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Improved Cider Mill.

In preparing apples to make cider they are usually crushed between corrugated rollers, and ground or mashed up. In this process many large pieces are carried through the rollers unacted upon, thereby wasting the material and reducing the quantity of cider made from a given amount of fruit.

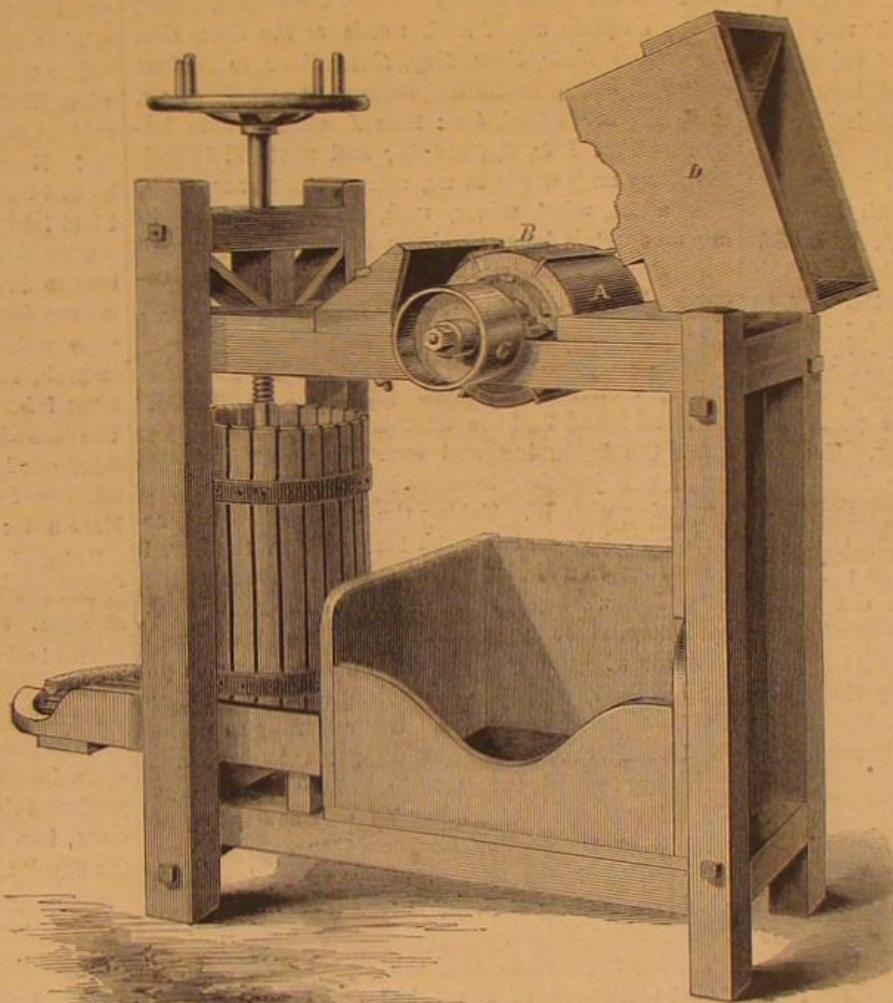
In this engraving a representation of a new mill is given, wherein the apples are not ground but scraped, thus reducing them to a fine pulp, which is the most favorable condition for obtaining all the juice.

The details are as follows:—The cylinder, A, has knives, B, in it, which are driven at a high velocity by a belt on the pulley, C. The hopper, D, which is tipped up in the engraving to show the cylinder, feeds the apples down to the knives, where they are subjected to the action alluded to. From the knives the prepared pulp falls into the box below, after which it is pressed as usual. A press is attached to the mill for that purpose.

In order that the knives may be always efficient, a flap is placed in juxtaposition with the cylinder, cleaning it and the knives as they rotate.

This mill is made portable, or can be, for family use. Very many occasions arise where a glass of cider is sometimes as welcome as a cup of coffee, and by the aid of this mill it can be obtained. For bakers and others, who make large quantities of mince pies, and reduce apples to pulp for various culinary purposes, this mill will be a valuable assistant.

It was patented through the Scientific American Patent Agency, by William and Lewis Clayton, on July 11, 1865. For further information, address them at No. 8 Walnut st., West Philadelphia, Pa.



CLAYTON'S CIDER MILL.

CRYPTOGRAPHY.

This is the art of reading and writing dispatches, messages, etc., in such a way that only those who possess the key can decipher them. It has borne a most important part in all the business of life, from love to war, from mischief to money-making, and is in daily use now for these objects. Dispatches in cipher are often sent by telegraph, and much trouble they are to the operators. A knowledge of cryptography and a faculty of reading secret language is an enviable one. We find in a foreign publication an interesting and explanatory article on this subject, which we reproduce much abridged, to suit our columns.

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"Well," I said, after looking at it for a few moments, "this cipher does not seem to be of the simplest kind! Before undertaking the task, I should like to know the terms." He mentioned them, and I am bound to say that they were very liberal.

"But, after all," I said, "this may not be J. C.'s advertisement. Yet I shall have the trouble all the same!"

"And the check also, my dear sir," said Waitzen with fervor.

"Very good; on those terms I undertake it. If I cannot succeed in reading the cipher, I agree to lose my pains."

My first step was to get some inkling of the nature

The first step was gained; the division was a necessary part of the cipher.

The fact I had remarked led me on another step. Had the plan of the cipher been to represent certain letters by certain figures, I should have been entitled to expect the "0" at the head of a group; since, in English, the language in which the cipher was probably written, there is no letter of frequent occurrence which is not also an initial letter, a rule which holds good in all the European languages with which I am acquainted.

I should have been already almost justified in concluding that the meaning of the cipher depended on the grouping, but I found other proofs, which at the same time led me still further on. I have already remarked the frequency of groups of 5 figures. Now, this singular predominance of groups of 5 figures would scarcely harmonize with any plan which represented letters by single arbitrary signs, although it would no doubt be possible to compose sentences consisting chiefly of words of 5 letters, retaining or rejecting the vowels. But in the great majority of cases of 5 figures, I found 3 figures before the dot. To these figures before the dot I, for the moment, restricted my attention. I found that (taking all the groups) they ranged, with intervals, from 5 to 268; in 37 cases out of the 55, there were three figures. Discarding repetitions, I found that under 100 there were 15; between 100 and 200, 15; and from 200 to the end, 13; a degree of uniformity higher than I had expected to find, and high enough to establish that it was the result of the grouping being dependent on a plan.

I had thus determined that the divisions were not arbitrary, and that the characters used did not singly represent letters; by inference, therefore, as they must be

held to mean something, that in groups they represented letters or words. Exclusive of the word at the head, I found that the specimen I had consisted of 252 figures, divided by brackets into 55 groups, a dot in every case again separating the figures within each bracket into two parts. The number of figures inclosed in each bracket varied from 2 up to 5; the proportions in which the various combinations were found differing widely, there being only two instances of groups of 2 figures each; 2, of 3 each; 13, of 4 each; and 38, or more than three-fifths of the whole number, of 5 each. Now, the object of these brackets and dots might quite possibly be merely to increase the difficulty of reading the cipher; it was, however, equally possible that they were there to serve their ostensible purpose, the division and subdivision of the figures. Carefully guarding against absolutely assuming the correctness of this latter view, I sought in the cipher itself for something to lead me to its adoption or rejection. I found that the characters used were the numerals from 0 to 9. I looked at this "0" a little more closely, and found that it occurred 19 times. Now, had the division and subdivision of the figures been arbitrary merely, it would require no proof to show that it should have occurred once, at the very least, at the beginning of a group. It did not so occur.

held to mean something, that in groups they represented letters or words.

I now went over the groups of figures after the dots, and found that they ranged from 1 to 112. Dividing the numbers between these points equally at 56, I found, discarding repetitions, that up to that number there were 27; above it, 22. With the light I had now got, all converging on one point, I should, in a long specimen, have expected a far more exact proportion; it was one of my difficulties that I had to deal with so short a piece of writing. The proportion, however, was, as in the former case, sufficient to prove the existence of a system. The numbers stopped short at 112, whereas, in the other groups, they went as high as 268; the two systems, regulating the groups before and after the dots, were therefore different. It did not absolutely follow that they depended one on the other, but the bracketing rendered it highly probable that they did. I considered myself justified in assuming that each bracketed group represented a letter or a word.

So far, the conclusions at which I had arrived had been almost forced on me. There was now, however, less certainty in my progress. My examination of the cipher had, nevertheless, shown me in what direction the probabilities lay. They pointed to a conclusion which might well have made Chr. Wait-

30 at one pressure of the atmosphere it will at any other, or even if there were no atmospheric pressure at all; so it is manifestly incorrect to say that the vacuum in the condenser is equal to 30 inches of mercury, if the pressure of the atmosphere will support no more than 28 inches, or if it be sufficient to support 31 inches. But if we place 0 upon the scale in the place of this 30, and graduate it upward in divisions representing pounds and fractions of pounds pressure to the square inch in the condenser, this gage will indicate absolutely correct whatever the variation may be of the atmospheric pressure; and, moreover, it would be impossible to misapprehend the indications.

With all vacuum gages that are affected in their indications directly by the variations of the atmospheric pressure, such as the open syphon and the different varieties of spring gage, we must make corrections, by means of the barometer, to be able to determine the exact pressure in a condenser; and it would be just as easy to do this if the numbers began at the perfect vacuum point and read upward as the pressure increased, as it is now with the numbers reading in the other direction, and would be much more intelligible. There can be no positive point upon the dial or scale of such a gage to indicate a perfect vacuum, nor can there be any such point at which any given pressure in the condenser can be recorded, no matter in what particular manner the dial or scale may be divided or numbered, so that the corrections must be made for every variation of the atmospheric pressure under any circumstances; and certainly it would be much less ambiguous to have the indications read, for instance, 2 lbs. pressure in the condenser—and be sure to convey that idea to the mind—instead of 26 inches of vacuum; for to know the pressure (which is what we really require) we must deduct this 26 from 30, and if the barometer reads 28 inches instead of 30 inches, we must deduct 24, which the gage would then indicate, not from 30 but from 28, while, under the same conditions (the scale counting upward in pounds), the scale would indicate 3 lbs. pressure, and we would have to simply reduce that indication one-half pound for every inch the barometer stood below 30.

We may trace the results of this really erroneous method of indicating pressures below that of the atmosphere to that very important instrument, the indicator, and find that it gives rise to errors of a considerable magnitude where accuracy is required.

The indicator itself is nothing more than a pressure gage, indicating precisely as the open mercurial or the various spring gages do, the difference of the atmospheric pressure and that within whatever vessel it may be attached to, varying in those indications with every variation of the pressure of the atmosphere.

It is customary, and indeed very explicit instructions are given to engineers, to take both the atmospheric and perfect vacuum lines upon a diagram; but how to take them, or rather make them correct, is not always told, and in many cases is not really understood. Most indicators are arranged with a stop, down to which the piston may be forced, and a line traced by the pencil while so held by the hand is generally regarded as the perfect vacuum line, to which all other lines in the diagram may be referred. Now, it would appear to many at first sight that, inasmuch as the atmospheric pressure varies while a perfect vacuum does not, if a correction is necessary to be made for a variation in the atmospheric pressure, it only requires that the atmospheric line, as traced by the instrument, shall be raised or lowered accordingly as the atmospheric pressure is greater or less than 30 inches of mercury.

It is not difficult, however, to show that the only line to which all parts of an indicator diagram may be referred, truly, is the atmospheric line taken with the pressure of the atmosphere admitted to both sides of the indicator piston, for which provision should always be made in the arrangement of an indicator or the pipes and cocks connecting it with the cylinder.—*Franklin Journal*.

A REDUCTION in wages is not always met by a strike. The workmen engaged in a hat factory at Yonkers, N. Y., in consequence of such a reduction, proposed to start a co-operative association, and have raised among themselves \$50,000.

A New Anæsthetic—Another use for Petroleum.

The Boston *Medical and Surgical Journal* has a paper communicated by Dr. Henry J. Bigelow, describing a new anæsthetic. The name "rhigolene," from the Greek word which means extreme cold, is proposed by Dr. Bigelow for a petroleum naphtha, boiling at 70 degrees Fahrenheit. It is one of the most volatile liquids obtained by the distillation of petroleum, and is applied to the production of cold by evaporation. It is a hydrocarbon, wholly destitute of oxygen, and is the lightest of all known liquids, having a specific gravity of 0.625. Dr. Bigelow, after speaking of the different products of petroleum, says:

"When it was learned here that Mr. Richardson, of London, had produced a useful anæsthetic by freezing through the agency of ether vapor, reducing the temperature to six degrees below zero, F., it occurred to me that a very volatile product of petroleum might be more sure to congeal the tissues, beside being far less expensive than ether. Mr. Merrill having, at my request, manufactured a liquid, of which the boiling point was seventy degrees, F., it proved that the mercury was easily depressed by this agent to nineteen degrees below zero, and that the skin could be with certainty frozen hard in five or ten seconds. A lower temperature might doubtless be produced were it not for the ice which surrounds the bulb of the thermometer.

"Freezing by rhigolene is far more sure than by ether, as suggested by Mr. Richardson, inasmuch as common ether, boiling only at about ninety-six degrees, instead of seventy degrees, often fails to produce an adequate degree of cold. The rhigolene is more convenient and more easily controlled than the freezing mixture hitherto employed. Being quick in its action, inexpensive and comparatively odorless, it will supersede general or local anæsthesia by ether or chloroform for small operations and in private houses. * * * But for large operations it is obviously less convenient than general anæsthesia, and will never supersede it. Applied to the skin a first degree of congelation is evanescent, but if continued or used on a large scale, the dangers of frost bite and mortification must be imminent."

In 1861 Dr. Bigelow, in experimenting with kerosolene, of four different densities, found the lightest of them, the boiling point of which was about ninety degrees, to be an efficient anæsthetic by inhalation.

The Eight-hour Question.

The bill to regulate the hours of labor, known as the eight-hour bill, was rejected on Friday by the Massachusetts House of Representatives, by a vote of 109 to 52. The workingmen of this Commonwealth, even admitting the restricted and partial use of the term, have not in our opinion lost anything by the failure of this bill. It is as clear as any proposition in political economy can be, that the attempt to make eight hours the legal limit for a day's work would either be inoperative, like the legal rate of interest, or that if it formed the basis of contracts between the laborer and the employer, it would occasion a change in the nominal rate of wages, sufficient to make the dollar in payment represent the same amount of labor as now. The smaller amount of wages which would thus be earned is not what the laboring men of this Commonwealth need or desire.

The friends of the measure appear to have resented an amendment introduced by Mr. Jones, of Pelham, to the effect that the two hours cut off from the day's work should be devoted to study. They seem to have regarded this provision—which is simply such an appropriation of time as has been urged among the reasons for passing an eight-hour law—as an attempted *reductio ad absurdum* of the whole scheme. It was, we believe, a very successful effort in that direction, whether it was so intended or not; but not half so effective as the thoroughgoing absurdity contained in the bill itself, in the provision which excepted agricultural laborers from its supposed benefits. If there is any class of men who need the interference of the law to secure for them moderate limits for labor, and opportunity for physical refreshment and mental cultivation, it is the laborers on the farms of Massachusetts. But the advocates of the bill were much more shy of the wrath of the farmers than of the opposition of men engaged

in manufacture, and hence, to gratify the former, they sacrificed the whole principle of their measure. It is not surprising that what was left showed so little vitality.—*Boston Advertiser*.

Inspecting Pumps Twenty-four feet Under Water.

Messrs. Wilton & Bolton, the divers who were so successful in repairing the pumps at the Grove Pit, South Wales, have been engaged for a similar operation at the Crown Colliery, Warmsley, near Bristol, the property of Mr. G. Goldway, M. P., and under the management of Mr. R. Brotherhood. It appears that the pump bucket had got out of order, and the water rose to 16 feet above the bucket door. It was, therefore, found necessary either to place a new pump, or to employ divers to restore the old one; the latter course was adopted. Wilton descended, and succeeded in getting off the bucket door, and, having made a close examination of this part of the pipe, he ascended, after the lapse of one hour and a half. Bolton then descended, and, having succeeded in removing the old "bucket," he brought it up in about an hour. After a short rest, the diver descended with a new "bucket," and remained under water two hours and a half, during which he fixed the new bucket, and screwed on the door.

The engine was then set at work till Tuesday afternoon, when it was still found that it did not do its work effectively, and it was resolved to make an attempt to ascertain where the new fault lay. At half-past 4 o'clock on Tuesday afternoon Wilton descended, and discovered a leak in the bucket-door, and also one in the joints of the pipe. This was rectified, but on going down to the "clack" door, 8 ft. below the bucket-door (24 ft. from the surface), the diver found that the fault arose from the "clack" or valve of the pump having been so worn that it would not act properly. The removal of the "clack" door was attended with a good deal of risk, as it weighed upward of 2 cwt., and the diver had to reach it by clinging to the pipe. The nuts and screws had to be felt for in the dark, and a spanner, some 2 or 3 ft. long, had then to be used. A new "clack" was sent down to him, and after fixing it in its place, and securing the door, the diver came up, having been under water for no less than 2 hours and 40 minutes. The pumps were then found to work effectively, and the task of clearing the pit of water was immediately commenced. Mr. Brotherhood, Jr., descended the shaft, and superintended the operations the whole of the time the men were down; and every precaution was taken to insure the proper carrying out the directions given by the divers. Only one of the latter descended at a time, the other remaining on the stage with the life-line, ready to notice the slightest signal from his companion.

[There are some divers in Boston who are up to this sort of thing.—Eds.]

MISCELLANEOUS SUMMARY.

A GERMAN firm of locomotive builders, who recently completed their thousandth engine, gave a dinner and a dollar to every workman to celebrate the event.

THE Prince of Wales recently visited a ship launch and happening to stand upon a plank, numbers of the workmen cut this precious piece of timber into slivers as souvenirs.

In many high-pressure engines where the ports are large and free, the stroke of the valve long, and the same properly set, there is not only an absence of back pressure but a partial vacuum created by the momentum of the escaping steam.

W. CLARE ANDERSON, St. Louis, Mo., is Agent for the Globe Sewing Machine, also for Folsom & Anderson's sewing machine treadle, represented and described in our last issue.

THE Navy Department has notified Mr. Forbes, contractor for the *Algonquin*, to remove the engine from the same and substitute one like that in the *Winooski*.

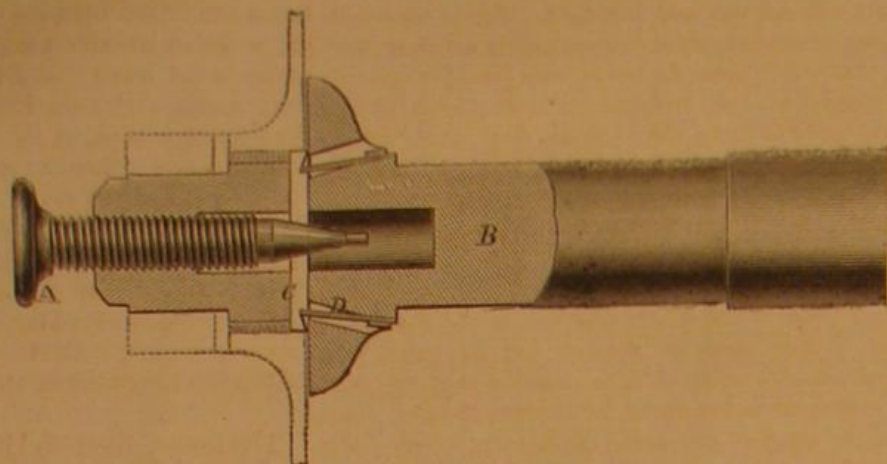
WATT was able, on an average, to evaporate 7½ lbs. of water with a pound of coal. A cylindrical boiler will evaporate only 7 lbs., but a Cornish boiler 10½ lbs.; and a locomotive boiler, with 1 lb. of coke, from 7 lbs. to 9½ lbs.

Improved Device for Centering Saws.

The holes in circular saws are not always the same size. When it is necessary to purchase a new one or use one of smaller diameter than is generally employed, it is often found that the saw mandrel is too small, so that the saw runs untrue when made fast.

This invention is intended to obviate that difficulty by furnishing a method to center them truly at all times. In the engraving A represents a screw which has a conical end; this screw passes through the end of the arbor, B, which is hollow. In the arbor are three slots which receive dogs, C; these rest on the screw at one end, and are fitted with springs, D, to hold them at all times. It is easy to see that when the screw, A, is forced in the dogs will be driven out from the center equally in all directions, and thus afford an accurate and reliable means of adjusting the saw.

The invention was patented by W. T. & L. H. Rand, through the Scientific American Patent Agency, Dec. 12, 1865. For further information address them at Manchester, N. H.



RAND'S DEVICE FOR CENTERING SAWS.

THE SECOND LECTURE OF PROFESSOR DOREMUS'S COURSE.

At the second lecture of Professor Doremus's course the Academy was more completely filled than at the first, several persons standing in the aisles.

LIGHT.

The subject of the lecture was light. After speaking of the natural light of the sun, the modes of producing artificial lights were discussed at length. All these are various plans of heating some solid body to a very high temperature. Gases, however highly heated, emit very little light. When any substance is burned, if the product is wholly and immediately gaseous, little light is produced, while if the product of combustion is solid, the burning is accompanied by a great production of light. To illustrate this, some sulphur was burned in a jar of pure oxygen gas; the product of combustion in this case is a gas-sulphurous acid—and the flame was very dull. A coil of iron wire was then heated at the end and plunged into a jar of oxygen, when it burned with scintillations so brilliant that they were painful to the eyes. The lecturer explained that the product of combustion was a solid—the oxide of iron—and he called attention to the fact that the jar was reddened by the fumes. The bottom of the jar contained a bed of sand, covered by water to a depth of five or six inches, and as the white-hot pellets of the oxide of iron dropped into the water they continued red hot until they reached the bottom. In explanation, it was stated that each pellet on entering the water immediately became surrounded by an atmosphere of steam, which preserved it from contact with the liquid.

