press, by means of the blocks, G H, having the dogs, 11, the rods, E E, the link, L, and the levers, J J, all acting in coöperation with each other, in the manner and for the purposes specified.

2d, The dogs, 11 each having the arm, a, and operating in combination with the blocks, G H, rod, E, and eccentric collar, m, in the manner and for the purpose set forth.

77,853.—BAIL EAR FOR PAIL.—Jonathan Walton, Brooklyn, N. Y. Antedated April 20, 1868.

I claim the bent wire bail ears, B, constructed as described, the two prongs b b, passing through the side of the pail, A, and clinched upon the inner side and held in position by means of the staple, C, encompassing said ears below the upward projecting loop, a, their inner ends also passing through the side of the pail, A, and clinched upon the inner side thereof, as herein shown and described.

77,854.—CONCRETE BLOCK PRESS.—Lawson S. Warner, Chicago, Ill.

I claim the spring, S, in combination with the toggle bars, H G E and F, and follow bottoms, D, substantsally as shown and described for the purpose of lowering the follow bottoms to their first position, all arranged as set forth.

77,855.—PLOW.—Thomas P. Warren, Norfolk, Va.

I claim, 1st, The slots, a a and a', when arranged in a vertical or inclined position in the mold board, and all extending in the same or parallel lines, in the manner and for the purpose set forth.

2d, The reversible heel iron and guide, G, when constructed so as to be employed in the manner and for the purposes specified.

77,856.—ADJUSTABLE COUCH.—Godfrey Widmer, New York city.

I claim, 1st, A couch consisting of a canvas or other sheet, F, which is fitted over an adjustable frame, B C H, so that it can be stretched in either direction, as set forth.

2d, The eccentric rings, E E, when arranged as described, so that they serve to elevate the sheet, F, to form the head rest of the couch, when said rings are adjustable around a common axis, as set forth.

3d, The strap, I, arranged on the under side of the sheet, F, in front of the head rest, substantially as and for the purpose herein shown and described.

77,857.—DEVICE FOR CLEARING PIPES.—Wm. Young, Easton, Pa.

I claim the arrangement of the tubular reamer, E, with the steampipe D, substantially as set forth.

77,858.—CAR TRUCK.—C. F. Allen, Paw Paw, Mich. Antedated May 9, 1868.

I claim, 1st, So supporting the end of a car upon a six wheeled truck that the weight shall be equally distributed upon all the wheels, by resting it upon a support over but not upon the middle axle, said support being sustained by springs placed on each side of and equidistant from the middle axle, and the whole weight being transferred to the axle through a rigid frame, substantially in the manner set forth.

2d, In combination with the beam, F, the braces, G, and swinging beams, H, placed on each side of the middle axle, and supporting upon their outer ends the side bearing blocks, N, so as to balance the weight of the end of the car over the middle axle, substantially in the manner set forth.

87,859.—FORMING TIGHT SEAMS IN RUBBER CLOTH.—Geo. M. Allerton, New York city.

I claim the stoppers to the rivets and the lapping strips, applied to and combined with the joint or seam of india rubber cloth, as and for the purposes set forth.

77,860.—FERTILIZER.—Jacob Althouse, Cross Roads, Pa., assignor to himself and Joseph V. Winemiller.

I claim the above described composition or fertilizer, compounded in about the proportions specified, for the purpose of manuring land.

Also, the process described of mixing and preparing said composition or fertilizer, substantially as described.

77,861.—WASHING MACHINE.—D. C. Baker, Buffalo, N. Y.

I claim the combination and arrangement of the slatted cylinder, B, one or more rollers, D, the series of aprons, k k k, and spring roller, E, when employed in the manner and for the purpose herein specified.

77,862.—SKATE.—E. H. Barney and John Berry, Springfield, Mass.

We claim, 1st, The heel socket, F, consisting of the portion, p, having the button socket therein, and the threaded neck, r, and operated by means of the screw, G, thus securing the skate to the inner sole of the boot, all constructed and operating substantially as described and for the purposes specified.

2d, A skate having the point or projection, t, formed upon the toe of the runner, substantially as described and for the purpose specified.

3d, A skate having a concave bottom, with the chamfered or beveled sides, n n, substantially as described and for the purposes specified.

4th, The heel fastening to a skate, having the neck, x', the button, b2, the hole, m2, in the heel plate, C, and the hole, m, in the button socket, all of the same shape, the button, b2, and stem having upon its lower end the larger portion, s3, substantially as described.

77,863.—FINISHING LEATHER.—August Bertram, New Albany, Ind.

I claim rendering leather water proof, when the same is accomplished substantially as described.

77,864.—POWER INDICATOR.—N. P. Bowsher, Ligonier, Ind.

I claim, 1st, The peculiar arrangement and combination of the dial, S, pointer, F, shaft, m, coiled spring, N, pulley, K, cord, I, pulley, J, arm, G, and sliding collar, F, of the ball governor, D, E, B, E, D, the several parts being arranged in the manner and for the purpose specified.

2d, The combination of the power indicator with a grain separator, substantially as and for the purpose herein specified.

77,865.—WASTE VALVE FOR PUMP.—Geo. E. Brettell, Rochester, N. Y.

I claim the arrangement in pump pipes of the automatic escape valve, substantially in the manner herein shown and described, and for the purposes set forth.

77,866.—SHEEP SHEARING CHAIR.—Henry D. Brown, Tipton, Iowa. Antedated April 25, 1868.

I claim oscillating racks for sheep shearing chairs, adjusted and fastened by braces, with a bolster attached to throw out the side of the sheep and prevent the skin from wrinkling.

2d, Also, the manner of fastening the hind legs of the sheep by means of straps and pins, as shown in the drawings.

77,867.—AUTOMATIC CAR VENTILATOR.—Isaac Buckingham (assignor to himself and H. W. Randall), Seymour, Conn.

I claim the arrangement of the driving blades, D, within the case, F, the said case provided with openings, G and H, so that the said driving blades will revolve in the same direction, into whichever of the said openings the air enters, and having combined therewith and so as to be operated thereby, the spiral blades, C, upon a vertical shaft within a cylinder, B, substantially in the manner and for the purpose described.

77,868.—SHOE FOR AMALGAMATOR.—John H. Bullock, Gold Hill, Nevada.

I claim the combination and arrangement on the face of a shoe or grinder for amalgamators of the grooves, H H, with the supplementary grooves, i I, by which the quicksilver is taken from different points at the outer edge of said shoe, and delivered at different points at the rear of the same, to be in the way of the following shoe, substantially as described.

77,869.—ROTARY STEAM ENGINE.—Wesley B. Campbell, Abingdon, Iowa.

I claim the arrangement of the following parts: The induction pipe, A, the case, B, wheel, C, packing, D, valve, E, spring, F, and eduction pipe, G, substantially as set forth.

77,870.—DEVICE FOR BOILING AND STIRRING FRUIT.—M. G. Collins, Baltimore, Md. Antedated May 8, 1868.

I claim in a fruit-butter stirrer the detachable frame, C, with hds, M, constructed and arranged as described, provided with the flanges, E F, and supporting the posts, G, having the shafts, H, upon one side of the vertical stirrer, K, as herein shown and described.

77,871.—HEATING RAILROAD CARS.—A. C. Crary, Utica, N. Y.

I claim the separate steam generator, M, on the locomotive, heated by the waste heat of the smoke or of the exhaust steam, for the purpose of heating the train of cars, and constructed substantially as herein described.

Also, in combination with a separate steam generator, M, constructed as above specified, the use of pipes, O, H and I, in the manner as herein set forth and described.

Also, in combination with a separate steam generator, M, and pipes, O, H, and I, as above specified, the use of universal or compound joints, in the manner substantially as herein set forth and described.

77,872.—ADJUSTABLE SOFA.—Edward Deetz, Philadelphia, Pa.

I claim, 1st, The rounded and notched rear portion of the end frame, A, of the sofa, in combination with the end frames of the back, hinged to the body and provided with spring bolts adapted to the notches on the said rounded portions of the frames, A, all as set forth for the purpose specified.

2d, The above, in combination with the within described cords and pulleys, by which the spring bolts at the opposite ends of the sofa, may be operated simultaneously as described.

77,873.—CHURN.—Wm. C. Douthett, Rochelle, Ind.

I claim, 1st, The provision in a churn operating mechanism of a weighted arm, F, applied substantially as and for the purpose described.

2d, The combination with the arm, F, of the ball, 11, and jaws, f2 f2, substantially as set forth.

3d, The combination of the bent or twisted blades or wings, J J, with the disk or dasher, B, substantially as and for the purpose set forth.

4th, In a churn, the herein described mechanism, by means of which a complete rotary movement of the churn dasher is produced, while it shall at the same time be caused to rise and fall, as herein set forth and described.

77,874.—ALLOY FOR METALLIC ROOFING.—Levi S. Enos, Almond, assignor to Nathaniel Sweet, Alleghany County, N. Y.

I claim the above described compound, when made substantially in the manner and for the purpose specified.

77,875.—RIGGING FOR JIB SAILS.—Frederick Fillingham, Ithaca, N. Y.

I claim the construction, arrangement and use of the jib sprit or boom, for the purpose of moving and adjusting the jib sail to any point on the starboard or port side of the bowsprit and vessel, as and for the purposes described.

77,876.—DECORATING WALLS.—James C. Finn (assignor to himself, William Howell, and Charles A. Duy), Philadelphia, Pa.

I claim the decorating of walls with a material composed of veneers or ornamental papers, mounted on muslin, stiff paper, or other fabric, when the said material is tacked at the edges only to the walls, and when the joints between the pieces are covered by moldings or beadings forming part of the decoration, all substantially as and for the purpose herein set forth.

77,877.—MORTISING MACHINE.—D. L. Gibbs (assignor to R. Ball & Co.), Worcester, Mass.

I claim, 1st, The combination, with the chisel spindle, the pinion or segment gear thereon, and the pawl, a, and ratchet, f, of the bell crank lever and its toothed segment, actuated by stops, m n, in the manner described, and the cam, I, and spring, N, for completing the movement of the spindle, substantially as and for the purposes shown and described.

2d, The combination, with the bell-crank lever and its toothed segment, arranged to operate the chisel spindle, as specified, of the friction spring, H, ledge, o, and stops, p p, substantially in the manner and for the purposes shown and described.

77,878.—GRAIN BINDER.—J. F. Gordon, Kalamazoo, Mich.

I claim, 1st, The binding arm, H, capable of adjustment in the direction of the length of the grain, in combination with an automatic twisting device, substantially as and for the purposes described.

2d, The shafts, G G2, in combination with the binding arm, H, substantially as and for the purposes set forth.

3d, The arrangement of the cam wheel, J, forked lever, I, pitman, f, and lever, n, for giving a vertical vibrating motion to the arm, H, substantially as described.

4th, The hooked twisting wheel, A3, constructed and operated as described and represented, having an intermittent rotating motion, in combination with the stationary knife, P3, as and for the purpose explained.

5th, The clamp plates or jaws, 2 and s, arranged and operating in combination with the arm, H, substantially as and for the purpose set forth.

6th, The slide plate, l 4, arranged and operating in combination with the arm, H, substantially as and for the purpose set forth.

7th, The combination of the shaft, 9, spring, g2, chain, h, and sector, X, for giving an intermittent motion to the twisting device, A3, substantially as described.

8th, The combination of the reciprocating rake, T, hinged weighted lever, S, stop pin, 33, and guide, U, all arranged and operating substantially as described.

9th, The employment of the jointed arms, t t2, stop pin, t3, and hook, t4, or equivalent devices, in connection with the connecting rods, S S2 e e2, whereby the rake is held at rest for a specific period, every time it completes its motion toward the binder, substantially as and for the purpose explained.

10th, The tension device, consisting of the arms, H4 h5 h6, and spring, h4, applied and operating substantially as and for the purpose explained.

11th, The combination of crank lever, e, rod, e2, arm, t, or its equivalent, slotted lever, S, and pitman, S2, for the purpose of imparting a reciprocating motion of the rake, substantially as described.

77,879.—STUMP EXTRACTOR.—Jesse Havens (assignor to himself and George Palmer), Auburn, N. Y.

I claim the differential cylindrical shaft, D, tackle block, G, and the rope, C, in combination with the frame, substantially in the manner and for the purposes herein shown and described.

77,880.—CARRIAGE SPRING.—W. B. Higgins, San Francisco, Cal.

I claim the combination of the springs, D D, with the wooden spring, A, to form the connection of the same with the body of the carriage, substantially as described.

77,881.—CHISEL HANDLE.—Robert V. Hilton, John G. Webster and Hiram E. Wheeler, Lowell, Mass.

We claim the handle, C, plug, A, elastic rings, B B, and cap, E, constructed and arranged in the manner and for the purpose as described.

77,882.—ELECTRO-PHONETIC TELEGRAPH.—Royal E. House, Binghamton, N. Y.

I claim, 1st, The use of the reflector, shaped and proportioned in accordance with the principles described, and for the purposes set forth.

2d, The respective arrangement and combination of the reflector and sounding head, as described.

3d, The combination of the reflector with sounding head and limiters, as described, and for purposes set forth.

4th, Hinging the sounder and adjusting its angle, as described, for the purpose of regulating the distance through which the permanent magnetic force shall move.

5th, The use of a set of deflecting magnetized needles, constructed as described, and relatively arranged as described, for purposes set forth.

6th, Constructing the axial aperture of a deflecting needle helix, as described, for the purposes set forth.

7th, The combination of a deflective needle helix, constructed with an axial aperture, as described, with a set of deflective needles, constructed and relatively arranged as described, for the purposes set forth.

77,883.—SLEEPING CAR.—George W. Hunt, Hopkinton, Mass.

I claim the berth leaf or shelf, d, when hung by links, f, in such manner that it may be swung up and locked against the roof, or swung down and locked in position to form the berth, substantially as shown and described.

Also, in combination with such swinging shelf, d, the folding partition piece, h, hinged crosswise at the top of the car, and folding up and locking against the bottom of the shelf, d, or swinging down to form a partition or a support for the front of the shelf, d, substantially as described.

77,884.—CULINARY APPARATUS.—George B. Isham, Burlington, Vt.

I claim, 1st, The combination of the several parts of a culinary apparatus or steamer, baker, broiler, and fryer combined, all as herein described, and for the purpose set forth.

2d, The particular construction of the outside, A, with its detachable bottoms, F and D, all as herein described and for the purpose as set forth.

77,885.—BUCKLE.—Joseph H. James (assignor to himself and Seth Baxter), Warren, R. I.

I claim a buckle composed of two frames, one sliding upon the other, and arranged with a thumb rest, or its equivalent, substantially as described.

77,886.—SHIELD FOR SMOOTHING IRON.—William J. Keep, Buffalo, N. Y.

I claim a shield plate, A, for smoothing irons, provided with the oblong opening or openings, a, for admitting the handle of the iron, and with a shank, B, for connecting a holder with the shield, constructed and operating substantially as herein specified.

77,887.—POSTAGE AND REVENUE STAMPS.—Miner Kilbourne Kellogg, Baltimore, Md.

I claim so printing a revenue or postage stamp or check requiring cancellation, with a non-fugitive color, and also with a fugitive ink or color, composed of the ingredients herein described, that the fugitive color shall lie in the blank places left after printing with the non fugitive color, substantially as described.

77,888.—SCREW PROPELLER.—John E. Kennedy, New Orleans, La.

I claim constructing the blades or wings of a screw propeller with two reversed curves, when the outer curves shall be drawn upon a radius equal to one fourth only of the radius of an arc of the circumference of the screw, and the inner curves upon a radius three times the length of the radius of the said outer curves, substantially as herein described for the purpose set forth.

77,889.—SEWING MACHINE.—Oscar C. Kerr, Philadelphia, Pa. Antedated May 4, 1868.

I claim, 1st, A loop carrier, U, constructed substantially as described, and operating in conjunction with an eye-pointed needle and a loop holder, W, to produce, from the needle thread, the stitch, fig. 15, in the manner set forth.

2d, A needle, a, and loop holder, W, in combination with an adjustable loop holder, U, the whole being constructed and operating substantially as and for the purpose specified.

77,890.—CURTAIN FIXTURE.—Ira Kinman, Freeport, assignor to Sarah Kinman, Stephenson county, Ill.

I claim the reversible crank handle, h, and angular catch, g, in combination with the roller, B, and arranged to operate as set forth.

77,891.—PREVENTING HOGS FROM ROOTING.—John D. Kirkpatrick, Urbana, Ohio.

I claim the within-described instrument, consisting of the handles, A A' B B', and the plates or parts, D E, having the openings, d f, and the cutter, g, provided with inclined side pieces, h h, substantially as and for the purpose set forth.

77,892.—BEEHIVE.—E. I. Kline, Kirkville, Iowa.

I claim a beehive, combining in its construction the following elements, viz.: first, a base, A, constructed with a diaphragm, A', spout, B, and openings, C; second, a section, D, with slats at E; third, the double glass plates, F; fourth, the section, G; fifth, the glass plate, H; and, sixth, a cap, I; said base, sections, and cap being composed of glazed earthenware, and the parts being arranged substantially as described.

77,893.—FISHING APPARATUS.—Joseph Koehler, N. Y. city.

I claim, 1st, The trigger lever, d, applied substantially as specified, in combination with the spring jerk, the parts receiving the fishing line, as set forth.

2d, The swinging arm, h, in combination with the trigger lever and holding eye, 11, or its equivalent, so that the parts may be folded as set forth.

3d, The steel yard, n, in combination with the trigger lever, d, and jerk spring, c, substantially as and for the purposes set forth.

4th, The spring hook q, formed of the arms, 14, extending from the coil, 15, and terminating in the reverse hooks, 16, so that the hooks can be opened by pressing the arms, 14, toward each other, as set forth.

77,894.—BRICK MACHINE.—Wm. O. Leslie, Philadelphia, Pa.

I claim, 1st, The combination of the pug mill or mixing tub, G, with the chamber, g', having the plunger, I, working therein, the chamber, g, with the plunger, J, and the reciprocating mold carriage, W, all constructed and arranged to operate substantially as shown and described.

2d, The mold carriage provided with the racks, T, in combination with the segment wheels, S and S', and the spur wheels, Q and Q', when arranged as shown and described, for the purpose of imparting to the mold carriage a reciprocating motion, as set forth.

77,895.—MACHINE FOR DRESSING STONE.—William O. Leslie, Philadelphia, Pa.

I claim the combination of the wheel, A, having the cutters attached, with the table, B, provided with the rack, s, and the shaft, m, provided with the pinion, n, and having its outer end journalled in the lever, L, all arranged to operate substantially as described.

77,896.—CYLINDRICAL PLATE PRINTING MACHINERY.—G. F. Lewis, Philadelphia, Pa., and F. D. Stuart, Washington City, D. C.

We claim, 1st, Applying whiting or other material, as a detergent, to the cylinder, in a solid form, by means of boards, i1 i2, and springs, 1, or equivalents, substantially as described.

2d, The buff, f3, applied to the detergent roller, F, substantially as and for the purpose described.

3d, The application of gas to heat the printing cylinder and the ink rollers, by means of pipes, b, passing through said rollers, and provided with burners or jets, b1 b1, substantially as described.

77,897.—HARVESTER.—E. J. Leyburn, Lexington, Va.

I claim, 1st, The shifting device, f, constituting an auxiliary to the cam, J, substantially in the manner described, and applied to a combined rake and reel of the character substantially as described, whereby the raking can be stopped and started at pleasure while the reels and rake continue to revolve, substantially as set forth.

2d, The combination of the vertically and bodily adjustable frame, A3, with the rock shaft, S, and the inner and outer supporting wheels, D and d3, substantially in the manner and for the purposes described.

3d, The segmental toothed frame, E, provided with a latch and lever, and pivoted to the draft frame, A3, said frame having the axle of the supporting wheel, D, applied to it, and being attached, by means of a lever, B1, to a pivoted draft pole, B, so that in the act of raising and depressing the draft frame the front end of said pole shall remain in one given position, substantially as described.

4th, The idler or pulley, E1, applied to the vibrating frame, E, so as to maintain proper tension of the belt, C1, at all times, substantially as described.

5th, The toothed segment frame, E, adapted for suspending the frame, A3, and for being geared with toothed pinions, a a, and for being connected to the devices which actuate the wheel d3, substantially as and for the purposes described.

6th, The continuously vertically revolving reel arms, I1, intermittent horizontally sweeping rake, I2, and a shifting device, r, in combination with a hand lever, G1, and catching device, y y', substantially as described.

77,898.—STUMP EXTRACTOR.—John Longanecker, New Pittsburg, Ohio.

I claim the combination of the tongue, C, gears, b' and d, windlass D, rope d2, pulleys, E and F, and lever, G, with the frame, A, and braces, a, when arranged and operating as and for the purpose set forth.

77,899.—METAL CANS AND CASES FOR PUTTING UP ALKALIES.—John McCoy (assignor to himself and W. T. Snell), Philadelphia, Pa.

I claim the within described can or case, composed of the body, A, bottom a, inner annular cover, b, and outer cover, d, all being arranged and secured by lap joints, as set forth, for the purpose specified.

77,900.—OIL CUP FOR STEAM PRESSURE.—Franklin P. McCullon and Wm. Woodcock, Philadelphia, Pa.

We claim, 1st, The needle or plug, B, and the index or finger, E, in combination with an oil cup, A, substantially as shown.

2d, The key, F', finger, I, sleeve, K, in combination with an oil cup, A, substantially as shown.

77,901.—SKATE.—Achille F. Migeon, Wolcottville, assignor to Union Hardware Company, Torrington, Conn.

I claim 1st, The metallic brackets, g g, each formed with an elongated hole receiving the tongue at the end of the runner arm, into which said tongue is riveted, so that said brackets stand as T-pieces across the arms of the runner, and are united to the sole plate by the screws or rivets, o, as set forth.

2d, The clamps, k l, in combination with the screw, m, that passes through the flange of the clamp, l, and through a threaded hole in the runner, fitting said screw, m, so as to confine the boot sole by the clamps, k l, in the manner specified.

77,902.—MANUFACTURE OF PACKING FOR STEAM ENGINES, ETC.—Wm. H. Miller, Philadelphia, Pa.

I claim the process above described, or its substantial equivalent, whereby the combination of dry powdered and dry fibrous material may be secured from the effects of water or condensed steam.

77,903.—CAR BRAKE AND STARTER.—C. D. Moody, St. Louis, Mo., assignor to himself and Horace Billings, Beardstown, Ill. Antedated April 28, 1868.

I claim the combination and arrangement of the wheels, B B' and D, with the axle, A, and the spring, C, as described and set forth.

77,904.—COMPOSITION FOR REFINING AND TOUGHENING IRON.—John H. Nolf (assignor to himself and John D. Williams), Philadelphia, Pa.

I claim the treatment of iron during the process of puddling with a composition consisting of the within described ingredients or their equivalents, in the manner and for the purpose described.

77,905.—CUTTING AND FORMING BLIND "HOOK BLANKS."—Galen Orr, Needham, Mass.

I claim making blind hook blanks by cutting plate metal to the shape herein specified.

77,906.—HAND FORK.—Fred'k. W. Palmer, West Richmondville, N. Y.

I claim a hand fork substantially as described, for the purposes set forth.

77,907.—HORSE HAY FORK.—Nelson Palmer, Albany, N. Y.

I claim the spring catch, k, in combination with the ball, E, and roller, l, for the purpose of holding the ball, e, in position, or releasing it, at pleasure.

77,908.—MACHINE FOR WIRING BLIND SLATS.—George Pancake, Harrisburg, Pa.

I claim, 1st, Feeding the staples to the driver, W, by means of the wheel, b, said wheel being constructed and operating substantially as described.

2d, The staple supplying incline, a, in combination with the feeding wheel, and driver, W, arranged to operate in the manner and by the means substantially as set forth.

77,909.—REVERSIBLE KNOB LATCH.—John E. Parker, Meriden, Conn.

I claim, 1st, The yoke, B, provided with a projection, a, and arranged so as to be raised from the latch bolt, substantially as shown.

2d, In combination with the above the fixed guides, d d, for guiding and holding the latch bolt in position, substantially as described.

3d, The arm, G, constructed so as to form a seat for the spring on the spindle, C, and also as a means for operating the yoke, B, to permit the removal of the latch bolt, substantially as herein set forth.

77,910.—MACHINE FOR THREADING SCREWS.—Wilbur F. Parker, Meriden, Conn.

I claim the combination of the mandrel, or its equivalent, for rotating the screw blank and the guide, R, with a chasing tool and mechanism for imparting to the said tool a movement of translation along the body of the screw blank, and curvilinearly along the curved or tapered extremity of the blank, substantially as described.

77,911.—HAIR DYE AND DRESSING COMPOUND.—George F. Peckham, M. D., Grafton, Ohio.

I claim a compound composed of the ingredients, and in nearly the proportions substantially as herein described.

77,912.—MACHINE FOR STICKING PINS.—Truman Piper and E. F. Bradley (assignors to Howe Manufacturing Company), Birmingham, Conn.

We claim, 1st, In combination with the several independent channels, the cut-off device for each of the said channels, constructed and arranged substantially as described, and operating so as at the proper time to deliver the pins from either or several of the channels, substantially in the manner herein set forth.

2d, The combination of the intermittently revolving ratchet, cam wheel, spring levers, and cut-off slides, with the slide, B, substantially as herein described.

77,913.—GLOBE VALVE.—James Powell, Cincinnati, Ohio.

I claim, 1st, The loose collar or guiding rim, F, applied to the neck of a globe valve, substantially in the manner described.

2d, The packing collar, G, in combination with the loose disk valve and grooved hub, C, as described and set forth.

77,914.—DETACHABLE NOSE FOR BOWLS, ETC.—George Raymond, Fitchburg, assignor to himself and Oliver P. Conklin, Worcester, Mass.

I claim the combination with a detachable nose for bowls and other articles, provided with one or more loops, b, as herein described, of an elastic band, for holding the said nose to the bowl to which it is applied, substantially in the manner and for the purposes herein shown and specified.

77,915.—JOINT FOR SHACKLES.—John F. Reiner, Columbus City, Iowa.

I claim a joint or shackle having parts, A and B, bolts, C and E, clutch, D, and bellows, G, constructed, combined, and arranged substantially as specified.

77,916.—CAN OPENER.—Charles F. Ritchel, Chicago, Ill.

I claim the can opener made of one piece of sheet metal, as described, provided with point, D, and blade, E, both arranged and operating substantially as herein shown and specified.

77,917.—GAS BURNER.—Wm. H. Rodgers, Brooklyn, N. Y.

I claim, 1st, the cock, c, formed with the gas ways 2, 4, and 7, in combination with the opening, 3, and pipes, 5 and 6, to supply gas to the chamber, f, and jet, i, when the jet, e, is extinguished, the parts being arranged and acting substantially as and for the purposes set forth.

2d, The regulating screw or cock, S, in combination with the jets, i and e, as and for the purposes set forth.

77,918.—HARNESS LOOP.—Geo. W. Rowland, Salem, Oregon.

I claim a winged metallic loop for attachment to harnesses, constructed to operate substantially as described.

77,919.—MOP WRINGER.—Hugh B. Rorke, California, Mo.

Antedated April 29, 1868.

I claim the rollers, B B', either with or without corrugations, the ear pieces, A, lever, C, when combined and arranged as described and set forth.

77,920.—MACHINE FOR TREATING HIDES.—Hermann Royer Louis Royer, San Francisco, Cal.

We claim, 1st, The vertical shaft, B, with a slot, B', and set screws, b b b, said shaft having a forward and and back motion, substantially as and for the purpose described.

2d, The pins or rollers, C C, set in the rings, D and D', together with the grooved weight, I, substantially as and for the purposes described.

77,921.—SOLDERING FURNACE.—Geo. O. Sanderson, Boston, assignor to himself and E. D. Goodrich, Cambridge, Mass.

I claim, 1st, The flattened tube, A D E, when made and arranged substantially as described and for the purpose set forth.

2d, The combination as well as the arrangement of a Bunsen burner with a deflector, G, to the pieces, K K' K" K"', and the case N O, made substantially as described and for the purpose set forth.

77,922.—APPARATUS FOR HANDLING IRON IN ROLLING MILLS. Elias Sanford, Meriden, Conn.

I claim the pan, C, with the valve, a, attached, and its peculiar construction, with the perpendicular bar, D, and double jointed lever, F, by which it is carried around and over the upper roll, and presented to the man in front of the machine, substantially as herein specified.

77,923.—REGULATING AND DISPENSING MECHANISM.—Socrates Schofield, Providence, R. I. Antedated March 20, 1869.

I claim, 1st, Causing the motion derived from any kind of governor, as transmitted in one direction, to be stopped and controlled by an obstructing point or notch, or system of elevations and depressions, operating under the action of a governor, transmitted in annother direction, substantially as described.

2d, Arranging the ratchet teeth in steps, or one above the other, in connection with a guard operating to produce a corresponding change in the elevation of the catches, substantially as and for the purpose specified, in any regulating or dispensing mechanism.

3d, The combination of several elements, consisting, first, of a dispensing device; second, of a vibrating bar or lever; and third, of an opposing point, placed in connection or combination with any governor or other indicator of a desired change in the action of a machine, to operate substantially as described.

77,924.—GRAIN DRILL.—Jacob H. Shreiner, Camp Hill, Pa.

I claim, 1st, The peculiar construction of the foot, B, substantially as and for the purpose herein set forth and described.

2d, The combination of the foot, B, cutter, C, and boot, A, substantially as herein shown.

3d, The cutter guard, E, substantially as and for the purpose set forth.

4th, The combination and arrangement of the feed pipe or boot, A, cutter guard, E, brace, D, cutter, C, foot, B, and share, d, substantially as herein set forth and for the purpose specified.

77,925.—MACHINE FOR MAKING DRAIN PIPE.—Robert Skinner, San Francisco, Cal.

I claim, 1st, The follower, G, constructed with slots, G' G', and the curved openings, F F, in which it slides, in combination with the stationary core, E, and ring, N, substantially as and for the purpose set forth.

2d, In combination with the above claimed apparatus, the steam jacket, J, for heating the same, and the material worked thereby, substantially as described.

77,926.—CHURN.—J. C. Slaughter, Crumpton, Md.

I claim, 1st, A casing, A, contracted in diameter near the bottom, in combination with a series of revolving blades, arranged nearer together at the lower than at the upper end of the casing, for the purpose set forth.

2d, The frame, G, having blades, m, extending across the same, and hung to the shaft, C, in respect to its blades, n, as and for the purpose specified.

77,927.—FOXING AND SOLING BOOTS.—Alfred G. Smith, Marathon, N. Y.