OUR COMMON LIGHTS.

All our light in ordinary use comes from intensely heated carbon—generally by burning carbon in connection with hydrogen. Illuminating gas is carburated hydrogen, and the products of its combustion are steam and carbonic acid. As both of these are gases, how is it that great light is produced—light being emitted in any considerable quantity only from solids? We may burn gas so that the flame will be very dull; it is necessary only to mingle it, before burning, thoroughly with air, so that combustion will take place throughout the volume. When it is burned from a jet in the usual way, the combustion goes on only on the outside of the issuing stream, and the hydrogen is burned first, thus decomposing the gas, and leaving the carbon momentarily in the solid state. This solid carbon is highly heated by the flame, and from it, while in this condition, is emitted nearly all the light of the jet. So soon as the hot carbon passes outward from the body of the flame and comes in contact with the air, it also is burned, combining with the oxygen of the atmosphere to form carbonic acid.

THE CALCIUM LIGHT.

When hydrogen and oxygen gases are burned together, though the heat is the most intense of any that man can produce with the single exception of the electric current, the product of the combustion being water, in the gaseous form of steam, the light emitted is very feeble, but if into the flame we introduce any solid which will remain solid at the intense heat of the flame, it glows with a dazzling light. Nearly

all said substances are either fused or evaporated by the oxy-hydrogen flame, but there are a few that will resist even its intense heat, and the most convenient of these is lime. As lime is the oxide of the metal, calcium, the light thus produced is called the calcium light.

Two calcium lights, prepared by Dr. Grant, of New York, a man who makes a business of exhibiting them, were then lighted, and the parabolic reflectors were slowly turned around, so as to throw the parallel beam into different parts of the house. It was curious to see the universal dropping of heads, or raising of hats and handkerchiefs, to shield the eyes from the intolerable brilliancy of the shining bit of lime.

THE ELECTRIC LIGHT.

If a piece of zinc and a piece of platinum be partially immersed in a vessel of dilute sulphuric acid, and their outer ends be connected by a metallic rod or other conductor of electricity, the zinc is gradually oxidized, and at the same time a current of electricity starts from the zinc plate, passes through the fluid to the copper, and thence flows around through the metallic rod to the zinc again. This was discovered by Dr. Volta, an Italian physicist, and is therefore called a voltaic circle.

If the metallic rod be of sufficient size to freely conduct all the electricity generated, no heat or light is emitted; but if in one portion the rod be made so small that the whole current cannot pass, then this small portion is heated, and if it be made sufficiently hot, light is produced. If the heated rod be of a metal which at a high temperature has a strong affinity for oxygen, it will, of course, be rapidly consumed, but a platinum wire may thus be kept glowing for many hours.

Upon the front of the stage was an apparatus having a point of carbon connected with one pole of a powerful voltaic battery, while with the opposite pole was connected a wheel with radiating spokes, the several spokes being armed with different kinds of metal. This wheel was turned so as to bring the copper spoke in connection with the carbon point, and was then slightly withdrawn so as to make a short break in the circuit between the carbon and copper. Both were quickly heated to a high temperature, and the copper was burned with a dazzling green flame. Iron, zinc and other metals were consumed in the same way.

Finally, the spoke of the wheel bearing a carbon point was turned in contact with its fellow carbon of the opposite pole, and then slightly withdrawn, when the space between the two was instantly spanned by the arch of the electric light; before the unequalled brilliancy of its glow the gas jets of the Academy became of a yellow, sickly hue, and the two calcium lights "paled their ineffectual fires."

THE ELECTRIC LIGHT UNDER WATER.

To show that the light was produced, not by the combustion of the carbon, but by its being intensely heated, the light was exhibited in a vacuum. The

points were so arranged that they could be covered by a bell glass, the air was then exhausted by an air pump, and when the connection was made, the same brilliant effects followed.

The points were also connected in a jar of water, but this had the effect somewhat to dim the light.

The lecturer explained that the light comes mainly from intensely heated particles of carbon, which are carried over by the current from the positive to the negative electrode—wasting away the power of the former and increasing the size of the latter.

A MONOCHROMATIC LIGHT.

The large, shallow, leaden tank in front of the stage had been covered to the depth of an inch with salt—the chloride of sodium. This was now sprinkled with about two gallons of alcohol from a watering pot, and the alcohol was set on fire. The colorless flame of the alcohol received a single yellow hue from the sodium of the salt. The gas lights had been previously turned down, and as the yellow ray of the salted flame fell upon the face of the lecturer, his countenance ceased to send forth the colors of life, and became of a cadaverous aspect; the same strange change came also upon the looks of the audience, and the great Academy seemed to be filled with the faces of the dead.

THE MAGNESIUM LIGHT.

While the lights were still turned down, a coil of magnesium wire was lighted. As the pure, white light of this flame is made up of all the blended rays of the sunbeam, when it fell upon the faces of the people, their ghastly hue was changed, as by a miracle, for the glow of life and health.

ALL LIGHT ORIGINALLY FROM THE SUN.

In conclusion, the lecturer reminded his audience that as our ordinary lights [are obtained by burning carbon, and as this carbon has been separated in the leaves of vegetables from the redundant carbonic acid of the atmosphere by the decomposing force of the sunbeam, it is the statement of a fact to say that all our light comes originally from the sun.

English Workmen Coming to America.

A foreign cotemporary says:—"The mania for emigration has again set in among the colliers and iron workers of South Wales, and the effects of the movement are beginning to be seriously felt, more especially by the colliery proprietors. Those who are induced by glowing descriptions to leave constant employment and good wages, and break up their homes, to seek new spheres for their labor in the States, are hardy, industrious men, who from long experience have become what may be called skilled colliers. These are the men that the district can ill afford to spare, especially at the present time, when the coal trade is so active, and their departure in such numbers will not only prove inconvenient but a positive loss to the employers of labor, inasmuch as it will take the hands brought in to supply the vacancies caused by the exodus a very long period to become proficient in their new avocations. In addition to the large numbers that have emigrated since the fine weather set in, upwards of sixty families left Aberdare for New York a few days since, and others are preparing to follow from different parts of the district. It is a matter of regret that industrious men should by false representations and delusive hopes, which have so often been exposed, be induced to leave their native homes to seek employment in America, where they will have to toil harder and be less remunerated in proportion to the cost of the necessities of life."

[It is a matter of regret to us to pay \$12 per ton for coal where it ought to cost but \$8 or \$9, and be told that from the high wages paid to miners it is impossible to sell it for less.—Eds.]

Sharp Shearing.

Mr. Morrill, from the Committee on Ways and Means, has reported a bill in the House to levy on all horses, mules, cattle, sheep, hogs and other live animals imported from foreign countries, a duty of 20 per cent *ad valorem*. He understood that the Canadians were sending sheep over the border, and having them shorn on this side, so as to evade the duty on wool. It is generally admitted that Yankees are *par excellence* sharp in doing things, but it must be confessed that our provincial neighbors have got the inside track this time.



"Perpetual Motion and Perpetual Rest."

MESSRS. EDITORS:—Perpetual motion ideas, like the comet, periodically make their appearance, and one creates in the world of matter the same multiplicity of conflicting theories that the other does in the world of thought.

Perhaps during the 17th and 18th centuries there was a greater amount of time and thought wasted on this subject than ever before or since. It became at last so fruitful a question of discussion and dissension, that the French Academy of Sciences, and other like societies, debarred the subject entirely from their debates, as one entirely impossible to exist. For years a floating hearsay statement has had many believers that a reward of £50,000 stands open for the discoverer of perpetual motion. It has no foundation in fact, however.

If perpetual motion is sought for in an application of mechanical forces, with or without aid from gravitation, magnetism, etc., then we can fully concede it as utterly futile to attempt it. But if we concede that perpetual motion is the constant or perpetual moving of an object or mechanical work, as indicated by its constantly changing its position on the ground or floor wherever stationed, then I declare that such motion is obtainable. The following is an illustration which has been successfully tried, and of which you doubtless heard some years ago:—

A wheel, four or five feet in diameter, constructed similarly to a carriage wheel, of wood least susceptible to the influences of moisture, heat, etc., was placed vertically and balanced upon a steel point, resting on a highly polished metal surface in the center of the wheel. Being wholly free from any attractive power, and so nearly without friction to affect it, indicators placed by it showed that the wheel kept up a slow continuous motion on its center. In other words, it was so suspended as to be independent of the earth's motion, which in its rotation around the sun, left the wheel in a perfect state of rest.

I conceive, therefore, that the only perpetual motion attainable, is by obtaining the condition of perpetual rest.

I. A. E.

New York City, April 19, 1866.

The Gear Question Reviewed.

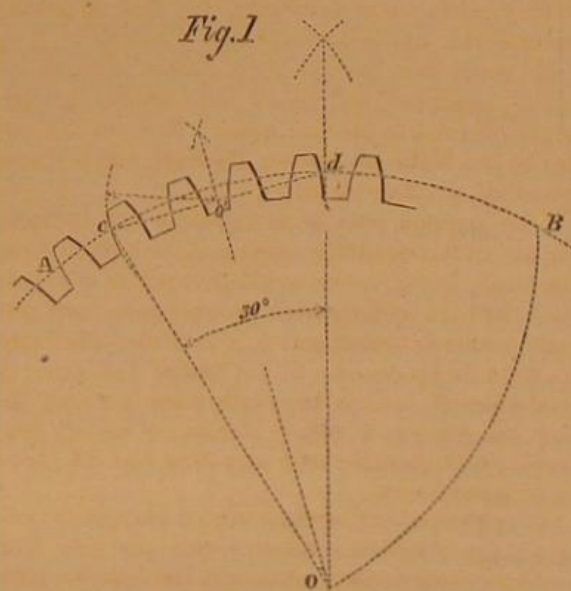
MESSRS. EDITORS:—My communication published on page 293, last volume of the SCIENTIFIC AMERICAN, has called out many others and led to an extensive discussion of the question whether the true pitch for the teeth of gears should be measured on the arc or chord. The difference of opinion upon this point thus shown to exist among good mechanics, is one which has never, to my knowledge, been properly explained, though the reason for it is very simple, and is to be ascribed solely to the difficulty of carrying out nice theories into ordinary practice. The true theory of gearing is that enunciated in your article on page 209, present volume, and also by several of your correspondents, viz., to cause two wheels to have the same motion as though their pitch circles were cylinders rolling in contact. If the contour of the teeth is formed of the proper epicycloidal curves, this effect will obtain in practice, and in this case the pitch should be measured on the arc of the pitch circle. But in gears of this construction the teeth of each wheel must be formed with special reference to the size of the wheel with which it runs, and a slight change in the size of either would produce a serious disturbance in a mechanism so finely adjusted.

As you very properly remark in the article above referred to, this nicety "would not only be costly, but wholly impracticable in the ordinary business of the workshop;" and for this reason, principally, correctly adapted epicycloidal teeth are almost wholly unknown in ordinary machinery. Mr. Corliss, of this city, has produced some very fine specimens of heavy gearing with teeth of this form almost theoretically perfect, but in general practice a form of tooth is selected which will enable any two gears having the same pitch to run together. This is rendered necessary to avoid the enormous expense otherwise required for

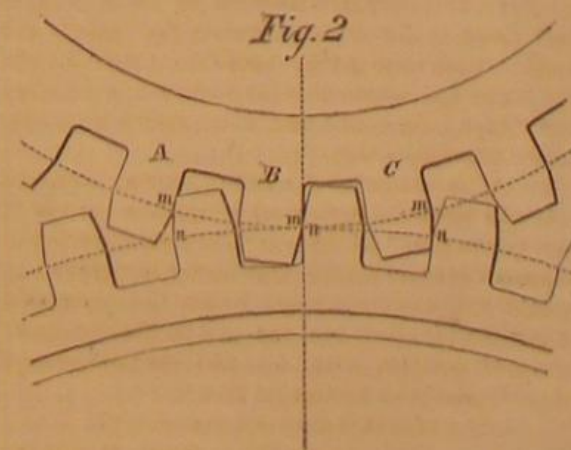
patterns and cutters. To produce this effect various rules are employed by different persons, but these rules all coincide in one point—the shape of the tooth is governed solely by the size of the gear of which it forms a part, and not, as in epicycloidal teeth, by the gear with which it meshes. With this form of tooth, determined by any rule dependent solely on the pitch and number of teeth, the pitch must be measured on the chord of the arc, or the gears will not run well together. This is the explanation of the fact stated in your article above referred to, that "it is usual for the pitches [arcs] of pinions of small diameter, working in large wheels, to be a little greater than the wheels they drive or are driven by;" and many mechanics work on that rule guessing at how much larger they shall make the pitch of the pinion, without any idea why they do so except that the gears run better for it.

For gears of 60 teeth and over the difference is so small (.012 of the pitch, and less in the diameter), that it may safely be ignored, but for gears of a small number of teeth it is essential that the pitch be measured on the chord, rather than the arc, which has the effect of increasing the circular pitch. Any one may convince himself of this fact by trying the experiment. Scribner, Haswell, and Nystrom all recognize this fact in their valuable pocket-books, but Nystrom alone gives a rule by which such gears may be properly proportioned, i. e., by the sine of the angle of half the pitch.

Where it is admissible the epicycloidal is the best form for teeth. The next best, and the only correct form adapted for general use, is that invented by Prof. R. Willis, of Cambridge University, England. This is composed of arcs of circles, the centers and radii of which are determined by means of an instrument invented by him and manufactured by J. R. Brown & Sharpe, of this city, which he has named the odontograph. For small gears with fine teeth, or for teeth of one inch pitch and under, the following construction produces the same form of tooth as is obtained by the odontograph; but for larger pitches, or where separate arcs are required for the points and flanks of the teeth, the instrument is the only simple means of determining the centers and radii.



In Fig. 1, A B is a portion of the pitch line of a gear of which O is the center; c d is the chord of an angle of 30°, easily found by first stepping off the



radius upon the pitch line, as in the figure, and taking half the arc thus subtended. The point, o', at the middle of this chord, is the center, and half the

chord the radius by which the sides of the teeth are determined.

While I am upon this subject allow me to refute a popular error in regard to gearing, which is, that properly-formed teeth will roll upon and never rub each other. The fact is that such action is impossible excepting for a brief space near the tangent point of the pitch lines. If the teeth engage before reaching that point, or remain in contact after, passing it they must rub. This will be apparent by reference to Fig. 2, which represents portions of two gears having epicycloidal teeth. At A the teeth are just coming into action, at B the acting points are in the line joining the centers, and at C they are just emerging from contact. Now, by noticing the points, m and n, in each position, it will be seen that at A they are separated, at B they are coincident, and at C again separated in the same direction by which they approached; and that in thus approaching and receding, the surfaces in contact cannot roll but must slide upon each other. At the central position only the action is rolling without friction.

G. H. BABCOCK.

Providence, April 13, 1866.

Trouble with Steam Boilers on the Mississippi.

MESSRS. EDITORS:—I inclosed you some time ago John Schaffer's letter on the subject of steamboat explosions, and the remedy he suggests. You have given the matter a favorable notice in your paper of the 7th inst., and inasmuch as we all look to your paper for reliable information on all mechanical subjects, and indeed all that tends to progress, I inclose you the statements of some of our most experienced river engineers, also the correspondence which has taken place on the subject of Schaffer's letter. You will perceive that the committee of practical engineers, who reported on Schaffer's theory, state this fact as the result of their experience and observation: "This phenomena has occurred to all of the members of the committee." "If the assertion of Schaffer be true, we would and should be satisfied as to the causes of explosion, and would not desire to seek further information."

The fact that the water will escape from the boilers through the engine, on our river steamers, is admitted by all engineers; but some contend that it cannot go out and escape without the engineer or watch knowing it, and that it is their duty to stop it. But while they all admit this, it has never occurred to them, indeed they never considered the subject, as to the space of time a boiler could be emptied in that way.

I will give you the dimensions of the boilers and engines of one boat which the evidence shows blew up for want of water in the boilers, and there is evidence that a few moments before the explosion the water was flush in the boilers, and also conclusive evidence that water began to escape out through the engines all of a sudden, and that in a few minutes after this was noticed by officers on the steamer Dictator, which was near enough to notice the fact, the boat blew up. The Missouri had 5 boilers 24 feet long, 46 inches diameter, with 21 feet 6 inches flues in each boiler, or tubes, as they are called. The flues were set 13 inches below the top of the boilers, allowing 4 inches of water over the flues; this left 9 inches for steam room. There were two engines with cylinders 30 inches in diameter, 10 feet stroke. The steam pipe was 8 inches in diameter; the engines made 15 to 16 revolutions per minute, giving two motions back and forth of the piston to each revolution. The steam necessary to supply the 30-inch cylinders through an 8-inch pipe would travel at the rate of about 4,000 feet per minute, and this draft on the steam in the boilers, unless there was large steam room, large openings from the boilers to the steam drum, would start the water to flow with the steam, and assuming that the supply to the cylinder was one-third water and two-thirds steam, or a greater or less proportion, the boiler from which the water started would be emptied in a few revolutions of the wheel.

The steamer Sultana, which blew up above Memphis on April 28, 1865, had boilers and engines very similar to the Missouri. There is abundant evidence to prove that the explosions have been caused by reason of the improper construction of the

boilers and mode of carrying the steam to the cylinders of the engines. The evidence is conclusive that the water escaped in that way while our most careful, experienced engineers were on duty.

Mr. Schaffer was an engine builder and has had twenty years' experience on our largest river steamers. He has made the science of engineering his constant study. It is difficult for such men to maintain their theories, owing to the present steamboat law, which gives to the Board of Supervising Inspectors entire control over the questions of construction of boilers machinery, etc. [See sec. 39, Act August 30, 1852].

The Supervising Board have heretofore sneered at all improvements which they have had no hand in suggesting, and the newspapers in the West, in so far as relates to steamboats, are dependent on the person they employ as river reporter. This individual gathers the river news, and whenever anything is suggested he will write short squibs on whichever side he may think will make him the greatest number of friends. The Supervising Board have heretofore held their sessions in secret and denied the right, or necessity of all persons attempting to lay information before them.

I have given you these details and facts, and if you will take the time to consider the subject, and if you agree with the theory these facts I think clearly establish, you can do much good by pointing out the correct mode of construction of boilers and carrying steam so as to avoid all danger of explosions such as has happened.

I may say this about my own opportunities for observation: I had long experience in the State of Pennsylvania in the manufacture of iron; came to St. Louis in 1838, and at one time was engaged in repairing and building steamboat hulls; in 1843 I had erected the first marine railway docks for taking out boats, which has proved a success. I have been acting as U. S. local inspector of hulls, that is, one of the local Board of Inspectors, and am well acquainted with the character of our boatmen; and from my experience am well satisfied that the steamboat law of 1852 has been a hindrance to the progress of the science in engineering as well as everything else in regard to river steamers.

St. Louis, Mo., April 19, 1866.

[As we do not know that our correspondent desires his name published we withhold it, and are obliged to him for his attention. We are, of course, powerless between the inspectors and the engineers, and it strikes us that it is a matter for the consideration of the people where the inspectors reside. If these men are not fit for their business, incapable by want of experience from understanding the details, why are they elected?

In regard to the construction of the boilers to produce dry steam or even to prevent priming, it seems not a difficult task. Locomotives in which the quantity of water in comparison to the fire surface is necessarily small, never prime in service although they do in isolated cases, and if Western boilers do habitually, it must be owing to some palpable defect easily remedied, which, at this distance, we can know nothing about. Whatever the inspectors may do, or say, they cannot prevent an engineer from reconstructing his boiler so that it will make dry steam, and to the practical men we must look for the remedy for the evil.—Eds.

A Telling Advertisement.

MESSRS. EDITORS:—A few months since the engraving and description of "Evans' Patent Graduating Circular Plane" appeared in your columns. Immediately afterward inquiries and orders began to come in, addressed to the manufacturers and agents, from every quarter of the Union. They are coming yet. We write to inquire if there is any limit to your circulation. Will it be necessary to advertise in any other journal? Inventors who do not avail themselves of your advertising medium are like travelers in a stage coach. I should prefer a locomotive. F. H. W.

Hudson, N. Y., April 19, 1866.

Chloroform—Describing a Circle.

MESSRS. EDITORS:—A notice in your last number that chloroform has been found to remove paint when other ordinary solvents failed, reminds me

that the result of recent experiments by Mr. Sanford, druggist, of this place, indicates that chloroform will also restore the color of garments, where the same has been destroyed by acids.

When acid has accidentally or otherwise destroyed or changed the color of the fabric, ammonia should be applied to neutralize the acid. A subsequent application of chloroform restores the original color.

In number 11 of your valuable journal, I noticed an illustrated method of describing a circle without compasses, making the thumb the center and grasping the pencil in a peculiar manner. For many years I have been accustomed to describe a perfect circle by what seems to me (perhaps from practice) an easier method. It is to make the center of the finger nail the center of the describing circle, the nail being flat on the paper, and the pencil held between the ball of the thumb and that of the finger used. I use the nail of any or either finger, but perhaps that of the index finger would be easiest with most persons. The paper is made to rotate by the other hand, as described in your paper March 10th. The process is simple and very convenient, but is not original with

JOSIAH CURTIS.

Knoxville, Tenn., April 14, 1866.

Speed of Cutting Tools.

MESSRS. EDITORS:—Will you please inform me through the columns of your valuable paper the rule for finding the proper speed for running iron planers, lathes, shaping machines, drill presses, etc. Say I have a line of shafting making eighty-five revolutions per minute, what size pulleys shall I put on to drive the above tools?

P. T. W.

Dubuque, Iowa, April 21, 1866.

[The usual velocity for shafting is 100 revolutions per minute. Planer beds run about 15 feet per minute; lathes run from 15 to 20 feet per minute; that is the velocity of the work, not the pulleys. Thirteen feet for cast iron, 15 feet for wrought iron turned, and 15 feet for planers on all metals, is a fair estimate. We cannot tell the size of driving pulleys without knowing that of those on the machine. The speed of pulleys is in inverse ratio to their diameters; that is to say, a 6-inch pulley driven by an 18-inch pulley will revolve three times as fast.—Eds.

Steam Pipes and Cut-offs.

MESSRS. EDITORS:—Will you, or some of your readers, be kind enough to inform me how large a steam pipe an engine with 12-inch cylinder, and three and a half feet stroke, cutting off at 6 inches, should have, to properly supply it with steam?

I am now using a cut-off that is very good, and answers well; but, it is very liable to get out of order. I should like to get another. Is there any one you would be kind enough to recommend?

A. M. H.

Strasburg, Pa., April 23, 1866.

[To find the proper size of the steam pipe, Bourne gives the following rule. Multiply the square of the diameter of the cylinder in inches, by the speed of the piston in feet per minute, and by the decimal .02; divide the product by 170. The quotient is the proper area (or cross section) of the pipe in inches.

There is no better cut-off for a stationary engine than one slide valve working on the back of the other, and provided with a right and left screw, to work at various grades.—Eds.

Western Steam Boilers.

MESSRS. EDITORS:—I propose to give you a few facts on Western boilers, and my views in regard to explosions, to assist you in relating some of the theories advanced on that subject.

In the SCIENTIFIC AMERICAN of the 7th of April, there is an editorial on tubular boilers, and a letter taken from a St. Louis paper, written by Mr. Schaffer, who sets forth the theory of the engines draining the boilers on account of too little steam space, and taking the steam from the boilers too near the top of the water. Our Western tubular boilers are generally from 38 to 42 inches in diameter, and 14 to 18 feet long, with tubes about four or five inches; there is about one-third of the top of the boiler steam space, with a steam drum 24 to 30 inches diameter; for four 38-inch boilers it would be about 4 feet long, attached by about a 6-inch connection with each boiler, which would take the steam at over three feet above the water line. I must say that in my expe-

rience as an engineer, which extends, off and on, to thirty-two years, I have never known an instance, since the old cast pipes were replaced by steam drums, of the water being drawn from the boilers in the way indicated.

In the next place, it seems to me an engineer must be asleep who would not detect so much water passing through the engine in one revolution, as the sound of the exhaust would be as different as the sound of gage cocks, when one had nothing but steam, and the other flush with water. The engine also exhausts into the heater, which has about the capacity of the cylinder, and does not have a direct passage to the escape pipe. The heater is a horizontal cylinder, and the steam passes the entire length, and has to return part, or all the distance, to enter the escape pipe. All water carried to the heater is apt to stop and pass out at the waste pipe, sometimes not leaving enough for the force pumps, which may account for the water passing out with the exhaust steam.

I believe tubular boilers to be as safe as flued boilers, but require more constant attention and greater care, as when the supply is stopped they reduce the water much faster. It is common to start a boat out with water very flush in the boilers, and either stop the doctor, or run very slow until the water falls to the proper height; and it often occurs that the pumping engine is run so slow that it will stop on the center, and I have seen them stopped for several minutes before those on the watch noticed it. I doubt if there ever was an engineer who would admit that he had less water or more steam than the law allowed.

ENGINEER.

Beetown, April 20, 1866.

Lateral Motion for Saw Mandrels.

MESSRS. EDITORS:—Lane & Boddy, of Cincinnati, Ohio, make it one of their principal claims of improvement, that a saw must have lateral motion, and they have a patent on it.

W. Herrick, of Northampton, Mass., disapproves of it altogether, and says it is utterly useless. Both have mills of their make operating successfully. I acknowledge I can see but one reason for lateral motion, and that is, the spring of timber, which in some sections of the country is worse than in others. The primitive growth on level ground is less liable to spring, while second growth is sometimes quite difficult to saw more than from 16 to 18 feet long. In that case lateral motion gives the saw a chance to avoid much friction, and it is consequently less liable to heat. A circular saw should be kept perfectly round. The manner which your correspondent suggests is a very good one, but the back of the tooth being left an inch and three-fourths, is altogether too long; three-fourths is nearer.

There is what is termed a draft in sawing lumber; if the back is too long it is inclined to resist the feed, and consequently causes the teeth to heat; then again, too much off the back causes it to enter the wood too freely, and consequently it will deviate at the least obstacle from a straight line. I have thus thrown out a few suggestions, hoping to excite the interest of some of the best sawyers, that they may be able to explain those points which some yet regard as too sacred to be made public. For the present I will be content to read; let others write.

POWAGANSETT.

Providence, R. I., April, 1866.

Hand Grenade.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of April 7th, page 226, I find a partial description of the Adams hand grenade; and as a portion of that description conveys a wrong idea of the manner in which that projectile is to be used, I would thank you to publish the following correction. Instead of "a lanyard several yards in length, one extremity of which is securely held in the hand of the person using the grenade," I use a lanyard eighteen inches in length which is firmly secured by a slip loop to the wrist of the operator. The other end of the lanyard has a spring hook by which it is attached to the igniting wire of the grenade. The grenade thus attached, can be hurled from the hand at the enemy, and the instant it leaves the hand, the sudden tension upon the lanyard withdraws the igniting wire, ignites the primer, and a five seconds time fuse, which burns

down to the powder as the projectile flies on its mission of destruction.

It will thus appear that it is as well adapted for offensive as for defensive warfare, which would not be true if the description of your correspondent was correct.

JOHN S. ADAMS.

Taunton, Mass., April 12, 1866.

NEW INVENTIONS.

Making Seamless Paper Boxes, Lamp Shades, Hats, and other Hollow Articles of Paper.—The box or other article is made upon a former which is dipped into the pulp; the latter collects on the reticulated surface by means of a partial exhaustion of the air from the interior of the former, the air being withdrawn through an elastic pipe communicating with a bellows or cylinder.

The water being drawn through the perforations, a film of pulp adheres to the surface of the former which is then raised from the vat, and the coating of paper pulp being removed and dried, forms a seamless article which requires no further manipulation for most ordinary purposes, but for ornamental uses may be covered wholly or in part with a second coating of colored pulp and embossed or otherwise ornamented by stamps, swedging or perforation. Edward H. Knight, Washington, D. C., is the patentee.

Fire Engine.—This invention consists in the arrangement of two or more pump cylinders of different sizes, the pistons of which are connected to one and the same piston rod, in combination with suitable cocks or valves, in such a manner that by adjusting said valves the amount of water thrown on each stroke of the pump can be made equal to the combined capacity of both cylinders, or each of the cylinders can be worked separately, and, consequently three changes are possible, whereby the amount of water thrown can be readily adjusted to the distance of the pump from the fire, or to the height to which the water is to be thrown. John M. Dennison, Newark, N. J., is the inventor.

Hay-loading Device.—This is a device for loading hay on wagons or carts direct from the field, or while the wagon or cart is drawn along over the same. The invention consists in the employment of gathering boards provided with teeth and arranged in such a manner as to cause the hay to be brought within the action of the rakes. The invention also relates to an improvement in the connection, whereby the device is secured to the wagon or cart to be loaded, and also in an improved arrangement of the stationary rake teeth, as well as an improved mode of operating the revolving rake teeth. The invention further consists in an adjustable holder, whereby the revolving rakes are made to act efficiently upon the hay and carry the same to the elevator. William A. Duncan, of Syracuse, N. Y., is the inventor.

Agricultural Implement.—This invention relates to a driver's seat for agricultural implements, and is more especially arranged for the seats of reaping and mowing machines, although applicable to other agricultural implements which are mounted on wheels. The object of the invention is to obtain, by a very simple and inexpensive means, a seat which will yield or give in two different directions—laterally as well as obliquely up and down, and to this end the invention consists in having the spring or elastic bar, to which the seat is attached, bent or otherwise constructed so that it will have two parts which will yield or give in planes at right angles with each other, and thereby admit of the seat yielding in any direction. Thomas S. Brown, Poughkeepsie, N. Y., is the inventor.

Water Wheel.—This invention relates to a water wheel which is designed for obtaining power from the current of a stream and where it is impracticable to build dams for the purpose of obtaining power by means of a head and fall. These devices, which are commonly termed "current wheels," are extremely useful in those cases where there are strong currents, as machinery may be driven without the expense of constructing dams, and they also may be advantageously used in tide mills. It consists in attaching a series of swinging buckets to an endless belt composed of plates connected together by joints or hinges and fitted on polygonal rollers, the whole being arranged in or on a suitable framing and in

such a manner as to obtain a large percentage of the power of the water. Matthias Devos, Big Sandy P. O., Neb. Ter., is the inventor.

Machine for Topping and Stripping the Leaves from Sugar Cane.—This invention consists in the employment or use of an endless feed apron, in connection with a toothed cylinder, slotted curved plate, and discharge rollers, all arranged to operate in such a manner as to strip the leaves from the cane in a very efficient manner. The invention further consists in the employment or use of a rotary knife, arranged to operate in connection with the parts aforesaid, so that the cane may be topped and have the leaves stripped from it simultaneously, or at one operation. This invention was patented on the 3d of last April by John M. Spencer, of Ottawa, Ill.

Science of Ballooning.

We have many readers who have devoted considerable time to investigating the science of ballooning. Every Saturday publishes a translation from a French journal, in which four conditions are specified as necessary to be fulfilled in making aerial voyages regular:—

I. An impervious skin to the balloon, or at least so nearly so, that it will retain the gas for a week or more.

II. The power of rising and sinking to take advantage of other currents, when we are thwarted by such as we are in.

Every one knows that, in the present state of our knowledge, the aeronaut throws out ballast to rise. Under three conditions he lets the gas escape—first, when the rarefied air permits the gas to distend the balloon dangerously; second, when having reached a favorable current he wishes to cease rising; and third, when the solar heat expands the gas too much. He also uses this power and that of ballast to regulate his momentum on landing. This is all very simple, but any one can see its many inconveniences; and the danger, when ballast and gas have been so far exhausted that you are left unprovided for contingencies. The frightful voyage of Blanchard and Jeffries, in crossing the English Channel, shows to what peril these maneuvers subject the aeronaut. Threatened with sinking into the sea, these adventurers threw over all their ballast without stopping their downward course. Their books, instruments, provisions followed. Next their clothes, and finally the wherry itself, so that they landed on the French coast, clinging naked to the cords. From the beginning of the art the dangers of this practice have been apparent. Guyton de Morveau looked forward to some substitute as the art developed itself. To find this is as much a desideratum now as then.

III. This condition relates to a matter little considered, namely, the dilation arising from solar heat. When the Duc de Chartres went up with the brothers Robert, and was carried suddenly above the clouds, the balloon so expanded under the heat of the sun that it was in danger of bursting. The valve being out of order the Duc cut the balloon in two places, when it rapidly descended. Blanchard relates, that in one of his voyages, his balloon swelled so much under the action of the heat that it snapped in every part. The narrative of MM. Biot and Gay-Lussac is more conclusive. They left the Conservatoire des Arts et Metiers on the 24th of August, 1804, at ten o'clock in the morning, and, reaching a height of 3,724 meters, were surprised at not finding it cold; but, on the contrary, the sun was so powerful that they gladly pulled off the gloves they had worn at the start, and the animals with them did not appear to suffer from the rarity of the air, while a bee flew humming away. Guyton de Morveau, in one of his statements, avers that the lowering of the mercury in the barometer was hardly perceptible, when the dilation was already considerable; and he adds, that the continuous flow of gas from the upper valve, like a thick smoke, made it seem as if the balloon had been rent in that spot. The explanation is this, that the gas confined in a case coated with resin is raised in temperature much more rapidly than the outer air. The history of aerostation is filled with instances. One day, Morveau, wishing to repair his balloon, had taken it to his garden and filled it with open air by means of bellows. The morning sun was shining, and presently the balloon began to roll

about, and at one time it came near escaping two persons who sought to retain it. Morveau, having opened the valve, the air which issued almost painfully affected the eyes, and was found to be four degrees warmer than that without. In another instance, the same observer noted a far greater difference, namely, that of thirty-nine to twenty-three degrees. At another time the same balloon was heated so much that it sprung up to an elevation of forty-three feet, with a weight to be sustained of one hundred and twenty-five kilogrammes, and then burst its confinement, and when a young man tried to hold it by seizing a cord and winding it about his wrist, he was carried over a wall nine feet high, and landed beyond. The balloon continued its way, traversing a public promenade, to the great wonderment of all, and settled down one hundred and fifty paces distant.

IV. The necessity of some means of steering a balloon has been felt from the start. "It is not well to deceive ourselves into believing," wrote Guyton de Morveau, "that there is not a great difficulty."

A Cigar Ship at Sea.

The recent passage across the channel of the *Walter S. Winans*, a small yacht belonging to the Messrs. Winans, and of similar construction to the now famous cigar steamer *Ross Winans*, possesses much interest to the public who have watched the completion of the larger vessel, and speculated so much of her performance at sea. The steamer in question is 72 feet in length, with a diameter of nine feet, and is 24 tons register. It is propelled by a high pressure engine of 25-horse power, driving a submerged three-bladed propeller, aft, of four feet and ten inches diameter. The yacht started from Havre for Newhaven at 5:30 A. M., on the morning of the 28th of March, with seven passengers. A heavy sea was running. The yacht had on board a full supply of coal, and was immersed to a few inches below her center. The engines worked smoothly and well, and she rode the heavy sea with ease and entire freedom from rolling. Rising slightly to the large waves she pierced their crests, which, dissolving, glided over the upper surface of her bow, and as far as the forward end of the deck; the main body of the waves passed gently along her sides, rising but little therefrom. Not a drop of water ever came upon her deck, while vessels of her size in sight were dashing the spray high over their bows. No shock of any kind was felt as she met the heaviest swells; on her rounded surface the waves could inflict no blow. The side seas, when her position was changed, and she lay in the trough of the sea, passed under without causing any perceptible roll; and this, too, whether she was going ahead or stopped. Early in the afternoon she arrived at Newhaven without accident of any kind.—*Manchester Guardian*.

New Solvents for Gold.

On the 26th of March M. Nickles presented to the Paris Academy of Sciences a note "On some New Solvents for Gold." The author has discovered that gold dissolves in the ethereal perchlorides and perbromides which he described last year (see *Chemical News*, vol. xi., p. 254). As the gold dissolves in the manganic compounds, the green color of these gradually disappears (proto compounds which are insoluble in ether being deposited), and a yellow or red solution of gold is left. The ether being evaporated from this solution and the residue sufficiently heated, a coating of metallic gold is left about the bottom of the tube, which suggests a process for gilding glass. The gold is reduced from the ethereal solution by proto-sulphate of iron and also by protochloride of tin, but purple of Cassius is not produced in the latter case. Many sesquichlorides and sesquibromides, the author states, also dissolve gold, those which are easily reduced answering best. The cause of the solution is obviously the instability of the per and sesquichlorides and bromides, from which free chlorine and bromine are easily separated. The ethereal periodides also dissolve gold, forming an iodide of the metal, showing that nascent iodine is a solvent, although that metalloids in the ordinary state is without action on gold. Last, an ethereal solution of hydriodic acid will dissolve gold leaf, owing, of course, to the instability of the acid and the liberation of free iodine in the nascent state.

Improved Fodder Cutter.

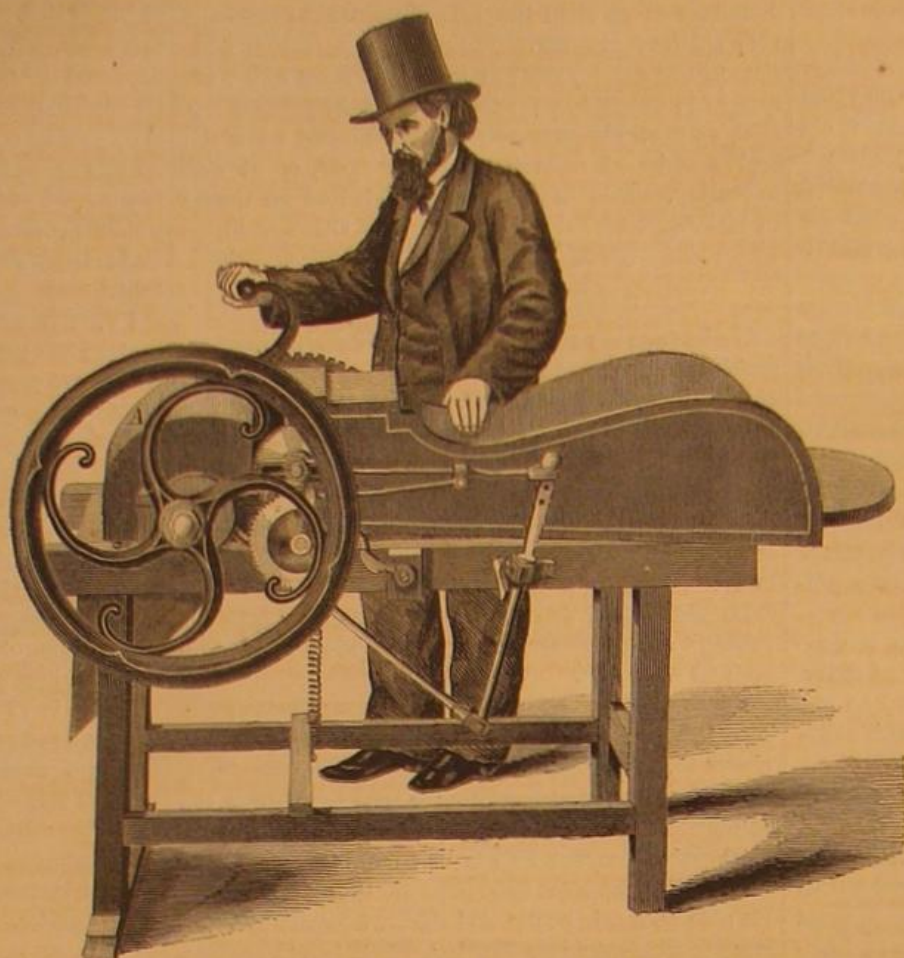
A regular and steady demand exists for good agricultural implements. Farmers are always looking out for those which are really durable and advantageous to them, and they seem willing, to judge from the quantities of all varieties sold, to give them a fair trial.

In this engraving we have shown a new fodder cutter, recently introduced at the West. It is substantially made and capable of being repaired by any ordinary mechanic or blacksmith, should an accident happen to it.

A large fly wheel is attached to the knife-shaft, which is covered by a shield, A, to prevent accidents, as well as to keep the cut feed from being scattered all over the floor. The knife is a single blade, curved and fastened, one on each side, to two arms on the shaft, so that they stand across the same, one edge being in advance of the other. In this way a drawing cut is obtained which is most efficient.

The feed on this machine is peculiar, in that it can be instantly adapted to cut any length desired, from two inches to one-fourth of an inch, and this without stopping the machine. A large number are now in use at the West, and the proprietors have many testimonials as to their efficiency.

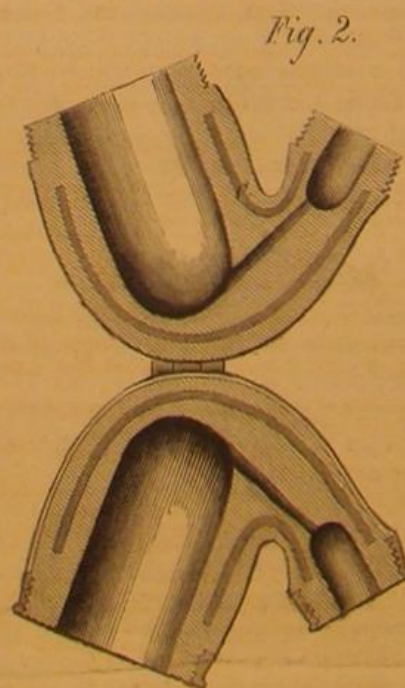
For further information in regard to the sale of rights, etc., address the inventor, W. D. Schooley, at Richmond, Ind., by whom it was patented, Aug. 22, 1865.

**SCHOOLEY'S FODDER CUTTER.**

that if a piece be cut from the lowest part of a casting, the phenomenon would not be noticed.

JEANNE'S PIPE.

This pipe is constructed to be easily taken apart for cleaning, so that the thick oil which condenses in



the passages can be quickly removed, and the pipe rendered as clean as new. It also facilitates the construction, for, by the use of special tools, the parts can be rapidly and quickly turned out.

The pipe is made in halves, which are hinged to each other, and confined by caps, A and B. Figures 1 and 2 show the pipe in perspective, and as it

appears when opened for cleaning. The material shown at C, in Fig. 2, is cork, and is inserted in the body, for the purpose of making it air-tight at the point of junction. The arrangement is, in fact, the counterpart of that in the cases used for covering meerschaums, while they are taking on the rich brown, so delightful to the eyes of those who color them.

Patented Feb. 6, 1866, through the Scientific American Patent Agency, by Paul Jeanne. For further information address the patentee, No. 175 Fulton avenue, Brooklyn, New York.

Purifying Beeswax.

At a recent meeting of the Academy of Sciences Paris, M. Lies Bodard sent a note entitled "Chemical Researches on Wax." A large quantity of wax, the author states, is imported from America more or less adulterated with paraffine, and he gives a process for separating the paraffine. It depends upon effecting the etherification of the wax constituents, the paraffine remaining unacted upon. The author first dissolves 5 grammes of the substance in 50 cubic centimeters of amyl alcohol, and heats to 100°. He also heats to the same temperature a mixture of 100 cubic centimeters of fuming sulphuric acid and the same volume of water. When heated he pours the diluted acid upon the solution of wax, continues the heat as long as bubbles of gas escape, and then allows the whole to cool. On cooling a mass collects of about twice the size of the original wax. This mass consists of the unaltered paraffine with a mixture of melissic alcohol and cerotate and palmitate of amyl, the last three somewhat altered by the excess of sulphuric acid. The mass is now heated on a water bath to 100° with a mixture of 50 cubic centimeters of monohydrated sulphuric acid and 25 cubic centimeters of Nordhausen acid. The action of this must be continued for about two hours or more, until no bubbles escape even when the mixture is stirred with a glass rod. In this way all except the paraffine is carbonized. The carbonaceous mass which remains is dissolved in amyl alcohol, filtered with the aid of a heated funnel, and the residue on the filter washed with the same alcohol. The alcoholic solution is again heated with monohydrated sulphuric acid to transform the amyl alcohol into sulph-amyl acid. This not holding paraffine in solution, that body deposits on cooling, and may, if necessary, be further purified and weighed. The author also gives a process by which the melissic acid and cerotate and palmitate of amyl may be separated, which need not detain us.