I claim, as an improved article of manufacture, a foxing or fronting and soling for boots and shoes, constructed separately from the work to which it is to be applied, substantially as and for the purpose set forth.

77,928.—MEASURING-FAUCET.—James D. Smith (assignor to Arthur P. Emery), New York city.

I claim, 1st, The combination, with a rotary measuring and drawing device, C, arranged in the chamber, B, of the faucet, A, and turned from the outside by crank or handle, G, of the fast and loose differential wheels, I J, pinion, K, carried by the handle and wheels, M N, or their equivalents, for operating the dial, P, substantially as shown and described.

2d, The dial, P, hung for independent action, as described, and for free rotation with the wheel, N, by which it is driven by frictional gear with the latter, through a spring or springs interposed between said wheel and dial, essentially as specified.

77,929.—DOUBLE SEAMER FOR TIN WORK.—Charles F. Spaulding, St. Johnsbury, Vt., assignor to himself and E. D. Goodrich, Cambridge, Mass.

I claim, 1st, The carrying disk, F, the shaft, D, and crank, E, when combined with the compressing-disk, H, operating substantially as described, and for the purpose set forth.

2d, The rubber band, G, in combination with the disk, F, substantially as described, and for the purpose set forth.

3d, The standard, K, pivot, K', in combination with the brace, N, substantially as and for the purpose set forth.

4th, The combination and arrangement of the lever, M, shaft, I, sliding standard, J, and standard, K, substantially as described, and for the purpose set forth.

77,930.—DITCHING MACHINE.—George H. Stevenson, Washington, Ohio.

I claim the construction of a spade that will cut a ditch ready for tile, thirty inches deep, without the use of any other instrument, and is useful for digging post holes and many other useful things, which is done by the movable foot-piece and peculiar shape of the blade and lips attached thereto.

77,931.—BOOT AND SHOE LAST.—James H. Swain, San Francisco, Cal.

I claim the projection or flange, C, or its equivalent, on the face of the last, substantially as and for the purpose specified.

77,932.—PUDDLING AND BOILING FURNACE.—William Swindell, Allegheny City, Pa.

I claim, 1st, A bottom plate for a puddling or boiling furnace, cast with a series of grooves in or along its lower surface, in which to arrange a series of water pipes, substantially as and for the purposes hereinbefore set forth.

2d, The use of a series of tubular water chills, a', when arranged in grooves cast in the lower face of the bottom plate of a boiling or puddling furnace, substantially as and for the purposes hereinbefore described.

3d, Supporting the boshes of a puddling or boiling furnace by a ledge or rim, c, on the upper face of the bottom plate, and extending around in it the outside line of the boshes, substantially as and for the purposes hereinbefore expressed.

4th, Jointing the boshes of a puddling or boiling furnace to the bottom plate and to each other by ribs, e, so shaped as, in connection with lips, c', to form a dove-tail joint, substantially as and for the purposes set forth.

5th, Making chill-faced boshes for puddling or boiling furnaces, by casting them against a metalic chill, substantially as and for the purposes hereinbefore set forth.

77,933.—OSCILLATING RUBBING MACHINE FOR MEDICAL USES.—George H. Taylor, New York city.

I claim, 1st, The rubber, A, composed of India rubber, and having its outer surface coated or covered with India rubber, the said outer surface being furnished with projecting ribs, points, or corrugations, and the said rubber A being constructed substantially as and for the purpose specified.

2d, The combination, with the rubber, A, of the forked rod, C, hung on a pivot, E, and operated by any suitable mechanism, substantially as and for the purpose set forth.

3d, The combination, with the rubber, A, and rod, C, of the crank, G, arm or connecting-rod, H, and shaft, I, substantially as described and for the purpose set forth.

4th, The combination, with the rubber, A, driven by suitable mechanism, substantially as set forth, of the couch, S, properly connected with the frame, O, and having an opening, R, through it, for the said rubber A to work through, substantially as and for the purpose set forth.

77,934.—TAILORS' PRESSING MACHINE.—Joseph W. Thorpe, Hillsborough Bridge, N. H., assignor to himself and David F. Brown.

I claim, 1st, The arrangement of the socket, E, the sleeve, F, and the spindle, J, with the press iron and its adjusting handle, substantially as set forth.

2d, Supporting the heater at a distance from the face plate of the press iron, by means substantially as described and for the purpose specified.

3d, The arrangement of the adjustable handle, a, and cam, a', with the spindle, J, and press iron, for the purpose substantially as set forth.

4th, The rubber or elastic bearing, e, arranged in combination with the jack P, substantially as set forth.

77,935.—APPARATUS FOR COOLING AND PURIFYING BONE BLACK.—Daniel H. Turner, New York city.

I claim, 1st, The combination of the circumferentially close revolving cylinder, A, provided with interior lifters, and set horizontal, or thereabouts, screen, or screen extension, C, at the forward end of said cylinder, and hot air, gas, and dust conductor, F, for operation together substantially as specified.

2d, In combination with the circumferentially close cylinder, A, and screen forward extension, C, the adjustable ring or cover, K, essentially as shown and described.

3d, The arrangement, within the conductor, F, of the distributing apron, H, for operation in connection with the cylinder, A, provided with lifters, and set horizontal, or thereabouts, as herein set forth.

77,936.—LAMP SHADE.—Gustav Wedekind, Philadelphia, Pa.

I claim, in combination with the radial braces for supporting the shade on the chimney, the raised elbows on said braces, to support the shade and prevent it from shaking about, substantially as and for the purpose described.

77,937.—BED PAN ATTACHMENT FOR INVALID BEDS.—Sam'l G. Welling, New Rochelle, N. Y.

I claim the movable elastic seat piece, in combination with the pipe and pan, substantially as and for the purposes set forth.

77,938.—ARTIFICIAL IVORY.—William M. Welling, New York city. Antedated May 2, 1868.

I claim the composition herein specified, prepared as set forth.

77,939.—CHURN DASHER.—E. B. West, St. Anthony, Minn.

I claim, 1st, The arrangement of the arm, N, and stationary paddle, O, as specified, and for the purpose set forth.

2d, The combination of the stationary arm, N, and its paddle, O, with the movable arms, M I, their paddles, and the plate, A, all constructed and operated as specified.

77,940.—PORTABLE MUSIC STAND.—Daniel M. White, Malden, Mass.

I claim so arranging a convertible cane and music stand that when closed to form a cane, said cane shall consist of the hinged legs, B B B, and the tube, A, said parts being adapted to enclose the rod, D, and folding rack, C, and, when arranged as a music stand, the legs, B B B, shall be extended to support the tube, A, and the rod, D, and frame C be adjustably supported on the latter by means of the spring, S, substantially as described.

77,941.—TUBE WELL.—William H. White, Lynn, Mass.

I claim the combination, with a well tube, A, of the movable strainers of induction tubes, applied and operating substantially as described.

77,942.—PORTABLE FENCE.—Thos. B. Wickham, Granville, Ohio.

I claim the manner of locking and supporting the panels by the double brace and clamp, B B, in combination with the stakes, D D, and lock, C C, all substantially arranged as set forth in the foregoing specifications.

77,943.—PLATFORM CAR STAKE HOLDER.—Wm. J. Willits, Detroit, Mich. Antedated April 28, 1868.

I claim, 1st, The arm, I, cams, N N, collar, H, staple bolts, F F, etc., clamp, E, plate, R, projection, O, staple bolt, P, nut, S, and lever, L, for the purpose designed.

2d, The combination and arrangement of the stake, B, the sill, A, the gain, D, in the floor, C, the clamp, E, the staple bolts, F F, etc., the collar, H, the arm, I, the head, K, the lever, L, the cams, N N, the projection, O, staple bolt, P, the plate, R, the ring, X, and the stop, T, arranged substantially as described for the purpose designed.

77,944.—VEGETABLE WASHER.—George H. Tift, Morrisville, Vt.

I claim the combination of the bolt headed journals, C C, when attached to the rotating cylinder, F, from its interior, and used with the pivoted blocks, J J, in the manner as specified.

REISSUES.

2,925.—COVERING WHIPS.—Chas. C. Pratt, Westfield, Mass., assignee by mesne assignments of Gamaliel King. Patented June 18, 1867. Division 1.

I claim, 1st, A water proof coating, consisting of the combined ingredients herein shown and described.

2d, The application of the dissolved caoutchouc with or without the lead and oil, to a whip, substantially as and for the purpose shown.

2,926.—COVERING WHIPS.—Chas. C. Pratt, Westfield, Mass., assignee by mesne assignments of Gamaliel King. Patented June 18, 1867. Division 2.

I claim, 1st, The covering of the body of a whip with an inner braiding, d, substantially as shown and described.

2d, The combination of the inner and outer braidings, d f, with the varnish or coatings, c c, all applied in the construction of a whip, substantially as shown and described.

2,927.—MACHINE FOR POLISHING BUCKLES.—Emanuel Andrews, Williamsport, Pa., assignee of Robert G. Pine. Patented April 8, 1856.

I claim, 1st, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for said holder, and springs to bear the article against the revolving wheel with a yielding pressure, substantially as before set forth.

2d, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, springs to exert a yielding pressure, and guides to limit the movement of the article under the yielding pressure, substantially as before set forth.

3d, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, springs to exert a yielding pressure, and traversing mechanism, to move the article transversely to the rim of the wheel, substantially as before set forth.

4th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, guide to limit the movement of the article towards the polishing wheel, and pattern for the article, substantially as before set forth.

5th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, guide to limit the movement of the article towards the polishing wheel, and pattern for the article, substantially as before set forth.

6th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, spring, guide, and pattern, substantially as before set forth.

7th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, springs to exert a yielding pressure, traversing mechanism, and guide to limit the movement of the article towards the polishing wheel, substantially as before set forth.

2,928.—OPERATING THE TREADLES OF LOOMS.—Robert W. Andrews, Stafford, Conn. Patented January 18, 1853. Extended seven years.

I claim the combination, in a loom, of the harness frame and cords with the treadles and treadle cams, constructed and operating substantially as described.

Also, the treadles and the movers or cams, combined, constructed, and arranged so that by reversal of the cams upon the shaft, a reversal of the movements and retentions of the harness frames is produced, substantially as herein set forth.

Also, in a cam loom having upright treadles or harness levers strung to the harness leaves or frames, and actuated by a single set of cam wheels, the arrangement of the fulcrum shaft of the harness levers directly over or within the vertical plane of the cam wheels, substantially as described.

2,929.—CORSET SPRING.—Francis L. Barnes, New York city, administratrix of the estate of Samuel H. Barnes, deceased. Patented July 17, 1866.

I claim a corset spring, consisting of the parts, B, provided with pins, b, and slotted springs, B2, riveted as shown, and having suitable clasps, C, and headed rivets, D, and of form corresponding to the body of the wearer, constructed and operating in the manner and for the purpose herein represented and described.

2,930.—PAPER FILE.—Henry E. Woodbury, Washington, D. C. Patented August 8, 1854.

I claim the box or compartment document file, consisting of a box part, A, and spring platen or holder, B, the said holder being hung or attached to a spring or springs, C, at its back, so as to give a flexible or yielding character to the platen, all constructed and operating substantially as herein described.

2,931.—HARVESTER.—Jacob V. A. Wemple, Quincy, Mich. Patented April 19, 1859.

I claim, 1st, A separating rod or finger, W, automatically interposed, for separating the falling grain from that which is being discharged from the platform.

2d, The rod or finger, W, pivotal piece, C, and standard, E, in combination with the rod, B, constructed and operating substantially as specified.

3d, A movable or separating rod and finger, for separating the falling grain from the completed gavel on the platform, in combination with a single supporting standard or post, located at the inner end, or inner front corner of said platform, substantially as described.

DESIGNS.

3,019.—IMITATION BRAID FOR BONNETS, ETC.—Samuel A. Blake, Milford, Conn.

3,020 to 3,032.—BRACKETS.—F. W. Brocksieper (assignor to Sargent & Co.), New Haven Conn.

3,033.—CARD RECEIVER.—F. W. Brocksieper (assignor to Sargent & Co.), New Haven, Conn.

3,034.—MATCH SAFE.—F. W. Brocksieper (assignor to Sargent & Co.), New Haven, Conn.

3,035.—MEDALLION.—Garret Erkson, Brooklyn, N. Y.

3,036 to 3,039.—FLOOR OIL CLOTH PATTERNS.—Charles T. Meyer, Bergen, N. J., assignor to Edward C. Sampson.

3,040 and 3,041.—FIGURE.—Carl Muller and John Deacon, New York city.

3,042.—CLOCK CASE.—George B. Owen, Winsted, Conn.

3,043.—BOX STOVE.—Asa Snyder and Alexander Delaney, Richmond, Va.

3,044.—TRADE MARK.—James S. Waters, St. Louis, Mo., assignor to St. Louis Lead and Oil Company.

3,045.—STEAM-VALVE CASE.—John Johnson, New York city.

3,046.—DOOR OF A COOK'S STOVE.—John Martino, Jacob Beesley, and John Currie, Philadelphia, assignors to March, Sisler and Company, Limerick Station, Pa.

3,047.—COFFIN HANDLE.—C. L. L. Nieberg (assignor to Sargent and Company), New Haven, Conn.

3,048.—TRADE MARK.—Dudley F. Stevens, Boston, Mass.

EXTENSIONS.

ATTACHING PROPELLERS TO THE DRIVING SHAFT.—James L. Cathcart, Georgetown, D. C. Letters Patent No. 10,790. Dated April 18, 1868.

I claim attaching the propeller, secured to a short shaft which passes through the rudder to its main or driving shaft, by a universal joint placed between the stern post and the rudder, by which attachment the propeller is moved laterally with the movement of the rudder.

APPARATUS FOR MOLDING CANDLES.—Willis Humiston, Troy, N. Y. Letters Patent No. 10,730. Dated April 4, 1854. Reissue No. 2,190. Dated March 6, 1866.

I claim, 1st, The employment of the wick stretcher, E, so arranged and combined with the machine, having vertical stationary candle molds therein that the candle wick within such molds shall be uniformly stretched or strained before the material is run or poured into such molds, and the friction or strain be removed therefrom before the candles are drawn or ejected from such molds in a vertical direction, substantially as herein described and set forth.

2d, I claim the stretching or straining of the candle wick in each and every of the vertical stationary candle molds contained in the candle mold machine, at and by one continued or simultaneous operation, when the said wick extends from spools or bobbins below said molds upwards into and through the center thereof, and from the lower or tip end of such molds to and into the candles suspended above such mold, substantially as herein described and set forth.

3d, I claim the employment of the candle tip bar, F, or any substantial equivalent therefor, which shall be so constructed and arranged as to be moved in a lateral direction up to, or against, or under the tips of the candles drawn or ejected from the stationary candle molds below, and thereby come in contact with the tips of the said candles in such manner as to center the candle wick in the said molds, and at the same time hold the said candles thus suspended during the operation of filling the said molds with melted material from which to mold candles, and during the cooling thereof, and until the wick is cut or severed between the said suspended and molded candles in said stationary candle molds, substantially as herein described and set forth.

4th, I claim a vertical stationary candle mold, constructed with an inner and annular shoulder, b', and with an outer surrounding shoulder, c, and with a screw and nut at or near the lower end thereof, in the manner and for the purposes substantially as herein described and set forth.

5th, I claim the contraction of the lower end of the vertical stationary candle molds, so as to form an inner annular shoulder, in the manner and for the purposes substantially as herein described and set forth.

6th, I claim the mode, substantially as herein described and set forth, for attaching to, and combined with the lower end of the vertical stationary candle molds, having an outer surrounding shoulder, c, and the bottom plate, B'', of the surrounding water box, so as to make the same water tight and firm therein, in the manner and for the purposes substantially as herein described and set forth.

7th, I claim the employment of the shovel blade cutter, J, or any equivalent therefor, and the passing of the same between two rows of the wicks of the vertically suspended candles, so as to cut or sever the two rows of the said wicks, in the manner and for the purposes substantially as herein described and set forth.

RAILROAD CARS.—B. J. La Moth, New York city. Letters Patent No. 10,721. Dated April 4, 1854. Reissue No. 360. Dated March 18, 1856.

I claim the construction of the frames of railroad cars, substantially in the manner and for the purposes specified.

SEWING MACHINE.—Samuel J. Parker, Ithica, N. Y. Letters Patent No. 10,757. Dated April 11, 1854.

I claim that combination that secures to me the relative position in which I place the needle's eye to the movement of the material or feed motion, and and the position of the shuttle and its race resulting therefrom, when the needle is straight and the table on which the material to be sewn is horizontal, said relative position meaning the longitudinal axis of the shuttle and its race at right angles to the feed motion, and the consequent position of the needle's eye therefrom, so that the line drawn through the needle's eye, when in the act of passing the center of the material sewed, shall coincide with the line of feed motion, not be at right angles therewith, and this for the purpose of rendering the stitch more nearly straight and perfect than it otherwise would be, the combination and purpose substantially as described.

HEATING SKELPS FOR THE MANUFACTURE OF WROUGHT IRON TUBES.—James McCarty, Reading, Pa. Letters Patent No. 10,747. Dated April 3, 1854.

I claim the new mode of operating, as described, viz., heating the skelps in a furnace constructed substantially as herein set forth, with raw coals as fuel, whose combustion is maintained by a blast of air forced into the furnace under pressure, as set forth.

VESSELS FOR HOLDING LIQUIDS.—Julia M. Colburn, Baltimore, Md., administratrix of James Stimpson, deceased. Letters Patent No. 11,819. Dated Oct. 17, 1854. Antedated April 17, 1854.

I claim the employment of a chain or string attached to the handle and lid of a pitcher, as described.

TREATING CANE FIBER FOR PAPER AND OTHER PURPOSES. Benj. A. Lavender, Halifax, N. C., and Kate Lowe, Baltimore, Md., administratrix of Henry Lowe, deceased. Letters Patent No. 10,722. Dated April 4, 1854

We claim breaking down woody fiber of cane and other like plants, and dissolving the gummy and other foreign matters therefrom by means of muriatic or sulphuric acid, of the strength of 10° Baumé, or thereabout, preparatory to making hemp for bagging, rope, paper pulp, etc., in the manner substantially as set forth.

MACHINERY FOR LAYING ROPE.—Stephen Bazin and James A. Bazin, Canton, Mass. Letters Patent No. 10,823. Dated April 25, 1854.

We claim adapting the machinery for forming both hard and soft cordage by means of the ring, g, so actuated by the circular plate, i, and its rollers made to revolve, or hold stationary, as above set forth, as to form an extra twist in the rope when desirable, by giving an additional revolution to the bobbin frames, as above described.

We also claim an improvement in the movable crane, the same consisting in forming it of a bent shape, with the right angular hinged arm operating as above described, so as to feed the rope in a direction parallel with the axis of the winding reel.

We also claim stretching the rope after it is laid, by means of the double pulley, r b, with grooves of different diameters, as above set forth.

COFFEE POT.—James Buell, New York city, executor of Jas. MacGregor, Jr., deceased. Letters Patent No. 10,752. Dated April 11, 1854.

I claim having the pot where the tea or coffee is prepared air tight, and so regulating the heat that is applied to the heating of the same that a small pressure by the covers prevents it from boiling, and consequently from evaporation, while the tea or coffee is being prepared, in the manner and for the purpose substantially as above set forth.

AIR ENGINES.—Philander Shaw, Boston, Mass. Letters Patent No. 10,868. Dated May 2, 1854. Reissue No. 1,014. Dated July 17, 1860. Again reissued No. 71. Dated April 23, 1861.

I claim, 1st, The within-described auxiliary heater, constructed and arranged as set forth, the exhaust air and the products of combustion being passed through in one direction while the cold air from the force pump is passed through in the other, by which means the heat is extracted from the heated air and smoke and transferred to the cold air on its way to the engine the latter being pumped in against a pressure much less than that at which it is worked off from the main heater, as explained.

2d, I claim passing the exhaust air which has propelled the piston directly through the fire, for the purpose of economizing heat, as set forth.

3d, In combination with a tight ash pit, into which the air for the support of combustion within the furnace is forced, I claim a chamber, D, communicating with the ash pit and surrounding the furnace for the passage of a portion of the air not required by the fire, which, combining with the products of combustion in the chamber, E, passes off through the flue, G, for the purpose of economizing heat, as set forth.

4th, I do not claim refrigerating the cylinder or piston of hot air or other engines by means of cold water, but I do claim the arrangement herein described of the tubes within the piston rod, the reservoir, R, and the india-rubber tubes, S S', for the purpose set forth.

MACHINE FOR FEEDING SHEETS OF PAPER TO PRINTING PRESSES.—Henry Clark, Cedar Keys, Fla. Letters Patent No. 10,824, dated April 25, 1854.

I claim loosening or detaching the top sheet of a layer of papers from those underneath it, by giving a part of said sheet a backward and forward motion, as herein shown, previously to its being operated upon by the pressure rollers or other device for conveying it to the printing press or other to which the sheet of paper is fed, for the purpose of insuring the feed of only a single sheet of paper at a time, as set forth.

GLASS FURNACE.—Frederick G. Schaum, Baltimore, Md., administrator of Frederick Schaum, deceased. Letters Patent No. 10,839, dated April 25, 1854.

I claim making the external and internal configuration of the breast work of the furnace wall with the re-entering portions, so as to partly embrace the pots and to furnish room for additional or extra teaze or ring holes, substantially in the manner described.

PLATE FOR ARTIFICIAL TEETH.—Mahlon Loomis, Washington, D. C. Letters Patent No. 10,847, dated May 2, 1854.

I claim the improved manufacture of whole or half sets of porcelain or mineral teeth, substantially as described.

EXTENSION NOTICES.

Alexander Hay, administrator of the estate of M. C. A. Mellier, deceased, of Philadelphia, Pa., having petitioned for the extension of a patent granted to the said Mellier the 26th day of May, 1854 (said patent was also granted in France Aug. 7, 1854, and in England Oct. 26, 1855), for an improvement in making paper pulp, for seven years from the expiration of said patent, which takes place on the 7th day August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Albert G. Safford, of Boston, Mass., having petitioned for the extension of a patent granted to him the 8th day of August, 1854, for an improvement in applying springs to window sashes, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Jarah W. Reed, administratrix of the estate of Cheeney Reed, deceased, and Jane E. Mould, administratrix of the estate of Brooks K. Mould, deceased, of Chicago, Ill., having petitioned for the extension of a patent granted to the said Cheeney Reed and [Brooks K. Mould the 8th day of August, 1854, for an improvement in ventilating railroad cars, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Jacob Senneff, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 13th day of January, 1852 and additional improvement granted thereon the 20th day of July, 1853, for an improvement in metallic heddles, for seven years from the expiration of said patent, which took place on the 13th day of January, 1866, this application having been authorized by act of Congress, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

910.—PREPARING IRON ORE FOR SMELTING, AND FURNACES THEREFOR.—Alois Thoma, New York city. March 17, 1868.

1 096.—SEWING MACHINE.—Geo. Rehfuss, Philadelphia, Pa. March 31, 1868.

1,109.—COTTON GIN.—Joseph H. Adams & Coombs, New York city. April 1, 1868.

1,212.—MODE OF VENEERING PAPER, CLOTH, LEATHER, ETC.—Samuel W Huntington, Augusta, Me. April 11, 1868.

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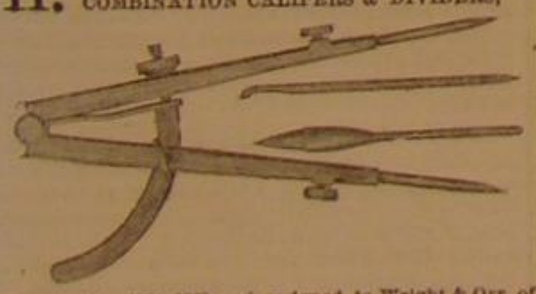

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For Instructions concerning Foreign Patents, Reissues, Interferences, Hints on Selling Patents, Rules and Proceedings at the Patent Office, the Patent Laws, etc., see our Instruction Book. Sent free by mail on application. Those who receive more than one copy thereof will oblige by presenting them to their friends.

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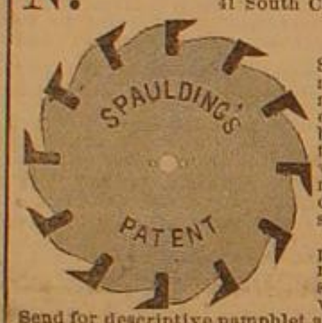

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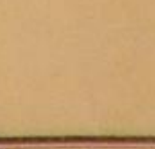

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1868.

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Vol. XVIII.—No. 23. [NEW SERIES.]

NEW YORK, JUNE 6, 1868.

$3 per Annum [IN ADVANCE.]

Improvement in Malt and Grain Kilns.

The drying of malt as ordinarily practiced, by spreading it upon the floor of a room, the floor being composed of perforated iron or clay tiles, is an onerous labor and greatly exhausting, because of the excessive heat and the vapors arising from the mass. The workman is exposed to the heat of the furnaces beneath the floor, while his work of turning and mixing the malt is of the most laborious character. All this exposure and most of the manual labor are saved by the use of the machine shown in the engravings, which is essentially self-acting. Fig. 1 is a vertical transverse section, and Fig. 2 also a vertical view of the driving and connecting parts of the device.

Fig. 2.

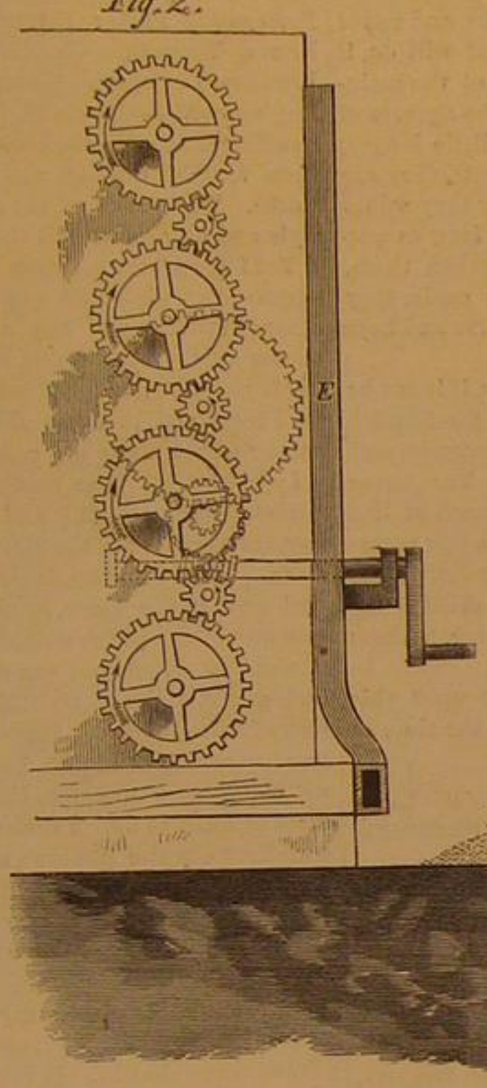
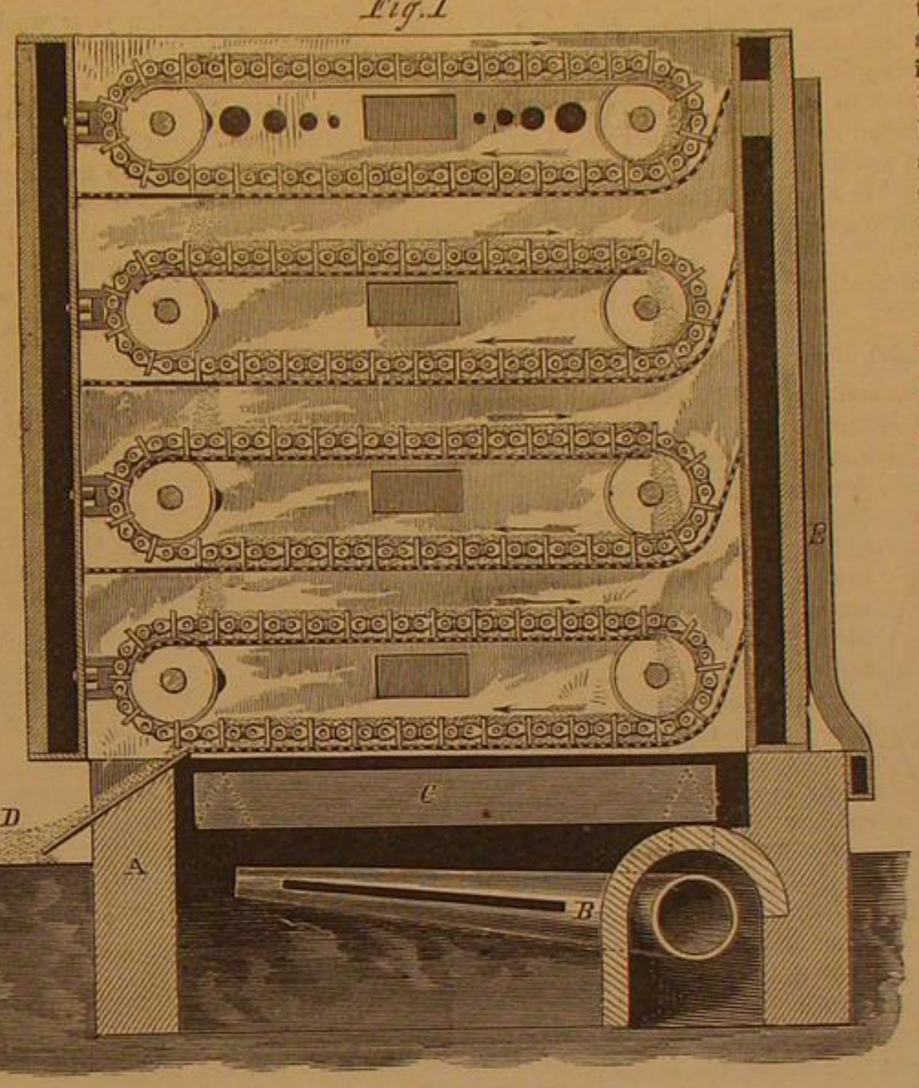


Fig. 1



DE BARY'S PATENT GRAIN AND MALT DRYER.

The dryer is a rectangular case, the outside walls being of wood or metal, and the inner wall of sheet metal, with a space between the two filled with air or a non-conducting material, to prevent the loss of heat by radiation. The case is fixed on a foundation, A, into which is conducted a hot-air pipe, B, and a sinuous or zigzag flue, C, from a furnace. The flue is of this form to give as large an area of heating surface as possible, and the pipe, B, has one or more longitudinal slots, as seen, for a similar purpose. When the case is heated by the pipe, B, the hot air is forced through it by means of a fan or other equivalent, but when the furnace flue, C, is used, the case is heated simply by the radiation of the heat. The latter is used when only a gentle heat is required, and the former when a greater and more rapid heat is desirable.