Nitro-Glycerin.

Mr. S. P. Ely, living in Marquette, Mich., dissents from the assertion of Mr. Nobel that "nitro-glycerin" will not explode under a temperature of less than three hundred and twenty degrees. After remarking that he had prepared some of this chemical for blasting, he adds:

"The first I knew I had a tremendous explosion in my office. There was not enough of it to take the roof off, but the contents of the bottle were scattered over every square foot of wall and ceiling. I made a second trial with similar success, except that the explosion took place out of doors. The practical difficulty in the use of the compound seems to be that it can only be prepared at a very low temperature, and instantly and violently decomposes with any increase of temperature."

INVENTORS.—The Commissioner of Patents has invited individuals throughout the country to send to the Patent Office busts of authors and inventors, and of all men who were celebrated for mechanical skill and ingenuity—the busts to be of plaster, metal, stone, bronze, or otherwise. To all such busts the Commissioner will assign appropriate and conspicuous positions on the top and front end of each case containing models. Places above described can be found for about two hundred busts.

NEW PUBLICATIONS.

THE GARDEN.—A Manual of Practical Horticulture, or How to Cultivate Vegetables, Fruits, and Flowers. 166 pages. Price \$1 00.

This volume embraces an exposition of the nature and action of soils and manures, and the structure and growth of plants, directions for forming gardens, instructions for sowing, description of implements and fixtures, transplanting, budding grafting and cultivating vegetables, fruits and flowers, to which is added a valuable chapter on trees and shrubs.

THE BARN YARD.—A Manual of Cattle, Horse and Sheep Husbandry. 165 pages. Price \$1 00.

This volume treats upon the breeding, rearing, and general management of horses, mules, cattle, sheep, swine and poultry, how to improve breeds and how to insure the health of animals, and how to treat them for disease without the use of drugs, together with a chapter on bee-keeping.

THE FARM.—A Manual of Practical Agriculture, or How to Cultivate all the Field Crops, with a valuable Essay on Farm Management. 150 pages. Price \$1 00.

It treats of soils, manures, rotation of crops, draining, fences, farm implements, crops, orchards, etc.

THE HOUSE.—A Manual of House Architecture. 176 pages. Price \$1 00.

This volume treats upon the art of home building, and is illustrated with many plans of houses, villas, cottages, barns and other buildings.

The above four series are most valuable books, and are creditable to their author, D. H. Jaques. They are each profusely illustrated, and eminently practical. Publishers, G. E. and F. W. Woodward, No. 37 Park Row, New York.

THE MILLER'S AND MILLWRIGHT'S GUIDE.—Henry Pallett. Pages 281. Published by Henry Carey Baird, Philadelphia.

This work, just issued, contains a great variety of information concerning mills and millwrighting, together with illustrations and tables which are no doubt valuable to those interested in the business. The author's views in regard to engineering are somewhat crudely stated, but on the special subject matter of the volume there is much which we can approve.

The Cast Iron Question.

We have occupied a great deal of space lately in

THE Scientific American.

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PATCHING ENGINES AND BOILERS.

Some years ago, a little steamer called the *Plover*, which ran between Detroit and a lake port, knocked the bottom of her cylinder out, and was laid up for repair. The engine was of the beam class, and the bottom of the cylinder and the nozzle, which the lower steam chest is bolted to, were in one piece. A new casting was soon applied and the boat went out again. She had scarcely made one trip, however, before the same accident occurred again, this time from a wholly different cause. In the first disaster the bottom was knocked out from the breaking of the piston rod, but in the second it was from the inequality in the ratio of expansion between the new metal and the old. Since there was nothing to compensate for this, no way in which the weaker could yield a little to the stronger metal, the bottom and side of the cylinder were rent away, and the last end of it was worse than the first.

A serious accident which recently occurred to a steam boiler in England, shows what may happen when they are improperly repaired.

The boiler in question was twenty-five years old, but had not been in use during the whole of that period. It was a plain cylinder boiler, 30 feet long, 9 feet diameter, and made of $\frac{3}{4}$ iron, in the usual manner, while the safety valve was loaded to a pressure of but 40 pounds to the square inch.

This boiler gave way over the furnace, and was repaired there, by having a new sheet put in. Immediately after, the boiler exploded, killing one man and injuring five others. The seat of the rupture was at the junction of the old and new metals, tearing the old sheet through by the line of rivets. The direction of the break was in the length of the boiler for five feet, when the rupture developed transversely and tore the boiler into three pieces, one of which was thrown 200 yards from the original locality.

Many persons would say that this is extraordinary, and instead of looking in the right direction seek, to mystify themselves and others by elaborate theories,

but the cause was plainly the weakening of the old plate by the strain imposed on it in putting in the new.

It is not a little singular, and significant that while the inspectors in England who have charge of those excellent institutions for the prevention of steam boiler explosions, denounce the cylinder boiler in such terms as these: "the recommendation is not given without good reason, that boilers of this treacherous, plain, cylindrical, externally-fired construction, should be discarded for those fired internally, which are much more reliable," a few unthinking persons at the West are endeavoring to have tubular boilers rejected and these "treacherous, plain, cylindrical, boilers" substituted instead.

"HOT ENGINEERS."

While public attention seems to have been directed not unreasonably, to the disastrous boiler explosions at the West, another class of men are changing the order of things, and seem to be turning their efforts in the other direction, endeavoring to destroy boats and boilers as fast as possible.

A letter recently received from a correspondent at Beetown states that on the Western waters, particularly the Upper Mississippi, the most reprehensible practices prevail. Engineers are sworn to carry not over one hundred and fifty pounds pressure, "but," says our correspondent, "they do not consider their oath binding;" therefore they proceed to alter the gages. Two hundred and two hundred and fifty pounds to the square inch, is not uncommon. "Men that refuse to work the boilers at such pressures are not in great demand." Our informant says: "Here you may wonder how it is that the passengers do not discover this." In the first place the gages are so set that the passengers would have to go on the foot board of the engine to see them, and he would be a bold man who would do that where he wasn't wanted; and in the next place, the face of the gage is taken off and the hand changed, so that there will be fifty or sixty pounds pressure in the boiler before it indicates at all. Instead of this, however, a good many who wish to be popular with the captain and crew, and be known as "hot engineers, without the risk, practice the reverse and set the gage the other way, so that it will show fifty or sixty pounds cold." It must be confessed that of the two, this is much the best deception.

The men also shut off the cock on the gage partially, so that it will show incorrectly. "Hot engineer," we take to mean a reckless man, and if these persons habitually break the laws and take oaths which they "do not regard binding," their places should be supplied by others.

CITY REFORMERS.

The Legislature of New York has blessed this city with a most admirable health law, and the Commissioners, of whom Jackson S. Schultz, Esq., is the President, are working with great energy to carry out the provisions of the bill, and already our hitherto dirty streets, and many other abominable nuisances that have festered here under municipal misrule, are being cleaned up and removed.

We called on Mr. Schultz a short time since to inquire if the inhuman system of driving droves of animals through our crowded streets could not be abated. He assured us that the whole thing would be stopped in less than three months, and, furthermore, that the slaughtering of animals in the thickly settled parts of the city would also be stopped. This business is hereafter to be carried on outside the city limits.

The new License Law has been placed under control of the Health Board, and the Commissioners are determined to so fix the licenses that liquor sellers shall hereafter pay the expenses of our police force, for the reason that most of its duties arise from the sale of intoxicating liquors. Commissioner Acton declared that seventy thousand persons were arrested last year for crimes that were directly traced to the influence of liquor. It was decided by the Board of Commissioners that there should be two classes of licenses—the first to pay \$250, the second, \$100, which at present calculation would yield an annual revenue of over one million dollars.

Verily the world moves; the millennium is coming.

ILL VENTILATED, OVER CROWDED SHIPS.

The steamship *Virginia* arrived at this port recently with a large number of passengers, many of whom were on the sick list. She was immediately put in quarantine, the sick cared for and isolated from the city until cured.

Investigations made by the proper officers show that none of the passengers came from ports infected with cholera, and that it was not until some eight days after the departure of the *Virginia* from Liverpool, that disease broke out on board. It appears that the ventilation was so defective that the passengers suffered greatly, and being enfeebled by bad air and insufficient food, poor in quality, were especially liable to attack. That many died is not to be wondered at. But it seems passing strange, however, that with all the modern appliances for obtaining fresh air and creating a thorough circulation in apartments, that so little attention is paid to it. On ship board, of all other places, this matter is easy to regulate. The loss to the owners by the detention of their vessel amounts to a large sum, and if not for humanity then for the pocket's sake, a little more interest in the welfare of the steerage passengers would pay. Every person who has been to sea, however, in a steamship, must acknowledge that the officers are not always to blame in this matter. When there are only one hundred passengers it is a matter of the greatest difficulty to get those in the steerage to behave with common decency. They defy persistently all the laws and rules of the ship, not perhaps in all cases to be ugly, but from their inability to comprehend the importance of them. Tell a man who has lived thirty years without ever being really clean, that if he does not instantly change his habits he will lose his health and life, sooner than heed the advice he will die, and his fellow by his side will die from the same cause.

They prefer to skulk away in their berths, to grovel in filth in the darkest corners, to be dirty when it is easier to be clean, because that is the way they have always lived. It requires close watching and strict discipline to preserve even an ordinary degree of health in emigrant vessels at all times, still more when epidemics rage.

In view of these facts the strictest quarantine should be enforced, and if legislation is necessary to security, certainly those in authority should see that nothing is omitted.

AGRICULTURAL EXHIBITION IN BRAZIL.

Senor D'Aguiar, the Consul General of Brazil, has handed us the rules and regulations that are to govern the "Exhibition of Agricultural Implements," which is to open at Rio Janeiro on the 19th of October next. These rules are published in another column. The Consul General informs us that already agricultural implements made in the United States have been introduced into Brazil to a considerable extent, and the future promises greater encouragement. Our manufacturers of farming implements are generally very enterprising, and if the prospect of reward is sufficient they will enrich the Brazilian exhibition with some of their best productions.

How to Preserve Newspapers.

H. R. Heyl, of Philadelphia, has recently secured a patent for an adhesive binding tag which is an excellent article for temporarily binding newspapers, magazines, music, and other documents. Each of these tags has a string loop secured to it, and by punching through the edges of the sheets and sticking on two or three tags on the inner fold of the sheet, a string can be passed through the loops, and when tied makes the sheets secure. For a single number of the SCIENTIFIC AMERICAN three tags are enough, and two sheets of pasteboard, provided with suitable metallic eyelet holes, can be used for covers.

The tags are put up 200 in a box with punch and strings for tying up the sheets after the tags are stuck on. We can supply the boxes at our office sent by mail at \$1. If a portfolio with leather back is wanted, the price of portfolio at the office is \$1 25, or \$1 50 by mail.

A LATIN journal, in Paris, will be a literary curiosity, equal to the Chinese journal announced for appearance in London. It has begun business under the title of *Apis Romana*.

For the Scientific American.

NITRO-GLYCERIN—THE CAUSE OF ITS PREMATURE EXPLOSION.

BY PROF. CHARLES A. SEELY.

In a recent number of the SCIENTIFIC AMERICAN it is suggested that the late disastrous explosions of nitro-glycerin were the result of spontaneous combustion. As the subject is one of great interest at the present time I trust the facts I present herewith, now published for the first time, will be acceptable.

The morning after the explosion of nitro-glycerin in Greenwich street (Nov. 5, 1865), I went to the Wyoming Hotel and made a careful inspection of the premises, being assisted by several of the gentlemen who were wounded. At this time the cause of the explosion and the explosive material were a profound mystery. Inquiries elicited the following facts: A few minutes previous to the explosion, the men, a dozen or more, occupying the bar room, which was on the level of the street, observed a peculiar odor which by some, at first, was taken to be due to a leakage of gas. It was soon apparent, however, that the odor was not of gas, and as it increased in strength, search was made for its cause. The odor was traced to a small baggage room, and there it was found to be issuing from a small chest or packing box provided with rude handles of rope. The box was brought out into the center of the bar room and placed upon the floor. But the stench became stronger and very offensive, and some of the gentlemen saw what they supposed to be smoke and a yellow or reddish flame issue from the box. All were then alarmed and the box was hastily carried to the edge of the side walk. The men who carried the box had barely time to re-enter the bar room and turn round to look at the box through the glass doors when the explosion took place.

The small size of the box, the absence of a smell of sulphur, and the terrific effects of the explosion, indicated something different from gunpowder. We searched in vain for some relic of the box or its contents.

I directed inquiries most minutely and particularly with reference to the odor. Unfortunately none of the gentlemen were familiar enough with the odors, which we of the laboratory know so well, so as definitely to describe that which they had perceived; but I was able to get so many positive statements that when they were put together, I felt warranted in concluding that the odor was that of nitric gas, and that the yellow smoke or flame was nitric gas. Under this state of things, I was inclined to believe that the box had contained gun-cotton, and that here was a case of spontaneous combustion, with which I am quite familiar. As ordinary gun-cotton, however, alone could not produce the mechanical effects shown, it was necessary to suppose that it was combined with chlorate of potash, or that the box also contained a fulminate. This theory proved to be incorrect, but its plausibility was singularly confirmed, when next day it became known that nitro-glycerin, a substance so much like gun-cotton, was, in fact, the explosive. I made a very near guess.

I have made the above narrative so minute, for the reason that the peculiar odor, and the red fumes observed at the Greenwich street explosion, so characteristic of the spontaneous combustion of compounds like gun-cotton, seemed of little consequence to others who examined the case. I desire it to be put on record that there is sufficient reason for believing that this disaster was chargeable to spontaneous combustion.

It is also proper to add, that, as a good citizen, shortly after the occurrence, I brought the subject before one of our scientific societies, and sent a communication to one of the daily papers, in which I gave warning of other explosions, in case proper precautions were not taken. Unfortunately, the communication was not published; its publication, possibly, might have prevented the fearful catastrophes at San Francisco and Panama.

As above intimated, I am familiar with the spontaneous combustion of gun-cotton. I am acquainted with the particulars of several cases which occurred unintentionally, and the conditions are now so well understood that we know how to bring it about at will, and with certainty. The conditions are simply that the cotton, slightly acid, be kept so that the

acid fumes and the heat, generated by the reaction of the acid, shall be prevented from escaping. For example, take an ounce of gun-cotton, slightly acid, and contained in a bottle, and pack in with cotton wool or saw dust, in a close box; within a few weeks, in warm weather, it will be pretty sure to take fire. An actual case of this sort is described in the *American Journal of Photography*. The spontaneous combustion theory completely explains the many "mysterious" explosions of gun-cotton which occurred within a few years after its discovery.

The constitution and properties of gun-cotton and nitro-glycerin are so similar that little argument is necessary to show that the latter also is liable to spontaneous combustion. To put the question, however, beyond dispute, I have made experiments which demonstrate that nitro-glycerin is subject to the same accidents from spontaneous change, as gun-cotton. Other theories, which have appeared in the newspapers, to account for the Greenwich-street explosion, are altogether insufficient. We have, as yet, very little information with reference to the explosions at San Francisco and Panama, on which to base a perfectly satisfactory explanation. But unless we can have something to the contrary, they too, must be accepted as cases of spontaneous combustion. In the investigations of this nature, I would recommend that inquiries be most particularly directed concerning the temperature to which the packages had been exposed, and as to the escape of acid odors or fumes, previous to the explosion.

Many seem to suppose that nitro-glycerin, being proved to be a dangerous substance, can no longer be used. Congress, I see, are proposing to make its manufacture and sale a penal offense. The people and Congress, nervous under a panic, perhaps reasonable, are yet greatly in error. We cannot afford to allow a substance so useful as nitro glycerin has proved itself to remain unused; we cannot confess that our science and inventive skill are unable to find the means of making it safe. I venture to predict that, in a short time, nitro glycerin will be esteemed far less dangerous than gunpowder, and that in a great measure it will supersede it; within a few years the annual consumption of nitro-glycerin in the United States will reach a million of pounds.

Gun-cotton was at first looked upon with as much dread as is now nitro-glycerin; the accidents from it were quite as terrific as those from nitro-glycerin, and they were also then quite inexplicable. I quote a few cases. In 1847, the gunpowder factory of Hall Brothers, in England, where they were making gun-cotton, blew up, killing every man at work in the place. On the 17th day of July, 1848, a similar explosion of over 3,000 lbs., took place at Bouchet, near Paris; walls from eighteen inches to a yard in thickness, were reduced to powder from top to bottom, and heavy weights were thrown to a great distance. An explosion took place in a magazine at Vincennes, which no one had entered for several days previously. An explosion of 300 lbs. took place in Connecticut under precisely similar circumstances.

But lately what a change! Wherever there is a photographic artist you may find gun-cotton. It has been manufactured in all quarters of this city. I have myself made tons of it. During our late war, thousands of pounds were sent by Adams Express from this city to a neighboring State, and the business was conducted in such a way that there was less risk from fire than in the ordinary handling of dry goods. It is only to our ignorance that such things appear dangerous; whenever we are forewarned we must learn how to be fore-armed. Shall we banish edge tools, and steam, and gunpowder on account of the ignorance and carelessness that exist in the world? Let us rather look upon what we call accidents as indications of something to be learned, and something to be invented.

Now, the property of nitro-glycerin, which heretofore we have not understood, and which has rendered its storage and transportation dangerous, is its liability to spontaneous combustion; in other respects it is far safer than gunpowder. It is with great pleasure I feel able to announce, positively, that sure and simple means are known, and will be put in practice, to remove that danger, so that, shortly, nitro-glycerin will be thought of only on account of its eminently useful properties.

In conclusion: The preparation of nitro-glycerin

must never be intrusted to unskillful hands, and its transportation for some time to come should be regulated by suitable legislation.

MODERN MARINE ENGINEERING.

Although the marine steam engine, in general, is essentially the same to-day as it was ten years ago, the details of it, and the practice of to-day compared with the past are so changed for the better that the mechanical portion of the community are always ready and eager to obtain a knowledge of the construction at the present time.

English writers have, with a few exceptions, supplied all the literature of the profession, and to them we look for the best works on the subject. John Bourne has rendered substantial service in this way, and there are no works on mechanical engineering more useful and reliable than his "Catechism," and later "Hand Book."

We have before us a new work on "Modern Marine Engineering," applied to paddle and screw steamers, by N. P. Burgh, engineer. The work is published in England, and issued in New York by D. Van Nostrand, No. 192 Broadway.

The first number contains drawings of a new set of engines recently built in England for a Russian frigate. These are made to scale, and accurately colored to represent the different metals employed. The colors are those generally used by the profession, not attempts at pictures. They give a clear idea of the plan and general arrangement. The style in which the work is got up challenges attention. The type is large and fine, the matter is double-leaded, and in point of mechanical execution faultless. The scope of the text is somewhat comprehensive; and in view of the interest always attaching to the subject, the reader scans every page attentively. Mr. Burgh goes into the subject quite prepared, indeed confident of his ability to cope with any question, and after discussing some of the types of engines in general use, he alludes to our forefathers as follows:

"To design engines on land, and correctly manage, or rather attend to them at sea, would puzzle some of our forefathers, whose originations were nevertheless fair examples of that age of progression; what may seem perfection of arrangement, even after construction, on land, will often betray want of foresight as to access for repair or renewal at sea."

An Irish member of note, Sir Boyle Roche, is reported to have said in reply to the inquiry of a peer,—"By forefathers I do not mean our descendants, sir, but those who come immediately after us," and taking a view of engineering analagous to that of Sir Boyle Roche, it is hardly fair in Mr. Burgh to reproach those worthy men with not knowing about engines that came immediately after them.

But Mr. Burgh does not always say what he means, as in this paragraph:—

"The parallel motion, direct acting engine, cannot ever claim much favor in the estimation of those who consider natural laws; when the shortness of the connecting rod be taken into consideration, it is not surprising to relate that this type of engine soon proves its worth."

It would seem from the construction of the previous portion that Mr. Burgh intended to deny the utility of parallel motion, but as it closes it claims a special advantage from the shortness of the connecting rod, a thing that is somewhat difficult to comprehend, and that our forefathers are to be reprimanded for not having discovered.

Faults of grammar are, however, so common, that perhaps we are hypercritical, and if Mr. Burgh's English is sometimes cloudy, his drawings will supply all that relates to the construction part of our modern engines. These it seems our forefathers knew nothing about.

Mr. Burgh, in the construction of American engines of the beam variety, is very charitable. He scorns to take advantage of the ignorance of his cousins. He does not even criticise them; he disposes of us in seven lines. He merely says: "Over head motion for paddle engines is not much adopted in England at the present day. Our transatlantic fast cousins still adhere to the arrangement of the beam above the crank shaft. For smooth water and flat bottom vessels there is not much objection to this arrangement, i. e., as far as power is concerned, but for correct locality of detail, to be merciful is to be silent." And that is the way a modern, marine engineer talks of beam engines of 105 inches diameter of cylinder and 12 feet piston stroke, in ships that go around "the Horn."

In another part of his work, Mr. Burgh, in describing a steam engine, states that it has a cylinder and a central rod, to which is attached "an opaque piston." Recovering from the stunning effect which this intelligence naturally produced on our sluggish mind, we reflected that as cast iron is usually quite translucent, it was an advantage to have this special piston "opaque," inasmuch as common people would be quite unable to see through it.

We cannot sufficiently admire the boldness and versatility of Mr. Burgh's mind. Whatever he bends his attention to, falls before his all-conquering intellect. He not only grapples with the mysteries of the steam engine, but he swoops upon the Latin tongue, and presses that into his services to make his machinery and his views plain to the unlettered reader.

A variety of quotations are introduced, which come before us with the charm of novelty beaming from them. As for example, on page six we read that "the truthful application of natural laws will be attended to *per se seriatim*," and on page five a certain arrangement is "not unworthy of comment *ad valorem* of the arrangement *per se*." *Ab initio* is also a favorite phrase with Mr. Burgh. It must not be supposed, however, that such a daring spirit willingly brooks the conventionalities which hampered "our forefathers" in reading the Latin tongue. Not he; in some instances he yields to the prejudice and bigotry of the day, and employs the standard spelling, but we notice that on page eighteen he breaks forth into this masterpiece: "The cause for the recognition of some promulgations is that in allusion to the originators, the phrase of *suum cuique*, shall be in full force." If the perpetrators of the "promulgations" alluded to, survive this, they may boast of the most vigorous constitutions.

But lest we seem to pursue this subject with too great detail, let us stop at once. The English language is capable of expressing simple ideas very clearly, and it is the extreme of bad taste to interpolate foreign phrases; particularly out of place in mechanical works.

Future numbers of this work will contain plates and cuts of all the latest marine engines, which we shall examine with great interest.

Brazilian Exposition of Agricultural Machines.

This exposition will be opened on the 19th of October next, and closed on the 2d of December, 1866, and the following regulations and instructions for the special exposition of machinery and instruments manufactured in foreign countries, for the cultivation, preparation and improvement of agricultural products, are published for the use of those it may concern:—

First, All machinery and instruments will be admitted to the exposition when followed by the following inscription "Foreign"—with the name of the manufacturer, inventor, and cost of each.

Second, Said machines and instruments will have no right to premiums, and should be worked by proper persons employed by the expositors, on the days and hours appointed.

Third, The necessary space and steam power will be furnished free for the working of the machinery.

Fourth, No machinery to be admitted which will require foundation or special constructions, or is already known or used in Brazil.

Fifth, All machinery to be taken to the place of exhibition by the expositors at their own expenses.

Sixth, No machinery to be removed without special permission.

Seventh, After the exposition is over, said machines may be sold after satisfying the conditions of art. 12, sec. 3d, free of expense to the managers.

Eighth, Tickets of admission will be furnished to those working and giving explanations in regard to the machines.

Ninth, Those wishing to take part in the exposition will give due notice of such intentions to the Brazilian Minister (in New York), with full particulars of their machines.

Tenth, All empty boxes and packages to be removed by the expositors when advised to do so, otherwise to be sold for the benefit of the exposition.

Eleventh, The managers to have the right to exclude any machine or instrument which is not under the conditions of article fourth.

Twelfth, The dispatch and clearances of machines and instruments at the Custom House are—

1st, To be received at the Custom House and sent to the place of the exposition without being opened, or paying duties, all packages destined to said special exposition and directed to the Board of Managers.

2d, The expositor or agent to make a declaration of the contents and value of each package, and sign a bond for their re-exportation or the payment of duties in case of being sold.

3d, All goods so imported and not re-exported, will be subject to a duty of 1½ per cent *ad valorem*.

4th, All packages will be sent from the Custom House under the care of an officer.

5th, Packages only to be opened at the place of the exposition, before an officer of the Custom House, who will examine the contents according to sec. 2, and subject only to the conditions of sec. 2d and 3d.

6th, All machinery and instruments sold not to be removed until all the Custom House dues are paid.

Board of Managers, Rio de Janeiro, February 19th, 1866. Luri P. Couto Ferrar, President.

By order D'AGUIAR.
Consul General of Brazil,
No. 13 Broadway, New York.

New Agent for Deadening Pain.

An important addition to the means of diminishing pain has been made by an English physician, who has introduced a new method of producing local insensibility to the knife. Chloroform robs the most terrible surgical procedures of the worst horrors which formerly surrounded them, and has even rendered possible some operations which could hardly have been attempted without it; but it has its own peril—the peril of death. Surgeons justly encourage their patients, by reciting to them the statistics of fatal accidents under chloroform, which, incomplete though they be, demonstrate the extreme rarity of such misfortunes. It has, however, been observed by all authors who have collected these cases, that a remarkably large proportion of the recorded deaths have occurred where only minor operations have been contemplated. Hence a rapid and efficient means of producing local anæsthesia, and one free from any of the constitutional risks attending the administration of chloroform, is a boon of great price. Dr. B. W. Richardson effects this result by directing on the skin a finely divided spray of pure ether, using an ingenious modification of the spray tubes, lately much in vogue as toys, for diffusing perfumes. A rapid blanching of the skin, and insensibility to pain, follow in from about thirty seconds to two minutes. Upward of a hundred operations have recently been painlessly conducted under this method. It is only likely to be generally useful for superficial operations; but these are so often undergone at the cost of great terror and anguish, through dread of the risks of chloroform, that the value of this invention must be very great.

[We find this extracted from some unknown source into one of our exchanges. The external application of ether has long been practiced, but this mode of employing it in spray may be an improvement.—Eds. Sci. Am.]

Name of Weights and Measures.

At a meeting of the Polytechnic branch of the American Institute held April 19th, there was an interesting discussion on the importance of legalizing in this country the decimal system of weights and measures, according to the French standard, already in use among scientific men of all nations, and which will probably be soon adopted in Great Britain. A new point was raised regarding the nomenclature. The Chairman, Prof. Tillman, said there could be no question as to the utility of the proposed reform, which would effect a great saving of time and labor in making computations, yet in adopting the decimal system of weights and measures, we should be careful to designate the decimals by names which could be readily distinguished and easily pronounced. It appeared to him that a serious evil would arise from using the French nomenclature, which distinguishes the multiples of the unit by prefixes derived from the Greek, and the divisions of the unit by prefixes derived from the

Latin language. In some cases there is a perplexing similarity of names; for instance, a decameter is equal to one hundred decimeters, the only difference between these names is in the fourth letter. Although the pronunciation of these names expresses the distinction between them, it is probable that errors would often arise in writing these words. To obviate this objection, and to make the distinction between the whole series of names more plain, the Chair proposed that prefixes to the unit be used to express the multiplication or increase of the unit by ten, and that suffixes be added to express the division or decrease of the unit by ten. It is best to retain these prefixes as nearly like the French as is consistent with easy pronunciation, but the suffixes derived from the Latin cannot be easily added. After a numerous coinage of names, the following were selected as the best adapted to common use. In measures of length the word meter is contracted to met:—

39-37079 inches—1 meter.
Decamet.—393-7079 inches—10 meters.
Hectomet.—3937-079 inches—100 meters.
Kilomet.—39370-79 inches—1000 meters.
Myramet.—393707-9 inches—10,000 meters.

On the other hand the decrease of the meter is thus expressed:

Metet.—3-937 inches—.1 of a meter.
Metun.—3937 of an inch—.01 of a meter.
Metmill.—3937 of an inch—.001 of a meter.

In the same manner the prefixes and suffixes would be added to the unit of weight and, commencing with the highest, the following would embrace the whole series, the gram being equal to 15.44 troy ounces:—

Myrogram—10,000 grams.
Kilogram—1000 grams.
Hectogram—100 grams.
Decagram—10 grams.
Gramet—.1 gram.
Gramun—.01.
Gramill—.001.

In the same manner the additions are made to lit. the contraction of one liter—22009687 of an English gallon—a little less than a quart—myralit., kilolit., hectolit., decalit., liter, lilet., litun, litmill.

The Chair believed it was of the highest importance to settle the question of names before we adopt the system, and to do it in such a way as to save as much time and trouble as possible to those who are to follow us.

SPECIAL NOTICES.

Asahel G. Batchelder, of Lowell, Mass., and Geo. O. Way, of Claremont, Minn., administrators of the estate of Lafayette F. Thompson, deceased, have petitioned for the extension of a patent granted to Henry Tanner, assignee of the said Batchelder and Thompson, on the 6th day of July, 1852, for an improvement in railroad car brakes.

Parties wishing to oppose the above extension must appear and show cause on the 2nd day of July next, at 12 o'clock, M., when the petition will be heard.

Co-operative Molders.

Some molders of Troy, N. Y., have organized a Co-operative Association, and have purchased thirty-six lots in the vicinity of J. B. Carr & Co.'s chain works, upon which they intend to erect a furnace and undertake business for themselves. These lots were purchased for the sum of \$5,800, and are well located and adapted to the purpose indicated. The capital stock is fixed at \$100,000—subscriptions limited to \$5,000. We understand that about \$40,000 have already been taken, and that the projectors feel confident of raising the balance without difficulty. Indeed, so determined are they and so confident of success, that the engine and cupola have been put under contract, and Mr. Hyde's patterns for the improved gas burner purchased by the Association. It is designed to begin work upon the building immediately, and to have the whole ready for operation by the middle of May or the first of June. The result will be watched with interest by the community in general.—Exchange.

An association of American riflemen is to meet a Chicago on June 13th.

AMERICAN ENTERPRISE IN CHINA.

From a recent number of the *Friend of China*, a journal in the English language at Shanghai, just received, we clip the following:—

"We wish now to draw attention to the establishment known as the Kiangaan Machine Shop, Hongqua, to which on several occasions we have made reference. As our local readers know, the site of this establishment was formerly Messrs. T. Hunt & Co.'s, then, as now, under the superintendence of Mr. Thomas A. Falls, an American engineer of some eminence in his profession. Since the establishment has changed proprietors, although only monthly tenants, the Chinese, on Mr. Falls' suggestions, have made several valuable additions and improvements on the property; one of them being a furnace of greater capacity for castings than any east of the cape, we are told. But it is to the work done on the premises to which we would draw attention. We see there, in profusion, howitzers in iron and brass, light and heavy, of exquisite finish; shell of all sizes; the place around being resonant with the roar of a steam polisher of balls as they emerge from the foundry; fuses completed, from the sheet of brown paper and paste, up; muskets in all stages of manufacture, from the small screws which secure the springs of the percussion locks, to the barrels rolled and welded as they come from the furnace; boring machines and lathes of every size, for the mortar or the pistol; immense drops for punching, cupolas for melting the crude ore, ovens for baking, draughtsmen, molders, blacksmiths, boiler makers, copper smiths; in a word, a native arsenal as ponderous and compact as the best of those we see at home.

"Assuring to peace lovers, indeed, is an inspection of this splendid foundation. Would that this peace-securing missionary institution, as we term it, had for its supporters men of better deservings; would that all this peace securing was in aid of a Government bent on enlightening, not on enthraling its subjects, both mind and body!

"The number of artisans employed by Mr. Falls, on an expenditure for salaries of some \$5,000 a month, is over three hundred, fifteen of whom are Americans or Europeans; Mr. Stevenson has charge of the draughting department, Mr. McIlwrath the heavier engineering. Among some pieces prepared for shipment by the *Confucius* for transport last week to Nanking, and thence for the various war fields over the country, were some beautiful three-pounder howitzers, weighing, mounted on iron carriages, the insignificant total of five hundred pounds; twelve-pounder howitzers, similarly mounted, five hundred and twenty pounds; while there were heavy howitzers for ship board, or shore use, of over nine hundred pounds weight; one sixty-eight-pounder howitzer, of cast iron, being just ready for placing in the lathe. The wheels of the carriages seem to be particularly well made, dished as only adepts in that branch of mechanics know how to shape their stocks for whole tires on breech fellows, and it but wants Collinge's patent axletrees to make them equal to the exposition of a Long Acre coach factory.

"A week or so ago there was a trial of some of the guns at Woosung, all proving in a most satisfactory manner. A Parrott gun, in particular, was highly delighted in by the Mandarins inspecting by order of the Taoutai. The distances being calculated for 500 and for 700 yards, the fuses for those distances burnt with excellent precision; the bullets, with which the shells were filled spreading on over distances as far again. Among the three hundred artisans are men from various provinces, the best, however, being Cantonese. As many as thirty are educated youth from Peking. Though now begrimed with the soot of the forge, or the dust of the laboratory, they are 'swells at home.' Two of them, under Mr. Stevenson's tuition, promise well as draughtsmen; and if the Manchous could only secure themselves from the intrigue of native haters, their tenure of the Chinese throne, relying on such establishments as now described, might be considered safe for another century. Time will show, however, whether these arsenals under foreign management are not the weapons to effect the usurpers' expulsion."

Thomas A. Falls, mentioned in the above article,

was formerly connected with the Novelty Works, and Thomas F. Stevenson was formerly of the Neptune Works, of this city.

The Industrial Application of Oxygen.

When illuminating gas was first introduced, it was compressed in strong vessels, just as soda water is at the present day, and delivered to customers in their dwellings. Very few persons had the temerity to suppose that it would ever be conducted through the city in large mains, and be passed into every house through connecting pipes.

"We now hear," says the *Evening Post*, "of the organization of companies in France for supplying oxygen gas in portable receivers, the gas to be used for purposes of light and heat. We may some day have oxygen pipes carried along by the side of the illuminating gas ready for the various applications to which it is adapted.

"The only obstacle hitherto has been the expense. There are many substances which yield oxygen in abundance, but they are all too dear. M. Archereau has proposed the reaction of silica upon the sulphate of lime as a source of oxygen. When these substances are heated to a proper temperature, silicate of lime and two gases—sulphurous acid and oxygen—result. The former is used for the manufacture of sulphuric acid, and the latter it is proposed to compress into cylinders and sell by the cubic foot. The materials here used are very cheap, and the heat required to fuse them will be obtained from a mixture of common gas and oxygen. The silicate of lime could be used in the manufacture of glass.

"The company which has been organized in Paris to make a trial of this process, asserts that it can furnish oxygen at the rate of two cents per cubic foot; whereas, by the old methods, where the gas has been employed in the Drummond light, the oxygen has cost nearly a dollar per foot. By directing a jet of oxygen through an ordinary gas burner, the illuminating power of the gas is greatly increased, and a saving of from forty to fifty per cent effected. The introduction of the oxygen into the flame has also important consequences to health. It will destroy all the noxious gases which have escaped the purifiers, and only water and carbonic acid will result from the combustion. The amount of these latter will be less than usual, for the reason that greater illuminating effect is produced by the employment of a smaller quantity of gas.

"By the combustion of illuminating gas and oxygen nearly the same heat is obtained as in the oxy-hydrogen blow-pipe. All metals can be fused by this means if placed in suitable crucibles; and the cost of large furnaces and expensive fuel will be saved in numerous industries."

Effect of a Strike.

We cut the following from the *New York World*:—

"Strikes sometimes have a solution not looked for by either the employer or the employee. We have a recent example. The masons and plasterers have recently struck for higher wages and shorter hours, demanding, at the same time, some regulations respecting the manner of conducting the trade. The builders were obliged to yield, but limited their new contracts as much as possible. The result is a great decline in the price of building materials. Brick is three dollars per thousand lower. Lath has declined from six dollars to four dollars per thousand, and lime has declined from two dollars to a dollar and twenty-five cents per barrel.

"Thus, instead of exacting anything from those for whom building is done, or diminishing the profits of the builder (who has probably got an advance on his contract by pleading the strike), the party injured is the poorly-paid class, who go into the woods and get out lumber, who make brick, or who burn lime. The practical result of the strike of the masons has been as if they and the carpenters were each receiving three dollars per day, the masons, by demanding and receiving four dollars per day. We have another illustration. The molders about Troy have been standing out on a strike recently, during which pig iron declined seven dollars per ton, and coal two dollars per ton, the result of which will be, that the miners will ultimately be compelled to accept lower wages. Beyond a certain cost, the building of houses and the construction of machinery is checked; when the utmost cost is reached, the strike of one

class of operatives works injury only to another class."

A Sulphur Well.

We have mentioned several times, says the *Terre Haute Express*, the progress of boring an oil well at Lodi, on the Wabash, some forty miles north of this city. A few days since the auger broke through the roof of a cavity. The auger was taken out, when the gas began to come up in considerable quantities, pushing the salt water before it, causing it to flow over the conductor. After the salt water was driven out, sulphur water continued to flow in a small stream. The well was sunk four feet deeper, which opened new cavities, and the water increased to ten gallons a minute, and it is now flowing five hundred barrels a day of white sulphur! The water as it flows from the conductor is white; after standing awhile, it deposits a white sediment and becomes clear. On being agitated it boils and emits gas. In mineral ingredients, disagreeable smell, and specific gravity, it is said to exceed the Lafayette Artesian—especially the sulphurous odor—and it is claimed it will rank with the most famous medical waters of the world.

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In connection with the publication of the *SCIENTIFIC AMERICAN* have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past twenty years. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after so many years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the *SCIENTIFIC AMERICAN* are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the office, I always observed a marked degree of promptness, skill, and fidelity to the interests of your clients."

Ex-Commissioner Holt says:—"Your business was very large, and you sustained and justly deserved the reputation of marked ability and uncompromising fidelity to the interests of your clients."

Ex-Commissioner Bishop says:—"I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys."

EXAMINATIONS.—If an inventor wishes our opinion in regard to its probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an opinion, without examination at the Patent Office, we make no charge, but if a

PRELIMINARY EXAMINATION AT THE PATENT OFFICE is desired, we charge the small fee of \$5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over ELEVEN THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us by express, charges prepaid, a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

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
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In addition to which there are some small revenue-stamp taxes. Canadians have to pay \$500.

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If an inventor wishes to apply for a patent, all he has to do is to write to us freely for advice and instruction, and he will receive prompt attention. If his invention contains any patentable features, he can depend upon getting his Letters Patent. All communications considered confidential. Send models and fees addressed to

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FOR THE WEEK ENDING APRIL 24, 1866.

Reported Officially for the Scientific American

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.

54,085.—Car Truck.—C. F. Allen, Aurora, Ill.:

First, I claim the employment of metal boxes, b, b, between the ends of the transverse beams, A, A, of the truck, said boxes being so constructed and applied that they form metallic bearings or abutments for the metallic blocks, C, C, and the lower strap or brace, D, substantially as described.

Second, The combination of the straps, D, D, the posts, c, c, the pillow blocks, C, C, and the box, b, the wooden cross beams, A, A, the whole being bolted together, substantially as described.

Third, The construction and arrangement of the plates, x, x, x, blocks, p, p, and straps, n, n, in combination with the beams, A, A, B, substantially as and for the purpose described.

54,086.—Railway Frog.—E. G. Allen, Boston, Mass.:

First, I claim a railway frog made elastic by the combination of the curved plate, A, and elastic suspension c, with the frog plate, C, substantially as and for the purpose specified.

Second, The combination of the independent elastic chair, M, with the frog plate, C, also made elastic, substantially as and for the purpose described.

54,087.—Weeding Hoe.—George P. Allen, Woodbury, Conn.:

First, I claim the cutter blade, A, constructed substantially as described.

Second, The pins, b, in the cutters, A, which with the uprights, B, give to the implement the advantages of a common rake.

Third, The combination of the cutter blade, A, pins, b, uprights, B, as described, and handle, c, arranged and operating in the manner and for the purpose herein specified.

54,088.—Machine for Preparing Peat.—Edward H. Ashcroft, Lynn, Mass.:

I claim the mode substantially as above described of treating or preparing peat the same consisting in breaking it up, and discharging water from it by one or more centrifugal machines or the same and a set of squeeze rollers and subsequently passing it through a drying apparatus, and form thereof into and through a compressing apparatus, whereby it may be compressed into such shape or shapes as may be required.

I also claim the combination of the feed rollers, one or more centrifugal machines, as described, a set of squeeze rollers, a drying apparatus, the whole being to operate substantially as and for the purpose specified.

I also claim the combination of the feed rollers one or more centrifugal machines as described, a set of squeeze rollers, a drying apparatus, and a compressing mechanism or apparatus, the whole being substantially as and for the purpose herein specified.

I also claim the compressing apparatus made substantially in manner and so as to operate as described.

I also claim the drying apparatus as made, substantially in the manner and so as to operate as described.

I also claim the centrifugal machine composed of the toothed cylinder, or its equivalent, and the foraminous case arranged and applied together, substantially in the manner and so as to operate as described.

I also claim the use of perforated tubes, P, in drying cylinder, O, to assist in absorption of moisture of peat in said tubes by temperature of surrounding steam.

54,089.—Gang Plow.—C. Atwood, Lebanon, Ill.:

First, I claim forming the forward connection between the beams of the frame A, of a metal plate, C, having slots, a', in it for the passage of the attaching devices, a, and a', so that the machine may be readily adjusted to any width.

Second, The adjustable tie or brace rods, D, or their equivalents, when used as and for the purpose set forth.

Third, The combination of the shaft, E, levers E' and E2, hook rods, F, and cross bar, G, or their equivalent devices, with the plow beams of gang plow, for the purpose herein set forth.

Fourth, The combination of the strap piece, c, and set screw, c', with the beam H, and with the braces, H3, as and for the purpose set forth.

54,090.—Cut-off Valves.—George H. Babcock and Stephen Wilcox, Jr., Providence, R. I.:

First, we claim an auxiliary piston and cylinder to operate the cut-off of a steam engine, to which auxiliary cylinder the admission of steam can be regulated in point of time to correspond with any desired point in the stroke of the piston in the main cylinder, substantially as described.

Second, C combining with the main valve or valves an auxiliary piston and cylinder to operate the cut-off when arranged to travel with the valve, out to work independently of it, substantially as described.

Third, The intermediate toothed pinion, k', or its equivalent, connecting the valve gear which controls the cut-off with the moving member of the engine which actuates such valve gear when the same is arranged to alter the relation of such valve gear to the main valve without breaking the connection between the two, substantially as herein described.

Fourth, The combination substantially as described of a regulator with a cut-off valve gear of the character, and possessing the qualities herein specified.

Fifth, The combination of the contracted orifice, o, Fig. 5, with a pocket, h, formed by the part of the auxiliary valve, E, substantially as described for the purpose specified.