Within the casing is a series of endless aprons or carriers, consisting of machine chains, passing at each end over suitable wheels and driven by the train of gears seen in Fig. 2. They may be driven by power or by hand, as is convenient. Between these chains on each carrier is a series of slats extending across the interior of the casing and traversing on fixed perforated plates, the surfaces of which they sweep; the upper plate of the upper carrier only being solid. The malt or grain is deposited on the upper carrier and is conveyed along on the solid plate of the top carrier and deposited on the perforated plate underneath, from which it is discharged at one end, as seen in Fig. 1, to be again carried across in the direction of the arrows, and so on to the bottom, where it is dropped, at D. The shafts at one end of these carriers are attached to the side of the case by bolts, by which they can be adjusted when the chains or any other parts become loosened by wear. The hot air in passing up in the casing, through the perforated plates and the malt, carries off the moisture through the side tubes, E, represented in both figures; and it will be seen that the malt or grain is subjected gradually to the heat, as the temperature of the kiln increases gradually from its top downward, and the grain must pass over a large area within a small compass.

This is a German invention, patented in this country through the Scientific American Patent Agency, March 10, 1868, by Wm. Einstein, the assignee for this country. It is in use at some of the most extensive breweries of Southern Germany, as that of Anton Drehers, the Spaten brewery, and the Lion brewery of Munich, and many others. Its advantages are summed up by the patentee as follows: It occupies only one tenth of the ground space of others; one laborer can attend to two kilns; there is no stirring and turning of the malt by manual labor; there is no interruption to the process; the malt is carried gradually to a higher temperature, while it is always in continuous motion; the kiln may be regulated to give the malt any color desired; it requires less fuel than others and yields a superior product.

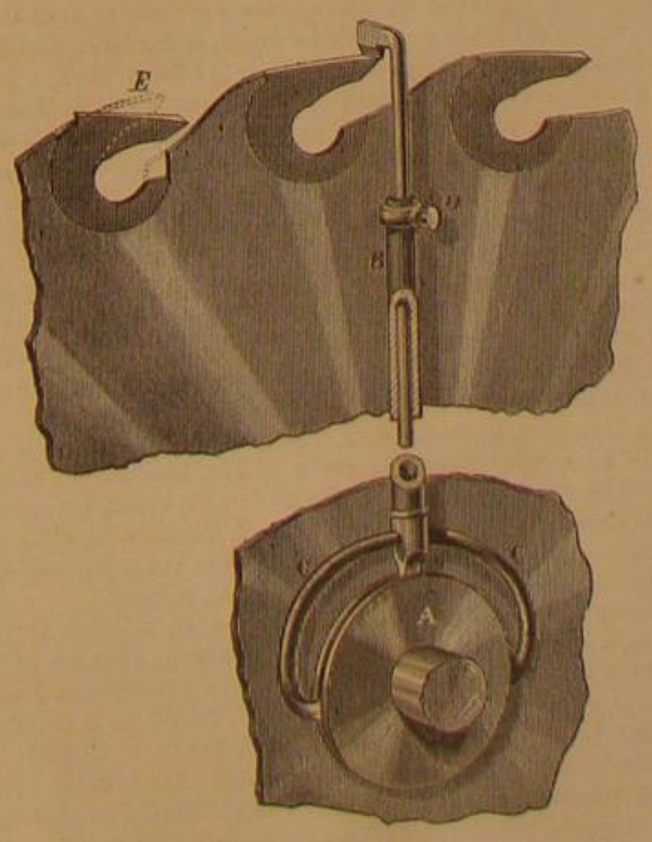
Further information may be obtained by addressing Wm. Einstein, St. Louis, Mo.

Bromide of Potassium.

Bromide of potassium still continues to attract the attention of the medical faculty. That it is a valuable therapeutical agent there can remain no possible doubt. Its action appears to be dissimilar from all other known remedies, and it cannot be classified upon the general principles adopted by most writers upon the materia medica. It promotes sleep without narcotism, controls excitement of the sexual organs, and is found in general to be a valuable remedy in functional derangements having their origin in reflex nervous action. Its action in such cases doubtless takes place in some mysterious manner upon the nerve centers. A very interesting and instructive treatise upon the power of bromide of potassium in checking the reflex nausea induced by the administration of anæsthetics, by Alex. J. Stone, M. D., of Boston, has made its appearance, and is a valuable contribution to the literature of medicine. Dr. Stone's method of administering this remedy in combination with narcotics in cases of delirium, or great nervous excitement, is worthy of notice, and will undoubtedly lead to other methods of prescription.

ADJUSTABLE INDICATOR FOR ROUNDING SAWS.

The engraving illustrates a new device for rounding circular saws, especially those which are run with the points of the teeth spread. By its use the practice of grinding off the



points of the teeth around nearly the whole circumference of the saw, to accommodate one or more teeth that may be a little too short, is avoided; for if it is known to the sawyer, before he begins to spread a tooth with the swage that it is too short, he can raise the point by means of the swage.

The engraving shows a section of Miller's Adjustable Teeth Saws with the indicator applied to a tooth to determine its length. A is the fast collar on the saw shaft. The indicator, B, is a pipe, or hollow shaft, having secured to its bottom end two forks, C, which, with the V-point of the hollow tube, engage with a score cut in the periphery of the collar, A. This score can be easily cut by a hand tool, if a rest is fitted for it near its circumference, and the saw shaft be made to revolve at a proper speed. This scoring of the fixed collar furnishes a seat for the lower end of the gage or indicator. The upper end of the indicator has a knife edge, which, when set to the point of a tooth, is held by the thumb screw, D. It is evident that the gage may be used to designate the circumference of the saw simply by turning the saw around, noting the difference in elevation of the points of the teeth. When saws with adjustable teeth are used, it is only necessary to turn the point of the tooth down to expose the shoulder, which may be filed away, as shown at E, with dotted lines, somewhat exaggerated.

Such a device is really valuable to practical sawyers to enable them to adjust their saws without the necessity of grinding off the edge by a fixed stone, and then filing up and swaging to gage. By this simple gage every tooth of a saw can be made to cut alike.

This device was patented on March 31, 1868, by W. P. Miller, Middletown, N.Y. They are manufactured and sold by Henry Seymour & Co., 52 Beekman st., New York city. Either of the above parties may be addressed.

An Alarming Theory.

From the annual recurrence of rains, meteoric showers, and the explosions of steam boilers in various parts of the country, Professor Loomis suggests a very uncomfortable theory in regard to the safety of the earth itself. He thinks it not impossible that sufficient steam might be generated in the burning center of the world to blow the whole globe to pieces. A volcanic eruption under the sea, or near it, like that of Vesuvius now in progress, may at any moment convert the earth into a huge steam boiler, by letting the water in upon the central fires, to be followed, for aught we know, by an explosion that shall rend it apart, and send the fragments careering through space as small planets or meteors, each bearing off some distracted member or members of the human family, to make, perchance, new discoveries and new acquaintances in other parts of the planetary system now revolving with us. So that the final catastrophe may, after all, be only a boiler explosion on a magnificent scale of grandeur and destruction.—*Eclectic Mag.*

Stub Twist Gun Barrels.

A writer in the London *Quarterly Review*, in an article entitled "The Use of Refuse," gives currency to the old, and we had supposed exploded, idea, that old horseshoe nails derive their superior toughness by hammering upon the stones of the street pavements. He says: "The horseshoe nails are not mixed with the common cast iron, as they are much sought after by gunmakers for the purpose of making stub twist barrels. This is a roundabout way to get tough iron, it is true, and it remains as an instance of an improved product brought about by accident; it is like the Chinese method of discovering roast pig. Perhaps, following out this idea, some quicker and less laborious method of making cohesive gun barrels will be discovered than the banging of horses' feet upon the granite pavement."

There is no apparent scientific reason why the pounding of the ends of the cold horseshoe nails upon the stones of a wagon road, the mass of the metal meanwhile being incased in the elastic hoof tissue, should improve the quality of the metal. We incline to the belief that gun barrels made out of new horseshoe nails, originally of the same quality of iron, would be of just as good quality as though made of oldd nails, and we further express the belief that if the writere alluded to should investigate the method of manufacture oe the stub twist barrels, he would find that the "roast pig" has never been discovered in this instance, and that the majority of such barrels which are offered in market, are not made of iron accidentally refined in the manner indicated.

THE noise of cannon has been heard a distance of more than two hundred and fifty miles by applying the ear to the solid earth.

THE WATCH—ITS HISTORY AND MANUFACTURE.

BY H. F. PIAGET.

No. 5.

LIST AND DESCRIPTION OF THE DIFFERENT AMERICAN WATCHES.

The American Watch Company, Waltham, Mass.

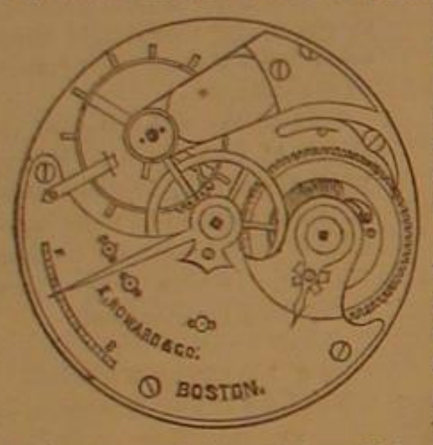
Its first quality Nos. 1 and 2 have been much improved lately, not only in the finish, but also in having the reversible center pinion, whereby the accidental breaking of mainsprings frequently causing bending or breaking of teeth in the wheels or pinions, and even jewels, is avoided, in having ruby jewels, visible pallets, and isochronal hair springs, which regulate with much more nicety than the flat ones.

This company is also making some of its watches with pendant winders. I also notice a great improvement in its watches engraved "Waltham Watch Co." This consists in having stop works to the barrels, chronometer balances, and in having the hair spring fitted to a movable stud, so that they need not be unpinned to clean the watch, and the hair spring being above instead of below the balance, which my experience has taught me is better for regulating more accurately. This company has also introduced a new kind of watch, engraved "Home Watch," a cheap and serviceable article.

For the other kinds of watches made by this company see list of watch manufacturers.

The Howard Watch, Boston.

This watch I consider a good, reliable, and serviceable watch, much improved lately by introducing the patent barrel, which like the reversible pinion is a safeguard against breakage of teeth, etc. This watch is made of different qualities and prices. Its construction renders it quite a convenient thickness for gentlemen.



I understand they intend soon to make some smaller sizes. This it would be advisable to do, and by putting plain gold balances instead of the chronometer ones made at present, the watch could be made thinner and cheaper.

By present construction of this watch if the spring breaks, in order to replace it, the movement has to be taken entirely to pieces, so that it has frequently to be recleaned. If the workman is not very careful with the plates, etc., the oil spreading sometimes from the holes or pivots over the gilding, etc., occasions a slovenly appearance, and looks bad, particularly in new watches.

Nearly the same fault exists in the "American Co.'s" watch, although not quite to the same extent. In the "American Co.'s" watch the spring is hooked to the barrel, while in the "Howard" it is fastened to the main plate. I think that by altering their caliber this could be avoided. These watches are, I am informed, soon to be greatly improved by the application of quite a new patent regulator, also a new style of pendant winding.

The Tremont Watch, Boston.

This watch is a strong, good, and serviceable watch, it is a little thicker than the "Howard" watch, on account of having the balance in the center instead of the side of the plate. By its construction dirt or dust cannot be easily introduced in the works. The chronometer balances and escapements used by this company are made by American machinery in Europe, under the superintendance of Mr. Dennison, who, with Mr. Howard, many years ago, first originated the American system of watch manufacture. The watches of this company are made of two qualities, the first engraved "Tremont Watch Co.," Boston, and the second "Melrose Watch Co."

The National Watch, Elgin, Ill.

This watch has not been long in the market, but from what I have seen of it, I believe it will prove to be a good, strong, and serviceable watch, as it is thoroughly well finished. The hair spring is fixed in an improved manner, and the pinion is attached to the center wheel in such a way that the breakage of teeth, etc., in the train (from main springs breaking), is avoided. It is also made with full upper plates, like the "Tremont" and "Waltham" watches. The first quality, engraved "B. W. Raymond," with expansion balances, jeweled in every action, and properly adjusted, I think will prove excellent timekeepers.

The Keyless or Wadsworth Watches, Manufactured at Newark New Jersey.

There is a watch manufactory at the above place, where a very excellent watch is made, with an improved patented pendant winding and hand-setting arrangement. From what I have seen of it, I should say it would not be likely to get out of order. It is very simple in its construction. The movements are full upper plates, chronometer balances, well jeweled, and very nicely finished. I approve very much the whole getting up of the watch.

I should mention an improved feature in the Tremont, Melrose, National, and the Wadsworth watches, which is, that a new main-spring can be put in without taking the watch to pieces, and merely by unscrewing the bar which holds the barrel, effecting a saving of time in repairing.

I have not inserted engravings of the Tremont, Melrose, National, or Wadsworth watches, as the reader by looking at the one marked Waltham Watch, will see the general appearance of them all. The sizes of all the above named watches are the same, so that they will all fit the cases made for the 18th size Waltham, or Appleton, Tracy & Co.'s full plate watch.

I must here again warn the reader, that there are many imitations of American watches sent here from Europe, where they are manufactured much cheaper. Therefore be particular from whom you purchase, so that you are not deceived.

I would earnestly recommend all manufacturers of American watches, if they desire to make their manufactures permanent and lasting, and as they say "the best in the world," not to relax in the quality of the material and metals used, or in the finish of their movements (according to their prices), for if they do they will assuredly share the fate of the "Yankee Clocks," as the English call them.

Strive to be continually improving your works, and never make a watch without a stop work. Any kind will do, if made to stop at the center, and not at the end of the main-spring. Another suggestion is, to leave both the squares of the half plates, American and Howard watches, a little longer; for having the cases made without the movements, they are frequently below the caps, but if they were longer they would have a much better appearance. Make them as long as possible, for it is much easier to shorten than to lengthen them, the latter only being done by having new ones made; they would also be better for winding, and the squares and keys would last longer.

Let not an imperfect article leave your factories, if it can be avoided, particularly in fine watches, for if you do the English will keep the lead for large watches and chronometers, and the Swiss for the small and complicated ones. The latter people have been improving their work very much of late years, and will continue to do so if they are paid a fair remunerative price for their labor; for remember the Swiss, like the Americans, are a persevering, ingenious, and skillful nation, and if possible will not allow any other to surpass them in watch work.

There are so many in that country depending upon this business for support, that they are stimulated all the time to keep improving and perfecting their watches.

LIST OF THE PRINCIPAL AND MOST CELEBRATED MAKERS OF MOVEMENTS AND WATCHES IN ENGLAND, SWITZERLAND, AND AMERICA.

I think it will greatly benefit the purchasers of movements or watches, not only the storekeepers, but also the wearer, to know the names of the most eminent manufacturers who export watches from England and Switzerland, and those who manufacture in the United States. I have not included in the list many that I knew in London, who do not export for the trade, but sell their watches themselves to the wearers, such as Vulliamy, Arnold, Parkinson, Earnshaw, Barrauds, Brockbanks & Atkins, French, McCabes, Duncan, Dwerrihouse, Carter, Ogston & Bell, etc.; nor those in Paris, many of whom have their watches made in Switzerland, Breguet, Lepine, Le Roy, Oudin, Andemars, Bautte & Moulinie, etc. Some of the above original makers may not be living now, but their fame will last for ages, and persons who have genuine watches of these makers, although they may be old, if they have not been spoiled in repairing, will find them to be still good timekeepers.

I would, however, here observe that there are many importers and watch dealers in this country, who have their own names engraved on movements or watches that they sell, which are made expressly for them, either in England or Switzerland. In that case the buyer is almost always sure to get a good article, for no respectable dealer or storekeeper would allow his name to be put on an inferior watch, and such watches are made by makers on whom the dealers can depend for the quality of the works as well as the cases. I will therefore name those watches that are the most reliable, to my certain knowledge.

In London, the first quality made by Frodsham or Dent, claim the pre-eminence, but are very expensive, when genuine ones; next grade, the F. B. Adams, Guillaume, E. D. Johnson, Dixon, T. F. Cooper, Stoddard, Hoddell, David Taylor, B. J. Warner, Morris, Tobias, etc.

In Liverpool, Roskells, M. T. Tobias & Co., R. & G. Beesley; their 2d quality have the name of Jas. Blundell on them. Harrison, Sewell, Joseph Johnson, 25 Church street, Liverpool, which was, and I believe is still M. T. Tobias's 2d quality; of these and the Beesley watches there are, perhaps, more bogus ones made than of any other English makers.

There has not been, that I am aware of, for over thirty years, a watch maker of the name of Joseph Johnson at 25 Church street, Liverpool. From all the information I can gather, after his death, the firm of M. T. Tobias & Co. purchased from his heirs the right to put his name on their 2d quality movements. Their 3rd quality have the name of Frederick Spears. I do occasionally have an original Joseph Johnson to repair, yet the imitation is so close (although the quality is very inferior) that it is difficult for an inexperienced hand to detect the difference, unless they are too common; this is also the case with the imitation Beesleys.

American Watches.

The American Watch Company, Waltham, have several kinds, qualities and sizes, for ladies and gentlemen, some full and some half plates. Those engraved American Watch Co., are their first quality; they are fine articles, but, like the Frodsham, expensive; 2d quality is engraved Appleton, Tracy & Co., 3d, Waltham Watch Co.; 4th, P. S. Bartlett; 5th, Ellery, and 6th, Home Watch.

Howard Watch, Boston. These are made of different grades of quality, and are still improving.

Tremont Watch Co., Boston. Their 2d quality is engraved Melrose Watch Co., Melrose.

National Watch Co., Elgin, Ill., have at present six different qualities. The 1st, engraved, B. W. Raymond; 2nd, Culver; 3rd, H. Z. Culver; 4th, J. T. Ryerson; 5th, G.M. Wheeler, 6th, Mat. Laflin. All have Elgin, Ill., on them. Other styles are in progress of manufacture.

The Keyless Watch, American pendant winders, and other movements, manufactured at Newark, N. J., have the name of Wadsworth engraved on them.

Of Swiss watches their names are legion, but I will only name some of the principal and most reliable makers: Jules Jurgensen, Copenhagen, fine watches, but like the Frodsham, expensive. His 2nd quality have the name of Lavalette, Locle, on them, James Nardin, Locle; H. L. Matile, Locle; Richard, Locle; Favre & Andrie, Locle; Favre, Leuba & Co., Locle; Vacheron & Constantin, Geneva; Breitling, Loederich, Chaux de Fonds, H. Bock, Locle; Borel & Courvoisier, Neufchatel; Perregaux, Locle; Beguelin Houriet, Tramelan; Mathez Freres, Tramelan; Ch. Horrmann & Co., Neufchatel; Lutz Brothers, Locle, etc. There are other good makers both in England and Switzerland, but I trust that I have enumerated a sufficient number to choose from, and these can be depended upon for the quality and the good performance of their works. The make of the above manufacturers varies as to style and quality to suit the most fastidious.

Yet I must here mention that their own names are always engraved on their first quality, unless they manufacture for others: still, if you buy a movement or watch with other names on than the above list mentions, and the person selling it recommends it, I think you need not fear being cheated, for I hope and presume that no respectable dealer or storekeeper would stake his reputation on the value of a watch.

I speak of all these makers from my long practical experience with the quality and make of their works, having had some of each kinds through my hands to examine, repair, or clean. Yet I must again impress on the minds of the inexperienced in the trade, as well as the public, wishing to obtain any of the above makers'—get them of reputable parties, of those on whom you can depend to get the genuine names and goods, and not imitations or bogus ones, as there are many in the market. Some may have been foisted upon the inexperienced, although honest dealers, by reason of their not being able to detect the difference which it is in many cases difficult to do. I believe that few can detect the difference between the genuine and the counterfeit watch unless he has worked in the factories of England for English, those of Switzerland for Swiss, and those of the United States for American, and are or have been practical workmen themselves.

No matter how much my fellow craftsmen may disagree with me in some of my remarks, they will, I am convinced, acknowledge that in this last I am right.

THE FOLLY OF PUTTING FICTITIOUS NAMES ON WATCHES.

The Swiss made a great mistake many years ago, and I am afraid it is still done occasionally, that is, putting English and fictitious names upon their watches, instead of their own. Had they not done so the really good makers would have been known in America long before this, and they would not have lost so much of their trade, which I am sure they will agree with me in saying that they have done.

I do not mean to say that although these watches bore false names they were not good watches. I will admit that some of them were very good; still it was wrong and a fraud on the public; and according to my ideas of honesty, quite culpable. It deserved not to prosper, and it did not.

By continuing this practice for several years, and to a great extent, their work was condemned, and they were stigmatized as impostors and cheats, so that their watches, at least many of them, were looked upon as disreputable pieces of workmanship, and the Swiss very nearly lost their American trade and the reputation of being an upright nation; although until this quackery was exposed they had enjoyed the people's confidence, but afterwards they became afraid of the Swiss watch. By many it was done innocently, they thinking it was all right so long as they received the orders to execute them, not thinking of the consequences during the time their wares had a good sale. Some, however, of the most respectable manufacturers, both in Switzerland and England, would not receive orders in that way; but if an order was given they would engrave the watch or case, made by ——— for ———, giving name and place where made, leaving it to the honesty of the parties selling it to properly represent it.

I am glad that they have at last awoke to the necessity of having a good name and of maintaining it.

Although I do not claim to be a prophet, yet over thirty years since I said the day would come when the Swiss would repent this to their cost, and I find my words have come true, and they now see the mischief and folly of it.

The plan that I suggested was, that they should put their own names on the watches they knew to be good, and on watches of inferior quality, such as they could not recommend, no name at all, or if they wished to have them engraved, give the proper description, and not "Patent Detached Levers," or "Full Jeweled," on common Lepines, and even Verge watches. But by persisting in this they were encouraging and supporting a system of cheating traffic, which they must have known was absolutely wrong.

I am sorry to say that at the present time the deception is still practiced of engraving false names on their imitations of American watches. But if they were to engrave them in this way: American Caliber or Style—then put their names if they wished, or leave them blank, I believe it would be more honorable, both for the maker and the dealer; and although some may make money by the operation, I do not envy them their gains.

In England this fraud was not carried to such an extent, yet it was and is still done in many instances, by putting the names of good makers on very inferior watches. In both countries the laws against this is very severe: yet the unprincipied find means to evade the law—and throughout the world men are found who value money better than good reputation. The Swiss are now, as the saying goes, "being paid back in their own coin," for many who first induced them to do this wrong are now trying to injure their manufactures, by giving them a bad name; and they will take time to regain what they have lost, but it can and I trust will be done. My Swiss readers must forgive me if I am too severe. But although myself and my descendants are now Americans, yet Switzerland, my native land, with all thy faults I love thee still, and if thou errest I must tell thee, for my idea is, that to prosper in this world, and to have no fear of the next, one must act on the square towards all men, and be willing to be judged by our deeds.

The reader, I think, must allow that although born in Switzerland and educated in England, I speak plainly and impartially, and I always intend to do so when I see a wroug done, but I desire not to offend any one. If any feel themselves aggrieved, to them I say, we had far better appear what we are than pretend to be what we are not.

Watches whose cases open at the back by a spring are not so secure and free from dust as those with a proper snap, which can be made to shut close and open easily; springs are only necessary for wearers whose fingers are particularly soft, or to raise the covers of hunting watches.

Hunting watches have a cover to protect the glass, and it will do so when sufficiently thick and convex, but very flat hunters neither admit of the necessary shape nor thickness; in many that are now made, particularly Swiss watches, the glass is nearly as liable to be broken from pressure as it was when unprotected, and the difficulty of procuring another is muck greater. When flatness is necessary, an open-faced watch should be preferred, with a number of spare glasses, which a very little practice will enable any wearer to put properly in their place.

In giving advice with regard to choosing a watch, I have said nothing but what every good watchmaker or importer of good watches will acknowledge to be the facts.

I have divested myself of any prejudice or partiality, and have only related what I have learned by practice, and the experience of forty years, and which I have endeavored to explain plainly, without any technicalities.

I will now endeavor to be more explicit, and give my reasons. For a large thick or a three-quarter plate chronometer, duplex, or lever escapement, properly compensated watch, with a fusee and chain, the English certainly claim the priority, they having been the first to apply, and from the great practice and attention given by them to, compensation.

The American watches being more simple in their construction, and easily repaired in case of accident, claim the next notice.

For a thinner or smaller watch, the Swiss must have the preference, as it is nearly the only kind of watch made there, and other reasons explained in a former part of this article. There is, in Geneva, a celebrated manufactory wherein nothing but good watches are made, and it is well known to most of the best stores in the United States; every part of the watch is made in the same establishment. I have had considerable practice with them, and I have generally found that they are the most perfect that I have had in my hands.

I do not pretend that there are no bad English watches made; quite the reverse. I have always found that a bad English watch was worse and more difficult to put in good order than any other.

For an ordinary or cheap watch, I should prefer a Swiss one, they having the facilities to manufacture cheaper than any other nation. Fine Swiss watches are made as correct and as accurate as it is possible to make them for the size and thickness, but the prices will not be less than for the English ones, although the style will be different. Common and cheap watches will of course always be made to keep pace with competition, and as an article of trade. I do not intend to explain their defects, I only endeavor to point out the merits of a good one.

In my next, I will give such instructions as I can to keep it good, and it may possibly be the means of saving the reader some unnecessary expense, if he will take the trouble to peruse these articles throughout, as well as save us from being often erroneously blamed, however honest and square we may do our work.

ON MUSICAL AND SENSITIVE FLAMES.

[Abstract of a Lecture delivered before the Dublin Royal Society, by W. F. Barrett.]

One of the earliest natural facts which arrest the attention of a thoughtful mind is the stability of the wonderful universe in which we live. This permanency is, nevertheless, the product of incessant change; for nothing is absolutely at rest. The secret of the stability of nature, its unresting repose, is found in the fact that the motion is regular—the change is periodic. Atoms, as well as planets, have their period of revolution. Hence, sooner or later, in the physical world at any rate, phenomena repeat themselves. Like a vast living body the throbbings of the universe announce the accord of its varied parts. This rhythmic flow of nature constitutes most literally the "Music of the Spheres." Not this, but a less ethereal music, I have had the honor of being invited to bring before you this afternoon.

The so-called musical or singing flames were discovered nearly a century ago by a native of this city, Dr. Higgins, who found that, when a flame of hydrogen was burning within a glass tube, the flame emitted a musical note. The experiment was repeated; and it was moreover shown that glass tubes were not necessary, for similar sounds, though of different quality, were produced when metal or pasteboard tubes were employed. Neither was it necessary to use hydrogen, for a small flame of common coal gas gave a musical note when burning within a tube.

The cause of this phenomenon had been investigated by many, but most successfully by an illustrious man who had lately passed from among us—a man who has left behind him a name as good as it was great, and who possessed a mind as simple and child-like as it was sagacious and profound—the late Professor Faraday. This subject had been one of Faraday's early *flames*. The cause was shown to be due to the fact that the gas, in issuing from the burner, did not burn silently. It rustled in passing through the orifice of the burner, and in burning it made a continuous series of inaudible explosions. This was proved by several experiments, for, by suitable means both these causes could be exalted so as to become sensible. The resonance of the tube placed over the flame renders audible all the sounds of a certain pitch made by the gas. By a series of experiments it was then proved that any noise, if made regularly and with sufficient rapidity, was converted into a musical note. Thus rough and rude taps, and hard and harsh explosions could be chased into perfect melody by mere rapidity of succession.

The condition of the flame when burning within the tube was shown by a moving mirror. It was seen that when the flame was silent, and the mirror moving, a band of light was produced; but when the flame was sounding, this luminous ribbon was broken up into a series of disjointed images of flame. The effect of lengthening the tube in which the flame was burning was next shown, and a series of gas jets burning within glass tubes of varying length gave a corresponding series of musical notes of varying pitch. By placing the finger upon the top of these tubes the sound could be quenched, and thus a novel musical instrument could be constructed. From glass tubes the lecturer passed on to show the effects of flames burning within extremely long tin tubes. Within a tube six feet long, and about one and one-half inches in diameter, the flame of a large gas burner gave a loud unmusical roar. By adding to the end of this tube a glass chimney, it was seen that when the flame was sounding it was broken up into wild confusion. By enclosing a still larger gas flame from a huge Bunsen's burner within a tube 18 feet long and three inches in diameter, a deep roar was obtained intermingled with loud reports similar to the discharge of musketry.

Returning once more to the gentler music of the small glass tubes, two flames, enclosed in their respective tubes, were taken and made to emit notes of the same pitch. This point was gained by shifting to and fro a paper slide, which moved stiffly at the upper extremity of one of the tubes. When the notes were nearly in unison a series of intermittent sounds or beats were obtained, due, as is well known, to the mutual extinction at certain intervals of the two sounds. Corresponding beats were obtained from two organ pipes and two tuning forks nearly in unison. One of these tuning forks, mounted on its resonance case, being silent, the other, unmounted, was now struck, and its prongs brought near to, but not touching those of the first fork; at first no sound could be heard, but by degrees the unmounted fork transferred its motion to the mounted one, and the sound of the latter slowly welled forth. The sound of the voice can thus be transferred to the strings of a pianoforte, and in the same way a flame can be made to accept and resound to a note of the proper pitch. This was illustrated as follows: A singing flame, by adjusting the paper slider, was tuned to the note of a certain fork; the tube was then raised slightly, so that the sound could be quenched by momentarily placing the finger on the top of the tube. On now striking the fork, and holding it over a resonant jar, the flame instantly started into song. The same effect was shown by the syren, and also by the human voice. Retreating to some distance from the flame, the latter could be made to respond at pleasure, by pitching the voice to the proper note, whilst it remained utterly unaffected by any note not in unison with itself. Musicians would find such a flame a faithful monitor in training the voices of their pupils.

In the last experiment we have really a *sensitive* flame; but this name is now applied to another discovery, which was made in another manner: Two years ago (December, 1865), while engaged in some acoustic experiments, the lecturer had observed that every time a shrill note was produced, a tall tapering gas flame in his vicinity was singularly affected; the flame shrinking every time the note was sounded. That observation led to further experiment and inquiry, the result of which has been the discovery of the conditions of success for obtaining flames sensitive to the slightest sound. Some month after the above observation, Professor Tyndall took up the subject, and having largely added to its interest and importance, offered an explanation of the phenomenon in a lecture delivered at the Royal Institution, in January, 1867. At this lecture the discovery was first published, and the name given to "Sensitive Flames." Subsequently the lecturer had proposed a fuller explanation, and had discovered that not only flames, but all gases could be rendered extremely sensitive to sound, the track of the gas being marked by mixing it with smoke. This historical notice would be unjust without referring to an observation made ten years ago in America by Professor Leconte. That physicist had noticed that certain sustained sounds in an instrumental concert caused a very susceptible movement of the ordinary gas flames in the room. This observation is really the germ of the more wonderful effects afterwards independently discovered by the lecturer. Though Professor Leconte was the first to publish the fact, in 1838, it appears that, previous to this date, artisans had frequently noticed the phenomenon as resulting from the shrill sounds of their work; and several musicians have informed the lecturer that the same effect has been one they have commonly observed.