54,091.—Beer Faucet.—Johann Conrad Baer, Cincinnati, Ohio:

I claim the arrangement of body, A, plug chamber, B, plug, C, frothing chamber, D, plunger, E, e', and rods, G, G', substantially as and for the purposes set forth.

54,092.—Churn.—Thomas K. Bailey, Lockport, N. Y.:

I claim an improved churn dasher, constructed and arranged substantially as herein described and for the purposes set forth.

[This invention consists in the peculiar formation of the dasher; to the lower end of the dasher handle is firmly attached a piston head a little smaller than the interior diameter of the churn. A little above the piston head, is a ring small enough to play freely within the churn. Immediately below the piston head is another ring suspended from the upper ring by vertical rods. As the dasher descends the lower ring is pushed down by the piston head forcing the cream to pass into the upper part of the churn around the edge of said lower ring; but as the dasher ascends, a space is left between the piston head and the lower ring through which the cream passes freely to the lower part of the churn.]

54,093.—Process for Recovering Waste Alkali.—Hayden M. Baker (assignor to self, Albert M. Hastings, and Alexander McLean), Rochester, N. Y.:

I claim the recovery of the alkali (used in the preparation of paper stock), in its most stable state, by transmitting it to the utilization of the vegetable matter upon the principles of destructive distillation, thereby forming useful products, such as are usual in the destructive distillation of wood and coal, in the manner herein described and set forth, or in other process, substantially the same, which produces the same intended results or effects herein described.

54,094.—Stocking Heel Protector.—Sarah J. Baker, Chicago, Ill.:

I claim a stocking heel protector, constructed substantially as herein described, and for the purposes specified.

54,095.—Plow.—L. M. Bates, Newark, Ohio:

I claim the detachable point, c, attached and secured to the plowshare by a shank, having a dovetail section, substantially as and for the purpose specified.

54,096.—Screw Tap.—Benjamin F. Bee, Harwick, Mass.:

I claim, as an improved article of manufacture, the screw tap, made as herein shown and described, substantially in the manner and for the purpose set forth.

54,097.—Medicine for the cure of Consumption, etc.—Thomas Bell, New York City:

I claim the syrup composed of alcohol officinalis, alcoholic spirit, and sugar, in the proportions, and so as to form a permanent compound, having the properties herein set forth.

54,098.—Cough Syrup.—Cyrus Benedict, Jr., Omro, Wis.:

I claim the compounding and medicating the herein described article into a cough syrup.

54,099.—Cultivator.—Theophilus F. Bertrand and Peter James, Rockford, Ill.:

First, We claim the combination of the plows, draft rods, and elbow levers, O, with the frame and driver's seat, when constructed, arranged, and operating as described.

Second, The combination of the standard, braces, eye-bolt, and groove-d block, when constructed and arranged as described, to vary the angle of the plow to the crop, as set forth.

Third, The combination of the standard, eye-bolt, J, loop, m, and draft rod, M, connected and arranged as described, to secure center draft when plowing at an angle to the crop.

54,100.—Reeching-loading Fire-arm.—Charles E. Billings, Windsor, Vermont:

I claim the combination of the brace or bolt, a, and spring, b, with the frame and hammer of the arm when arranged and operating in the manner and for the purpose herein set forth.

54,101.—Machinery for Stamping Chain Links.—Peter S. Bishop, Attleborough, Mass.:

First, I claim combining the carrier, F, constructed substantially as described, with the yielding holder plate, J, provided with a projection, c', or the equivalent thereof, substantially as described, for the purpose specified.

Second, Combining such carrier, F, and yielding holder plate, J, with a die and former, a, b, for the purpose of transferring the blanks, one by one to the latter, substantially as herein described.

Third, C combining with the hooked finger, L, a spring-seated die, b, substantially as described, for the purpose specified.

54,102.—Heating Stoves.—Lewis Bridge and G. W. Ruby, York, Penn.:

First, We claim the arrangement above shown, of the fire chambers, A, A, separated from each other by a central air channel, K, through which pass connecting flues B, B, each chamber having direct escape flues, G, G, and a common flue, H, when the direct flues are closed, substantially as described.

Second, We also claim the combination of the fire chambers, A, A, the air channel, K, C, C, air space, D, and the drum, E, containing a flue space, E', divided by partitions, L, substantially as described.

[This improvement relates to stoves for heating purposes, and is adapted for all kinds of fuel. It embraces an air passage extending from the under surface of the base of the stove up through the middle of the stove, so as to divide the fire space into two independent chambers, which are connected by flues that cross such central air space. Also, an air tube extending from the under surface of the base of the stove upward, through it, near each extremity of its longer axis. Also, a horizontal air space immediately above the fire chambers, with which space the said air passages communicate. Also, a drum, in shape like a flattened ring, surmounting the fire chambers, and communicating with them by suitable flues, which extend through the horizontal air space.]

54,103.—Wool Presser.—Henry H. Brown, Washington county, Pa.:

I claim the mortised clamping front leaf and spring latch in combination with the folding side and end leaves, substantially in the manner and for the purpose set forth.

54,104.—Broom Head.—John Buchanan, Aurora, Ind.:

I claim the combination of the cap or ring, A, arms, B, B, shank, S, stem, E, the plate, G, with its hooks, b, and cord, b, or its equivalent, substantially as and for the purpose specified.

I also claim the loops, D, D, in combination with the cap or ring, A, and plate, G, with its hooks, b, constructed and operating substantially as and for the purpose specified.

54,105.—Milk and Cream Refrigerator.—Jos. Buchnall and J. T. Johnson, Kalamazoo, Mich.:

We claim the combination of the trough A, pan, B, perforated pipe, D, and nuts, F, whose holes register therewith, and operating in the manner and for the purpose herein specified.

[This invention consists of a water trough and milkpan combined with each other, in such a way as to leave a space or water chamber between them, both pan and trough being provided with stop cocks, or their equivalent, by means of which the milk and water may be drawn from their receptacles, and replaced, each independently of the other.]

54,106.—Flour Sifter.—Charles Burnham, Philadelphia, Pa.:

I claim the combined flour sifter, scoop, and measurer, constructed in the manner as herein described and shown, to wit: with a rectangular box, grooved or ribbed horizontally, internally; with a concave base within said box, above the lower edge of the box; with a handle on one side of the box, and with a combined stirrer and scraper within the box, above the sieve; and stirrer and scraper being formed with rubber strips and wire brushes set tangentially, all in the manner set forth.

54,107.—Wave Power Propulsion.—Charles W. Cahoon, Portland, Maine:

I claim connecting two vessels together by means of a lever or its equivalent, so that the motion of the waves of the sea may cause the lever to act upon machinery, and thereby propel the vessel through the sea.

I also claim for the purpose, the machinery, or its equivalent, substantially as described.

I also claim the shaft, B, in combination with the lever, C, or equivalents, for regulating the speed of the vessels, substantially as described.

I also claim the levers, b, b, in combination with the ratchet rods, E, E, or equivalents, for disconnecting the wave motor, substantially as described.

I also claim the combination of a steam engine, or its equivalent, with a wave motor, substantially as represented.

54,108.—Machine-made Knitted Mitten.—Augustus C. Cary, Malden, Mass.:

I claim, as a new article of manufacture, a machine knit mitten, the thumb of which is first commenced at its tip, and knit up to where it is to be joined to the body of the mitten, and there stopped, and then both united and knit on in a cylindrical form to the wrist, by means of needles and a thread automatically operated by a jacquard pattern, substantially as described.

54,109.—Machine-made Knitted Stocking.—Augustus C. Cary, Malden, Mass.:

I claim, as a new article of manufacture, a machine-made stocking, the heel of which is knit, turned, or turned, by a jacquard connected with the knitting machine and composed of a series of the rows or courses, alternating with one or more continuous rows or rings of knit work, substantially as herein described and represented.

54,110.—Stereotype Block.—Ariel Case, New Haven, Conn.:

I claim a stereotype block of quadrats, and inserting therein blocks, B and F, or their equivalents, substantially in the manner and for the purpose herein set forth.

54,111.—Children's Carriage.—Andrew Christian, New York City:

I claim the improvement in the class of children's carriages known as "perambulators," herein described, the same consisting in supporting the front end of such carriage upon two in lieu of one wheel, substantially as and for the purpose herein specified.

54,112.—Shaft for Drilling.—James H. Clapham, New York City:

I claim the tubular rod for well drills or pumps, formed with polygonal depressions for the reception of the clamps or wrenches, as specified.

54,113.—Bolt Fastening for Boiler Head.—Edward Clark, New York City:

I claim the method of securing together boiler and other plates by the employment of conical head bolts in combination with tubes or thimbles, substantially as described.

The conical head screw bolt, A, in combination with split tube, D, substantially as described.

54,114.—Burner for Gas Stove.—I. R. Clark, New York City, and S. T. Savage, Albany, N. Y.:

We claim the inverted conical-shaped tube A, perforated upon its side at its upper portion, and capped or closed with a deflector plate, C, in combination with the cylindrical box, D, surrounding its perforated portion, and resting upon a flange, F, provided with apertures or openings, G, when arranged and applied together, substantially as and for the purpose described.

54,115.—Hair Curling Fluid.—Richard Clark, Chicago, Ill.:

I claim the employment of the extract, or tincture, or other decoction of boxwood, substantially as specified and for the purpose set forth.

54,116.—Imitation of Braided Human Hair.—Sarah E. Cook, Philadelphia, Penn.:

I claim a fabric woven at its edges and twisted spirally, in the manner described, so as to produce an imitation of braided human hair.

54,117.—Fruit Jar.—William F. Corpe, Windsor Locks, Conn.:

First, I claim the cover with circular groove and plunger, p, and head, m, when constructed and used for the purpose set forth.

Second, I claim the shoulder, c, flange, d, recess d cover, f, projection, h, beads, m, n, and inclosing band, g, in combination, when constructed, arranged, and employed as and for the purposes herein specified.

54,118.—Solar Mirror for Photographic purposes.—Wm. Crane and Warren H. Pease, Goshen, Ind.:

We claim, First, The apparatus, herein described, for directing a line of light from a sun to sun set, whatever the attitude of the sun may be, made and applied substantially as and for the purpose above set forth.

Second, We also claim retarding the speed of the movement of the rod k, shaft, o, by means of the traveling nut, V, and its pin, X, substantially as herein shown.

54,119.—Device for Tightening Wire Fence.—Peter S. Crawford, Union, Ill.:

I claim the arrangement and combination of the lever, A, hook, D, with drum, H, and runs, E, when constructed and operated as set forth, and for the purpose described.

54,120.—Compressed Rod Solder.—Lewis and Robert Crooke, New York City:

We claim the compressed rod solder herein before described, consisting of lead and tin combined by fusion, and subsequent expression through a die, the same being a new manufacture.

54,121.—Machine for the Manufacture of Rod Solder.—Lewis and Robert Crooke, New York City:

We claim the hydraulic pressure solder machine composed of the hydraulic cylinder and ram, the solder cylinder and piston, and the die, perforated with numerous holes of the form and size of the rods to be produced, all combined and operated, substantially as set forth.

Also, the combination of the solder cylinder, piston, and die, perforated with numerous holes, as aforesaid, with a pipe to supply water to cool the solder cylinder, substantially as set forth.

54,122.—Cultivator.—H. W. Curtis, Worcester, Mass.:

I claim the wings, E, E, connected at the rear of the plow share, D, by means of joints, in combination with the segment racks, G, G, and the pinion if for adjusting the wings, E, all arranged to operate in the manner, substantially as and for the purpose herein set forth.

54,123.—Water Wheel.—Dwight Cushman, Hartford, Conn.:

I claim a water wheel consisting of a series of buckets, B, having their faces standing at an obtuse angle from the hub, and having their outer edges forming a vertical line, or nearly so, as shown by the line extending from e to e, of figure 4, arranged and operating in combination with the hub, A, as herein shown and described.

54,124.—Track Clearer of Mowing Machine.—John M. Davis, St. Louis, Mo.:

I claim the curved mold-board shaped blade, a, provided with the adjustable rod, D', when said blade is constructed as described, and is applied to the shoe, B, and finger bar, A, in the manner and for the purpose herein specified.

54,125.—Car Truck.—Walter Dawson, Pottsville, Pa.:

I claim the bearings A4 and B4 or their equivalents, arranged relatively to the truck, and to the load substantially in the manner and for the purpose herein set forth.

54,126.—Revolving Grain Feeder.—M. Decamp, South Bend, Ind.:

I claim the roller, d, provided with spirally-arranged scrapers, f, f, in combination with inclined sides, b, and opening c, the several parts being arranged and operating as and for the purpose specified.

54,127.—Marking Stock.—George W. Devin, Ottumwa, Iowa:

I claim the rivet, a, provided with a head and shoulder, as described, when used with the label or plate, A, for the purpose of marking stock, substantially as described.

54,128.—Water Wheel.—Matthias Devoc, Marysville, Kansas:

The endless chain of plates, D, provided with swinging buckets, E, and placed around polygonal rollers, B, B, fitted in a suitable framing, A, all arranged to operate substantially in the manner as and for the purpose set forth.

54,129.—Steam Valve.—Thomas B. Dexter, Lynn, Mass.:

I claim the shell, A, provided with the openings and plugs, m, for the purpose of introducing material and enabling the valve to be ground to its seat without removing the hub, D, or other parts, as set forth.

54,130.—Lever Power of Windlasses, Etc.—Perry Dickson, Jersey City, N. Y.:

I claim the connecting of the dogs, D, of the pulley, C, to the lever, H, through the medium of slides, G, G, arranged as shown, or in any equivalent way, so as to admit of the slides being raised on the lever at a greater or less distance apart, in order to vary the speed and power of the device, substantially as and for the purpose set forth.

[This invention relates to an application of lever power, for operating windlasses and turning shafting, and has for its object, the vary-

ing of the lever power so that speed may be obtained and power sacrificed, when the power and not the latter is required, and power obtained and speed sacrificed when power is required. The invention is applicable to various purposes: ordinary windlasses, hoisting machines, ship windlasses, hand cars for railroads, etc.]

54,131.—Machine for Cutting Shoe Soles.—James Downing, Philadelphia, Pa.

I claim a machine for cutting shoe soles, constructed and operated substantially as herein described and for the purpose set forth.

54,132.—Apparatus for Carburetting Air.—Oliver P. Drake, Boston, Mass.

I claim as my invention the combination, as well as the arrangement, of one or more vaporizers, B, B', their induction and education pipes, C, C', and a system of pipes, T, X, Y, Z, and stop cocks so arranged as to enable the air to be driven either through the whole of vaporizer or vaporizers, or a portion or portions thereof.

I also claim the improved air forcing apparatus composed of the drum, A, and the series of flexible sheets, K, as explained, and having mechanism substantially as described, for operating them by means of a crank, P, and the series of rods, N, N', connecting such apparatus with the movable plates, M, M', of the several blowers.

I also claim the improved flexible top aerometer, E, having the cap, W, and guide, X, combined and arranged with its disk, V, and flexible top, W, as specified.

I also claim the combination, as well as the arrangement, of the air forcing apparatus, the annular channel, G, and the aerometer, E.

I also claim the combination as well as the arrangement of the chamber, F, the annular channel, G, the air forcing apparatus, and the aerometer, E.

I also claim the automatic combination arranged in the chamber, F, and for operating the lever valve, H', the same, O', P', applied to the shaft, D.

I also claim the combination of the weight, D', rod, C', shaft, B, arm, A', annulus, Y, a d spring, Z, or the equivalent, to read, with the aerometer, E, constructed substantially as described.

I also claim the arrangement of the supply tank, C, and its communicating pipe, F, with the vaporizer, B.

I also claim the combination of the air pipe, D, with the air forcing apparatus or its pipe, E, and the supplying tank, C, arranged and connected with the vaporizer as set forth.

54,133.—Machine for Raking and Loading Hay.—William A. Duncan, Syracuse, N. Y.

First, I claim the arrangement of the folding gathering boards, H, bars, G, and elastic teeth, I, in combination with the frame, A, all constructed and operating in the manner and for the purpose herein specified.

Second, The loaded tooth, H, one or more, fitted between rollers, G, in the rear cross-bar of the frame, A, substantially as and for the purpose specified.

Third, The adjustable board or plate, I', placed in the rear of frame, A, in connection with the cylinder, D, provided with rakes, substantially as and for the purpose set forth.

Fourth, The arrangement of the sliding fork bars, E, cylinder, D, and cam, F, constructed and operating in the manner substantially as described.

Fifth, The ribs, M, attached to the inner side of the rear cross-bar of the machine, substantially as and for the purpose set forth.

Sixth, The combination of the cylinder, D, provided with sliding rakes, the elevators, adjustable teeth or teeth, and gathering board, provided with elastic teeth, all arranged to operate substantially as and for the purpose herein set forth.

54,134.—Egg Beater.—Timothy Earle (Valley Falls), Smithfield, R. I.

I claim the combination of the spindle, B, with its beaters, A, A', the pinions, D, D', and the toothed sector, C, the same being arranged to operate together as described, for the purposes specified.

54,135.—Watch.—S. D. Engle, Hazleton, Pa.

First, I claim the combination of the studs, C, and ring, B, arranged with the body, H, recess, D, and notches, I, constructed and operating in the manner and for the purpose herein described.

Second, I claim the cap, B, with its flange, H, and washer, I, arranged with the key hole, G, in the manner and for the purpose herein described.

[The object of this invention, is to more perfectly exclude dust and dirt from the working parts or movements of the watch and it consists in providing (for the movement of the watch) a separate and independent box or case, from the ordinary watch case in which box the movement is secured in the usual manner now practised for fastening it in the watch case; and then the said box fastened in the watch case, in any proper manner to allow it to be easily and readily removed therefrom, when so desired.]

54,136.—Manufacture of Watch Rims.—Charles H. Field, Providence, R. I.

I claim the means substantially as herein described, for producing a watch rim from a single piece of metal, as set forth.

54,137.—Manufacture of Watch Backs.—Charles H. Field, Providence, R. I.

I claim the means substantially as herein described for producing a watch back with the bezel on it, at one operation, as set forth.

54,138.—Sheep Rack.—M. Foreacre, New Harrisburgh, Ohio.

First, I claim the above described combination of hay rack and grain trough, the whole being constructed substantially as set forth.

Second, I claim making the upper part of the front of the hay rack of the board, A, in combination with short rounds, F, for the purpose of preventing the hay seed from falling into the wool of the sheep, substantially as specified.

54,139.—Combined Seeder and Cultivator.—J. L. Fountain, New Milford, Ill.

First, I claim the arrangement of hatching the cultivator to the bounds, C, at, Q, and by links, P, the levers, X, Y, in combination with the bounds, axle and cultivator frame, as and for the purposes set forth.

Second, I claim the adjustable arms, D, cross brace, F, and pieces, E, E', for extending and contracting the frame, in combination with the seed box apparatus, lever, L, and seat, O, arranged as and for the purpose described.

54,140.—Settee and Table.—Elijah Fowler, New York City.

First, I claim the attaching of the table, C, to the settee, by means of the slide, C', made in the sides of the cleats, B, B', in connection with the pins, D, D', attached to the side pins, A, A', of the settee, all arranged substantially as shown and described.

Second, The skirt board, D, provided with the adjustable leg, E, and applied to the settee and table, in the manner substantially as herein shown and described.

[This invention relates to a new and improved table of that class which is frequently termed "kitchen tables," as they are more especially designed for kitchen use. The invention consists in a novel, and improved manner of attaching the table to the settee; and also, in the application of a skirt board, all constructed and arranged to form a very desirable article of the class specified.]

54,141.—Tree Protector.—George Frost, Cambridge, Mass.

I claim the arrangement of the ring, A, and the two tubes, B, C, when combined with the suspensory guard, D, the two tubes under such an arrangement being made to project both above and below the ring as explained.

I also claim the arrangement of the suspensory guard, D, with respect to the upper end of the inner tube, C, of the trough, A, viz.: below the said edge, and so that there may be an annular channel between the guard and the tube, as represented.

54,142.—Adjustable Back Straps for Vests.—Rodmon Gibbon, San Francisco, Cal.

I claim as a new article of manufacture, the arrangement with the right and left straps, or tags, of a vest, pantaloon, or other garment, which said straps or tags, have no other fastening attached, of an elastic strap having a buckle at each end, and being thus adjustable and detachable, all substantially as described.

54,143.—Attachment for Upholstery Springs.—William H. Goodale, Colton, N. Y.

I claim the securing of upholstery springs to their slats, by means of strips, C, of metal, applied in the manner substantially as shown and described.

54,144.—Mode of Boring Artesian Wells.—Alexander Hamar, New York City.

First, I claim the combination with the drill stock of the hinged, expanding cutters, when constructed, arranged and operated, substantially as described.

Second, The combination of the guide rod and cone, with the drill stock and expanding cutters, substantially as and for the purpose described.

Third, Expanding cutters having free play on their bearings to relieve their points from all strain of the concussion, and so formed as to expand D by the contact of the drill head.

54,145.—Waxed-thread Sewing Machines.—Thomas J. Halligan, New York City.

First, I claim the construction and arrangement of the upper waxing, smoothing and thread-controlling apparatus, as described, in combination with the heater, substantially as set forth.

Second, The combination of the spool, B, vibrating take-up bar, R, and a wax cup, C, when these parts are arranged on the bracket, A, as described.

Third, The construction and arrangement of the wax cup, C, rollers, C', C', depressed bar, C, and smoothing pads, C', C', in the manner and for the purpose described.

Fourth, Applying the bar, C, to a crank arm, which is furnished with a spring catch-arm, C, in such manner that it can be conveniently released and adjusted upward, and also again moved down to its position, and fastened, C, substantially as described.

Fifth, The metallic tubular spool, B, which is supported upon tubular bearings in such a manner that heated air can be conducted through the spool for softening and keeping the waxed thread upon it, substantially as described.

Sixth, The chimney, E, constructed with branching tubes, E', C, air combination, with the hollow metallic spool, B, and the tubular heater, D, substantially as described.

Seventh, The combination of the laterally sliding pulley, B', on the take-up bar, B, with the spool B, when said take-up bar is arranged directly in rear of the spool, substantially as described.

Eighth, The construction and arrangement of the inclined-faced smoothing pads, C', C', in combination with the double cone roller, C, substantially as and for the purpose described.

Ninth, The construction and arrangement of the metallic device, D, upon the part of the needle bar arm in combination with a heater, whereby the upper waxed thread, for an upper needle, is kept warm, and subjected to heat nearly down to the needle, and whereby, also, heat is imparted to the needle bar and needle, substantially as described.

Tenth, The combination of the re-waxing cup, F, arranged so that the needle will dip into it at every down-stroke of the needle bar, with the upper waxing cup, C, both cups being subjected to heaters, substantially as herein described.

Eleventh, The construction of the attachment, F, E, in combination with a lower heater, all applied, so as to heat all the parts of the machine which are arranged below or beneath the table, A, exposed to wax, substantially as described.

Twelfth, The combination of the pressure pad, D, with the vibrating take-up bar, B, substantially as described.

Thirteenth, A spring, P, made adjustable substantially as described, and applied to the table or plate, N, thereof, in such manner as to act with an increased or its greater tension upon the thread which is passing from the shuttle bobbin, just as the shuttle is completing its stroke, substantially as and for the purpose set forth.

Fourteenth, The combination of the inclined spring, P, lever, P', and adjusting nut, P', with a shuttle, substantially as described.

Fifteenth, The construction of a feed wheel, with a serrated steel band, P, shrunk upon it, substantially as described.

Sixteenth, The removal of ground plate, F, in combination with the clamp, G, and needle bar, A, substantially as and for the purpose set forth.

Seventeenth, The arrangement of the elastic pressure pad, R, and its bar, R, in combination with the adjustable screw, S, S, and the nut, S, substantially as and for the purpose set forth.

Eighteenth, The hooked looper, J, J', constructed, arranged and operated substantially as described and for the purpose set forth.

Nineteenth, The construction of the shuttle and bobbin as represented in Figs. 5 and 6 and as herein described, for the purpose set forth.

Twentieth, The manner herein described and as represented in Figs. 6 and 7, of combining the bobbin and shuttle and holding in place and applying spring pressure to the bobbin by means of a single pivoted lever spring clamp, for the purpose set forth.

54,146.—Mop Head.—George H. Hammer, Newville, Pa.

I claim the mop head consisting of the frame, B, cross bars, b, and v, in combination with the spring, C, when said parts are arranged to operate as herein shown and described.

54,147.—Shot and Cartridge Pouch.—Henry Hammond, Bridgeport, Conn.

First, I claim in combination with the pouch or holder in form of a shoulder belt as described the mouth piece consisting of the tube, A, for discharging the cartridges and the two catch pieces, B, A, C, combined therewith and with suitable moving means in form of a lever for forcing in and drawing back the pieces, B, and C, substantially in the manner and for the purpose herein set forth.

Second, The single gate, M, when used in combination with the branches, A, A, and D, D' of the holder for the purpose of closing one or both of these branches and stopping the discharge therefrom, as herein described.

54,148.—Method of Boring Oil Wells.—Dennis R. Harder, North Chatham, N. Y.

First, I claim rotating the drill and drill rope continuously in one direction during the operation of drilling, by means of a suspended reciprocating cylinder having grooves in its surface which are acted upon by pins, K, K, through the center of which cylinder the drill rope is passed loosely, substantially as described.

Second, Supporting and winding a reciprocating device adapted for rotating the drill and drill rope in such a manner that this device shall receive a perpendicular movement when actuated by means of a vibrating working beam, A', substantially as described.

Third, The pivoted cylinder, F, with a hole through its center and also with a hollow adjustable jack screw, F', for receiving and holding the drill rope, all constructed substantially as described.

Fourth, The combination of rope clamps, H, H', jack screw, F', and a rotating cylinder, F, substantially as described.

Fifth, The divided cylinder, F, in combination with the divided screw, F', substantially as described.

Sixth, Attaching the rotating device, F, to the working beam, A, in such a manner that said device, F, can be attached thereto, and also detached from the drill rope at pleasure without lifting the drill rope from the well substantially as described.

Seventh, The stationary fork, I, spring pin, K, K, and rotating cylinder, F, in combination with a drill rope which passes through the center of said cylinder and which is affixed thereto, substantially as described.

Eighth, The perpendicular stop post, C, in combination with the working beam, A', lifting cam, S, and the device for rotating the drill rope, C, substantially as described.

Ninth, The combination with the device for automatically rotating the drill rope, C, continuously in one direction, I claim providing a means for lowering the drill as the well deepens substantially as described.

Tenth, In combination with a drilling apparatus wherein the feeding rope passes through the turning guide which is turned with an intermittent motion always in the same direction, I claim a device for preventing the rope from becoming twisted and also for supplying the rope to the drill, the said device having but a single axis of revolution, substantially as described.

Eleventh, The combination of a drill which is suspended by a rope and receives a vertical rotary motion with a device for preventing the rope from becoming twisted and also carrying the supply rope, the said device having but a single axis of revolution, substantially as described.

54,149.—Ash Sifter.—P. Harlow, Kingston, N. Y.

I claim the arrangement of the partitions, I, and P, within a barrel or cylinder sieve in combination with the delivery spout, V, of the outer casing or box, operating together, substantially in the manner described and for the purpose specified.

[This invention relates to coal and a h sifters in which a barrel or cylindrical-shaped sieve is used, and consists in a novel arrangement of a hopper therein in connection with a discharge spout, whereby the ashes, by slowly revolving the barrel sieve are caused to be entirely separated from the large particles of coal, and when entirely so sifted the coal can be automatically delivered from the sieve into a coal scuttle or other vessel.]

54,150.—Steam Engine.—Andrew Hartup, Pittsburgh, Pa.

First I claim the arrangement of the two cylinders, A and C, having three piston rods, E, E' and P', fastened to a common yoke or cross piece, K, when connected with the receiver, A, moderator, B.

Second, The combination of the valve or cock, J, pipe, I, and pipe, J, with the receiver or moderator, B, as described and for the purpose specified.

Third, The arrangement of the two cylinder heads, F and G, as specified so as to leave between them the space, H, in the manner and for the purpose specified.

54,151.—Horse Rake.—Horace R. Hawkins, Akron, Ohio.

First, I claim connecting the rake teeth with the body of the rake by a roller, K, in combination with supporting the upper ends of the teeth by means of levers or links, C, and springs, D, substantially as set forth.

Second, The combination with the upper ends, P, of the rake teeth of the links, C, springs, D, and cross bar, F, substantially as and for the purpose set forth.

Third, The combination with the notched bar, F, attached to the cross piece, M, of the locking bar, Q, and its spring, I, substantially as set forth.

Fourth, The combination with the foot board or treadle, N, and locking bar, Q, of the bent lever, R, arranged and operating substantially as and for the purpose set forth.

Fifth, The combination with the teeth, N, roller, E, cross bar, F, and pieces, H, H', of the links, N, N', clapper frame, D, and fingers, S, said parts being arranged and operating in the manner and for the purpose set forth.

54,152.—Car Brake.—George H. Henkel, Middletown, Ohio.

First, I claim the tumbler D, or its equivalent, in combination with the levers, C, C', for operating car brakes, in the manner and substantially as described.

Second, Rods, d, and tumbler, D, provided with the friction rolls, X, X, in combination with string beam, A', or its equivalent, substantially as described.

54,153.—Cut-off Valve.—Joseph L. Hewes, Newark, N. J.

First, I claim the revolving crank, A, having double or more throw than the valve is required to lift, in combination with the cut-off toe, D, and regulating toe, G, and their combination with the governor, in the manner and for the purpose substantially as herein set forth.

Second, The collar, I, or its equivalent placed in the valve chamber, in the manner and for the purpose substantially as herein set forth.

54,154.—Machine for Forming Corrugated Wrought Iron.—Charles Hewett, Trenton, N. J.

I claim the combination of the series of benders with the mold or die, substantially as described.

54,155.—Carriage Wheel.—G. G. Hickman, Coatsville, Pa.

I claim the combination of concave faced hollow socket, A, laterally sustaining the sides of the felly with the hollow hub, C, C', piece, B, the elastic material, E, spoke, C, and felly, F, arranged and operating as described and represented.

54,156.—Journal Box.—D. H. Hickok, Morrisville, Vt.

I claim the divided and adjustable box, D, in combination with the rollers, A, slotted bearings, C, and grooved shaft, G, constructed as described and for the purpose specified.

54,157.—Distilling Petroleum.—Abram D. Higham, Jersey City, N. J.

I claim the method substantially as above described for conducting distillations of hydrocarbons that is to say, distilling the lighter portions of the charge a vacuum and heavier portions under pressure, as and for the purpose set forth.

[This invention consists in a new method of distilling hydrocarbons, whereby a larger percentage of illuminating oil is obtained than by the methods hitherto known or used, the quality of the residuum being diminished, and the light oils, which are commonly run off separately from the illuminating oils, being by my method made into good illuminating oil.]

54,158.—Sash Supporter and Fastener.—Warren F. Hill, Portland, Me.

First, The combination of the bar, F, the bent lever, K, B, the spring, G, and projection, L, with the plate, A, all constructed and arranged substantially as and for the purposes herein set forth.

Second, The use in conjunction with the above combination of the recess, E, for the purpose specified.

54,159.—Device for Tightening Wagon Tires.—George Hillegass, Philadelphia, Pa.

First, I claim a device for contracting the tire of a wagon or other band, by an endless screw, F, nut, E, collar, C, and tongue, B, substantially in the manner set forth.

Second, The rib, G, on the inside of the tire, A, in combination with a device for contracting the tire, substantially as set forth.

54,160.—Cultivator.—Samuel Hoffheins, Hamilton Township, Pa.

I claim the combination of the devices for raising the shovels from the ground, and consisting of the levers, G, G', foot boards, H, H', and rocking seat, I, operating substantially as described and represented.

54,161.—Machine for Polishing Wood.—Ferdinand Hoffman, West Cambridge, Mass.

I claim the combination of the movable shaft boxes, I, I', the guides, M, M', and lifting mechanism with the shaft, I, a d its screw, K, hub, H, and the plane stock, G, applied to a movable carriage or bed to hold and move the work to be scraped or otherwise reduced, and to operate substantially as hereinbefore explained.

54,162.—Lock.—Lewis G. Hoffman, Albany, N. Y.

I claim the rod, C, orifice, D, a d the button, E, as applied to door locks substantially as described and for the purposes set forth in the above specification.

54,163.—Slide Valve.—Andrew G. Homan, Yonkers, N. Y.

I claim the valve, F, formed with the steam ports, h and h', above and around the exhaust ports, i and i', in combination with the inlet steam port, e, and port e' d k k', in the valve seat, as and for the purpose set forth.

54,164.—Saw Iron Holder.—Lewis Hover, Chicago, Ill.

First, I claim constructing the handle, A, and shields, C, of a saw iron holder in two parts, having a sliding lateral movement with respect to each other, substantially as and for the purposes specified and shown.

Second, I claim the combination and arrangement of the two parts, A, A', with the guides, B, constructed and operating substantially as herein set forth.

54,165.—Tire Shrinker.—James P. Howell, New York City.

First, I claim the vise, N, when supported on a pivot or its equivalent to allow it a circumferential motion in direction of the motion of the jaw, d, of the swinging arm, C, substantially as set forth.

Second, The bed plate, M, cast in one piece with the stationary arm, d, and used in combination with the swinging arm, C, for the purpose and in the manner, substantially as herein set forth and shown.

Third, The combination of the pawl R, and ratchet, A, with the lever, M, for operating and holding the movable jaw, J, of the vise, substantially as and for the purpose set forth.

54,166.—Corn Planter.—William W. Hulbard, Edinburg, Ind.

I claim, First, The slotted levers, R, R', at each end of the shaft, E, when used for operating the said shaft, with its connections, substantially as and for the purpose herein specified.

Second, The shaft, E, provided with the seed cylinders, H, H', as constructed and arranged with the wire springs, F, F', and rod, G, substantially as and for the purpose herein specified.

Third, The T-shaped lever, O, provided with eyes as described and used, substantially as and for the purpose set forth.

Fourth, The arrangement of the lever, O, disk, L, rod, M, plate, A, and lever, N, when used substantially as and for the purpose specified.

Fifth, The wire or cord, J, provided with balls or stops when used

with the levers, R R, or their equivalents for operating the seed cylinders and regulating the distance the grain is to be dropped as is herein fully set forth.

Sixth, The seed-pout, S, as constructed when used with the rods, u, said rods, u, being formed as described and connected to the seed cylinders, as and for the purpose specified.

54,167.—Elastic Webbing.—Liveras Hull, Charlestown, Mass.:

I claim as my invention, the new or improved manufacture, fabric or band as composed not only of a series of elastic strands, but of a series of linen cotton or silk threads, braided on and beyond the stretch of the strands when stretched or extended lengthwise as to form, by the contraction of the latter, frills of braiding at the opposite edges of the band, as explained.

54,168.—Collar and Neck Tie.—William Hunter, Berkeley Springs, West Virginia:

I claim, as a new article of manufacture, the collar and neck tie combination made, substantially as herein described and for the purposes specified.

54,169.—Shifting Rail for Carriage Tops.—Shadrach Johns, Waupun, Wis.:

I claim, First, The adjustable and locking feet attached to the lower rail, constructed and operated substantially as described and for the purpose set forth.

Second, The screw rod, G, in combination with rail, B', constructed and operating substantially as described and for the purpose set forth.

54,170.—Knife for Removing Corn from the Cob.—John Jones, Portland, Me.:

I claim the above described knife provided with a broad adjustable gage, substantially as set forth.

54,171.—Hinge.—David C. Jordan, Sen., Brooklyn, N. Y.:

I claim the butt hinge with flange or leaves to screw upon the face and edge of the door, and upon the edge and face of the jamb, constructed as described.

54,172.—Ash Box.—James Kee and John Sloan, Philadelphia, Pa.:

We claim the raised cast iron ash or garbage box, provided with interior recesses, as and for the purpose described.

We also claim the combination of the lid, F, segment, G, and spring, H, operating as and for the purpose described.

54,173.—Drying or Evaporating Device.—Washington Kendrick, New York City. Antedated April 19, 1866:

I claim the combination of the fans, B C, with the chamber, A, arranged as described, that is to say, the fan, B, discharging a current of air into the chamber, A, and the exhaust fan, C, removing the air together with the vapor of evaporation.

54,174.—Sad Iron.—George G. Kauffman, Long Island City, N. Y.:

I claim the dovetailed flange, c, on the standards of the handle, B, to fit into corresponding dovetailed sockets on the sad iron, in combination with a drop catch, D, all constructed and operating substantially as and for the purpose described.

This invention relates to a removable handle for sad iron, which is provided with dovetailed flanges to fit into corresponding dovetailed sockets on the top of the iron, in combination with a drop catch, which passes down through one of the flanges and drops automatically into a socket in the iron, as soon as the handle has arrived in the proper position, in such a manner that a handle is obtained which can be readily taken off from or attached to an iron, and which can be used for a number of irons with the greatest ease and convenience.

54,175.—Musical Clock.—Theodore A. Kohn, New York City:

I claim the construction of two L-shaped plates marked, A, in combination with the plate, D', having the wire, K', and the manner of a ratcheting the swinging lever marked, E, thereto as shown and described.

54,176.—Ox Yoke.—William B. Krum, Troy, Pa.:

I claim the independent action of the collar, B, and bows, C, from main yoke, A, which is produced by means of a hinge formed by D, E, which allow the bows to always remain in an easy position whether oxen are plowing or working on uneven ground, which improvement does away with the cramping and twisting produced by the old method.

54,177.—Grain Binder.—Israel Lancaster, Baltimore, Md.:

First, The sliding frame 4, acting in combination with the shaft, 7, provided with the notch, 8, and friction wheel 9, arm, 17, with the spring upon it, and the piece, 15, to which it is attached; collar, 24, with the piece, 25, and pin, 16, giving the longitudinal motion to the piece, 16, tube, 14, with the spiral thread, 2, upon it, and the block, 28, which gives the rotary motion to the tube, all constructed, arranged and acting in the manner and for the purpose set forth.

Second, The application to the sliding block, b, of the irregular groove, 32, to operate the block, 28, and of the irregular piece, e, 41, to throw out the sliding frame, 4, to operate the lever, 78, which cuts the cord, and to operate the lever, 79, which releases the sheaf band, constructed in the manner and for the purpose set forth.

Third, The device or releasing the sheaf band, consisting of the lever, 79, the two bars, 48 and 55, and the arm, 80 constructed in the manner and for the purpose set forth.

Fourth, The mechanism for cutting the cord, consisting of the lever 78, the bar, 77, the arms, 76 and 74, the rod 72, and the knife, 73, constructed for the purpose and in the manner set forth.

Fifth, The sliding jaw, 66, with its spiral spring 68 and the self-acting device, 64 65 70, acting in combination in the manner and for the purpose set forth.

Sixth, The projection, 43, and block, 59, in combination with the levers, 51 46 and 61, the wheel, 62, the rods, 53 and 46, the bars, 49 and 57, and the lever, 56, all constructed in the manner and for the purpose set forth.

Seventh, The device for giving the longitudinal motion to the shaft, C, consisting of the wheel, c, with its segmental projections, t, and u, the coupling, W W and X, and the wheel, v, acting in the manner and for the purpose set forth.

Eighth, The sectional gear, r, with its projection, z, the sliding rack, 8, the stop 11, with the spring, 2, operating in combination in the manner and for the purpose set forth.

Ninth, The reciprocating bars, g g g, constantly traveling in parallel paths, without lateral motion, the connecting rods, h h h, and O O O, the short arms, l l l, and the long arms, K K K, on the vertical shafts j j j, all acting in combination in the manner and for the purpose set forth.

54,178.—Wrench.—William W. Landbeck, Rochester, N. Y.:

I claim the special construction and arrangement of the wrench, viz., with the head of the handle, A, and the bearing, l, of the block, D, so formed as to receive removable jaws adapted to different purposes, and with the ratchet block, s, employed in connection with the lever, B, in such a manner as to insure a strong hold upon the ratchet bar, and draw the jaws toward each other, as set forth.

54,179.—Brush.—Joseph C. Lawrence, Brooklyn, N. Y.:

I claim confining and securing bristles or other material, for brushes, in a socket by means of the expansion therein of an elastic or expandable material, substantially as described.

[This invention consists, among other things, in a novel way of holding and securing the bristles or hairs of the brush, whereby they can be at any time made more secure, and can be tightened if at any time they become loose.]

54,180.—Machine for Cutting Laths.—Charles Leaped, Indianapolis, Ind.:

I claim First, The adjustable flexible guides, c, and loop, E, arranged and operated in the manner and for the purpose, substantially as set forth.

Second, Operating the reciprocating rests, H, in the manner and for the purpose substantially as set forth.

54,181.—Button Attachment for Apparel.—Isaac Lu-vine, New York City:

What I claim as my invention and desire to secure by letters patent is the combination of the elastic loops, F, F, and buttons, D

D, both attached to the garment by eyelets in stay pieces, substantially as and for the purposes herein specified.

54,182.—Sealing Fruit Cans and other Vessels.—Wm. K. Leurs, Boston, Mass., and J. W. Bailey, West Brookfield, Mass.:

Hermetically sealing a vessel or vessels containing fruit or any other article of food or other substance whether in its natural state or treated by heat, or cooked or in any other proper manner prepared, while in a chamber or chambers of receivers, from which the air has been exhausted and a vacuum or partially so produced, substantially as herein described and for the purpose specified.

54,183.—Submarine Torpedo.—J. McDonough, New York City:

First, I claim the construction of a torpedo so as to be capable of elevation or depression under water at the will of the operator, by means of air, substantially as described.

Second, I claim the combination with a torpedo of a water chamber, A, open at the bottom and adapted to allow the water to be expelled by air or gas when required, substantially in the manner and for the purpose set forth.

Third, I claim the shell, G, G, with a water and air chamber open at the bottom a closed powder chamber near the top, and a passage extending from near the top of said water and air chamber adapted to be connected by a flexible pipe from the bottom of the shell to an outside source from which air or gas may be received, substantially in the manner and for the purpose herein set forth.

Fourth, I claim in combination with the above, coiling a quantity of flexible tube, d, d, within the base of the torpedo so as to be uncoiled as the torpedo rises, substantially as and for the purpose herein set forth.

Fifth, I claim the combination of the elastic wires, c, with the air tube, d, substantially in the manner and for the purpose herein set forth.

54,184.—Fan.—George Mallory, Watertown, Conn.:

I claim a fan constructed, substantially as shown and described.

54,185.—Car Window.—George Mann, Jr., and Henry Hise, Ill. Antedated April 12, 1866:

We claim, First, Pivoting or otherwise securing the valves or side windows, D D, to the stationary or front part, C, of the window, substantially as specified.

Second, Providing such valves or side windows with bolts, b, for securing them in either a closed or open position, substantially as described.

Third, Making a hole or opening, E, in the bottom plate, B, of the frame of the window, for the purpose herein specified.

Fourth, We claim the slide, d, or its equivalent in combination with the hole or opening, E, for the purpose of closing the same, substantially as herein shown and described.

54,186.—Peat Machine.—Samuel Marden, Newton, Mass.:

In combination, with reciprocating follower, a mould box having a construction substantially as described.

54,187.—Lath.—D. W. Maurice, Springfield, Ohio:

I claim the combination of chuck, c, socket D, and shaft, B, with the screw sleeve, E, arranged substantially in the manner described and for the purpose set forth.

54,188.—Machinery for Threading Screw Blanks.—Dustin F. Mellen, New York City. Antedated April 13, 1866:

I claim the tool block and tool holders, constructed, arranged, and combined, substantially as and for the several purposes herein set forth.

I also claim the construction, arrangement and application of the socket-cutter, for chamfering the end of the screw blank before threading, in combination with the threading apparatus, as set forth.