Turning now from scientific history to experiment, the lecturer showed various kinds and degress of sensitive flames. First, a "batswing" flame, which, under the ordinary gas pressure, moved slightly at the sound of a whistle, but thrust out long tongues of fire when the pressure was increased by urging the gas from a holder. The increased pressure was always necessary to obtain the more sensitive flames, for a reason that will be understood directly. A jet of gas, issuing from a V-shaped orifice, was shown to be quite insensible to sound until the flame reached a hight of ten or twelve inches, and then, at the sound of certain high notes, the flame shortened and spread out into a fan shape. Whistling to this flame in one key had no effect, while in another the effect was very marked. Playing an air upon a so-called bird-organ, the flame selected the high notes, and promptly shortened at their recurrence.

The probable cause of the sensitiveness of these flames was then alluded to. The impact of air evidently had nothing to do with the phenomenon. This was strikingly shown in the following experiment: By tapping a membrane stretched over the mouth of a large tin funnel, a puff of air could be driven with such force from the narrow extremity that a candle was easily extinguished some twelve feet away. Directing this puff of air against the sensitive flame, it was seen that the flame moved violently, but was utterly unaffected when the puff was driven either to the right or left. This should also be the case if in former experiments it were the impact of the air, and not the sound, that produced the effect. But it was at once seen that when the lecturer whistled, at the same time slowly turning round, the flame still continued to shrink, and was almost as powerfully moved when the back was turned to the flame. The effect, then, is solely produced by the wave-like to and fro motion of the sonorous pulses. As first indicated by Professor Leconte, a gas flame, to be sensitive, has to be brought near its point of roaring; it then stands, according to Dr. Tyndall, as it were on the brink of precipice, over which the sound pushes it. Agreeing with this explanation, that a sensitive flame is a body in a state of unstable equilibrium, the lecturer supplemented it by comparing the flame to a resonant jar; the flame, as was proved by a moving mirror, being in a state of rapid isochronous vibration when under the influence of external sound. The actual shrinking of the flame was due to an increase in the velocity of the current of gas, which was possibly brought about by an external sound throwing the pipe that conveys the gas into a state of vibration, which would thus narrow the channel of the gas passage; the change in the aspect of the flame being largely modified by the shape of the burner.

Whatever may be the complete explanation of the phenomenon, there can be do doubt that in a somewhat similar manner other objects besides flames are also sensitive to slight external impulses. Thus, many chemical compounds, as, for example, fulminating powders, are in a state of unstable equilibrium. The so-called "Rupert's Drop," which, when scratched, flew into a thousand fragments, is another instance of this kind; and some of the most eminent physicists are inclined to believe that the surface of our sun is in a somewhat analogous sensitive condition. From inorganic things we may travel on to organic, for we have evidence that there also exists, in organized structures, a more or less sensitive state at certain times. Thus, our wonderfully complex bodies, by disease or nervous derangement, are often thrown into an abnormal state, and when in that condition are sensitive to the slightest stimuli, if of the proper kind. This may possibly be the foundation for whatever truth there is in the science of homeopathy, the body being sensitive to a feeble influence, similar in kind to the disease under which it is suffering.

Here some may ask: "Of what good are these speculations, and to what practical end can these experiments be turned?" This observation, permit me to remark, is wholly improper. There is something nobler in life than the accumulation of wealth, and a higher end to experiment than its mere monetary value; for all accession to knowledge must finally benefit the world. This ever intrusive exclamation, *cui bono*, is a serious check to the advancement of knowledge, for it disheartens those who are making nature yield up her secrets, and it damps the ardor of every searcher after truth. Allow me to illustrate my meaning. Imagine that when enchanted by the performance of some well-executed opera or oratorio, a companion by our side were to say: "Well, after all, of what good are these fine sounds; to what practical end can you turn this music?" Should we not instantly condemn a speech so characteristic of a sordid and sensuous mind? And when the student of nature is listening with admiration and even awe to the sweet, though silent, music sung to him by every object of his diligent study—by air and water, by flowers and flowers—he is conscious that he bows before an oratorio as far above that of Handel as the works of the Creator are superior to the composition of the creature.

Still, however, the lecturer was enabled to show a practical application of these sensitive flames. Attention was drawn to the fact, that the flame shortened and spread out laterally

under the influence of a whistle. Advantage was taken of this peculiarity to construct an instrument which may be turned to some practical use. The instrument consists of two sliding brass rods, *b b'* (see diagram), attached at right angles; to the summit of one is a compound metallic ribbon, consisting of thin layers of silver, gold, and platinum, welded together. This arrangement expands unequally by heat, by so doing it swerves aside, and is thus brought into contact with a platinum point projecting from the top of the second brass rod, which is fixed about half an inch from the free extremity of the compound metallic ribbon. Connected with the two brass rods is an electric battery, associated with which is an electric bell, placed in a far distant part of the room. The bell will immediately ring if the electric circle be complete, but at present there is a gap in the circuit between the metallic ribbon and the platinum point. "I now ignite," said the lecturer, "a sensitive flame, which, in its ordinary state, burns at about two inches from the compound metal ribbon. I retreat some thirty feet from the flame, and whistle; the flame at once responds; it shrinks and spreads out sideways. By so doing it comes in contact with the metal ribbon; the latter instantly springs aside at the warm touch of the flame, strikes against the platinum point, completes the electric circuit, and there you hear that distant bell answering me every time I whistle." In the same way, at any hour of the night, the crying of a child in its cot would automatically announce itself in its parent's room. By a somewhat similar arrangement, using, however, a different burner, a burglar filing the iron-cased doors of a jeweller's shop could be made to sound an alarm bell; and it is even possible, by making use of the propagation of sound through water, the reflection of that sound through a trumpet immersed in the water, and its conduction to a sensitive flame, shut out by non-conductors of sound from the noises on board ship, that an arrangement might be constructed by which the approach of a vessel in a fog might be detected by ringing a bell in the captain's cabin. It is not, however, my province to develop such inventions. With diffidence I throw out these suggestions, which may, I trust, by the practical mind be in some way turned to the public good.*

The lecturer had reserved for the conclusion a flame wonderfully sensitive to the slightest noise. The burner which gave this flame was formed of steatite, and consisted of a single circular orifice, through which the gas was forced from a large holder in the lecture room, with greater pressure than could be obtained from the main. The flame was now fully two feet in length, and observe, said the lecturer, how delicate and fragile a thing it appears to be, for at the slightest noise it drops down a foot.‡ The jingling of this bunch of keys, the crumpling of this paper, the dropping of a small coin, are more than sufficient utterly to break up its hight and symmetry. This flame makes no response to the vowels, O, U, nor to the labials, but it energetically responds to the sibilants. Repeating the stanza—

"Roll on, O rill, for ever!
Rest not, lest thy wavelets
Sheen as shining silver—
Shrink and sink to darkness."

The flame is unmoved by the first line, but emphatically bobs at the sound "rest" and "lest," and admirably suits its action to the words of the last line, for, when shrinking, the light of the flame almost disappears. So sensitive is this flame, that even a chirp made at the far end of the room brings it down more than a foot. Like a living being, the flame trembles and cowers down at a hiss—it crouches and shivers as if in agony at the crisping of this metal foil, though the sound is so faint as scarcely to be heard; it dances in tune to the waltz played by this musical box—and, finally, it beats time to the ticking of my watch. How wonderful are all these facts! And the more we know of them the more wonderful do they appear, for this astonishing change in the aspect of the flame is produced by an infinitesimal portion of those almost inaudible sound waves, already enfeebled by their distance, from the flame. Looking back on these, and innumerable other wonders revealed by physical science, and looking forward on that vast region which remains to be explored, do we not feel ourselves sinking to utter insignificance by contemplating the mysteries by which we are surrounded, while at the same time are we not conscious there is that within us still more wonderful than that without—a consciousness which lifts itself above all phenomena, grand and mysterious though they be?—*London Chemical News.*

* Several of the laws of acoustics may be illustrated to a large audience by means of the sensitive flame next to be described. Placing, for example, a watch in the focus of one concave mirror, and a sensitive flame in the focus of a distant second one, the reflection and convergence of sound is seen by the regular beating of the flame to every tick of the watch. The decay of sound, and the prevention of that decay by tubes, can also be shown in a similar way. Many other illustrations of acoustical phenomena at once suggest themselves. I hope shortly to publish some further applications of this novel *phonoscope*.—W. F. B.

‡ It is easy to see how a modification of the instrument just described can be, and has been, applied to this flame. The diminution of heat, arising from the falling of the flame can cause the compound ribbon now placed above the flame to recoil upon the other battery connection; or, another arrangement may be employed, an air thermometer having a bent stem, in which are sealed asunder platinum terminals; the circuit being closed by the backward movement of mercury in the tube, owing to the contraction of the air in the bulb.

ARAGO has demonstrated that the duration of a flash of lightning does not exceed the one-millionth part of a second.

Correspondence.

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

Do We See the Sun as Soon as it Rises?

MESSRS. EDITORS:—In the number of your paper for May 2d, I notice an article on the theory that, as "it takes light eight minutes to come from the sun to the earth, we do not see the sun until that amount of time after it rises;" or what is the same thing, we always see it eight minutes of time, or two degrees of space, behind its real position in the heavens. The writer denies this theory, leaving out of the problem refraction and other disturbing elements, and invites your readers to its solution.

Now if the sun's motion through the heavens was real this theory, that it is not seen as soon as it rises, would be correct, for, while the ray projected from the sun is traversing the distance between the sun and the earth, the sun continues to move on in its orbit, and, as an object is seen in the direction from which the ray enters the eye, an observer on the earth would see the sun in the position where it was when the ray left, namely, two degrees of space or eight minutes of time behind its real position.

But in attempting the solution of this problem it must be distinctly borne in mind that the motion of the sun through space is only apparent—it is stationary—its apparent motion being caused by the rotation of the earth on its axis. Now, it takes light eight minutes to reach the earth from the sun, and in that time an observer is carried forward by the rotation of the earth two degrees. It is evident, then, that in order for a ray to make an impression on the retina of an observer's eye, it is only necessary for it to be projected from the sun towards a point two degrees in advance of him (just as a sportsman, in order to hit a bird on the wing, must shoot a certain distance in advance of it), and he, glancing along the ray, which has advanced towards him in a straight line, will see the sun in its real position, it having remained stationary.

CHAS. T. PLATT.

Cheyenne, D. T.

The Ball and Jet.

MESSRS. EDITORS:—When a ball is brought in contact with a vertical jet of water, the water will follow upward around

the curvature of the ball, by its adhesion, and be thrown off in tangents on the opposite side. It is a well established principle in hydraulics, that there is always a reactionary force exerted in a direction opposite to that in which the water is discharged. This force has a tendency to carry the ball horizontally, in the direction of the jet. Should it be such as to carry the ball over to the opposite side of the jet, then the direction in which the water will be discharged, with its reactionary force, will be reversed; the obvious tendency being to bring the center of the ball over the center of the jet. That this is the true disposition of the water can be ascertained in a moment by any one, by putting a ball of any kind on the point of a knife, and holding it in varying positions over an ascending jet of water; and I think it explains all the phenomena connected with the ball and jet question.

To show that it is not the rotation of the ball which enables it to maintain its position, take a tube bent in the form of a blow pipe, with which a light ball may be sustained by the breath. By piercing the ball with two minute fibers of wood or bristles, placed at right angles to each other, its movements can be distinctly seen, when it will be found to rotate at different times in a horizontal, in a perpendicular, and in an inclined plane. Sometimes it will rotate rapidly, at other times slowly, and at times it will remain poised on the jet for a considerable time, almost entirely motionless. These facts are incompatible with the rotary theory.

To show that it is not the inward rushing currents of air that sustain the ball, as suggested by your correspondent on page 291, suspend a ball by a thread from the ceiling, and bring the jet gradually toward it, when it will be seen that there will be no perceptible effect till the jet touches the ball. Other similar experiments may be tried which will do away with many of the theories that have been advanced, which only tend to muddle the problem, instead of making it clearer. The accompanying engraving illustrates these remarks.

F. G. FOWLER.

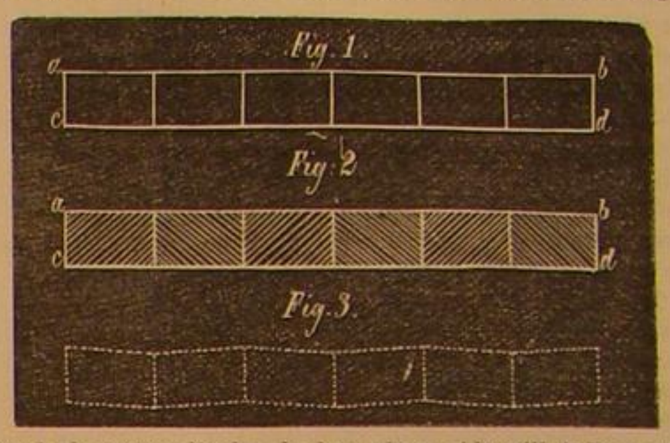
New York city.

Optical Illusions.

MESSRS. EDITORS:—The optical illusion to which you alluded on page 292, current volume, reminds me of another singular illusion, which may be of interest to your readers.

In the accompanying diagrams it will be seen by measurement that the lines, *a b*, and *c d*, are parallel, and the included space is divided into equal rectangles, the lines appearing in Fig. 1, as they really are, straight. But now let the surfaces of each of these rectangles be covered by a system of fine, equidistant lines drawn parallel to the diagonal of each separate rectangle, alternating the direction of each set of lines in the alternate rectangles, as in Fig. 2, and the optical illusion illustrated in Fig. 3 is observable at a glance.

By experiment it will be seen that the flatter, or more nearly horizontal the "hatched lines"—as they are technically termed—the more apparent will be the departure of the lines, *a b*, *c d*, from right lines, and the nearer the hatched lines approach the perpendicular the less observable will it be, until finally, reaching the perpendicular, the illusion disappears.

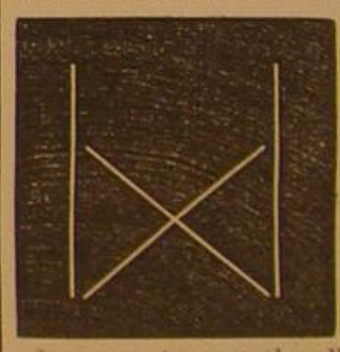


The reason of this is evident. The eye naturally seeks to follow the direction of the hatched lines, rather than that of the including boundary lines, and hence, as their lengths really increase and diminish regularly, and their directions really alternate, the mind unconsciously and involuntarily considers each rectangle separately, and sees in it not a rectangle but a rhomboid, the result of which is to apparently divert the direction of the lines, *a b*, *c d*, producing not straight lines but indented ones, as in Fig. 3.

J. A. J.

Newport, R. I.

MESSRS. EDITORS:—In No. 18, of your journal, a correspondent endeavors to explain the optical effect which my diagram previously published was made to indicate. This he does by saying that an additional length is given the perpendicular bar by the horizontal one being laid across its top. It needs a more satisfactory solution than this. For proof, take



two bars, equal in length, one black and the other white; or at least, bars of different colors, and place them in rotation to each other as the figure represented, and the seeming disparity will still remain just as discernable as before. The eye, in this case, cannot unconsciously add the thickness of the horizontal bar to the length of the perpendicular.

I present above another diagram, wherein the lines of comparison have no contact with each other. The four lines are exactly equal in length, yet there is a great apparent difference. I doubt whether it is possible for any person to group mere straight lines, or bars, in any other manner, to show such a seeming disparity as appears in this. It is worth trying, merely for pastime, if nothing more.

J. HERVA.

Rockford, Ill.

Improvement Needed in Railroad Management.

MESSRS. EDITORS:—I beg leave to call the attention of the public, through your popular journal, to a fact which probably is but little known, viz., that nine tenths of all the accidents which happen on railroads, and much of the discomfort which arises from railroad travel, might be avoided if the companies would adopt many of the self-evidently valuable improvements, the work of skilled inventors, which have recently been patented in the United States. For instance, I lately saw in Chicago, on exhibition, an invention whereby a train would be saved from the destruction often caused by a broken rail. It had been submitted to many railroad men, who, while admitting its value, declined to adopt it. Again, the interior arrangements, with reference to seats, warming, etc., have been to a great extent unchanged from what they were twenty years ago, solely, I presume, because railroad companies are jealous lest some inventor should make a few thousands out of them. I am very familiar with a gentleman who has a perfect plan of warming cars, in which there is no danger from upsetting stoves and firing cars, and by the use of which every passenger would have warmth and comfort, but who will not take out a patent therefor lest railroad companies should refuse to adopt it. Has the community no interest in these matters?

J. B.

Patent Office Illustrations for 1868.

We learn that the contract for engraving the illustrations to accompany the next Report of the Commissioner of Patents has been awarded, by the joint committee of the two Houses in Congress, to Jewett & Chandler, of Buffalo, N. Y., the same firm who have executed the work for a number of years past. Inventors will be pleased to know that the standard adopted for the execution of the work will not be lowered, but will maintain the same excellence of character as heretofore.

Improvement in the Construction of Bedsteads.

The full advantages of the bedstead shown in the accompanying engraving will not be seen without attention to the description. It seems to combine a number of the excellencies of several which have been proposed or put in actual use. First, the frame—side and end bars—is a whole. Second, the slats do not rest in recesses formed in the side or end bars, which are perfectly smooth, offering no retreat for vermin; and, third, the posts or standards can be removed from the frame simply by slipping them out of the metallic sockets at the corners of the frame.

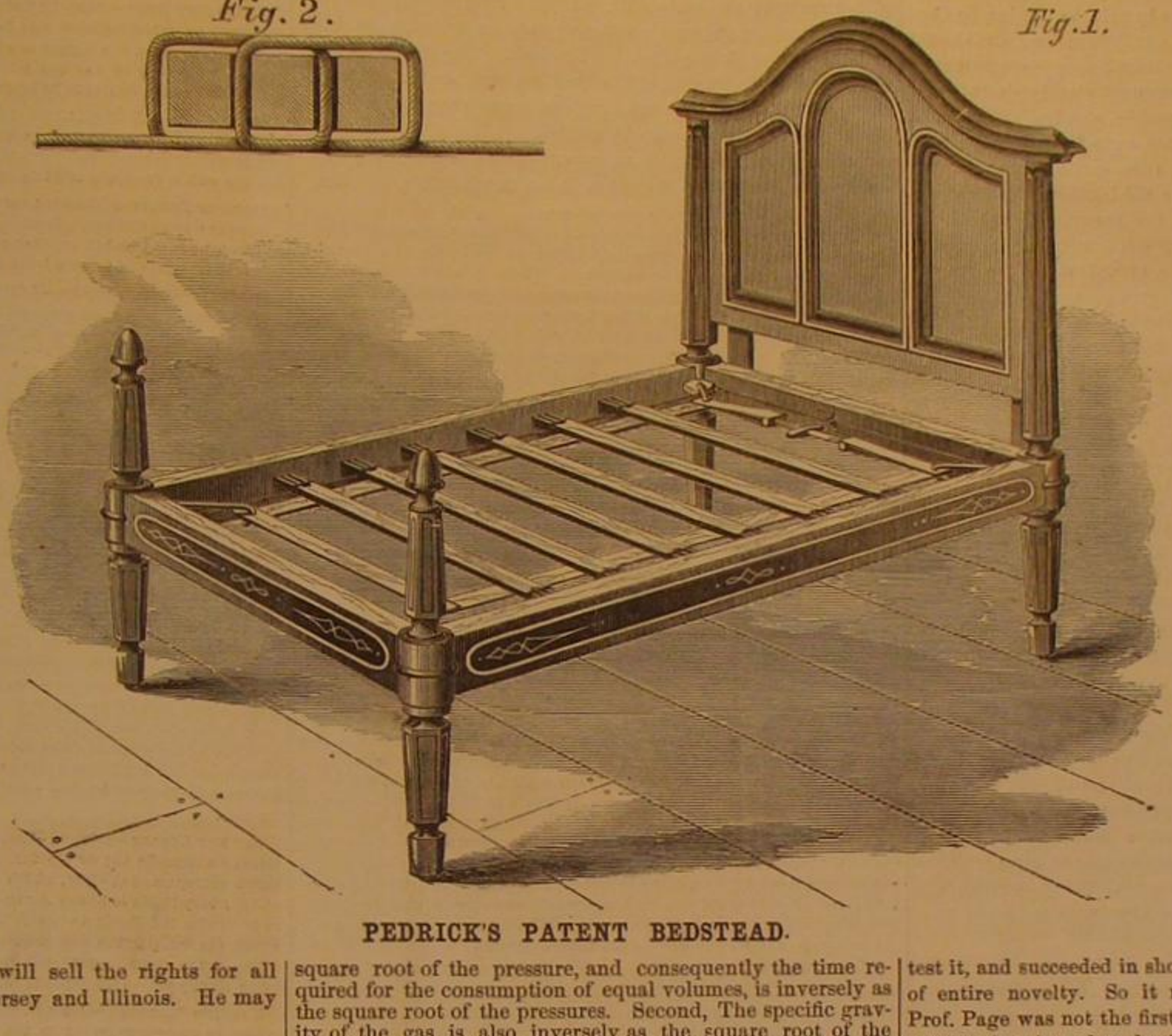
Inside the rails is a suspended frame, preferably of sheet metal, held to the corner sockets by means of double hooks engaging with V-flanges on the sockets passing through slots in the ends of the bars and projecting inside the bedstead, and also with holes in the frame that supports the slats. At one end or both, if required, a swivel nut engaging with the ends of the slat-supporting frame is used to tighten the side pieces of the frame. On this frame is laid the slats, which are held in place by a cord fastened at each end of the bedstead and passing through slots in their ends, as seen clearly in Fig. 2, which is an end section of one of the slats. This arrangement of cord and slats holds the latter in place while the repeated passing of the cord through the slats permits them to be turned over in either direction for cleaning.

The post sockets may be made circular, square, or octagonal, and this method of construction permits either the employment of artistic taste or the building of the plainest styles of bedsteads. The rails and posts may be made very light, and when the posts are removed two of these bed frames with mattresses may be placed together, with mirrors or other fragile articles between, and secured at the corners, thus making the device valuable for removal in case of fire or from any other cause. It will be seen that the greater the weight placed on the bedstead the firmer all the parts are held together. No mortising, screws, or other devices for securing the parts together are required.

Patented through the Scientific American Patent Agency May 21, 1867, by Isaac Pedrick, who will sell the rights for all the States except those of New Jersey and Illinois. He may be addressed at Bridgeton, N. J.

Fig. 2.

Fig. 1.



PEDRICK'S PATENT BEDSTEAD.

The Astor Library.

A correspondent, a resident of New York, complains of the hours of keeping open the Astor Library, which are from 9 A. M. to 5 P. M. He thinks the intention of the founder of the library was to accommodate all, whether persons of leisure or those whose ordinary duties absorbed the most of the working hours of the day. "If," he says, "it is too great a demand that the librarian or his assistants should be on duty during the day and evening, it might be as much a matter of accommodation all around to open the library only from 1 to 9 P. M." It is certain that a very numerous class of our citizens and those likely to be most benefitted by the library besides strangers, would be better accommodated with such a change of hours, and we hope the Trustees will inaugerate some such improvement.

New Crystallized Cards.

The poisonous composition with which "mother of pearl" visiting cards are made, was made public in these columns some months since. Puscher gives a simple process whereby nearly the same, and certainly as ornamental results are obtained by a mixture of harmless ingredients. He dissolves six parts by weight of sulphate of magnesia, and six parts of dextrine, in six parts of water, adds a small quantity of glycerin, and boils the liquid for a moment. He then strains the solution, and before it becomes quite cool, spreads it with a camel's hair brush upon paper previously covered with a thin solution of glue or gelatin. Variegated crystals may be produced by coloring the solution with aniline colors, and preparing the surface of the paper with a mixture of equal parts of white of egg and water, instead of the gelatin solution. When the crystals are dried, the paper is to be run between smooth rollers, or put under a press, when the surface assumes a glazed appearance.

The process thus described, as our readers will notice, is but a slight modification of the discovery of M. Auguste Bertsch, which we described in No. 18, current volume, but the application in ornamenting paper, envelopes, visiting and playing cards, is new. The author has recommended a still more useful application in preparing bank notes. A solution prepared with one third the quantity of gum before mentioned, and with no glycerin may be applied to a lithographic stone, and a copy of the crystallization be transferred to three or four working stones, from which thousands of impressions may be obtained. A back ground for bank bills may thus be prepared, and as no two crystallizations can be exactly similar, forgery of these notes is impossible. By using yellow paper, photography cannot be employed in copying them.

THE RELATION BETWEEN THE SPECIFIC GRAVITY AND PRESSURE OF GAS.

The *Gas Light Journal* gives place in its columns to a statement taken from "Orr's Circle of the Sciences," upon the relation of the specific gravity of gas to the pressure it sustains, and to the time which is consumed in burning equal quantities with the same burner. The language in which the statement is made would lead to the inference that Dr. Fyfe, who is said to have observed these relations, had made a new discovery. The relations to which attention is called, and the table of consumption per hour, with corresponding specific gravities, are as follows:

First, The consumption of gas in a given time, is as the square root of the pressure, and consequently the time required for the consumption of equal volumes, is inversely as the square root of the pressures. Second, The specific gravity of the gas is also inversely as the square root of the pressures. So that, if we determine by experiment what time it takes for a given volume of gas, of known specific gravity, to burn from a jet of the given size, with a flame of the given hight, we are then in a condition to tell the specific gravity, or rate of consumption, of any other gas, provided it be burnt under the same circumstances, and we observe the pressure. This will be manifest from the following table:

Pressure in inches of water.	Consumption per hour.	Specific gravity.
0·6	0·67	·841
0·7	0·72	·770
0·8	0·77	·729
0·9	0·81	·687
1·0	0·86	·652
1·1	0·90	·622
1·2	0·94	·595
1·3	0·98	·572
1·4	1·02	·551
1·5	1·05	·532
1·6	1·09	·515
1·7	1·12	·500
1·8	1·15	·486
1·9	1·18	·472
2·0	1·21	·461

We do not recollect seeing these relations expressed before in tabular form, but as to the principles enunciated there is nothing that has not been long familiar to gas engineers and meter manufacturers. The specific gravity of illuminating gas, if uniformly manufactured, would be an index of its quality; but it is not, as the statement to which we refer asserts, by any means synonymous with the "goodness" of gas, under usual circumstances, or even when "carbonic acid and atmospheric air" are not mixed with it. As gas is usually made, it contains many other impurities besides carbonic acid, and the test of specific gravity, though it might determine the time a certain amount would consume in flowing through a burner of specified size, would be very far from determining the illuminating power of the same amount of other gas of the same specific gravity.

The table is constructed for a burner having an aperture one fortieth of an inch in diameter with the tap so turned as to permit the flame to burn constantly at the hight of five inches. Nothing is said of the form of the section of the aperture, or the form of the burner, and the only other condition specified is that the pressure gage should be on the jet side of the tap. The results given seem to have been based upon such imperfect experiments as to render them unreliable, and the suggestion of Dr. Fyfe, that by operating in a similar manner meters and photometers may be dispensed with, seems to us in the highest degree impracticable.

A Most Important Patent---Great Lawsuits Ahead.

One of the most important pieces of apparatus employed in the operations of the magnetic telegraph in this country, called the automatic circuit breaker, was invented by Charles G. Page, recently one of the examiners in the Patent Office, but who departed this life on the 5th May. From his official position he was not permitted to take out a patent for the invention, and it has been used by all our American telegraphers, for many years without compensation. Shortly before his death, however, Congress, by a special act, removed the disability under which he labored, and granted to him the requisite patent, which is now vested in his heirs for fourteen years to come. Henceforth, no company or individual can use the circuit breaker without paying these heirs for the privilege; and thus the reward of Prof. Page's ingenuity, denied to him in person, seems likely to be reaped by those he leaves behind him.

To the general reader, unacquainted with the practical details of telegraphy, it is impossible to fully describe the nature of the invention, which we refer to, and the extent to which it applies to the business of our telegraph companies. We can only quote the admission of the *Journal of the Telegraph*, which is the organ of the Western Union Telegraph Company, to the effect that the bill granting the patent to Prof. Page practically puts American telegraphy into the hands of his heirs. It says: "All automatic closers, repeaters, local circuits, registers, printing machines, etc., are covered by this sweeping patent. Circuit breakers in actual use, or manufactured April 15, are exempt from its operation; but no machinery after that date can be employed without the consent of the patentees." So that these patentees can dictate their own terms, and make our American telegraph companies pay them almost any price they choose to ask for permission to make use of the invention.

It is not likely that so immense a claim will be conceded without resistance. When Ross Winans undertook to enforce his sixteen-wheel car patent, all the railroad companies in the country banded together to contest it, and succeeded in showing that it was invalid for want of entire novelty. So it may yet possibly be proved that Prof. Page was not the first man to divise the automatic circuit breaker, but that the idaa was already known before it occurred to him. We may, therefore, expect some interesting litigation on the subject, and a rummaging among old telegraphic literature, which has not taken place since the suits brought by Samuel F. B. Morse, and in which he was defeated, upon his patent for the general application of wires and magnetism to telegraphic purposes.—*N. Y. Sun.*

The Induction Coil Patent of Prof. Charles G. Page.

Some excitement has been created in telegraph circles by the statement that the heirs of the late Prof. Charles Grafton Page claim that the special patent granted to him, by Act of Congress, covers all known forms of telegraphy, except the simple closing of a circuit by the key and hand, practically putting American telegraphing in the hands of his heirs.

We apprehend that there must be some misunderstanding in regard to this matter. We have carefully examined the claims on which Prof. Page's patent was granted (and which have already been published in our columns), and the only clauses on which such an assumption can possibly be founded are the fourteenth and fifteenth, and these could not, in our opinion, be sustained against any of the numerous telegraph instruments invented and in use at this time. We have not room this week to go into a discussion of this subject, and must content ourselves with a few general observations.

The object of Prof. Page in obtaining the special Act of Congress referred to, was doubtless merely to obtain honorable recognition of the fact that he was (as has been demonstrated), the original inventor of the so-called Rhumkorff coil, and a vindication of his right and title to that invention. It is not probable that the idea of gain, or of making the telegraphic interests of the country tributary to him, actuated him in seeking this recognition and vindication; it was the desire to establish his reputation as a scientific man, and expose the pretensions of Rhumkorff and others, who had acquired great and honorable reputation at his expense. And even if the patent could be construed to cover all that is understood to be claimed by the heirs of Prof. Page, we doubt whether it could be maintained in a court of law and equity. Congress has no right to legislate away the vested rights of the public or of private individuals. Such legislation is doubtless unconstitutional, and would be so declared by the Supreme Court.

Prof. Page, in his position as Examiner of Patents, has passed on and approved hundreds of patents for electrical and telegraphic improvements and inventions, which now, it is claimed, are tributary to his heirs.

When Prof. Page's application was before Congress, it was distinctly stated that it applied to induction coil apparatus, and its passage was urged as a just recognition of the scientific attainments of a distinguished American citizen, unjustly defrauded of his rights and credit in that particular branch of electrical science. Had it been intimated that the patent applied for covered telegraph inventions in use for a score of years, and which, by expiration of the original patents, had become public property, it would not have received ten votes in either branch of Congress.

Should the design attributed to the heirs of Prof. Page be persisted in, we shall have something more to say on this subject.—*Telegrapher.*

[We coincide with the views above expressed. If the claims of the Congressional patent to Page were to be interpreted according to their broad wording, there would be good reason for the indignation and alarm that prevail in telegraphic circles. But we think the claims will be held within narrow bounds.

The grant of special monopolies to private parties, by Congress, is repugnant to the spirit of our institutions, and should never be tolerated except under extraordinary circumstances, when the welfare of the whole country clearly demands it. Monopolies are burdens upon the people, and had their origin in oppression. To call them patents, or to issue them under pretense of rewarding inventors, does not alter their real character. They are still the same old legalized forms of enriching the few at the expense of the many. The people already have burdens enough to carry without being tormented by hordes of private tax collectors, armed with the special Acts of Congress. Some of the hugest patent swindles have been passed by the present Congress, and others are in a forward state for passage. Indeed, the Capitol has become a second Patent Office, and is doing a large and flourishing business, but not creditable, or beneficial to the country.—EDS.

A New Electrical Engine.

The philosophical lecture room of the College of the City of New York, on the afternoon of Tuesday, the 19th ult., was filled by an attentive audience to witness a practical demonstration of the working and power of a new electro-magnetic motor invented by Mr. Laban C. Stuart. Previous to explaining the principle and construction of the new apparatus, Prof. Doremus gave a short lecture on magneto-electricity, introducing a number of pleasing experiments, and giving a short history of the many attempts which have been made for utilizing this agency in furnishing motive power. Stuart's machine, as exhibited by Prof. Doremus, consists essentially of a horizontal central axis about three feet in length, armed with a series of electro-magnets, and having opposed to them a set of stationary magnets. With a Bunsen's battery of forty cells, the axis revolves 500 times per minute. When connection was made with a pump, a simple calculation showed the working power of the apparatus to be $\frac{1}{10}$ of a horse-power.

According to the report of the sub-director of the *écoles imperiales d'arts et metiers*, the most efficient electrical engine in France, where great attention has been bestowed upon the perfecting of these motors, is the apparatus of M. Dubos, which, with a battery of seventy cups, gives a working power of two kilogrammeters, or $\frac{1}{38}$ of a horse-power. The same authority pronounces the next best engine to be that of Loiseau. This machine, with twelve Bunsen's cells, gives only the $\frac{1}{127}$ of one horse-power. An electrical motor exhibited by an Englishman attracted considerable attention at the Paris Exposition. It was worked by a battery of fifty cells, and was warranted of one horse-power. When, however, subjected to an actual test, it was found to be but the $\frac{1}{50}$ of one horse-power.

Mr. Stuart's engine is evidently ahead of either of these machines. The principle of its construction has been so highly commended that he is going on to construct larger ones. In its present incipient state, the apparatus may be employed to advantage in pumping, running sewing machines or turning lathes, or other light work. The inventor feels confident that larger engines can be built, with not a proportionate, but a far greater increase of power; founding his belief on a fact which Prof. Doremus demonstrated by showing that doubling the size of the battery much more than doubled its efficiency. The immunity from danger by fire or explosion is a great recommendation which this motor enjoys in common with others of its class. The claims for superiority peculiar to this machine are, the arrangement of the magnets, so that a steady and uniform electrical current is kept up, and so that they are only magnetized twice in each revolution, instead of many times, as in most other motors, obtaining greater power than is possible with any electrical engine hitherto invented.

As we shall soon present to our readers an engraving and description of this machine, we reserve further description till then.

Improvement in the Manufacture of Zinc

Patented by A. G. Hunter, of Flint, Wales. The zinc ores, after having been subjected to the usual preliminary treatment, are intimately mixed with the usual quantity of carbonaceous matter, and placed on the hearth of a reverberatory furnace, in which the mixture is acted on directly by the heat and flame from the fire. In order to effect the reduction of the zinc from its ore, care must be taken to prevent the presence of any free oxygen in the flame, or heated gases passing over the zinc ore mixture. This may be accomplished either by keeping a thick mass of burning fuel in the fireplace, or by introducing carbonic oxide, carburets of hydrogen, or hydrogen gas, or other deoxidizing agent, at the fire bridge, so as to be mixed with the flame from the fire before it reaches the zinc-ore mixture, care being taken to prevent the admission of air at any other part of the furnace except through the grate bars of the fireplace, which must be well filled with fuel while the zinc-ore mixture is under treatment. By the reducing action of the heated gases and flame, and of the carbonaceous matter mixed with the ore, the zinc the ore contains is liberated in a metallic state, and distills off as a vapor, mixed with the heated gases and flame from the fire. The zinc vapor is condensed to metal by causing the heated gases, flame, and zinc vapor, previous to their reaching the chimney, to pass through a pipe or condenser surrounded with water, which cools the gases sufficiently to allow the zinc to deposit. In this pipe or condenser, suitable recesses or cesspools are provided to receive the melted zinc as deposited, from which it may be run off into molds; also suitable openings, through which the pipe may be cleaned out. Either a stationary or a revolving reverberatory furnace may be used to heat the zinc ores in, and the condenser may be either vertical or horizontal, or both alternately, and the sizes of the furnace and condenser may be varied, to suit the amount of work required to be done. The inventor has found a furnace hearth eight feet square, and a condenser twenty inches diameter and sixty feet long, a convenient size; but these proportions may be varied.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The manufacture of wall paper has not as yet been entirely superseded by the wood veneer hangings, although the latter, we are informed, are making steady progress in the public estimation. There is a factory in this city where 1,700 tuns of paper were last year converted into finished paper hangings. The facilities are such that blank paper, as it comes from the mill, can be converted in half an hour into printed wall paper, reeled and ready for market. Cylinder machines are so arranged that a dozen colors are printed at one operation. The finer grades of hanging are printed by hand

A good move has lately been inaugurated by the New Jersey railroad company, which we hope soon to see adopted by roads generally throughout the country. Passengers for Philadelphia, on purchasing tickets at the office, are at the same time furnished with coupons specifying the number of the car, and the seat they are to occupy, and depot ushers are in attendance to show them to their places. This system of securing seats is eminently just, guarantees a seat to all passengers, and, at the same time prevents those of an avaricious turn from appropriating to their own use more than by right they are entitled to.

It is rather a humiliating fact, that all the mechanical power exerted by a man during his lifetime is more than equaled by the power stored up in one cart load of coal. The annual coal produce of Great Britain is equal to the power exerted by 530,000,000 horses, working eight hours per day, for one year. Taking this as a standard, the world's supply of this fuel equals the work of 924,000,000 horses, working as before.

Our mining intelligence from the tin discoveries of Missouri has not been very startling; certainly the deposits have not as yet proved themselves sources of fabulous wealth. The most favorable indication regarding their professed richness that has come under our notice, is the fact that one of the largest and best known metal firms in this city have just purchased an extensive tract of land in Madison county, which is reputed to contain one of the richest tin lodes in the State. A railroad will soon be in working order to within a few miles of the region. The local papers enthusiastically announce that recent discoveries reveal the fact that not only tin is to be obtained there, but that the mountain regions abound in iron, lead, silver, and gold, awaiting only the expenditure of capital and labor to speedily make the territory the rival of the far famed mineral territory on the Pacific coast.

The immense cost in the construction of English railroads is mainly derived from the extravagant prices which have to be paid at the outset for the land. The average of this item for all the lines has been rated at $43,000 per mile, or more than the entire average cost for each mile on our American roads. The parliamentary charges incurred in procuring a charter are also enormous, many roads having cost over $10,000 per mile. The corresponding charges in our own country are not so accurately nor so publicly estimated, as it depends entirely upon the price of each legislator.

Two public works belonging to the highest grade of modern civilization are being undertaken in Greece, the center of ancient civilization,—a telegraph line from Athens to Kephisia, and a railway to the Piræus, whence the people of the capital draw every article of consumption. The entire length of railway is but six miles, and the company can easily complete the line before the end of August, the time fixed by contract for opening the road.

A German traveler of repute, named Mauch, reports to the geographical society of Gotha his discovery of two gold mines in the interior of Africa. The geological character of the section, which is located about 900 miles from Natal in a northwest direction, indicates an extraordinary amount of auriferous wealth. The existence of small pits, about three yards deep, throughout the region, would seem to indicate, as Dr. Livingstone has already said, that in former times the Kaffirs were acquainted with the art of extracting the precious metal.

Three sumptuous "drawing-room" cars have been built in Troy, N. Y., for the Hudson River railroad. Each car is sixty-four feet long, contains eight small compartments, capable of accommodating four persons each, and four other rooms suitable for an entire family. One of the large rooms is set apart for the common use of all the occupants of the car. Each compartment is fitted up with chairs, table, mirror, and other conveniences, heated from hot-air registers, well ventilated, and furnished with the most elegant carpets and curtains. The cars cost $15,000 each.

Recent American and Foreign Patents.

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

BLAST FURNACE.—Charles Mellinger, Cornwall, Pa.—This invention relates to improvements in the method of manufacturing pig iron, but having more particular reference to preparing or desulphurizing the ore before before it is introduced into the blast furnace.

MOP.—Andrew J. Davis, Hartford, Mich.—This invention relates to a new and improved method of constructing mop frames, whereby facilities are afforded for wringing the mop, and it consists in attaching the mop to a sliding frame by a holder, which is revolved by gearing and crank, for twisting or wringing the mop.

CHURN.—Geo. W. Goodwyn, Petersburg, Va.—This invention relates to an improved means for operating the churn, whereby the work of churning can be performed much more easily than by any of the old methods.

DEVICE FOR PROPELLING PLEASURE BOATS.—J. O. Belknap, Mobile, Ala.—This invention is a neat and ornamental apparatus for moving pleasure boats in a circle around a central standard, by means of horse power.

STEAM-PIPE CONNECTION FOR RAILROAD CARS.—Henry R. Robbins, Baltimore, Md.—This invention is an improved flexible and self-adjustable joint for connecting the ends of the steam pipes in a train of cars so as to admit of the heating of the cars by steam or hot air from the locomotive or from a boiler or furnace in any part of the train.

RAFTING DOG.—Charles C. Comstock, Grand Rapids, Mich.—Patented May 12, 1868.—The object of this invention is to provide a simple and cheap device for the purpose of attaching logs together to form a raft, and operating in such a manner that with it the logs can be more expeditiously as well as securely fastened together than by the means now commonly employed.

PRESS FOR CONCRETE BLOCKS.—L. S. Warner, Chicago, Ill.—Patented May 12, 1868. This invention relates to the pressing of concrete blocks, so called, which are used for building purposes, and which are lower than common brick, differing, also, therefrom in character; and it consists of molds or boxes which are filled with the concrete material, together with compound toggle or knee-joint levers for actuating the follow bottoms of the molds upward to press the concrete material into a dense building block.

SPINNING FRAME.—Frederick Haythorn, Philadelphia, Pa.—This invention relates to an improvement in spinning frames, and it consists in providing a series of guards between the spindles, to prevent the yarn of each bobbin or cop from coming into contact with that of the adjacent bobbins or cops, on either side, during the act of being spun.

CRIBBING PREVENTER.—Michael H. Sullivan, Providence, R. I.—This invention consists of a curved plate provided with a buckle to attach it to a horse's head near the throat, and provided with a pricking point which is actuated by the flexing of the animal's head to present the point and thus deter him from the act of cribbing.

SUPPLY GAGE FOR BOILERS.—H. P. Stafford and J. A. La Farge, Decatur, Ill.—This invention relates to an improvement for regulating the supply of water in steam boilers, and which acts automatically in maintaining the proper water lever within the same, and regulates the supply of water.

HORSE HAY FORK.—John Milholland, New Concord, Ohio.—This invention relates to an improved horse hay fork, and consists of an adjustment of the trip cord by means of a trigger and of the handle, whereby the handle is protected by the side of the eye when the fork is loaded, and the point kept straight when the fork is to be returned.

LINIMENT.—A. J. Creel, Hopkinton, Iowa.—The object of this invention is to provide a liniment for healing wounds on man and beast, and for curing inflammatory diseases and for various other aches and ails to which mankind as well as the brute creation are subject.

MODE OF TREATING MINERAL PHOSPHATES IN THE MANUFACTURE OF FERTILIZERS.—John Commins, Charleston, S. C.—This invention relates to a new and improved method of treating phosphatic minerals and earths after such minerals or earths have been treated with a solution of chloride of sodium.

RAILROAD SWITCH PLATE.—Adolph Philippi, Elizabethport, N. J.—This invention relates to a new switch plate, which is so made that the rails have an elastic bearing, and that they can be removed and replaced at will, without removing the switch plate.

WATER CONDUCTOR FASTENING.—G. A. Hein, Waterford, Pa.—The object of this invention is to provide a fastening for the water conductors of buildings, which, while it presents a neat and workmanlike appearance and is durable and not likely to get out of order, shall allow the conductor to be attached to or removed from the same without removing the fastening.

FABRIC.—R. D. Hine, Mattewan, N. Y.—This invention relates to a new manner of preparing fur hat bodies, and other fabrics having a fur surface, and consists in the application of a layer of wool, the surface of which is covered with fur, and is felted together with the same, so as to form a solid fabric. The fur here referred to is that kind which is mostly used in hat bodies, and from which the skin has been removed.

SAFE-DOOR LOCK.—John G. Kriechbaum, Youngstown, Ohio.—This invention relates to a new safe lock, which is so arranged that it cannot be opened even with the correct key, unless the required movements are well known. The bolts are arranged in pairs, moving in opposite directions, one bolt moving out while the other is thrown in by the key, so that there will always be one bolt out, which locks the door, unless one bolt is, at the proper time and by the proper motion, thrown out of gear. In the door no hole for the insertion of the key is to be seen when the door is locked, and the key hole cannot be opened unless a certain plate is moved on the under side of the safe.

TAG FOR STRAPS.—Edward Wadhams, Yorkville, N. Y.—This invention relates to a metallic tag or tip for straps, such, for instance, as skate straps, harness straps, and the like, which are frequently buckled and unbuckled, and are very liable to have their ends turned or coiled up and frayed out, so as to render it difficult to insert them through the loops of the straps. It consists in encasing the end of the strap within a thin strip of sheet metal, whereby the end of the strap is preserved and rendered capable of always being readily passed through the loop and retained in proper shape.

WASHING MACHINE.—John C. Crawford, St. Charles, Ill.—This invention relates to an improvement in the construction of a washing machine and clothes presser, and consists in forming a long box, or trough, with a corrugated bottom, and provided with two large heavy rollers, connected with a lever, by which the rollers are moved over the corrugated bottom of the box to wash the clothes by rubbing with their combined and reciprocating motion.

HARNESS.—S. L. Gray, Chillicothe, Ohio.—This invention relates to a new and improved harness for controlling vicious horses, the parts being constructed arranged and applied to the horse in such a manner that the latter will be entirely within the power of the driver or rider.

EVENER.—Freeman N. Corbin, Champlain, N. Y.—This invention relates to a new and improved application of a double tree to the draft pole of a wheel vehicle, whereby the clevises to which the whiffletrees are attached will be shifted laterally, one being brought nearer the draft pole as the other is moved outward from it, so that the most ambitious or the strongest pulling horse, whenever he exerts himself more than the other, will have his average power on the double tree decreased, while at the same time the average power of the other horse will be proportionably increased. By this arrangement a team will soon be made to pull evenly, without any special care or attention on the part of the driver.

WOOD POLISHING MACHINE.—H. O. Hooper, Diamond Springs, Cal.—This invention relates to a new and improved machine for polishing and smoothing doors, and other articles constructed of wood and having plane surfaces It consists of one or more pieces of rotary polishing plates, operating in vertical planes, in combination with one or more pairs of reciprocating polish-plates, and a feed mechanism.

CORN PLANTER.—J. M. Allison, Cranberry, Pa.—This invention has for its object to furnish a simple, convenient, and effective machine, by means of which corn may be dropped accurately and rapidly by hand power.

TRACE HOLDER FOR HARNESSES.—Stephen Stout, Tremont, Ill.—This invention has for its object to furnish a neat, simple, and convenient device for attachment to the harness, upon which the traces may be hooked when detached from the whiffletree, so as to hold them securely and prevent their dropping down and being stepped upon by the horses, or being injured by tying them.

CARRIAGE WHEEL.—Anselmo B. Smith, Plattsmouth, Nebraska.—This invention consists in a novel and improved manner of securing the spokes of wheels in a metallic hub, and in a peculiar construction of the hub, whereby a very strong and durable wheel is obtained, and one which may have its spokes adjusted to compensate for any shrinking thereof, so as to avoid the lowering of the tire and the necessary shrinking of the same, which is now required in wheels as ordinarily constructed.

HORSE COLLAR AND HAMES.—Alexander Dunbar, New York city.—This invention relates to a new horse collar, of that class which is known as the folding collar, that can be opened on top, so as to put around the horse's neck without having to be slipped over the head of the same. It consists in the use of a metal lock, which serves to fasten the upper ends of the hames together, and which is adjustable in notches cut into the hames, so as to adapt the device to various sized horses.

POCKET FAN.—H. B. Smith, Essex Conn.—This invention relates to a new lady's fan, which is so arranged that the handle can be folded out of the way when the fan is folded together, whereby the handle will be protected, and will not be liable to break off.

ORNAMENTING FABRICS.—Wm. Swan, New York city.—This invention relates to a new process of ornamenting fabrics of all descriptions, such as gauze, silk, and others, and consists in securing a series of small beads or drops, made of gum arabic, to the fabric; said beads being translucent, so

Electrical Separation of Gold and Other Metals.

John Corson, of Washington city, has lately patented the following :—

He uses two machines, auxiliary to each other, in order to complete the process of crystallization and amalgamation of the metals found in the ores. Both machines must be insulated from earth currents by glass pillars or globes, or other poor conducting substance. The crystallizer consists of a tub or pan, of wood or iron, of suitable size (say eight or ten feet in diameter and two or three feet high); the pan, if of wood, having a false bottom of glass, one and a half or two inches thick, or of well burned and glazed tiles. A glass shaft is used to propel the mixing wheels, or any other means as effectual, to insulate the pan from earth currents, and four or eight arms, attached to and driven by the shaft, carry the mixing wheels through the pulp. The latter are made of wood, twenty-four to thirty inches diameter, and two to three inches thick, fastened to the arms by any suitable device. The face of the wheels is covered with a metal tire, one half the number with one kind of metal, as copper, and the other half with a different metal tire (zinc), so that when arranged in the pan they will be in pairs.

The tires of different metals are connected by a metallic rod, having at each end a small friction roller, of same metal, resting on the tire of the wheels, thus forming a metallic connection between the upper side of each pair of wheels. When a proper conducting fluid, as salt, or very dilute acid, is placed in the pan, the battery is ready for operation.

To put this pan in use as a crystallizer: First, the raw ore, reduced to an impalpable powder, is put into the pan, and to it is added a proper amount of salt or dilute acid, rendering it a semi-fluid pulp. As soon as any one pair of wheels are wet with this fluid compound, electricity is generated, and currents are established between each pair of wheels, causing crystallization immediately to commence. A slow motion is now given to the wheels, by means of suitable gears or belts, and continued until the operation is completed. The time occupied in each operation will vary with the various kinds of ore, but from six to eight hours will be found sufficient.

After crystallization has been completed in the pan, the whole mass is drawn off and put into the amalgamator, made of a wooden or iron cylinder, or barrel, of suitable size, running on a hollow shaft. The pulp being introduced into the barrel through a suitable opening, with the proper quantity of mercury. The amalgator is closed perfectly tight, and is rotated by very slow motion, by belt or otherwise, for from four to six hours.

After the amalgamation is completed, the amalgam is separated from the pulp by the introduction of a stream of water. The pulp being run into cisterns running lengthwise, east and west, a plate of suitable metal is put in each end, and these plates connected by a wire outside the cistern. Here it is to remain as long as convenient, or as long as any remaining metals crystallize. The mass may then again be subjected to the action of mercury in the amalgamator.

PATENTS.

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

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In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions—smaller if possible. Send the model by express, pre-paid addressed to Munn & Co., 37 Park Row, New York, together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions, mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

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On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
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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.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING MAY 19, 1868.

Reported Officially for the Scientific American.

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☞ *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.*

77,945.—HORSE POWER.—Hiram Aldridge, Goshen, Ind., and Willis Bedford, Chicago, Ill., assignors to Hiram Aldridge.

We claim, 1st, In combination with a stationary or mounted horse power, a vertically adjustable shaft, E, which is provided with two or more pinion spur wheels, for the purposes and substantially in the manner described.

2d, The vertically adjustable shaft, E, with two or more pinions upon it, in combination with sliding or compensating knuckles or couplings, F, or their equivalents, substantially as and for the purposes described.

3d, In combination with a shaft, E, which is made vertically adjustable, and also longitudinally adjustable, the adjustable collars, I I, substantially as described.

4th, The triangular L-shaped cast frame, C C', constructed substantially as and for the purposes described.

6th, The combined arrangement of the driving pinions, G G G, radial shafts D D D1, bevel wheels, c c c', arranged upon a triangular frame, C C', substantially as described.

77,946.—STRAP FASTENER.—J. B. Armstrong, Corunna, Mich.

I claim, 1st, The cam, E, provided with the angular edge, F, and stem, J, with the spring, I, operating substantially as described, for the purposes set forth.

2d, The combination and arrangement of the cam, E, the recess, H, the spring, I, with the frame, A, the hook, B, the cross bar, C, the strap bolt, D, and the bolt, G, all operating in the manner specified, and for the purposes set forth.

77,947.—TRUSS.—Samuel Ayres, New York city.

I claim, 1st, Connecting the pap of a truss with the band or strap by a loop, F, through which the belt slides loosely, substantially as described.

2d, Making a truss pad of cork, substantially as described.

3d, The flange, E, around the edge of the pad, substantially as described.

77,948.—GOVERNOR FOR STEAM ENGINES.—Chas. H. Bacon (assignor to himself and William Read, Jr.), Boston, Mass.

I claim the combination of the propeller and shaft, a b, working within the cylinder, A, constructed with one or more chambers, B C, with the link, E, crank c, and rod, d, substantially as and for the purpose set forth.

77,949.—DITCHING MACHINE.—Emory Barnes, Chelsea, Mich.

I claim the combination of the sills, Y, the posts, B, the crosstree, C, the beam, B, the braces, A2, the vertical shaft, D, pulleys, E G and H, the chain or rope, R, windlass, V, lever, W, block, F, crane, I, bolt, 2, lever, J, scoop, K, platform, U, capstan, V, lines, P S N T and Q, crosshar, M, blocks, O, and rope, X, when arranged, constructed, and operating substantially as and for the purposes herein set forth and shown.

77,950.—FURNACE FOR ROASTING ORES.—Nathan Bartlett, Centerville, N. J., assignor to himself and Franklin Osgood, Richmond county, N. Y.

I claim, 1st, The sectional arrangement of the oven, and the breaks or openings by which the sections are coupled or united together, constructed and operating substantially as described.

2d, The combination of the sectional oven with a furnace and chimney, constructed and operating substantially as described.

3d, A sectional oven, as herein described, in combination with openings or doors in both ends of each section of such oven, for the purposes stated, constructed substantially as described.

4th, Constructing a sectional oven with the sections alternately inclined to each other, for the purposes stated, arranged and operating substantially as described.

5th, The arrangement and combination with each other in pairs of the sectional ovens, the furnaces, and the chimneys, in the manner and for the purpose substantially as described.

77,951.—MACHINE FOR CUTTING ECCENTRIC TAPS.—Benj. F. Bee, Harwich, Mass., assignor to the New York Tap and Die Company, New York city.

I claim, 1st, The combination in one machine of the following instrumentalities, viz., the rotating mandrel to support the blank, vibrating rotary cutter, inclined cutter arbor, feed screw, and regulating cam, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

2d, The combination in a machine of the following instrumentalities, viz., the rotating mandrel, rotating cutter, mounted on a free arbor, cutter guide, and spring, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

3d, The combination in a machine of the following instrumentalities, viz., the rotating mandrel, rotating cutter, inclined cutter arbor, regulating cam, and weight, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

4th, The combination in a machine of the following instrumentalities, viz., the rotating cutter, regulating cam, and adjustable connecting mechanism, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

5th, The combination in a machine of the following instrumentalities, viz., the regulating cam, vibrating tool support, variable connecting mechanism, and a directing instrument, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

77,952.—VULCANIZING INDIA RUBBER CAR SPRINGS AND OTHER ARTICLES.—Henry W. Beins, Mount Vernon, N. Y.

I claim the molds, b, secured in the heads or plates, a, of the heater, and having their ends extending beyond such heads or plates, substantially as and for the purpose set forth.

77,953.—HERMETICALLY CLOSED AND KEYLESS PADLOCK.—S. Bickerstaff, Cincinnati, Ohio.

I claim a self-sealing or keyless padlock, consisting of two pieces only, the body and the shackle, and constructed without rivets, bolts, screws, or opening of any kind, except for the reception of the shackle, substantially as shown and described.

77,954.—PACKING FOR JOINTS OF STEAM AND WATER PIPES.—Hyppolyte Brocard, Paris, France.

I claim the employment, as means of making the joints of metal pipes and other metal articles tight, of washers or packings of lead, rolled, substantially in the manner hereinbefore described.

77,955.—BUCKLE.—S. P. Burdick, New York city.

I claim, 1st, The lip, e, turned up from the lower face of the shell, A, to hold the lever, b, when the cam, a', is fully locked and operating in combination with said cam, shell, and lever and the lip, e, as herein described.

2d, The construction of the shell, A, of a flat plate, having a depressed concave flange, g, at its front edge, substantially as and for the purpose described.

3d, The guide, i, secured to the shell, A, and running crosswise to the belt which is secured in said shell, substantially as and for the purpose set forth.

77,956.—GATE.—John P. Butz and Abner McFarland, Enterprise, Ind.

We claim, 1st, The lever, D, with the brace, C, and the slats, a a', used as and for the purposes set forth.

2d, The combination of the lever, D, with the brace, C, and the latch, c, and ratchet bar, g, as and for the purposes specified.

77,957.—TUBE WELL.—O. D. Chapman, Chicago, Ill.

I claim the combination of the bands, d, wire cloth, E, spiral wire, F, and perforated plate, G, with tube, A, substantially as and for the purpose set forth.

77,958.—BOOKBINDERS' BEVELING MACHINE.—Wm. P. Chase, Boston, Mass., assignor to R. Hoe & Co., New York city.

I claim, 1st, The reciprocating plane, provided with an oblique cutter, in combination with the oblique groove, to guide the plane in its travel, whereby I am enabled to obtain a smooth shear cut of the material, as set forth and specified.

2d, The combination with the oblique groove and reciprocating cutter, of the adjustable plate, B, for holding the material for the action of the cutter, substantially as set forth and specified.

3d, The combination with the oblique groove and reciprocating cutter, H, of the adjustable bed, D, for giving any desired bevel to the material, substantially as set forth and specified.

4th, Making the face of the cutter or plane, H, concave, in combination with the oblique cutting iron, I, whereby I obtain a clean, smooth cut, without abraiding the material, substantially as specified.

5th, The combination and arrangement of the oblique guides, C C, reciprocating plane, H, holding plates, B B, and adjusting plate, constructed and operating substantially as set forth and specified.

77,959.—LUBRICATING OIL.—Robert A. Chesebrough, New York city.

I claim the product or article called by me Filtrene, as a new article of manufacture.

77,960.—HEEL CORK.—Geo. F. Clemons, Springfield, Mass.

Antedated May 15, 1868.

I claim, 1st, A heel cork adapted to be self-securing to the boot by means of spring clamping surfaces, substantially as described.

2d, The releasing lever, g, when employed substantially as described and for the purposes set forth.

77,961.—RAFT DOG.—C. C. Comstock, Grand Rapids, Mich.

I claim the combination of the two wedges, A A, the link, C, and the rope, B, when employed together in the manner as and for the purpose set forth.

77,962.—COAL STOVE.—Thos. Crane, Fort Atkinson, Wis.

I claim, 1st, A single-cylinder drum stove, provided with an annular flue jacket, H, surrounding its upper portion, and communicating with the fire chamber by means substantially as described.

2d, The means shown and described of compelling the products of combustion leaving the fire chamber, A, to circulate entirely around the suspended jacket, H, when this jacket is arranged and applied to a stove substantially as described.

3d, A flue jacket, H, made shorter than the fire chamber, A, and adplied to said cylinder so as to form an air space, J, which leads through the perforated top, P, substantially in the manner and for the purpose described.

77,963.—UMBRELLA.—William Damerel, Brooklyn, N. Y.

I claim, 1st, The conical collar, f, connected to the runner, e, by means of links, b, substantially as and for the purpose set forth.

2d, The cam, e, on the spring hook, d, arranged to operate with the collar f, substantially as described.

3d, An umbrella stick made of an inner and outer tube united throughout their length, substantially as described.

4th, The bridge piece, i, applied within a tubular umbrella or parasol stick substantially as described.

77,964.—LOOPED PIN FOR SECURING ARTIFICIAL TEETH.—C. H. Eccleston, Oxford, N. Y.

I claim an angular loop for securing artificial teeth, when made with an enlarged and flattened head, provided with projecting shanks whose outer ends are bent at an angle therewith, all substantially in the manner herein set forth.

77,965.—BRAN DUSTER.—Peter T. Elting, Buffalo, N. Y., assignor to Elting Bolt and Duster Company, Cincinnati, Ohio.

I claim, 1st, The fan wings, J4, revolving within the chamber, J, and extending downwardly and outwardly beyond the periphery of the screen disk, as and for the purpose set forth.

2d, The combination of the serrated scouring plate, at the eye of the screen disk, with the surrounding screen cloth, as and for the purpose set forth.

3d, Making the screen frames in sections, as and for the purpose set forth.

4th, Supporting the brush tempering wheel at two points by the brush adjusting screws, and at a third point by the screw post from the flour chamber, for the purpose described.

5th, The brackets, K, with their adjusting screws, K1 K2, for adjusting the flour case laterally and vertically, as set forth.

77,966.—REVERSIBLE KNOB LATCH.—Barthel Erbe, Birmingham, Pa. Antedated May 12, 1868.

I claim the hook, n, in combination with the depression, l, on the latch arranged and operating as described, for the purpose set forth.

77,967.—FENCE.—O. J. Everson, Lake City, Minn.

I claim connecting and adjusting the panels of a portable fence together by means of the pin, e, and the stay brace, C, constructed and used with the panels, in the manner and for the purpose set forth.

77,968.—CAR AXLE.—Wm. B. Fahnestock, Lancaster, Pa.

Antedated May 16, 1868.

I claim the plate, D, constructed and operating as described, in combination with a divided axle, as specified and for the purpose set forth.

77,969.—MOLD FOR MAKING DRAIN TILE.—Henry Felthoff and Lucas D. Tingley, Prince William, Ind.

We claim the arrangement of the molds, B and C, with pin, n, and elongated slits, b b, substantially in the manner and for the purpose as herein shown and described.

77,970.—CONSOLIDATING COAL DUST FOR FUEL.—William Footner (assignor to Wm. J. Footner), Chicago, Ill.

I claim consolidating particles of coal by mixing with a solution of glue, and compressing, substantially as and for the purposes specified.

77,971.—MANUFACTURE OF PLATED SPOONS, FORKS, ETC.—H. E. Fowler and W. W. Holmes, Wallingford, Conn. Antedated May 4, 1868.

We claim the improvement in the manufacture of spoons, etc., from iron, substantially as herein described.

77,972.—CREASING APPARATUS FOR SEWING MACHINES.—H. W. Fuller, New York city. Antedated May 5, 1868.

I claim, 1st, The mode, substantially as described, of conveying motion to the creaser or marker.

2d, The combination of the means herein described, or the equivalent thereof, for giving motion to the marker, with a marking device having a fixed fulcrum of vibration, as and for the purpose specified.

3d, Placing the set screw for the adjustment of the said lever at the center of said fulcrum, for the purpose stated.

4th, The combination with the lever having a fixed fulcrum or center of motion, of a spring which may be adjusted in elasticity or power relatively with said fulcrum.

5th, The arrangement of the spring with respect to the lever and its fulcrum, so that the act of adjusting the lever, long or short, will also adjust the power of the spring, substantially as and for the purpose specified.

6th, So attaching the points to the lever which carries them, substantially as described, that they may be readily detached and renewed, or others substituted, as specified.

7th, Guarding and protecting the points by a movable rest, substantially as set forth.

8th, The combination with such rest of a removable key, to regulate the spread of the points, for the purposes specified.

77,973.—HORSESHOE CALKING VISE.—Geo. L. Gerald, Thorndike, Mass.

I claim a calking vise having the dies, a and b, with the shaping devices hereinbefore described formed thereon, said dies, a and b, being opened and closed by means of the lever, k, link, i, and springs, w, all constructed and operating substantially as herein described and for the purposes specified.

77,974.—LUBRICATOR.—E. F. Gerdom and C. W. Schindler, Albany, N. Y.

We claim, 1st, The stop, e, in combination with the tubular conductor, D, leg, B, and top of cup, A, substantially as and for the purpose set forth.

2d, The disk, f, and spring, g, in combination with the stop, e, and tubular conductor, D, of the cup, A, substantially as and for the purpose described.

77,975.—UMBRELLA.—G. G. Griswold, New York city. Antedated March 13, 1868.

I claim, 1st, The combination, with a notch or crown piece or runner for umbrellas or parasols, having an annular groove and radial slots in it for the ends of the ribs or stretchers to work in, of a ring or rubber, or other suitable elastic yielding material, for fastening said ribs or stretchers in said groove, while at the same time one or more of the said ribs or stretchers may readily be removed for repairs, substantially as set forth.

2d, The combination, with a notch or crown-piece or runner of an umbrella or parasol, having an annular groove and radial slots in it for the ends of the ribs or stretchers to work in, of a metal, leather, or other suitable ring for fastening said ribs or stretchers in said groove, said ring having one or more slots in its side to permit of the introduction or withdrawal of one or more of the ribs or stretchers, substantially as set forth.

3d, The combination, with the runner, E, of the spring catches, G G, operated in part or wholly by the India-rubber or other elastic ring, I, substantially as set forth.

77,976.—SANDAL.—Wm. Hall, Georgetown, Ill.
I claim the bars,spurred and affixed to the bottoms of the sandals or other covering for the feet.

77,977.—HUB FOR CARRIAGE WHEELS.—Harvey D. Haraden, Hartford, Vt.
I claim the improved supporter, A, or arrangement of disks, socket rings, or radial connections, as set forth.
Also, the combination and arrangement of the two separate cylinders or pieces of wood, B B, with the disks, the socket rings,and these radial connections, arranged together and cast in one piece, as set forth.

77,978.—LOW-WATER INDICATOR.—T. C. Hargrave and W. B. Charlton, Boston, Mass.
We claim the arrangement of the pipe, I, expansion tube, H, provided with the cock, G, arm, F,adjustable weight rod, D, in connection with the lever,C, and whistle, B, substantially as and for the purpose set forth.

77,979.—PAD FOR HORSES' HOOFS.—John Haseltine, Methuen, assignor to Chas. L. Wheeler, Cambridge, Mass.
I claim, 1st, An elastic cushion, constructed substantially as described for the purpose set forth.
2d, The air chambers, formed as described, in combination with the air or vent holes, C, for the purpose and substantially as described.
3d, The narrow flange, B, for the purpose and substantially as described.
4th, The wires, g, or equivalent, combined with the elastic cushion, in the manner and for the purpose substantially as specified.

77,980.—REFRIGERATOR.—J. H. Hollingsworth (assignor to himself, Albert Rementer, and W. C. Russell), Philadelphia, Pa.
I claim coil of pipes, C P, and pipes, C' P', water tank, W, outer and inside boxes, A and B, salt, S S, the whole combined and constructed and operating for the purpose and the manner herein described and set forth.

77,981.—MODE OF SECURING TIRES TO WHEELS.—Wm. H. Hovey, Holly, Mich.
I claim the securing of tire, B, to the rim, A, by inserting between the same parallel bolts, D D, provided with heads or plates, C C, perforated to receive the ends of the bolts, and secured by riveting the same, substantially as described and for the purposes set forth and shown.

77,982.—APPARATUS FOR COLLECTING MARSH AND OTHER GASES.—C. S. Hunt Parish of Terrebonne, and J. B. Knight, New Orleans, assignors to C. S. Hunt, and William F. Pratt, and Peter M. Peterson, New Orleans, La.
We claim, 1st, The chamber, A, or its equivalent, in combination with a gas pipe, C, and a pump, D, when these several parts are constructed substantially as and for the purpose set forth.
2d, The chamber, A, or its equivalent, in combination with a pump, D, and a gas pipe, C, when the latter is partially filled with a hydrocarbon liquid or other agent, for carbureting or increasing the illuminating power of the gas, substantially as herein described for the purposes set forth.

77,983.—ILLUMINATING GAS.—C. S. Hunt, Parish of Terrebonne, and J. B. Knight, Parish of Orleans, assignors to C. S. Hunt, and Wm. F. Pratt, and Peter M. Peterson, New Orleans, La.
We claim the gaseous composition or compound herein described, consisting of marsh gas, commonly so called, and carbon, when the latter is infused or incorporated into the former, substantially in the manner and for the purpose set forth.

77,984.—MATCH-SAFE.—Melvin Jincks, Dansville, N. Y.
I claim, 1st, The rocking floor, B,arranged as described,so as to be tilted by the slide, C, in its withdrawal, and returned to its horizontal position after depositing the match.
2d, The combination of the floor, B, slide, C, and striking hands, D D',when arranged and operating in the manner and for the purposes set forth.

77,985.—CUTTING MACHINE.—William H. Johnson, Springfield, Mass.
I claim, 1st, The combination of a cutter, having a cutting edge of the required form, with a plain hard surface or plate, harder than the cutter, co-operating, substantially as described, as a device for cutting leather, cloth, paper, and other similar material.
2d, The employment, in a cutting machine, of a duplex embossing die, in combination with two corresponding dies or matrices, placed opposite to each other, and coöperating substantially as described, by which two sheets may be simultaneously embossed upon their contiguous surfaces by the same impression.
3d, The employment, in a cutting machine, of two embossing dies, placed opposite to each other, and facing toward each other, in combination with a central plate placed between the same, and coöperating substantially as described, by which two sheets may be simultaneous embossed upon their exterior surfaces by the same impression.
4th, The employment, in combination, of the cutting apparatus described, with two sets of embossing dies, as described, by which the several operations described can be simultaneously performed upon two sheets of material by the same impression.
5th, The combination of the central plate with the two yielding pressers placed on opposite sides of the same, substantially in the manner and for the purpose described.
6th, The method herein described for adjusting the length of the pitman by means of the scarf joint, and the key inserted between the offsets therein, or substantially as described.

77,986.—CUT-OFF VALVE GEAR.—Adoniram Kendall, Buffalo, N.Y.
I claim, 1st, The levers, I I', links, K, and lever, J, as constructed and arranged in combination with the pawls, G, as herein set forth.
2d, The arrangement of the lever, L, in combination with the pawls, G, substantially as herein described.
3d, The arrangement of the oscillating valve, N, and walls, Q', as set forth.
4th, The stop, U or T, as constructed and arranged in relation to the valve, N, and arms, S, so as to operate said valve by the pressure of steam, substantially as set forth.

77,987.—MODE OF UTILIZING TIN SCRAP OR WASTE.—Carl Kuehn, Vienna, Austria, assignor to Joseph R. Von Wessely, New York city.
I claim, 1st, The method herein described of utilizing tinned iron waste by digesting the waste in hot water, in combination with muriatic and nitric acids, substantially as set forth.
2d, The method herein described of collecting the metallic tin from the solution herein described by means of zinc plates immersed therein, and exciting galvanic action, to cause the tin to be deposited on the plates, as set forth.
3d, The method herein described of segregating the tin and the iron by means of heat, water, muriatic and nitric acids, evaporation, crystallization, and galvanic action.

77,988.—TOMPION FOR FIRE-ARMS.—T. T. S. Laidley, U. S. Army. Antedated May 1, 1868.
I claim in combination with a tompion and means for expanding it, a tubular packing, substantially as and for the purpose set forth.

77,989.—STEAM ENGINE.—Henry O. Lothrop, Milford, Mass.
I claim the arrangement with the rods, b4, connecting the pistons, A1 A3, with their crank or driving shaft of the rods, c1 g4, and sliding cross head, e4, connecting the piston, B2, with said shaft, substantially as herein shown and described.

77,990.—MODE OF TREATING LEATHER, CLOTH, AND THE LIKE, TO RENDER THEM WATER AND FIRE PROOF.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the treating of fabrics, substantially as herein described, for the purpose of rendering them water proof, either with or without the addition of the fire proofing ingredients.

77,991.—PLASTIC COMPOUND FOR ROOFING AND OTHER PURPOSES.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the compound produced by the admixture of silicate of soda with vegetable fiber, with or without the addition of sand, clay, and similar substances, and then treating the same with a solution of the chloride of calcium, substantially as described.

77,992.—FIBROUS COMPOUND FOR ROOFING AND OTHER PURPOSES.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the material produced by the union of vegetable fiber, either alone or with sand and similar substances, with silicate of soda, and treated with a solution of alum, or of alum and salt combined, substantially as described.

77,993.—MODE OF PRODUCING FLOOR CLOTH, LEATHER CLOTH, AND THE LIKE.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the production of the new article herein described, as a substitute for oil cloth, rubber, leather, etc., when produced substantially as set forth.

77,994.—TAP FOR CUTTING SCREW THREADS.—Wm. Mantey, New Orleans, La.
I claim in the construction of taps for tapping nuts and the like, obliterating or diminishing every alternate cutting thread, from the point of the tap back to near the termination of the cut portion, but leaving in a space near said terminal portion all the cutting threads full and perfect, as herein described and shown.

77,995.—ARTICLE FOR FOOD FROM POTATOES.—C. K. Marshall, New Orleans, La.
I claim as a new article of manufacture and commerce, a desiccated yam, sweet, or other potato, prepared substantially as described and for the purpose specified.

77,996.—PLOW.—Elbridge G. Matthews (assignor to Frank F. Holbrook), Boston, Mass.
I claim, 1st, The combination and arrangement of the bracket or rest, c, the tenon, b, and the mortised projection, a, with the mold board, D, and standard, A, of the plow.
2d, The combination and arrangement of the duplex-pointed dog, or brace, g, the hooked bolt, e, the nut, f, and the eyes or staples, h h and i, with the bracket, standard, and the moldboard, connected by means substantially as set forth.

77,997.—GAGE.—E. W. Mathewson, Norwich, Conn.
I claim the slotted support, A B, in combination with the shaft, worm-wheel, H, screw, F, and pointer, C, arranged and operating substantially as set forth.

77,998.—CARPENTER'S BENCH DOG.—E. B. McCoy (assignor to himself and R. Cook and Sons), Winsted, Conn. Antedated May 4, 1868.
I claim the screw, C, arranged with its gear, c, and combined with one or more screws, D, of reverse threads, so as to operate together, and the one to bind the other, substantially as herein set forth.

77,999.—TRUSS SUPPORTER.—John McFadden, Cadiz, Ohio.
I claim a truss pad, A, provided with a series of radiating buckles, a b c d e, and acting in combination with the straps, B C D E, substantially as and for the purpose described.
Also, the additional brace, D', in combination with the pad, A, waist strap, B, and thigh strap, D, substantially as and for the purpose set forth.

78,000.—BRIDGE.—Rufus Spaulding Merrill, Boston, assignor to himself, Levi Liscom, and William Lincoln, Brookline, Mass.
I claim the construction of iron bridges, substantially in the manner herein described.

78,001.—PROCESS OF SEPARATING COBALT AND NICKEL FROM OTHER ORES.—Alfred Monnier, Philadelphia, Pa.
I claim the treatment of a solution of cobalt, nickel, iron, and manganese, for the purpose of separating one or both of the two former from one or both of the two latter metals, substantially as herein set forth.

78,002.—KNIFE FOR REMOVING THE SKIN FROM ANIMALS.—George W. Myers, Harleton, Pa.
I claim the combination and construction of the guard, C, that is movable and adjustable with the knife blade, A, as herein described, and for the purposes set forth.

78,003.—WHEEL BARROW.—William F. Newcombe, Cleveland, Ohio.
I claim the application of the iron bridge, to strengthen the front part of a wheel barrow, substantially as shown and described.

78,004.—BLIND SLAT FASTENING.—James M. Peirce, Mokena, Ill. Antedated April 30, 1868.
I claim the use of a fastener or button, A, also the spring, E, and the pin, D, as herein described, to prevent blind slats or blinds from being opened on the outside.

78,005.—MANUFACTURE OF SULPHATE OF ALUMINA.—Henry Pemberton, Allegheny City, Pa.
I claim the employment, in the manufacture of the sulphate and other salts of alumina, of the improved process hereinbefore described.

78,006.—GAS APPARATUS.—John Ponton (assignor to himself and Jacob F. Hayen), Buffalo, N. Y.
I claim, 1st, An automatic machine, substantially as above described, for the purpose of making fixed illuminating gas, which will regulate itself and maintain any desired degree of heat, and supply itself with petroleum or other fluid hydrocarbon, in exact proportion as the gas generated by such machine is used or consumed from the gasometer.
2d, The use of a retort, arranged with an inclination, together with a movable screw, or its equivalent, in the interior, substantially as described, arranged in such a manner that the gas generated from petroleum or other hydrocarbon, will have to travel over the whole interior surface of said retort previous to its being let free.
3d, The application of any mechanical device attached to said retort, in the manner substantially as above described, whereby the expansion or contraction of said retort will regulate the supply of fuel to the furnace.
4th, The application of any pyrometer to any retort, in connection with any mechanical device, which will automatically regulate the supply of fuel to any furnace used in the manufacture of gas.
5th, The application of a gas furnace, substantially as above described, for the above purpose, the chief principle of which consists in utilizing the waste heat of the furnace for the purpose of causing the gas and atmospheric air, which are used as fuel, to be mixed at any high temperature before ignition.
6th, A sub-reservoir in the above connection, substantially as described, the chief principle of which consists in its being hermetically sealed and entirely submerged, and so connected with the retort that the pressure of the gas will drive the oil or other fluid hydrocarbon from the sub-reservoir to the retort, in lieu of atmospheric pressure.
7th, The application of a float valve, substantially as described, in connection with a reservoir, the chief principle of which consists in admitting only sufficient oil to said reservoir as will maintain any fixed level.
8th, In connection with said reservoir, a ball, check, or other valve, substantially as described, the chief principle of which is to prevent the return of any fluid or gas from said reservoir to the main source of supply from any undue pressure in said reservoir.
9th, The application of an air mixer, arranged upon the principle of the old wet meter, substantially as above described, in connection with said apparatus, the chief principle of which consists in having any desired number of compartments, and each compartment having buckets running in one and the same direction, so that air or gas can be admitted to either compartment by a movable piston, or its equivalent, thereby mixing the gas and air in metrical proportions, as required. I do not claim a meter or air mixer in which the buckets are reversed.
10th, That the said mixer may be worked by power other than the pressure of gas, which will then answer the purpose of exhausting the gas from the retort, and relieving it from pressure, as well as mixing the air and gas.
11th, The application of a feed pipe to the retort, substantially as above described, the chief principle of which consists in being totally submerged in cold water to the very point of ingress to said retort.
12th, The application of a spring or other valve, substantially as above described, attached to the said feed pipe, and arranged in any manner similar to that above described, so that the rise or fall of the gasometer will regulate the supply of oil to the retort.
13th, In connection with above apparatus, a tank or tanks, arranged in any manner, so as to protect the different parts of the above apparatus from heat.
14th, A condenser, substantially as above described, arranged in such a manner that the distillate will return to said reservoir.

78,007.—FURNACE FOR MELTING METALS, GLASS, &c.—William P. Prickett, Philadelphia, Pa.
I claim the application, to furnaces, of the base upon which the pots or crucibles rest, and the small apertures opposite each, that lead into the surrounding flue, and from thence into the main stack or chimney, substantially as herein described and set forth.

78,008.—FANNING MILL.—William C. Ray, Pleasant Run, and Gideon Leigh, Clinton Station, N. J.
I claim, 1st, The combination, substantially as set forth, of the cranked fan shaft, the pitman, O, the bell-crank lever, P, which sustains the rear end of the pitman, the laterally-vibrating shaking shoe, D, the longitudinally-vibrating screen frame, G, and the horizontally-oscillating balance lever, S, for the purposes specified.
2d, The combination, substantially as set forth, of a longitudinally-vibrating screen, F, suspended centrally from short radius bars, f, with a longitudinally-vibrating frame, G, suspended at its forward end by long radius bars, g, and hinged at its rear end, f', to the screen, F, whereby an opening and shutting or rising and falling, as well as a longitudinally-vibrating movement, is imparted to the latter, and the grain thereby thoroughly sifted.
3d, The combination, substantially as set forth, with the pitman, O, of the depending bracket, R, the balance lever, S, and the longitudinally-vibrating frame, G, for the purposes set forth.
4th, The removable deflecting board, L, arranged and operating as set forth.

78,009.—SPRING WAGON SEAT.—Adam Reichert, Cogan Station, Pa.
I claim the combination of the ordinary wagon seat, A, of the springs, C, constructed of iron, steel, brass, or other material, of the supports, B, fastened to said seat by hinges, and of the slides, E E, for the purpose of elevating either end of the seat.

78,010.—KNIFE SHARPENER.—Charles H. Reynolds, New York city, assignor to himself and Albert Bridges, Jersey City, N. J., and said Reynolds assignor to Edwin Ray. Antedated May 7, 1868.
I claim, 1st, A knife-grinding machine, having a guide, A3, and file-carrying piece, B, arranged to serve relatively to each other, and to a bed for holding the blade in position, substantially in the manner and for the purposes specified.
2d, The within-described compound bed, a a1 a2 a3, adapted to hold the blades both of knives and scissors, and to allow them to be acted upon by the file, C, or its equivalent, substantially in the manner and for the purpose herein set forth.

78,011.—TRACE FASTENER.—E. D. Rhoads and J. P. Rhoads, Dayton, Ind.
We claim the arrangement of the ferrule, B, with its perforated jaws, h h, and the lever, C, with its spring, D, and pivoted pin, g, said lever being pivoted to the outer end of the ferrule, and curved to the rear of the swingle tree, to operate substantially as set forth.

78,012.—THROTTLE VALVE FOR LOCOMOTIVE ENGINES.—George Richards, Boston, Mass.
I claim the arrangement of an additional or supplementary valve with the throttle valve of a locomotive engine, when both are operated by one and the same lever, substantially as and for the purpose specified.

78,013.—BEARING FOR SPINDLE.—John Richards, Cincinnati, Ohio.
I claim, 1st, The adjustable sleeve, b, in combination with the screw, e, for adjusting the spindle, c, to different positions in the socket, substantially as and for the purposes specified.
2d, The oil cell, n, in combination with sleeve, b, and screw, e, operating together in the manner and for the purposes set forth.
3d, The adjusting screw, d, in combination with the sleeve, b, and screw, e, for adjusting the sleeve, b, and spindle, c, substantially as specified.
4th, The sleeve, b, screws, c and d, together with the lubricating cell, n, when combined and operating in the manner and for the several purposes as specified.

78,014.—DEVICE FOR ROLLING ROOFING.—Edmond Richardson and James H. Cole, Adrian, Mich., assignors to James H. Cole.
We claim, 1st, The method herein described of making sheets of Egyptian case-hardened marble, or sheets of any similar material, by the application of the felting simultaneously with the rolling and pressing of the sheets, substantially as described.
2d, The construction of the rolling instrument shown in fig. 1, having the rollers, A and B, the former being provided with shoulders, m and n, and scrapers, o o, substantially as and for the purposes set forth.
3d, In combination with said instrument, the frame, D E, when provided with the cutters, i i, substantially as described and for the purpose set forth.

78,015.—ANIMAL TRAP.—Thomas L. Rivers, St. Louis, Mo. Antedated May 13, 1868.
I claim the trigger, A, with its rounded shoulders, F F, and catch, C, in combination with the door, as above described and for the purposes set forth.

78,016.—PROCESS OF OBTAINING GELATIN FROM FISH HEADS.—Benjamin Robinson, East Gloucester, Mass.
I claim the process described, for obtaining gelatine from the heads of fish.

78,017.—MEDICAL COMPOUND.—Levi Rogers, Morehouse Parish, La.
I claim the medical compound herein described, when made of the ingredients herein mentioned, in the proportions and by the method stated, for the purpose set forth.

78,018.—MEDICAL COMPOUND.—Levi Rogers, Morehouse Parish, La.
I claim the medical compound herein described, when composed of the ingredients herein mentioned in the proportions stated, and compounded by the method and for the purpose set forth.

78,019.—SAWING MACHINE.—Albert E. Ross, Hollis, Me.
I claim the combination of the slide, o, lever, z, lever, a', cords, q r, spring, s, and slide, v, as and for the purposes set forth.

78,020.—WATCH, CLOCK, AND LOCK KEY.—Edward C. Ryer, Burlington, Vt. Antedated May 7, 1868.
I claim, 1st, The manner of applying the sleeve, C, to the barrel of an adjustable watch, clock, or lock key, all as herein described and shown, and for the purpose specified.
2d, The ring, A, or its equivalent, as applied to the sleeve, C, all as herein shown and described, and for the purpose specified.
3d, The ring, G, as applied to the barrel, B, all as herein shown and described, and for the purpose specified.

78,021.—MACHINE FOR WIRING PANS.—James Shepard, Bristol, Conn. Antedated May 7, 1868.
I claim the combination of the roller die, D, with the revolving die, A, constructed and operating as described

78,022.—LOADER FOR LOCOMOTIVE TENDER.—A. D. Smith, Grafton, Ohio.
I claim the frame, D, its sustaining rods, f f, the latches, C C, in combination with the box, A, and trap doors, B D all constructed and arranged to operate substantially as and for the purpose set forth.

78,023.—SOLDER FOR ALUMINUM.—Alfred Starr, N. Y. city.
I claim the alloy specified, forming a solder for aluminum.

78,024.—MUSKETO BAR.—Edward Steinel, Amsterdam, N. Y.
I claim the hinged frame, B, and top bar, C, in combination with cords, b, and with a musketo net, substantially as and for the purpose described.

78,025.—CHURN DASHER HEAD.—Benjamin F. Stover and Abram H. Stover, Lodoga, Ind.
We claim the concave head, A, of finely-perforated or reticulated metal, having a socket, B, as and for the purposes specified.

78,026.—SPRING BED BOTTOM.—Jay C. Taylor, Ann Arbor, Mich.
I claim the combination of slats, A, buckles, B, rubber springs D, adjustable bar, E, hangers, I, journal, F, and transverse bar, G, when arranged and operating substantially as and for the purposes herein set forth.

78,027.—NECKTIE.—Edwin Thomas, Philadelphia, Pa.
I claim, as a new article of manufacture, a necktie, composed of sections of material of different colors or quality, said sections being detached from each other, substantially in the manner specified, and for the purpose set forth.

78,028.—SALT AND SUGAR EVAPORATOR.—Joseph M. Thompson, Rome, N. Y.
I claim the admission of air by jets into the flame under the pots or pans, at points equidistant from each other.

78,029.—ANIMAL TRAP.—James Trainer, Vinton Station, O.
I claim, in combination with a trap, having the above-named devices, the tilting platform, d, arm, K, crank, l, and the described connections, all arranged to operate in connection with the levers, e e', as and for the purpose set forth.

78,030.—GUN CARRIAGE.—Charles S. Tyson, Old Point Comfort, Va.
I claim, 1st, A mechanism for taking up the recoil of heavy guns, consisting of a spring or springs working against or between inclined surfaces, so that the spring or springs will be more and more compressed as the carriage runs back, opposing a regularly-increasing resistance to the recoil force, substantially as described.
2d, In combination with the springs, C C, and the inclined bars, B B, the crank, E, on the forward axle of the carriage, the link bar, e, and the hinged coupling of the springs, all constructed, arranged and operating substantially as described.
3d, In combination with the inclined bars and springs, the intermediate sliding bars, I I, as and for the purpose set forth.
4th, In combination with the side rails of the carriage pressing against the outer sides of the bars, B B, and the cross bar, G, and plates, g g, pressing against the upper and lower sides of said bars, and the springs, C C, said bars, B B, with their outer, upper, and lower sides parallel, and their inner sides inclined, substantially as and for the purpose set forth.
5th, In combination with the inclined bars, B B, springs, hinged coupling, and intermediate sliding bars, substantially as described, the transom plates, D and D', to hold all the parts in place, as set forth and described.

78,031.—SUBSOIL PLOW.—John Vaughn, Miami county, and Eli Chamness, Grant county, Ind.
We claim, 1st, The construction and arrangement of the wheel, B, substantially in the manner and for the purpose as herein set forth.
2d, The combination of the frame, A, and dash board, d, with the wheel, B, substantially in the manner and for the purpose as herein set forth.
3d, The combination of the plow, D, with the wheel, B, substantially in the manner and for the purpose as herein set forth.
4th, The combination of the jack or cleaner, C, and frame, A, with the wheel, B, substantially in the manner and for the purpose as herein set forth.

78,032.—METALLIC TAG FOR STRAPS.—Edward Wadhams (assignor to himself and A. Wadhams), Yorkville, N. Y. Antedated Dec. 28, 1867.
I claim, as a new article of manufacture, a tag for straps, consisting of the metallic plate, B, when provided with the two rectangular openings, a, and strips, b, and adapted to be bent over the end of the strap, as herein set forth for the purpose specified.

78,033.—COMPOSING STICK.—John L. Wait, East Cambridge, assignor to himself and George J. Sutton, Cambridgeport, Mass.
I claim as my invention, the clamp, C, as combined with the cammed lever, E, and the adjustable shoulder, B, and formed to straddle or embrace opposite sides of the ledge of the composing stick.
Also, the combination and arrangement of the screw, d, with the clamp, C, the cammed lever, E, and the adjustable shoulder, B, arranged and applied together, substantially in manner and so as to operate as specified.

78,034.—WHIFFLETREE.—Harvey Webster, Cambridge, Vt.
I claim the plate, A, with its grooves, B and C, the spring lever, E, cast-off, D, the spring, F, and draft pin, G, all arranged and operated as shown and described.

78,035.—THILL COUPLING.—Harvey Webster, Cambridge, Vt.
I claim the wedge plate, A, bolt holder or cap, B, and the spring, C, as applied to thill couplings, and operated either by draft or pressure, all for the purpose herein specified.

78,036.—HAT.—William H. White, New York city.
I claim, 1st, A hat or cap in which the crown is detachable or removable from the brim, substantially as and for the purposes herein shown and specified.
2d, A hat composed of a brim, brim, former or frame, and crown, arranged substantially as herein described, so that each of said parts may be readily detached from or combined with the others, as set forth.
3d, In a hat or head covering in which a brim of suitable material is combined with a brim frame or former, as herein described, the combination, with the brim and draw casing formed in the outer edge of the fabric of which the same is made, of draw strings or a draw string passing twice around the brim, under the arrangement and for operation as shown and set forth.
4th, The combination of a detachable or adjustable and removable crown with a cap vizor and head band, when the two latter are permanently fastened together, or formed in one piece, substantially as and for the purposes herein shown and specified.

78,037.—HOP POLE.—David F. Wilcox, Greenville, N. Y.
I claim the arrangement of the curved bars, B B, passing through the pole, A, arms, C C C C, and cords, D and e, all constructed and used substantially in the manner specified.

78,038.—DOOR LOCK.—Lucius L. Woolley, Medford, Mass.
I claim the combination and arrangement of the tooth notch, a, and the arcal stop notches, b c, of the bolt, C, with the segmental tumoler, D, provided with the tooth, d, and the two notches, e e, arranged as specified.

78,039.—CORN PLANTER.—J. M. Allison, Cranberry, Pa.
I claim, 1st, The combination of the gear wheels, O and N, shaft, J, cams or arms, I, slotted slides, G, and springs, D, with the drive wheel, C, frame, A, and hoppers, E, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the adjustable slide bottom, F, with the hoppers, E, and slotted slide, G, substantially as herein shown and described and for the purpose set forth.

78,040.—VENETIAN BLIND.—Hans Heinrich Andresen and Hans Asbahr, Davenport, Iowa.
We claim, 1st, Hinging the slats, a, by their edges to the suspension chains, C C, in combination with a lifting chain or chains and pull cords, arranged substantially as described.
2d, In combination with slats which are hinged and hung, substantially as described, attaching the free edges of the slats together by means of separate lifting chains, D D', substantially as and for the purposes described.
3d, A Venetian blind, which is constructed and operates substantially as described.

78,041.—MANUFACTURE OF STEEL.—Fritz Asthower, Witten an der Ruhr, Prussia, assignor to Joseph R. Von Wessely, New York city.
I claim, 1st, The combination of the fire chamber, A, and crucible chambers, C E, as and for the purposes set forth.
2d, The construction of the dome of the furnace with vertical plugged openings, as described, to afford a view of the interior.
3d, The crucibles, having plugged covers arranged beneath the openings in the dome, as and for the purpose described.

78,042.—CHURN.—David Bartholomew and David C. Dinsmore, Kirkville, Iowa.
We claim the combination of the churn and the frame, A, constructed with a removable brace, A', and the arm, D, for giving a reciprocating revolution to the dasher, and so adjustably connected with the pitman, E, and driving mechanism that the churn may be removed from the frame, substantially as set forth.

78,043.—DEVICE FOR PROPELLING PLEASURE BOATS.—J. O. Belknap, Mobile, Ala.
I claim the employment of a revolving frame, working on a vertical standard, and having arms or sweeps, to which pleasure boats may be attached for the purpose of propelling such boats on the water, substantially in the manner above set forth.

78,044.—CHICKEN COOP.—S. S. Bent, Portchester, N. Y.
I claim a chicken coop, formed with an openwork metallic plate, in the lower portion of which there are openings, closed, when desired, by a range of doors or covers, substantially as and for the purposes set forth.

78,045.—PISTON ROD ADJUSTER.—Douglas Bly, Macon, Ga.
I claim the clamp, A, combining both a free vertical adjustment of the rod and a joint for connecting with the walking beam for insuring a free play, substantially as herein set forth.

78,046.—PAVEMENT.—W. W. Boyington, Chicago, Ill.
I claim a foundation for a wood and concrete pavement, formed with a layer of boards, A, lengthwise with the street, and a layer of plates, B, transverse, and nailed fast thereto, said plates being of equal widths, and with spaces between equal to the thickness of the blocks composing the wooden portion of said pavement, substantially as described.
The combination of the foundation, A B, constructed as described, with the blocks, C and C', and concrete filling, in the manner and for the purpose herein set forth.

78,047.—PIPE WRENCH AND CUTTER.—James L. Brierly, Auburn, Mass.
I claim, 1st, The slotted hook, C, when pivoted to the lug, a, formed upon the side of the nut, B, and held against the pipe by means of the spring, E, pressing against its back, and secured at one end to the end of the lug, a, all constructed, arranged, and operating as described for the purpose specified.
2d, The cutter block, F, when provided with the lateral pin, c, fitting through the slot in the spring hook, C, whereby the cutter is guided and prevented from turning upon the rod, A, as herein described for the purpose specified.

78,048.—ARTIFICIAL LIMB.—B. Briody, Detroit, Mich.
I claim, 1st, The combination of the parts, A and B, by means of a hinge joint, constructed substantially as and for the purpose described.

2d, The combination of the parts, A and C, by a hinge joint, substantially as and for the purpose described.

3d, The combination, with the hinge joint, d d, constructed substantially as described, of the rubber or other yielding washer springs, f f', as and for the purpose described.

4th, The combination, with the parts, A and B, and the hinge joint as described, of the india-rubber, or other yielding springs, D D, substantially as and for the purpose described.

5th, The combination, with the parts, A and C, and their hinge joints, d2 d2, of the rubber or other yielding springs, F, substantially as and for the purpose described.

6th, The combination, with the parts, A and B, jointed together as described, of the semicircular spring, h, substantially as and for the purpose set forth.

78,049.—DRAFT ATTACHMENT FOR VEHICLES.—W. P. Brooks, Bloomington, Ill.

I claim a draft attachment, or evener, composed of a bar, A, provided with bars, C, having hooks, d' d'', either or both, at its ends, in connection with the central bar, B, with adjustable eye or loop, d, attached, all constructed and arranged substantially in the manner as and for the purpose set forth.

78,050.—VEGETABLE MASHER.—Edmund Brown (assignor to himself and G. D. Wright), Burlington, Vt.

I claim, 1st, A vegetable masher consisting of a perforated stationary frame and of a smooth swinging and sliding presser, as set forth.

2d, The perforated frame of a vegetable masher, when composed of the stiff bars, a a, and of the wire rods, b b, arranged in front of and crossing the bars, a, substantially as herein shown and described.

3d, The sliding and turning presser, E, provided with hooks, e, in combination with the pins, h, on the posts, B, and with the perforated fabric, a b, or its equivalent, all operating as set forth.

4th, The device set forth in the foregoing clause, in combination with the sliding follower, F, operating as specified.

5th, The notched fixed scraper, J, in combination with the frame, D, and with the presser, E, all operating substantially as herein shown and described.

6th, The combination of the frame, A B, and frames, C D, with the smooth swinging and sliding presser, E, with the hooks, e, and pins, h, with the follower, F, and scraper, J, all made and operating substantially as herein shown and described.

78,051.—MODE OF CONSTRUCTION OF PEAT CARS.—Jonathan Bundy, West Liberty, Iowa.

I claim the car, A, provided with hinged bottom, E E, when combined with the shaft, G, cords or chains, s s, bar, m, and lever, H, all arranged as and for the purpose set forth.

78,052.—CORN HUSKER.—I. S. Bunnell, Carbondale, Pa., assignor to himself, Otis Reynolds, and Geo. W. Reynolds.

I claim the combination of the cast iron gate, O, steel knife, A, lever, C, spring, S, trough, D, with bench, B, as herein described, and for the purpose set forth.

78,053.—GAS HEATER.—Charles Burnham, Philadelphia, Pa.

I claim the two cylinders arranged to slide telescopically, one within the other, to adjust the hight of the plane of combustion or the length and capacity of the mixing-chamber, substantially as described.

78,054.—ROAD SCRAPER.—E. P. H. Capron, Springfield, Ohio.

I claim the combination of the scraper, A, provided with the plate, O, having the stop, e, and notch, n, with the frame, B, provided with the lever, C, and pawl, h, all constructed and arranged to operate as shown and described.

78,055.—BOLT CUTTER.—Alexander Carbnow, Potsdam, N.Y.

I claim the devices as arranged and shown in combination, as and for the purposes set forth.

78,056.—FASTENING FOR CORSETS.—Wm. B. Cargill, New Haven, Conn.

I claim, 1st, The combination of the busk, B, with the recessed clips, a, of the busk, A, substantially as described.

2d, The recessed clip or female fastening device formed with projecting lip or lips, substantially as described and for the purpose set forth.

78,057.—SHUTTLE FOR SEWING MACHINES.—D. M. Church (assignor to himself, W. T. Beard, and T. E. Beard), Birmingham, Conn.

I claim a bobbin for sewing-machine shuttles, provided with detachable ends or caps, C C, having center points, b, substantially in the manner as and for the purpose set forth.

78,058.—LANTERN.—P. J. Clark, West Meriden, Conn.

I claim, 1st, The ring, E, formed as shown, with the lower ends of the guards D, passing through it, and two or more of said guards provided with shoulders, d, in combination with the flange, b, on the upper edge of the base, C, with notches, c c, made in it, all arranged substantially as and for the purpose set forth.

2d, The spring catch, F, attached to the under side of the flange, b, when said spring catch is used in connection with the ring, E, and guards, D, and all constructed and arranged as set forth.

78,059.—WRAPPER FOR NEEDLES.—John Clark, Redditch, England.

I claim the sheath, a, applied to the wrapper, b, to operate in the manner and for the purpose substantially as set forth.

78,060.—TENONING MACHINE.—William F. Cobb, Whitestown, Ind.

I claim, 1st, The adjustable chisel bar guides, 4, rack bars, 3, crank, 5, and pinions, 6, in combination with central block, D, and its plates, 1 1, arranged and operating conjointly as and for the purpose described.

2d, The construction of the chisel, consisting of the blade, Q1, attached to the blade, Q3, by the hinge-joint, r, and adjustable by means of screw, t, and link, f, working in the arm, e, whereby the chisel may cut a tenon at a right angle or less, all constructed and arranged to operate, substantially as described.

78,061.—MODE OF TREATING MINERAL PHOSPHATES FOR THE MANUFACTURE OF FERTILIZERS.—John Commins, Charleston, S. C.

I claim, 1st, Treating mineral or earthy or natural phosphates, while in a heated state, with gas liquor and sulphuric acid, when such phosphates have previously been treated with a solution of chloride of sodium.

2d, Treating such phosphates, when in a heated state, with gas liquor, when such liquor is combined with sulphuric acid, or any other acid or salt, whether such phosphates have been previously treated with a solution of chloride of sodium or not, substantially as and for the purpose described.

78,062.—BEEHIVE.—Peter Compton, Sullivansville, N. Y.

I claim, 1st, The herein-described improved beehive, when constructed and arranged substantially as and for the purpose described.

2d, In combination with the boxes, D D, provided with the detachable portions, h h, and metal strips, i i, the metallic perforated covers, k, substantially as and for the purpose described.

78,063.—SADIRON HOLDER.—D. T. Conde, Beloit, Wis.

I claim a sadiron holder, having lid, A, adjustable irons, B, pin, C, bottom, D, springs, E, and shield, G, adjusted, combined, and arranged substantially as specified.

78,064.—WHIFFLETREE EVENER.—Freman N. Corbin, Champlain, N. Y.

I claim the combination of the doubletree, B, clevises, F F, bars, E E, all arranged and applied to the draft pole, A, to operate in the manner substantially as and for the purpose set forth.

78,065.—CARPENTERS' GAGE.—F. W. Coy, Boston, Mass.

I claim a carpenters' gage, the guide, L, of which is capable of angular adjustment, in the manner and operating substantially as described and for the purpose set forth.

78,066.—COMBINED SEEDER AND CULTIVATOR.—E. F. Crawford, Canaan, Ind.

I claim the construction and arrangement of the framework and operative gear of the machine, in such a manner that the different machines can be used together, or successively, substantially as and for the purposes specified.

78,067.—WASHING MACHINE.—J. C. Crawford, St. Charles, Ill.

I claim the combined washing machine and clothes presser, constructed as described, and consisting of the box, A, having corrugated bottom, B, and partition, c, the frame, a, provided with plain rollers, C, connecting rod, b, and lever, D, perforated bottom, G, follower, F, and lever, E, all arranged and operating as and for the purpose set forth.

78,068.—LINIMENT.—A. J. Creel, Hopkinton, Iowa.

I claim a liniment, formed of the ingredients and in the proportions substantially as herein described and for the purposes set forth.

78,069.—CLOTHES DRIER.—J. D. Davenport, North Providence, R. I., assignor by J. D. Thurston, his trustee, to himself, H. M. Curtis, and Henry Martin.

I claim the application of a clamp, E D, to the slats, B, of a clothes horse, radiating from a common spindle, substantially as described for the purposes specified.

78,070.—METHOD OF INSERTING ARTIFICIAL TEETH.—V. R. David, Sandwich, assignor to himself and D. R. Pomeroy, Plano, Ill.

I claim the wings, C C, constructed substantially as and for the purposes specified.

78,071.—MOP WRINGER.—A. J. Davis, Hartford, Mich.

I claim, 1st, The sliding frame, D, the shaft and gear wheels, E F and H, arranged substantially as shown and described, in combination therewith, and with the mop, B, and frame, A, for the purposes set forth.

2d, In combination with the above, the holder, G, constructed, arranged, and operating as described for the purpose set forth.

78,072.—MILK CAN.—J. E. Dean, Canaan, Conn.

I claim the adjustable metallic case, A, lined with felt or other non-conducting substance adhered to it, or without the lining, and the adjusting of it with the movable clasp, C D D, substantially as and for the purpose set forth.

78,073.—BRIDGE.—Edward Denmead, Marietta, Ga., and Wendel Bollman, Baltimore, Md.

We claim, 1st, Supporting the angle irons, E, upon a bolt instead of upon the chords, substantially as and for the purpose described.

2d, In combination with angle irons supported upon a bolt instead of upon the chords, the interposing, between said irons and chords, of an elastic cushion, substantially as and for the purpose described.

78,074.—RAILWAY-CAR STOVE.—Isaac Dripps, Fort Wayne, Indiana.

I claim, 1st, The grating, O, placed in the bottom of the draft opening, M, and over the ash box, substantially as and for the purpose set forth.

2d, The arrangement of the perforations, P, and door, N, substantially as and for the purpose set forth.

3d, A stove constructed with the grating, O, perforations, P, and perforated diaphragm, arranged substantially as and for the purpose set forth.

78,075.—HORSE COLLAR AND HAME.—Alexander Dunbar, New York city.

I claim, 1st, The draft hook, e, attached to the staple, d, and passing through the collar, A, and a slotted plate, f, attached to the hames, said plate, f, having its part, G, bent into the collar, all constructed and arranged to operate as herein described for the purpose specified.

2d, In combination with the hames, B, and collar, A, the adjustable link, b, as herein described for the purpose specified.

78,076.—RELAY MAGNET.—Charles Durant (assignor to G. F. Durant), Jersey City, N. J.

I claim, 1st, The jointed armature, or armature lever, A or G, in combination with the magnet cores, E or E', or Ex Exx, or either of them, substantially as herein shown and described.

2d, The flexible joint, in extended armature or armature lever, substantially as and for the purpose herein fully set forth and described.

3d, The shifting or sliding bolt in the extended armature or armature lever, substantially as and for the purpose herein fully set forth and described.

78,077.—MACHINE FOR SETTING BUTTON HOOKS.—Phillip Esser and F. A. Steere, North Providence, R. I.

We claim, 1st, A machine for setting buttonholes, consisting of a revolving block, B, with acting faces, as described, in combination with the spring-pawl, d, and jaws, A A, operating substantially as set forth.

2d, Constructing the jaw, A, with a receptacle, E, for the button hook, so as to hold and sustain the same while it is being inserted and its prongs clinched, substantially as shown and is worked.

78,078.—MANUFACTURE OF IODINE.—Jules Fougerat, New York city.

I claim, 1st, Producing iodine from mussels, as set forth.

2d, The process, herein shown and described, of producing iodine from mussels.

78,079.—MACHINE FOR ENAMELING PAPER.—M. H. Gardner, New York city.

I claim, 1st, The arrangement, within the mixing vessel or chamber, A, of the revolving brush, B, and stationary brushes, C C, for operation together, substantially as described.

2d, The combination, with the revolving brush, B, and stationary brushes, C C, of the mixing vessel or chamber, A, screen, D, and slide or gate, E, essentially as specified.

3d, The traveling endless belt or apron, J, constructed with thickened sides or edges, n, and divided into sections by openings, i, having fingers or gripers, i, at or near their edges, as herein set forth.

4th, The drums, L, grooved at or near their one end, and provided with detachable rings, M, in combination with the endless belt, J, formed with thickened sides, n, for operation together, as described.

5th, The combination of the trunk, G, cylinder, H, provided with openings, c and d, revolving brush, I, and valves or faucets, b.

6th, The rotary brush, I, constructed substantially as described, with its rows of bristles, or certain of them, attached to or carried by sliding bars of less length than the brush stock, and adjustable along the same, to vary the width or length of the operating surface of the brush, to adapt it to different widths of paper, as herein set forth.

7th, The angularly-arranged brush or brushes, N, adjustable as described, for operation on or over the surface of the paper or other material, essentially as and for the purposes herein set forth.

8th, In combination with the distributing or leveling brushes, N, the blending brush or brushes, P, for action together, as specified.

78,080.—CULTIVATOR.—Henry A. Gaston, Stockton, Cal.

I claim, in combination with an inclined reversible bit for a cultivator, the method of securing such bit to its standard, substantially as set forth.

Also, the combination of the series of bits (so applied to their vertical standards) with the cultivator frame or carriage, substantially as described.

78,081.—CHURN.—George W. Goodwyn, Petersburg, Va.

I claim the combination of a rocking wheel or lever, I, with the straps, G J, treadle, F, dasher, D, and spring, k, the whole constructed and operating in the manner and for the purpose described.

78,082.—HARNESS FOR VICIOUS HORSES.—S. L. Gray, Chillicothe, Ohio.

I claim the strap, D, and rings, c, in combination with the strap, C, pulley, b, and straps, F F, as herein described for the purpose specified.

78,083.—CORNICE FOR BUILDING.—C. C. Hare, Louisville, Ky.

I claim a cast-iron or other metal bracket or look-out for receiving a sheet metal cornice, substantially as described.

78,084.—LAMP SHADE.—E. K. Haynes, Hanover, N. H.

I claim a lamp shade, made of a screen, supported upon two uprights, bent and joined at their lower ends, to connect them, and to support the screen at proper distance from the chimney, and bent and made hook formed, at their upper ends, to suspend the screen from the top of the chimney, the screen sliding upon the frame, and being supported relatively thereto, substantially as described.

78,085.—SPINNING FRAME.—Frederick Haythorn, Philadelphia, Pa.

I claim the guards, E, in combination with the fingers, D, and shaft, C, substantially as described for the purpose specified.

78,086.—HORSE HAY RAKE.—W. A. Heath, Apalachin, N. Y.

I claim, 1st, The combination of the hand lever, T, shaft, S, standard, R, and lever, Q, with each other and with the frame, E, standard, M, and lever stops, O, substantially as herein shown and described and for the purpose set forth.

2d, Pivoting the draft bars, D, of the rake, to the frame, E, at points a short distance from the ends of said draft bars, so that they may serve as levers in raising the rake head from the ground, substantially as herein shown and described.

3d, The combination of the hand lever, K, shaft, I, and arms, J, with the frame, E, and forward ends of the pivoted draft bars, D, substantially as herein shown and described and for the purpose set forth.

78,087.—WATER SPOUT FASTENING.—G. A. Hein, Waterford, Pa.

I claim the conductor fastening, C, composed of two or more circular parts jointed together, and fastened to each other and to the building, substantially as herein shown and described.

78,088.—COTTON CULTIVATOR.—L. Henderson, Manson, N.C.

Antedated May 12, 1868.

I claim the adjustable hinged plows, E E, in combination with the gear wheels, D and E, shaft, F, and hoes, G and H, constructed substantially as described and operating as and for the purpose set forth.

78,089.—CONCENTRATOR.—Joshua Hendy, San Francisco, Cal.

I claim, 1st, The annular groove, 1, declining from a certain point to an opposite or discharging point, in combination with a vibrating or oscillating pan or concentrator, whose surface is convex or curvilinear, as described.

2d, The discharge valve or gate, M, when constructed and arranged to operate substantially as described.

3d, The T-shaped distributer, K K, pierced with holes, b b b, and having slots, b' b', said distributers being either stationary or movable, and when movable the notched edge, c c c, with pawls or their equivalents, d d, operating therein for driving the said distributers, substantially as and for the purpose described.

4th, The agitators or stirrers, a a a, attached to stationary or movable radial arms, x x, or their equivalents, with an oscillating pan, as described.

5th, The peculiar construction of the frame, A A, it being triangular in form, the projecting ends, B B, for the crank shaft, the point, A', in combination with an oscillating pan, substantially as described.

6th, The overreaching supports or braces, F F, connecting at the point, F', and in which the upper end of the vertical shaft turns, in combination with the frame, A A, with the projecting ends, B B, and oscillating pan, substantially as described.

7th, The peculiar construction of the ball crank pin, N', when employed in an oscillating pan, substantially as described.

8th, The oil groove, H, either in the hub of the pan or on the shaft, G, and the oil cavity, J', above the hopper, for lubricating the sleeve and step, with an oscillating pan, substantially as described.

78,090.—PROCESS OF FACING WOOL HAT BODIES WITH FUR.—Ralph D. Hine, Mattewan, N. Y.

In the manufacture of soft hats, applying a bat of fur to a bat of wool, taken directly from the carding machine, before either has been shrunk, basined, blacked, or felted, and after causing them to adhere together by slight pressure, shrinking and felting them down to the required dimensions to form a solid, even fur surface upon the outer side and under brim, substantially as herein described.

78,091.—CHURN.—Austin D. Hoffman, Mineapolis, Minn., assignor to himself, H. M. F. Carpenter, G. F. Townsend, and Frederick Brackett.

I claim the combination of the winch and crank, the pitman, E, segment, E', and pinion, G, for communicating both a vertical and rotary reciprocating action to the dasher, substantially as set forth.

78,092.—GAGE FRAME FOR SLITTING RAW HIDES.—James Hoffman, Belvidere, N. J.

I claim, 1st, Grooving the upper edge of the frame or plank, A, upon which the raw hide is suspended longitudinally, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the slotted spring, C, with the grooved frame or plank, A, substantially as herein shown and described and for the purpose set forth.

3d, Slitting raw hides by suspending them over a frame, A, grooved longitudinally along its upper edge to guide the slitting knife, substantially as herein shown and described and for the purpose set forth.

78,093.—MACHINE FOR POLISHING WOOD.—Henry O. Hooper, Diamond Springs, Cal.

I claim the circular rotary polishing plates, E, and the reciprocating polishing plates, H, arranged with and attached to the adjustable framing, B', all constructed to operate as described for the purpose specified.

78,094.—PLATE FOR ARTIFICIAL TEETH.—Isaac A. Horn, Cincinnati, Ohio.

I claim the suction or vacuum chambers, operating against the cheek and alveolus and the sharp ridge on the outer rim of the plate, these to be made of any material used in dentistry, substantially as and for the purposes above set forth.

78,095.—FARM GATE.—Van Rensselaer W. Horton, Palmyra, N. Y.

I claim the combination with a sliding and swinging gate of a movable support, provided with a roller or rollers, and loosely attached to the bottom rail of the gate by a loop or its equivalent, the whole so combined and operating, substantially as herein shown and described, that the gate when closed rests centrally upon the support, and has a free sliding movement through or upon it in being opened and shut, and lifts it and carries it out of the passage when swung to one side.

Also, the movable support, K, consisting of the body represented by fig. 3, the rollers, b b, and the loop, c, shown in combination with body at fig. 2, the whole combined and operating substantially as herein shown and described.

78,096.—MEDICAL COMPOUND.—J. P. Humes, Winnebago City, Minn.

I claim the medicinal composition composed of the ingredients and in the manner substantially as herein described.

77,097.—PERMUTATION LOCK.—Gottlob Kaiser, New York city.

I claim the thumb pieces, c, in combination with the rings, C, bolt, B, stumps, a, and case, A, arranged, constructed, and operating substantially as and for the purpose set forth.

78,098.—SCALE BEAM.—Joel F. Keeler, Pittsburg, Pa.

I claim a poly-poised scale beam, provided with adjustable or variable weights or stops, and constructed and operating substantially in the manner and for the purposes as described.

78,099.—MACHINE FOR TAKING THE TOLL FROM GRAIN IN GRIST MILLS.—C. F. Keller, Nevada, Ohio.

I claim a machine for tolling grain as it passes through it, and composed of a series of divided passages, and guiding and directing partitions, as and for the purpose described and represented.

78,100.—SHIELD PLOW.—Michael Kirkham, Eminence Post Office, Ind.

I claim the above described shield, when made of rigid vertical bars, having both their lower and upper ends united by rigid horizontal bars, substantially as set forth.

78,101.—SAFE-DOOR LOCK.—John G. Kriechbaum, Youngstown, Ohio.

I claim, 1st, The screw, s, when operating as herein shown and described, in combination with the bar, I, all made and operating substantially as herein shown and described.

2d, The bar, I, bar, I, and plate, K, when arranged as described, in combination with the spring, l, shank, k, and plate, J (or stem, k, of key, and head, J, of the same), all made and operating substantially as herein shown and described.

3d, The bolts, M and N, when the same are arranged in one lock, that when one bolt is moved out the other is drawn in, and *vice versa*, as set forth.

4th, The rack, o, when hinged to the bolt, M, so that it can be turned up and thrown out of gear, as and for the purpose set forth.

5th, The pin, t, on the plate, o, in combination with the slotted partitions, 2 and 3, and hinged spring plates, P and R, all made and operating substantially as herein shown and described.

6th, The plate, P, when provided with a slot, w, and when combined with the pin, t, and bar, I, all made and operating substantially as herein shown and described.

7th, The plate, P, when arranged in combination with the catch, S, so that a full turn of the key will not keep it up, as set forth.

8th, The plate, R, when provided with a slot or recess, y, and when combined with the pin, t, and bar, I, all made and operating substantially as herein shown and described.

9th, The bar, I, when provided with recesses, g, h and x, in combination with the plates, K, f, R and P, all made and operating substantially as herein shown and described.

78,102.—MACHINE FOR WASHING BRISTLES, ETC.—Louis F. Lannay, Indianapolis, Ind.

I claim, 1st, The combination of the vertical grooved frame, B, crank shaft E, and pitman, F, with the sliding frames, G and D, for the purpose of holding and operating the said frames, substantially as shown and described and for the purpose set forth.

2d, The adjustable convex corrugated rubbing blocks, K, in combination with the frames, G and D, and cam, H, substantially as herein shown and described and for the purpose set forth.

78,103.—DEVICE FOR PULLING HOP POLES.—Isaac W. Legg, Long Eddy, N. Y.

I claim the levers, A, when hinged to the upper edge of the wedge-shaped block, C, by means of the pin, B, and cross bar, e, said levers also provided with the plate, f, upon their under sides, as herein shown and described, for the purpose specified.

78,104.—TIN WARE.—Leopold Lehmann, Monee, Ill.

I claim the application of round tinned wire to the bottoms of tin ware, in the manner and for the purposes substantially as herein specified.

78,105.—MACHINE FOR FORMING SHEET METAL WARE.—N. C. Lombard and Mellen Bray, Boston, Mass., assignors to Mellen Bray.

We claim, 1st, Imparting the motion of the vibrating shaft, V, to the side toggles that operate and control the motion of the cutting and holding dies, by means of the vibrating cranks, W W, and the oscillating slotted levers, X X, substantially as described.

2d, So constructing the oscillating levers, X X, that a portion of the slot or path may be adjusted, substantially as described.

3d, The combination of the vibrating cranks, W W, with the central crank, B', by means of adjustable dogs or stops, Y Y, substantially as described.

4th, The yielding stop bars for arresting the downward motion of the shel and plunger, substantially as described.

5th, The spring fingers, d', or their equivalents, for removing the dish from the male forming die, substantially as described.

6th, We do not claim, broadly, wedges placed under toggles for adjusting the same, for we are aware that such have been used before; but what we claim is the use of wedges under toggles for adjusting the pressure of the same when they are so attached to the toggles, and to the base in which they slide that they may be freely moved out or in, while at the same time they hold the toggles firmly in their proper relation to the base, and prevent them from being disconnected from the same.

7th, Fitting the plunger, G, to the shell, E, in such a manner that the plunger shall rest upon the shell, and be moved with it when the shell is moved up by the action of the side toggles, substantially as described.

78,106.—DOUGH KNEADER.—S. H. Lombard, Winona, Minn.

I claim the sectional hinged board, A, having the detachable frame, B, and roller, C, arranged for use therewith, substantially as shown and described.

78,107.—ORGAN PIPE.—Joseph Lorenz, Cincinnati, Ohio.

I claim the *vox humana* organ pipe, A B C c D, formed as and for the purpose set forth.

78,108.—MANUFACTURE OF WATERPROOF FABRICS.—R. O Lowrey, Salem, N. Y.

I claim, 1st, The new waterproof fabric produced by the combination and treatment of paper, cloth, and leather, or similar articles, substantially as herein described.

2d, The process as herein described of combining and treating paper, cloth, and leather, or similar articles, for producing a new waterproof fabric, substantially as described for the purposes set forth.

78,109.—CHICKEN COOP.—J. H. Mabbett, Jersey City, N. J.

I claim, 1st, The coop, having its sides hinged, hooked, or otherwise connected, in such manner that they may be folded together when the ends of the coop are removed, substantially as herein set forth.

2d, The combination of the detachable slatted end frame with the sides of the coop, substantially as and for the purpose herein set forth.

3d, The shelf or ledge, provided within the coop, substantially as and for the purpose specified.

78,110.—FRUIT BASKET.—Osborne McDaniel, New York city.

I claim, 1st, The improved fruit basket or box, made of one piece of veneer, having the flaps cut out at the corners, substantially as described, and bent in a curve with the grain of the wood, so as to prevent splitting in bending, and to provide for shrinkage, as herein set forth.

2d, In a fruit box made of a single piece of veneer, as described, bending two sides with the grain of the wood, when green or wet, in such manner that there shall be an excess of wood in the curve to provide for the shrinkage of the wood in drying or seasoning.

78,111.—GANG PLOW.—G. W. Manuel, San Francisco, Cal.

I claim, 1st, The arrangement of the crank arms, d e f, under the hounds or bars, and in their relation thereto, as and for the purposes set forth.

2d, In a gang plow, having a series of plows arranged on bars or hounds parallel to each other, placing the one plow on the bar, g, outside of the wheel, a, and in front of the axle, as and for the purposes recited.

3d, The combination of the extended crank arms, d and e, with the lever, l, and curved bar, o, as and for the purposes herein set forth.

4th, The crank screw, r, and plates, s and t, for elevating and depressing the tongue, as described.

78,112.—PRESERVING POWDER.—George A. Mariner (assignor to himself and John B. Turchin), Chicago, Ill.

I claim the powders composed of sulphites, bisulphites or hyposulphites, or any compound evolving the sulphurous acid gas, when acted upon by acid or acid substances, in combination with vegetable or mineral acids, or with vegetable or mineral acid salts, or desiccated vegetable juices, with or without the absorbents herein specified, for the purpose of generating the sulphurous acid gas, and applying the same to various uses, substantially as and in the manner herein set forth and specified.

78,113.—FURNACE FOR ROASTING IRON ORE.—Charles Mellinger, Cornwall, Pa.

I claim, 1st, In combination with a desulphurizing furnace or oven for preparing iron ore for smelting, the sliding door or damper, B, arranged and operated substantially as described.

2d, In combination with a desulphurizing furnace for the purposes mentioned, the grated or perforated arch, F, substantially as described.

3d, The combination of the arch, F, the chambers, E and H, the apertures, J and L, and the damper, B, substantially as and for the purposes described.

78,114.—HORSE HAY FORK.—John Milholland, New Concord, Ohio.

I claim the construction and arrangement of the handle, C, connected with the sliding bar, B, by the arm, E, turning on the pivots, e e', the lower ends of said handle pivoted to the stud, c, upon the bar, A, the bent trigger, F f, pivoted upon the pin, e, of the bars, E, and handle, C, all operating as described, for the purpose specified.

78,115.—SASH AND SHUTTER FASTENING.—Wm. J. Miller, Washington City, D. C.

I claim the combination of the shutter catch, b, lock, C, rod, h, hook, k, and plates, l and j, or the equivalents of said plates, constructed, arranged, and operated in the manner substantially as shown and described and for the purpose of locking or unlocking shutters and sash from within the room.

78,116.—BUTTON.—Marquis D. Moore, Brooklyn, N. Y.

I claim, 1st, The fastener formed in two sections, A B, fitted to each other, substantially as shown and described, for the purpose set forth.

2d, The lateral spurs, a*, of the piece, B, arranged to act in connection with the notches, b', at the sides of the recess in the piece, A, substantially as and for the purpose specified.

78,117.—MACHINE FOR CASING TOBACCO.—Enoch R. Morrison, Pittsburg, Pa.

I claim the method of casing tobacco by means of a hollow revolving vessel, receiver, or its equivalent, working on a shaft journals, or rollers, the receiver being made of any required shape or dimensions, for the purposes set forth.

78,118.—DOUBLER FOR STILL.—E. A. Muller and Theodor Stock, Chicago, Ill.

We claim, 1st, Arranging around the outside of a rectifier or doubler, A, a series of annular cooling vessels, D D, which communicate with the upper part of the vessel, A, substantially as and for the purpose herein shown and described.

2d, The arrangement and combination within the cylinder, A, of the dishes, E, plates, F, and combined dishes and plates, G, all made and operating substantially as herein shown and described.

78,119.—MANUFACTURE OF CART SADDLE.—Barak T. Nichols, Newark, N. J.

I claim the bridge, a, bridge pieces, c c, pads, f, tugs, l, and tug straps, J, all combined, constructed, arranged and connected substantially in the manner and for the purposes specified.

78,120.—CAR SPRING.—Wm. R. Nichols, Philadelphia, Pa.

I claim one or more springs, each of which is composed of one or more layers, in the manner described, in combination with saddles constructed and adapted to the said spring or springs, substantially as specified.

78,121.—MOP AND SCRUBBING-BRUSH HOLDER.—P. O'Brian, Philadelphia, Pa.

I claim, 1st, Cross bar, B, cast on shank, A, with opening, c c, and projections, d d, for the use and purpose as specified and herein set forth.

2d, The swinging clamp, E, made of wire or other material in the shape shown, and for the use and purpose as specified and herein set forth.

3d, A "mop and brush holder," constructed of shank, A, cross bar, B, nut, N, swinging clamp, E, and hook, F, as connected, combined and adjusted for the use and purpose specified and herein set forth.

78,122.—FIREMAN'S ELEVATOR.—Volney O'Bryan, St. Johns, Mich., assignor to De Witt C. O'Bryan and Amelia O'Bryan.

I claim the arrangement in a machine for the purpose set forth, of the wagon, B, stationary frame, C, movable frames, ropes and sheaves, and lateral supports, G H, and screws, I, substantially as described.

78,123.—CRIB AND BEDSTEAD.—George T. Palmer, Brooklyn, N. Y. Antedated May 5, 1868.

I claim a bedstead provided with a clamp, composed of the part, B, having spring bolts, a, and racks, b, or their equivalents, substantially as and for the purpose shown and set forth.

78,124.—HARNESS BUCKLE.—C. B. Payne, Bloomington, Ill.

I claim a double buckle, constructed with a central plate, A, wings, B B, and loop, D, cast in one piece, and with both ends alike, substantially as and for the purpose described.

78,125.—MATERIAL FOR INSULATING TELEGRAPH CONDUCTOR.—Wm. Perkins, Russell Place, Fitzroy Square, and George Grainger Tandy, Anerly Road, Hamlet of Penge, England.

We claim as our invention the combination of anthracene or para-naphthaline and naphthaline, with india rubber, gutta percha, gum-ballata, and other analogous vulcanizable substances, and sulphur, for the purpose of producing a preparation or compound applicable to the uses or purposes above mentioned, or any analogous purposes.

78,126.—RAILWAY SWITCH PLATE.—Adolph Philippi, Elizabethport, N. J.

I claim a switch plate, consisting of the bed plate, A, elastic bed, B, and plate, C, and of the removable blocks, D and E, all made and operating substantially as herein shown and described.

78,127.—MACHINE FOR CUTTING AND STAMPING SOAP.—J. S. Pierson, Brooklyn, N. Y.

I claim, 1st, The combination of stationary knives, F, sliding slab table, G, stamps, I, and cross knives, P, for operation together, substantially as specified.

2d, The cross knives, frame, and stamp frame, arranged independently of each other, in combination with devices for separately operating the same by foot and hand, as herein set forth, and whereby the slab may be held by the stamps while the cross knives are entering and receding, essentially as described.

3d, The combination of the knives, F, made of a sloping character, as shown and described, and sliding slab table, G, for action in concert as specified.

78,128.—MOLE TRAP.—Clark Polley, Sinking Spring, Ohio.

I claim the combination of one or more pointed stakes, A, with a cross piece, B, the tubes, e and d, the spring, g, trigger staff, n, level, l, crutch head, b, having points, f f, all constructed and operating together substantially as shown and described, and for the purpose set forth.

78,129.—PROCESS OF COVERING WHIPS.—A. C. Rand, Westfield, Mass.

I claim the process of covering whips, substantially as herein specified.

78,130.—GAGE FOR EMBOSSING-PRESSES.—Warren Richards, Jr. (assignor to himself and Shipley & Smith), Cincinnati, Ohio.

I claim, 1st, The arrangement, substantially as described, of the slotted plate, C, stops, H, and springs, I, or their equivalents, as and for the purpose specified.

2d, The combination of the longitudinal slot, F, and branch slot, G, for the object explained.

78,131.—BOOT CRIMPER.—Peter Richmond, Aberdeen, and Abner McFarland, Allensville, Ind.

We claim, 1st, The lever, E, in combination with the hook, j, when constructed, used, and operated substantially as and for the purpose set forth.

2d, The arrangement of the jaws, B B, bolt, g, eccentrics, C and D, lever, E, and forked rod, j, the several parts being constructed and operated substantially as and for the purpose specified.

78,132.—PLANER CHUCK.—Charles H. Riggs, Windsor Locks, Conn.

I claim, 1st, In a milling or planing chuck, the combination of the bed plate a, and angle iron, b, chuck g g', screw bolts, e, and nuts, f, substantially as and for the purpose described.

2d, The combination of the round or dove tail adjustable nuts, s, screws, s', with the jaws, m, with the index, n, substantially as shown and set forth

78,133.—HELIOMETER.—Conrad Friedrich Ludwig Risch, Huntingburg, Ind.

I claim, 1st, A heliometer, constructed and arranged to operate in the manner herein shown and described.

2d, The plate, E, when arranged as herein shown and described, and when provided with a pointer, K, in combination with the curve, d, on the stationary frame, A, all made as set forth.

3d, The plate, F, when arranged as set forth, in combination with the curve, E, and pointer, l, on the stationary frame, A, all made and operating substantially as herein shown and described.

4th, The sun dial, H, on the revolving block, C, when combined with the plates, E and F, all made and operating substantially as herein shown and described.

5th, The sun dial, D, and gnomon, f, in combination with the semi-cylindrical dials, H and H', and their gnomons, g, all made as described.

6th, The manner herein shown and described of making, dividing, and arranging the plate, E.

78,134.—STEAM PIPE COUPLING FOR RAILROAD CAR HEATER.—Henry R. Robbins (assignor to himself, J. J. Moran, and G. Colton), Baltimore, Md.

I claim, 1st, The combination of the pipe, D, with the sleeve, E, sliding pipe, F, having the opening, f, and the spring, G, substantially as and for the purpose specified.

2d, The cap, I, composed of one piece, and operating in connection with the spring, M, and pipe, C, substantially as and for the purpose described.

3d, The cap, J, composed of two parts, j j', and operating in connection with the pipe, F, springs, n n, sleeve, E, and cap, I, substantially as and for the purpose set forth.

4th, The combination of the pipes, C and E, sliding section, F, with the spring, G, when the parts are constructed to operate in the manner and for the purpose described.

5th, The combination of the two sliding caps, I and J, with connecting steam pipes, C F, to prevent the escape of steam from the joint formed where they connect, substantially as specified.

78,135.—ROLLING PIN.—Albert J. Roof, Peoria, Ill.

I claim a rolling pin, constructed in the form herein shown, and having combined therewith, in the manner described, a cake cutter and vegetable masher, the latter working with the springs, B, substantially as specified.

78,136.—HAY RAKER AND LOADER.—John Ruhl and Elial S. Herrington, Defiance, Ohio.

We claim the lever, N, slide, m, bar, L, and rod, p, combined, as and for the purpose set forth.

78,137.—CAKE CUTTER.—George O. Sanderson, Boston, assignor to himself and Frederick M. Baker, South Reading, Mass.

I claim, in a biscuit cutter, the combination and arrangement of the disk, B, spring, D, and stem, C C', substantially as described and for the purpose set forth.

78,138.—HOISTING APPARATUS.—James Sanderson, Fredericksburg, Ohio.

I claim the arrangement of the ways, A A, tilting frame, I, car, E, with its rollers, g g, hooks, x x, windlass, C D, and cord, m, the whole combined and operated as specified.

78,139.—CHURN.—Levi Scott, Burgettstown, Pa.

I claim the combination and arrangement of the wheel, P, rollers, N N, segment head, L, pendulum, J K, horizontal lever, G, weight, C, dasher rod, S, pitman, H, and crake, F, with the gearing, D D D D, and frame, A, constructed substantially as described.

78,140.—FEED WATER HEATER.—T. Shipton, Newark, N. J.

I claim, 1st, The cylinder, h, suspended from the lever, g, of the valve, f, and connected with the reservoir, a, by the flexible pipe, j, substantially as and for the purpose herein set forth.

2d, In combination with the reservoir, a, the elbow, b, having a flat lower surface, the exhaust pipe, c, and water supply pipe, d, provided with a broad flange, e, around its top, forming a seat for the valve, b, all constructed and arranged to operate as and for the purpose herein specified.

78,141.—TIRE TIGHTENER.—Silas Shirley, Santa Clara, Cal.

I claim, in the tip, B, having sockets for the felloes, the covers, F F, substantially as and for the purpose herein described.

78,142.—APPARATUS FOR BUNDLING CIGARS.—Charles A. Slecke, Philadelphia, Pa.

I claim the base, A, back, B, permanent frame, C, and adjustable frame, C', in combination with the adjustable rods, G and G', or their equivalents, the whole being constructed and arranged substantially as and for the purpose herein set forth.

78,143.—CARRIAGE WHEEL.—Anselmo B. Smith, Plattsmouth, Neb.

I claim, 1st, The wheel, consisting of the beveled and dove-tailed spokes, b, with the inner inclined ends resting upon the collar, d, surrounding the tube, C, and secured in place against the concave collar, G, by means of the loose collar, F, and nut, E, all constructed as described, for the purpose specified.

2d, The securing of the hub on the axle by means of the slot, e, in the axle, G, the key or slotted disk, H, and the screw cap, I, all arranged substantially as and for the purpose specified.

78,144.—HARVESTER.—Edward A. Smith, St Albans, Vt., and Haskell G. Smith, Goshen, Conn. Antedated May 9, 1868.

We claim the hub, e, made as set forth, and introduced in the end of the cutter bar, to receive the journal of the connecting rod, in combination with the oil receptacle, l, as and for the purposes set forth.

78,145.—FAN.—H. B. Smith, Essex, Conn.

I claim, as a new article of manufacture, a fan, whose handles, C, are pivoted to the outer ends of the extreme wings of the same, substantially as described, for the purpose of allowing them to be folded out of the way, as set forth.

78,146.—SEEDER AND CULTIVATOR.—Matthew D. Smith, Independence, Iowa.

I claim, 1st, The combination of the pivoted lever, J, distributing rod, C, and slide, L, when arranged and operating as and for the purpose set forth.

2d, The combination of the lever, F, with the rod, G, and shovel arms, H', substantially as described.

78,147.—HORSE RAKE.—Moore Smith (assignor to himself and T. W. Wellington), Worcester, Mass.

I claim, 1st, The combination with lever, P, chain or cord, j, and stop piece, S, of the stop bar, R, said parts being arranged in relation to each other substantially as and for the purposes set forth.

2d, The combination with axle or head, A, of the foot piece, T, arm, m, and readle, U, substantially as and for the purposes set forth.

3d, The combination of the unlocking piece, G, with the grooved ring, F, and its inclined tooth or projection, e, substantially as and for the purposes set forth.

78,148.—WATER CLOSET.—William Sprague, Lynn, Mass.

I claim in combination with the casing, A, having outlet, F, and hinged seat, B, the concave cover, D, rock shaft, a1, link, e, pivoted lever, E, having extension, a2, and spring, G, all constructed and arranged to operate in the manner and for the purpose substantially as herein shown and described.

78,149.—BREAD, MEAT, AND VEGETABLE CUTTER.—George Stackhous, Mount Washington, Pa.

I claim, 1st, The inclined actuating surfaces, f f, connected with a hinged end, D, by rods, d d, all substantially as described, for the purpose of operating the knife, n, all as set forth.

2d, The movable partition, b, operated by spring tension, substantially as and for the purpose described, in combination with the inclined rods, f f, hinged end, D, and knife, n, all as set forth.

3d, The box, A A A C, having a sliding stop, B, hinged end, D, and slots, J, in combination with the spring, G, partition, b, and knife, n, all as set forth.

4th, The concave and convex strips, g g, substantially as described, in combination with the inclined surfaces, f f, rods, d d, hinged end, B, and knife, n, for the purpose of imparting a lateral movement to the latter, all as set forth.

78,150.—DEVICE FOR REGULATING THE SUPPLY OF WATER TO STEAM GENERATORS.—H. P. Stafford and J. A. Leforgee, Decatur, Ill.

We claim the arrangement of the float, A, stem, B, solid ball, R, spindle, C, valve, E, box, D, perforated arm, F, adjustable connecting rod, J, slotted arm, H, stem, s, and elliptical valve, G, in the supply pipe, P, all constructed and operated as herein shown and described.

78,151.—ARTICULATOR.—Eli T. Starr, Philadelphia, Pa.

I claim, 1st, The attachment of the lower plate, A, to the upper plate, B, or its bracket, by cone-shaped pivots, a, arranged to fit V-shaped grooves, b, and retained in position by springs, substantially as specified.

2d, Constructing the reversible upper plate, B, with a crook, as at d, essentially as and for the purpose herein set forth.

78,152.—SCUTTLE COVER AND LADDER.—Joseph Steger, New York city.

I claim, 1st, The arrangement of a lever, e, connecting the ladder, A, and cover, B, substantially as and for the purpose described.

2d, The lock catch, D, in combination with the ladder, A, and scuttle cover, B, substantially as and for the purpose set forth.

78,153.—ANTI-FRICTION ROLL.—F. A. Sterry, Canton, Mass.

I claim as a new article of manufacture, a self-lubricating wheel for pulleys, sheaves, etc., constructed as described, consisting of the plates or raw hide, C, soaked in oil, revolving upon the shaft, A, and held in position by means of the rivets, D, and metallic plates, B, as herein described, for the purpose specified.

78,154.—TRACE HOLDER.—Stephen Stout, Tremont, Ill.

I claim the device, B E F, formed by forming the hooks, E, and guard loops, F, upon or attaching them to the ring, B, constructed substantially as herein shown and described and for the purpose set forth.

78,155.—CRIBBING PREVENTER.—Michael H. Sullivan, Providence, R. I.

I claim, 1st, The combination of the pricking points, g, screw shank, b, hollow spindle, a, spring, s, and plate, B, substantially as described, for the purpose specified.

2d, The plate, B, in combination with the longitudinally sliding pricking points, g, substantially as and for the purpose shown and described.

78,156.—MODE OF ORNAMENTING FABRICS.—William Swan (assignor to himself and Luis Duhain, Jr.), New York city.

I claim an ornamental fabric provided with drops or beads, a a, that are composed of the material, and are made and applied in the manner, substantially as herein shown and described.

78,157.—BRACE FOR BITS.—Isaac C Tate, New London, Conn.

I claim the combination of the spring jaws, C, with the socket, of the bit stock, substantially as herein shown and described.

78,158.—PENCIL HOLDER.—Ed. J. Toof, Fort Madison, Iowa.

I claim, 1st, The combination of the case, b, and its erasing pad, B, with the inner case, a, and finger rest, d, all constructed and operating substantially as shown and described and for the purpose set forth.

2d, The attachment of an erasing pad, B, to the pencil end of a pencil case or holder, substantially as shown and described and for the purpose set forth.

78,159.—APPARATUS FOR FREEZING.—Jean Baptiste Toselli, Paris, France.

I claim, 1st, The method of congealing and cooling liquids by the application of the chemical refrigerating substances, substantially as herein described.

2d, The successive mixture and combination of water and sub-carbonate of soda with nitrate of ammonia, as and for the purpose herein described.

3d, The apparatus herein described, or its substantial equivalent, for congealing and cooling liquids with chemical refrigerating substances, substantially as described.

78,160.—LAMP CHIMNEY CLEANER.—J. J. Wait, Oreana, Nev.

I claim the combination of the cushion, G, and the spring, E, the thumb piece, F, at the lower end of the spring, and the slide, D, operating on the guide plate, C, the whole constructed and made to operate substantially as and for the purpose herein described.

78,161.—SNOW PLOW.—W. Y. Warner, Wilmington, Del.

I claim, 1st, The steam pipes, F, arranged beneath the body of the car, parallel to the track, in combination with a pipe or pipes, E, having nozzles so arranged that steam may be discharged in a series of jets on to the track between the rails, as and for the purpose described.

2d, The combination of the above and the water reservoir, D, as and for the purpose specified.

3d, A casing surrounding a track-cleaning apparatus, in combination with a flue or flues, H, arranged to conduct the vapors from the casing, substantially as and for the purpose set forth.

78,162.—SLED.—Seth Way, La Porte, Ind.

I claim the combination of the knees, E E, head block, C, thimbles, I I, braces, J J, and tongue, K, respectively, constructed and arranged substantially as set forth.

78,163.—WEAVING PILE FABRICS.—William Webster, Morrisania, N. Y.

I claim, 1st, In combination with the pusher, the spring, A2, sliding block, A3, and spring, A6, all constructed and arranged substantially as described.

2d, The herein-described apparatus for operating pile wires, when constructed and arranged substantially as described.

78,164.—HAMMER HANDLE.—David Weiser, Philadelphia, Pa.

I claim the handle, D, collar, B, its check pieces, d d', with beveled ends, adapted to the dovetailed recess, c, in the head of a hammer or other tool or implement, the whole being constructed and arranged substantially as and for the purpose herein set forth.

78,165.—RAILROAD SWITCH.—William Wharton, Jr., Philadelphia, Pa.

I claim the permanent rail, A, and laterally-flexible rail, A', of the main track, in combination with the movable switch rail, D, forming a continuation of the rail, B, of the turnout, and the fixed rail, B', of the same, the whole being arranged and operating substantially as and for the purpose herein set forth.

78,166.—CAR BRAKE.—Thomas J. Whitney, Whitpain Township, Pa. Antedated May 9, 1868.

I claim, 1st, The buffer bar, A, rod, C, band, O, rock arm, H, rods, c c', lever, D, bolt, T, and the rubber block or spring, S, when constructed and combined as shown.

2d, The notched rod, C, and the rod, N, in combination with a clamp fixed to the axle, K, of a car, as shown.

3d, The notched rod, C, in combination with the rock arm, H, rods, c c', lever, D, rod, G, and the brake bars, E and F, as shown and described.

78,167.—LIFTING JACK.—Jas. Wilkinson, Bowling Green, Mo.

I claim, 1st, The posts, A A, when provided with the segmental serrated grooves, a1 a3, and combined with a movable fulcrum, B, substantially in the manner and for the purpose herein shown and described.

2d, The fulcrum head, B, when provided with the spring bearing pins, b, and otherwise arranged, as herein set forth and described.

78,168.—TREATING METALS AND MINERALS.—Zabdiel A. Willard, Boston, and William G. Adams, Franklin, Mass.

We claim, 1st, The process of dispersing or subdividing melted metals or minerals into fine particles, by means of a blast of highly compressed air or other gases, which impinges upon one or more fine streams thereof, the gases present, and the temperature of the metal, being respectively such that chemical action shall be thereby prevented, substantially as described.

2d, The process of converting metals or minerals into other products, by means of a jet or blast of air or gas, acting upon one or more fine streams of said metals or minerals in a melted state, as described, which jet or blast subdivides and disperses the material, and also acts chemically upon the same, substantially as described.

3d, The process of converting metals or minerals into other products by means of a blast of air or other gas applied thereto, when said metals or minerals are continuously supplied in regulated quantities to said blast in a subdivided and highly heated condition, substantially as described.

4th, The treatment of metals or minerals, by either of the methods before claimed, in a chamber filled with an atmosphere chemically so composed that by means of the same, in combination with the gas introduced by the dispersing blast, the desired chemical reaction may be produced or prevented, substantially as described.

5th, An apparatus (for performing some of the operations described), consisting, substantially, of the combination of a crucible or reservoir with one or more delivering jets, a furnace for heating the same, and one or more blast pipes, corresponding to said jets, co-operating substantially as described.

6th, An apparatus, consisting of the combination last claimed, in combination with the converting chamber, substantially as described.

7th, Combining with the converting chamber, as described, a means for supplying gas thereto separate from the dispersing blast, substantially as described.

78,169.—HORSE HAY FORK.—Linus Woodworth, Troy, Pa.

I claim the two bows, pivoted together, and having their extremities pointed, and furnished with lateral spurs or shoulders, in combination with the toggle bar, slide bar, and shank, substantially as and for the purpose specified.

78,170.—WINDING STOP FOR WEIGHT CLOCKS.—O. H. Woodworth, Columbia City, Ind. Antedated May 7, 1867.

I claim, 1st, The application of the ascending motion of the weights of weight clocks, when such weights are being wound up, to the stopping of the winding of the clock at any desired point in the ascent of the weights, for the purposes specified.

2d, The construction and application of a weight clock winding stop, operated by the ascending motion of the clock weights when they are being wound up, substantially in the manner and for the purposes described and illustrated.

3d, The combination and arrangement of the elevating rod, e, the connecting rod, r, the stopping pawl, n, and the stops, o, when used in connection with the winding shaft, n, and weight, W, in the manner described and for the purposes mentioned.

78,171.—CORN PLANTER.—Jacob J. Wright and John H. Penny, Harrison, Ohio.

We claim, 1st, The hinge joint, F, and adjusting chain, G, when used in combination as a means of giving mobility and adjustment to the plough and seed box for the purpose specified.

2d, The covering shares, J, when swiveling on or near the axis of the ground wheels or wheels as described, and for the purpose specified.

3d, The gravitating round headed plug, R, for the purpose described.

78,172.—FURNACE FOR BOILING AND PUDDLING IRON AND OTHER METALS.—John Zimmer, Pittsburgh, Pa.

I claim a cast iron puddling basin or chamber, having a bosh or water space cast therein around its sides, in combination with an elevated water tank, and communicating with each other by means of supply and outlet pipes, the whole being constructed, arranged, and operating substantially as and for the purposes herein set forth.

REISSUES.

2,932.—ROOFING COMPOUND.—Oscar N. Barthoiomew and J S. Thurston, Elmira, N. Y., assignees by mesne assignments of Oscar N Bartholomew. Patented October 8, 1867.

We claim a composition of matter compounded from the ingredients named and in the manner substantially as and for the purpose set forth.

2,933.—PREPARING CEMENT FROM SLAGS.—John James Bodmer, Newport, England. Patented November 5, 1867.

I claim, 1st, The rolling, laminating, grinding, and otherwise reducing or converting to scale or sheets, or to a lamellated or to a pulverulent state or condition, the cinder, slag, or scoria obtained from blast furnaces, copper smelting and other furnaces, in a fluid or semi-fluid or pasty or vicious condition, in the manner and for the purposes substantially as described, and for other purposes.

2d, The rolling, laminating, grinding, and otherwise reducing or converting to scale, or to a lamellated or to a pulverulent condition, of various descriptions of cement, and of materials from which cements are to be produced substantially as described.

3d, The application of slag, cinder, or scoria, whether artificially prepared for the purpose, or as obtained from blast furnaces or other furnaces, in the manufacture of cement, and the several modes or processes employed in the preparation of cements, substantially as described.

4th, The manufacture of artificial stone from the above-described cements, either by themselves, or with the admixture of coarsely ground materials, such as furnace slags, scoria, any descriptions of hard stones, or of shingle, sand, or other materials of a similar nature.

2,934.—FIRE PLACE.—W. D. Guseman, Morgantown, W. Va. Patented June 30, 1863.

I claim, 1st, The curved sliding blower, E, in combination with the curved plate, D, and grate, B, arranged to project in front of the chimney, as herein described, for the purpose specified.

2d, The damper, in combination with the flue, sliding blower, or screen and grate, all arranged substantially in the manner as and for the purpose set forth.

2,935.—METALLIC SHANK FOR BOOT AND SHOE.—Edward Heaton, New Haven, Conn. Patented February 23, 1864.

I claim, 1st, A boot or shoe shank, composed of two strips, of different elasticities, the one being of a flexible but not necessarily elastic material, and the other of an elastic material, united, substantially as and for the purposes herein shown and described.

2d, The combination of a tempered and an untempered spring, in the manner and for the purposes herein shown and set forth.

3d, The combination, with a boot and shoe shank, of otherwise ordinary or suitable construction and material, of a spring united with the said shank, so as to bear upon the same at both ends thereof, substantially in the manner herein shown and specified.

2,936.—ATTACHING ORNAMENTAL HEADS TO NAILS AND SCREWS.—Thomas C. Richards, New York city. Patented December 31 1867.

I claim the attaching of ornamental heads to nails and screws by means of a clasping recess or groove formed on or attached to the inner side of the ornamental head, so as to admit the lateral or transverse insertion of the head proper of the nail or screw, substantially as shown and described.

2,937.—HORSE RAKE.—C. M. Titus, Ithica, N. Y., assignee by mesne assignments of E. L. Bergstresser, Hublersburg, Pa. Patented August 25 1862.

I claim, 1st, A lifting or pressure bar, provided with hanging loops or staples, by means of which the rake teeth are lifted to discharge their load.

2d, The pendent loops or staples, in combination with the rake teeth and lifting bar, all arranged as described.

3d, The lifting or pressure bar, provided with lifting loops or staples, in combination with a lever connected therewith for operating the same, as described.

2,938.—VULCANIZING FLASK.—A. B. Woodward (assignor to himself and Thomas Ellis), Alfred Centre, N. Y. Patented January 16, 1866.

I 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 moulded 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, j, 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.

2,939.—PULLEY ATTACHMENT FOR RAISING WEIGHTS.—Geo. W. Gregory, Watertown, N. Y. Patented August 14, 1866. Antedated February 14, 1866; reissue No. 2,784, dated October 22, 1867.

I claim, 1st, An adjustable pulley support, having one or more sockets, or their equivalents, by and through which the pulley support may be operated and changed from place to place, substantially as described.

2d, An adjustable pulley support, provided with sockets or equivalents, and with means for supporting the pulley, substantially as described.

3d, The combination of an adjusting pole with a pulley support, having sockets or equivalents, substantially as and for the purpose set forth.

2,940.—COMPOSITION FOR THE MANUFACTURE OF WATER PROOF PAPER, AND OTHER ARTICLES.—Robert O. Lowrey, Salem, N. Y. Patented December 10, 1867.

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 a 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.

2,941.—ATTACHING DOOR KNOBS TO SPINDLES.—Darius Skidmore, Seneca Falls, N. Y. Patented July 15, 1862. Reissue No. 2,473, dated February 5, 1867.

I claim covering or enclosing the end of the coupling device of the knob shank and spindle wholly or partially by the socket or sleeve of the rose, substantially as and for the purpose herein specified.

2,942.—MACHINERY FOR MAKING HAT BODIES.—Eliza Wells, Brooklyn, N. Y., administratrix of the estate of Henry A. Wells, deceased. Patented April 25, 1846; reissue No. 366, dated September 30, 1856; extended seven years; reissue No. 1,087, dated December 4, 1860; again extended seven years by act of Congress.

I claim, 1st, The combination of the rotating brush or picker, substantially such as described, the rotating pervious cone, provided with an exhausting mechanism, substantially as described, and the bottom plate or guide, substantially as described, for directing the fur fibres towards the lower part of the cone, and preventing the fibres going to waste, the said combination having the mode of operation specified, and for the purpose set forth.

2d, The combination of the feed apron, the rotating brush or picker, substantially as described, the rotating pervious cone, provided with an exhausting mechanism, substantially as described, and the guide or deflector, for directing the fur fibers on to the tip and upper part of the cone, substantially as described, the said combination having the mode of operation specified, and for the purpose set forth.

3d, The combination of the rotating brush or picker, substantially as described, the rotating pervious cone, provided with an exhausting mechanism, substantially as described, and the side guides, or either of them, substantially as described, to prevent fur fibres from getting out of the proper influence of the currents traveling to the cone, and to protect the traveling fibres from disturbing currents, the said combination having the mode of operation specified, and for the purposes set forth.

4th, The combination of the feeding apron, on which the fur can be placed in separate batches, as described, the rotating brush or picker, substantially as described, the rotating pervious cone or former, provided with an exhausting mechanism, substantially as described, the said combination having a mode of operation substantially such as described.

5th, The combination of the feed apron, on which the fur fibres can be placed in separate batches, each in quantity sufficient to make one hat body, the rotating brush or picker, substantially as described, the rotating pervious cone, provided with an exhausting mechanism, and the devices for guiding the fur fibres, substantially as described, the combination having the mode of operation specified, and for the purpose set forth.

6th, In combination with the pervious cone provided with an exhausting mechanism, substantially as described, the covering cloth, wet with hot water, substantially as and for the purpose specified.

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May 21, 1868

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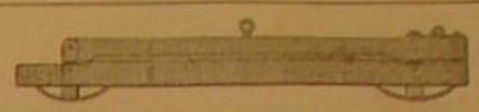

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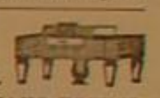
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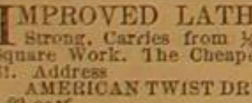

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