I also claim the bar, s, for throwing back the threading tools into place, as described.

I also claim the cutting tool, o, and its clamp, p, combined as herein described.

54,189.—Knife Handle.—David H. Merriam, Fitchburg, Mass.:

I claim the combination and arrangement of the two tangs, a, a, and the blade, B, or its equivalent.

I also claim the application of the shoulder piece or bolster, D, to the tangs and blade, substantially in the manner as specified.

I also claim the application of the handle to the tangs and blade, substantially as in the manner described.

I also claim the combination and arrangement of the cap, E, with the tangs, a, a, and the blade B, or the same, and the handle, C, substantially as set forth.

I also claim the application of the handle to the tangs, b, b, and bolster, substantially as described.

54,190.—Bag Frame.—William T. Mersereau, Newark, N. J.:

I claim jaw C, in combination with the cover, A, when the same shall be constructed and combined, substantially as and for the purpose specified.

54,191.—Cultivator.—James E. Morrison, Washington, D. C.:

First, I claim a cultivator having double-plow beams, u u, hooks, o o, clevis, p, standards, x x, and cross bars, Y Y constructed, combined, and arranged substantially as herein specified.

Second, In combination with double-plow beams united at their front ends as described, the standards, x x, and cross bars, Y Y, constructed and operated substantially as and for the purposes set forth.

Third, The entire cultivator with its various devices, constructed and arranged substantially as and for the purposes herein mentioned.

54,192.—Manufacture of Lubricating Oil.—Leander M. Mott, Chicago, Ill.:

I claim the process of crude rock or mineral oil for lubricating purpose, and the deodorizing of crude rock, and mineral oil by means of the application of the before mentioned chemicals direct to the oil, and subjecting the same to heat, as is substantially set forth above.

54,193.—Argand Gas Burner.—Robert Murray and George Oakes, Boston, Mass.:

First, I claim constructing an argand gas burner in two pieces fastened together so as to form two gas-light joints, and an air draught through both pieces, as described.

Second, The arrangement of the upper and lower castings in such a manner that the outer periphery of the upper portion of the burner is brought in close proximity with the inside of the outer wall of the upper casting, as and for the purpose specified.

Third, Constructing and arranging a chamber between the upper and lower castings, as described and for the purpose specified.

54,194.—Composition for Filling the Pores of Wood.—Henry S. Myers, Borough of Mount Joy, Lancaster, Pa.:

I claim the compound formed by the ingredients, in the manner and for the purpose specified.

54,195.—Machine for Soldering Tin Cans.—Peter H. Niles, Boston, Mass.:

I claim the method of soldering a cylindrical vessel of sheet metal by supporting it in an inclined position with reference to a pan of melted solder, in such a manner that rotation of the vessel will cause the joint to be soldered to travel through the solder by means, substantially as described.

Also the employment of the friction rolls, c d, and the driving roll h, for effecting the rotation of the can or vessel, arranged and operating substantially as described for the purpose set forth.

Also the employment of mechanism for automatically introducing the cans to the action of the rolls, and removing them therefrom, arranged and operating substantially as set forth.

54,196.—Sorghum Evaporator.—Henry P. Ninde, Oskaloosa, Iowa:

I claim the combination of the three pans, when constructed as set forth, and operated in conjunction with the sliding partition, J, as described.

54,197.—Stovepipe Damper.—Sherman R. Nye, Barre, Mass.:

I claim the above described damper, consisting of the concave annulars, A, the curved concave bars or ribs, B, and the ribs, C C', constructed and operating as and for the purpose specified.

54,198.—Calendar Clock.—George B. Owen, New York City:

I claim the annular plate, D, numbered and toothed and placed

between bearings, a, so as to be capable of rotating freely, in connection with the cam G lever, E, and pawl, F, or their equivalents, applied to a clock movement, to operate substantially in the manner as and for the purpose herein set forth.

I further claim providing the plate, D, with alternate large and small teeth, F, in connection with the opening in the front of the clock case so that the plate, D, will be moved under two revolutions of cam, G, to expose a succeeding number through said opening only once in twenty-four hours.

[The object of this invention is to obtain a simple and economical device which may be applied to clocks and operated from the movements thereof, so as to indicate the days of the month. Various calendar attachments have been devised for clocks, but they have not been generally adopted on account of being expensive and liable to get out of repair and to render the clocks to which they are applied very inaccurate time keepers—difficulties which, it is believed, are fully obviated by this invention.]

54,199.—Drill for Artesian Wells.—Henry Palmer, San Francisco, Cal.:

I claim a double-edged drill, cutting at the upward, as well as at the downward stroke or blow, with beveled shoulders, or upward cutters inclining equally upon the adjacent planes, and at right angles with the stem, substantially as and for the purposes specified and set forth.

54,200.—Broom Head.—George W. Parsons, Harrisburgh, Pa.:

I claim the combination of a sheet-metal head with a metallic camp, constructed substantially as described, when both are so arranged that the lower edge of the jaws of the clamp rests on the corn and the upper edge of the clamp rests on the lower edge of the metal head, and the handle and corn will be held in place by a single screw bolt, operating substantially as set forth.

54,201.—Stopper for Bottles.—Robert G. Pike, Middletown, Conn.:

First, I claim the elastic bag or sack, with an elastic ring permanently fastened around the border of the opening thereof (or its equivalent), substantially in the manner and for the purpose as described, whether with or without the perforated cork or stopper.

Second, I claim the stopper whether of cork or other material, perforated for the passage of the air, for the purpose substantially as described.

Third, I claim closing the orifice of bottles or jars by means of air acting expansively in an elastic bag or sack, placed within or over the orifice of the jar or bottle, substantially and for the purpose as described.

54,202.—Fire Alarm.—Rufus Powers, Prescott, Mass.:

I claim the use of fastenings or connections for wires in fire alarms, so constructed with soft metal or other substance, that they shall melt and release the wires or give the alarm upon being heated as described and in the manner and for the purposes set forth.

54,203.—Mordant.—E. Freeman Prentiss, Philadelphia, Pa.:

I claim the mordant, composed substantially as and for the purpose described.

54,204.—Apparatus for Molding Crucibles.—Jos. L. Presbrey, Taunton, Mass.:

I claim the combination and arrangement of the elastic bag and the crucible mold, substantially as described.

54,205.—Steam Generator.—R. Rafael, New York City:

I claim the herein-described arrangement of the furnace in the upper part of the boiler and the succession of horizontal flues whereby the products of combustion are conducted in a zig-zag course to the bottom of the boiler and there discharged into the chimney, as explained.

54,206.—Saw-filing Machine.—J. H. Rector, Syracuse, N. Y.:

First, I claim the combination of the index drum V, the lever, and point, S, the table, J, the dial, B, the rack, K, and the pinion wheel, q, all arranged substantially as described.

Second, The combination of the adjustable wheels, N and m, with the table, J, the dial, B, the rack, K, and the pinion wheel, q, all arranged substantially as described.

Third, The combination of the treadle G, the index drum, V, the lever and point, S, the wheel, N, and the wheel, m, with the table, J, and rack, K, constructed substantially as and for the purposes above described.

54,207.—Velocipede.—Harvey A. Reynolds, New York City:

First, I claim operating the steering wheel by means of lines, n, passing over pulleys, a at the sides of the horse's mouth, and connected with a lever, j, on the ring bolt or pivot of said wheel, substantially as specified.

Second, The combination of the slots, d, in the legs of the horse, with the extension, f, of the stirrup, working therein, substantially as and for the purposes set forth.

54,208.—Picture Frame.—J. E. Rice, Boston, Mass.:

I claim a picture frame and service plate made of one piece of glass, as a new and improved article of manufacture, substantially as described.

54,209.—Hay Press.—Benjamin Roberts, Highland, N. Y.:

First, I claim the arrangement of the series of levers, E E F F, frame, A A C C C, pulleys, d d d d, rollers, a, a, follower beams, D' D', and endless rope or chain, b b b b, substantially in the manner and for the purpose described.

Second, The manner of arranging the cover, C, in combination with the manner of suspending it from rollers, g' g', substantially as described.

Third, The spring loops, l, l, on the frame A, in combination with the hooked bill, G, so applied as to receive the ends of the battens, B' B', and to sustain the door, B, against outward pressure.

Fourth, The hooked bill, G, pivoted to plates, h h, in combination with loop holders, l l, which set upon the bills forward of their fulcrum, substantially as described.

54,210.—Machine for Cutting Tobacco.—Daniel T. Robinson, Boston, Mass.:

I claim the construction and arrangement of the standard, A, lever, B, arm, d, and cutter, C, substantially in the manner and to operate as before described.

54,211.—Rocket Harpoon.—Thomas W. Roys and G. A. Lillendahl, New York City:

First, We claim in combination with the stock, G, the rocket, B, the shank, C, and bars, E, substantially as shown and described.

Second, In combination with the breech or stock of the rocket the bow or loop shank, substantially as described.

Third, In combination with the stock or breech of the rocket, the bars to secure the harpoon in the whale without regard to the number thereof.

54,212.—Shaft Coupling.—Stephen P. Ruggles, Boston, Mass.:

I claim a shaft coupling made in two parts and held together and to the ends of the shaft by a differential screw bolt and screw threads in said parts and by a key, substantially as and for the purpose described.

54,213.—Hay and Straw Stacker.—C. Rundell, Chicago, Ill.:

First, I claim the employment of the screw elevator for the purpose of raising the frame or standard in the mow or stack, in stacking hay, grain, or straw in the manner substantially set forth.

Second, I claim the screw and standard or its equivalent, when arranged and operated conjointly, in the manner and for the purpose set forth.

Third, I claim the reel, connected with the pole or standard, substantially, and for the purpose specified.

Fourth, I claim the pulley, sheaves, and standard, with the run cord and pulley constructed so as to operate conjointly, as and for the purpose herein described.

54,214.—Retort for Generating Gases from Oils.—Silas C. Salisbury, New York City:

First, I claim the application and use of heating purposes, of the gases derived from oil, water, and air, or from oil and water combined substantially as described in combination with the gases produced from the fire of any ordinary furnace, for the purpose set forth.

Second, The construction and arrangement of the retort, A, substantially as described, for generating and combining the gases of oil, water, and air, for the purposes set forth.

Third, The combination of a retort for generating such gases from oil, water, and air, or from oil and water, with the furnace or fire box, in which such gases are to be burned, when such retort is placed in and heated by such furnace.

51,215.—Blast Furnace.—Silas C. Salisbury, New York City. Antedated April 19, 1866:

First, I claim the application and use, in blast furnaces, of a blast of current of the combined gases of oil, water, and air, combined, or substantially as described, applied and used substantially as and for the purposes set forth.

Second, The application and use, in such furnaces, of a blast of current of highly heated lime water vapor, substantially as and for the purposes set forth.

51,216.—Apparatus for Applying Oil and Water to assist the Combustion of Coal, etc.—Silas C. Salisbury, New York City. Antedated April 10, 1866:

First, I claim the construction and arrangement of the tubular retort, A, composed of an inner and outer perforated tube, substantially as and for the purposes set forth.

Second, The combination of a series of retorts so constructed for use and application in furnaces in the place of ordinary grate bars.

Third, The combination of a retort, so constructed, with an oil and water reservoir or supply, and an air blast, for the purposes set forth.

51,217.—Chair.—James F. Sargent, South Strafford, Vermont:

First, I claim the combination of the plate, B, seat, A, catch, D, or its equivalent, and supports, C, C, substantially as specified.

Second, I claim the foot rest, E, in combination with the seat, A, of a chair so arranged that its inclination may be regulated, as desired.

51,218.—Apparatus for Distilling.—H. A. Schesch, Brooklyn, E. D., N. Y.:

I claim exposing the upper part, or vapor space, of a still to the action of an additional fire, built in a secondary fireplace, substantially in the manner and for the purposes set forth.

51,219.—Grain Drill.—Peter Schmitt and Peter Jacob Schmitt, Waterloo, Ill.:

First, We claim the two perforated plates, E E', with lever, G G', attached in connection with the wheel H, provided with the arm, I, for guiding or adjusting screw, L, and the bar, J, connected with the shoe-lifting bar, K, all arranged to operate in the manner, substantially as and for the purposes set forth.

Second, The attaching of the shoe hangers, X, to the front part of the frame, A, by having said hangers notched at their front ends and fitted on a rod, Y, which is secured to the under side of the front bar of the frame, A, by hooks, I, substantially as shown and described.

51,220.—Motive Power.—J. Adam Schule, New York City:

I claim the centrifugal weights, c, in combination with the shaft, a, cogwheel, k, clutch, l, cogwheel, n, and shaft or axle, o, all constructed and operating substantially as and for the purpose described.

51,221.—Disinfecting Apparatus.—John M. Scudder, Cincinnati, Ohio:

I claim the disinfecting apparatus, consisting of the atomizer, C D E F I J, and a portable steam generator, substantially as set forth.

51,222.—Tenoning Blind Slats.—James M. Seymour, Newark, N. J.:

I claim passing a slat or lath horizontally around the cutters, substantially as described, for the purpose herein above specified; also, the projections, t, in combination with the disks or circles, v, when constructed and arranged in the manner and for the purpose herein above specified.

51,223.—Meat and Vegetable Cutter.—James Shepard, Bristol, Conn.:

I claim, first, The circular knives or cutters, A, A, mounted on a shaft, B, and operating substantially as specified, or any number of cutters, operating in the same manner.

Second, I claim the combination of a d arrangement of the knives or cutters, A, shaft, B, shank, C, with its arms, a, and handle, D, as herein specified.

51,224.—Steam Plow.—Gibson Simonson, Mt. Carmel, Ind.:

I claim, first, The driving pulley, T, slack belt, h, and pulley, V, in combination with the idler, Z, under control of the operator, for starting and stopping the traction wheel of a steam plowing machine.

Second, The arrangement of swivel d and internally-geared guide wheels, D K, capable of being brought into connection with the motor by means of the idler, I, so as to enable the turning of the machine to the right or left, by power under the control of the operator.

Third, The gravitating plow frame, J, capable of being set in or out of pitch by means of the swivel d and adjustable joint, K L.

Fourth, The device, M N P, for the suspension and adjustment of the plows relatively to the main frame.

Fifth, The arrangement of vibrating shaft, I, lever, p', scalloped pulley, q, q', pulleys, r, s, and shaft, t, and chain, t, or their equivalents, for unclogging the gang of plows, in the manner explained.

51,225.—Water Elevator.—Hiram Moore Smith, Richmond, Virginia:

I claim the combination and arrangement of pawl and brake, E F, brake and ratchet wheel, D, and crank, G, as and for the purpose described.

51,226.—Rock Drill.—John Y. Smith, Alexandria, Virginia, assignor to himself and Herman Haupt, Philadelphia, Pa.:

I claim the construction of a drill or reamer or kindred implement of any form bearing a wrought iron stem, combined with steel bits or cutting edges by casting the steel which forms the bits or cutting part of the drill around the wrought iron stem when at a white or welding heat, as and for the purpose herein set forth.

Second, In combination with a drill or kindred tool of otherwise ordinary suitable construction, I claim the wings formed with deflected surfaces at their upper ends, as and for the purposes herein set forth.

51,227.—Car Spring.—Joshua B. Smyth, Philadelphia, Pa. Antedated, Jan. 30, 1866:

I claim in combination a series of steel springs, whether composed of one or more plates, and so supporting them at their ends that they shall be in no part in contact with one another when without a load, and so arranging them that they shall successively be brought into action with the increase of the load, substantially in the manner and for the purpose set forth.

51,228.—Horse Rake.—E. R. and W. P. Spear, Orland, Ind.:

We claim the arrangement and combination of the levers, L, L, connecting rods, K K, draught arms, G G, and spring bars, J, J, and their springs, F F, with a revolving rake, substantially in the manner and for the purpose set forth.

51,229.—Gaging Rod.—William J. Tait, Bergen, New Jersey:

I claim an improved gaging rod formed by combining the slide rod, B, and stop, G, with the ordinary gaging rod, substantially as described and for the purpose set forth.

51,230.—Can for Caustic Alkalies.—Edwin A. Thomas, Philadelphia, Pa.:

I claim a can for putting up caustic alkalies, etc., the seams of which are secured by Thomas's patent cement, and the top or cover attached by rocking down the edges of said cover over the turned out edge of the body of the fill-d can, substantially as described.

51,231.—Evaporator.—Tower Thomasson, Neoga, Ill.:

First, I claim the provision in an evaporating apparatus of a train of portable and separate pans, F F' F'' F''' F''', or their equivalents adapted to be linked together and to be used in connection with the railway, E' E', substantially as described.

Second, The evaporating pan, F, when constructed with wooden ends, G G', metallic bottom, K, and partially wooden and metallic sides, H H', and I I', in the manner described.

Third, The hooks, O, and staples for devices, substantially equivalent for connecting a train of evaporator pans.

Fourth, In combination with the elements of the first and second claim, I claim the "receiving platform," S, for the purpose described.

51,232.—Tree Protector.—Timothy Tufts (assignor to Person Davis, Somerville, and Albert Taylor), Boston, Mass.:

I claim the combination and arrangement of the series of supporting nails, D, and their screws, E, and nuts, F, with the annular trough and its projections, d, or the equivalent thereof, or with the same and the annular packing, E, arranged above the trunk of a tree, substantially as specified.

51,233.—Heating Stove.—William Van de Gande, New York City:

I claim the movable fire pot or cylinder, c, the lever, L, and movable grate, H, when in combination with a coal stove, A, operating in the manner substantially as and for the purposes described.

51,234.—Railroad Car Spring.—Alexander T. Watson, New York City:

First, I claim the peculiar construction and adaptation of the sockets or grooved recesses, b b, in which the extremities of the plates or leaves are set together, with the flange or lever guards, a a, by which the free action of the ends of the plates is permitted, and they are at the same time held in their proper positions, substantially as described.

Second, I claim the plates or leaves constructed substantially as described and the cutting or fixing the extreme or end curves at such a point, and so combining and arranging the curves with each other that, when under pressure the elastic action of the plates is outward, and the curves of the plates, except at the ends, are caused to straighten, whereby the inability to fracture or collapse is greatly diminished.

51,235.—Harvester Rake.—George Wellhouse, Akron, Ohio:

First, I claim giving the rotary motion to the vibrating sweep-rake, by means of the arm, G, and the universal joint at the rear of the rake, substantially in the manner and for the purposes set forth.

Second, I claim the arrangement and combination of the lever, H, the connecting rod, I, and sweeping rake handle, substantially as described.

Third, I claim the arrangement and combination of the grain guard, L, the rod, M, and lever, H, substantially as set forth.

51,236.—Railroad Chair.—J. W. Wetmore, Erie, Pa.:

I claim a railroad chair, constructed of a bed piece, fig. 2, which has one jaw to hold the rail, and join in two parts to hold a wedge, and which has also a recess, g g, in which the jaws, fig. 3, are applied to the rail, and held in place by the wedge, with its key, s, and groove, r r' both the fixed and adjustable jaws being held by rivets passing through the notches of the rails, all substantially as described.

51,237.—Car Coupling.—C. O. Wheeler, Mattison, Ill.:

I claim the hooks, B B, arranged with the springs, D, in combination with the draw pins, c, said parts being applied to the draw heads, having central extra mouths, a, and all arranged substantially in the manner and for the purpose herein set forth.

[This invention relates to a new and improved car coupling of that class which are self-connecting or self-acting, and it consists in providing the draw heads with hooks, pins and springs, managed in such a manner, that the draw heads of the adjoining cars will engage or connect themselves on coming in contact, and without the possibility of being casually detached, and at the same time admit of being readily disconnected whenever required.]

51,238.—Car Coupling.—James Wedicev, Carlisle, Pa.:

First, I claim a coupling pin for railroad cars, constructed as described for the purpose set forth.

Second, Providing the buffer with a removable abutment, A', substantially as and for the purpose described.

51,239.—Lamp Chimney Lifter.—John H. Wilhelm and James W. Larimore, Cook County, Ill.:

We claim the hands, A, secured to the arms, B B, when said hands are provided with figures, 1, 2, 3, 4, 5, so arranged, that the chimney is securely held in said hands, and between said fingers in the vertical position in which it is grasped, substantially as herein specified.

51,240.—Eyelet Machine.—Ira E. Wilson and John Lowe, Providence, R. I.:

We claim the forcible introduction into, and application to eyelet machines, of one or more blais, or currents of air, or streams of water, or of such other fluid under a sufficient pressure as will accomplish the above described purposes, substantially in the mode above described and for the purposes indicated.

51,241.—Animal Trap.—George Wolf, Williamsport, Md.:

I claim the above described trap, provided with the wire, G, and the eye of the cord, D, or with the equivalent of these devices (dependent upon friction alone) for holding the trap, E, substantially as described.

51,242.—Well Windlass.—T. J. Wingham, Benson, Vermont:

I claim the arrangement of the fixed and loose ratchet wheels j j l, fixed drum, h, and crank arm, all attached to the windlass shaft of a well curb, as and for the purpose specified.

[This invention consists in a novel arrangement of mechanical devices for operating the windlass upon which the chain or rope carrying the bucket of a water well is wound.]

51,243.—Apparatus for Burning Tar.—Richard Yeilding (assignor to himself and Henry Gage), Ypsilanti, Mich.:

First, I claim a reservoir for fuel composed of tar, pitch or rosin, mixed with oil or tar alone, with its packs I cone having a feeding valve, F, contained in a chamber or case, a, of nonconductive material, and having a tube or tubes furnish d with regulating stop cocks for the purpose of ejecting the fuel in jets to be ignited, as hereinbefore set forth.

Second, I claim the reservoir, B, with its component parts and the tube or tubes, K, in combination with the retort, L, and the sleeve, M, for the purpose and substantially in the manner set forth.

51,244.—Paper Collar Machine.—Charles K. Brown and William Wright (assignors to Charles K. Brown), Troy, New York:

First, We claim a combination of two rotary, creasing, or folding wheels, and a device substantially as herein described for supporting and guiding a collar or a similar article in a curved course while being passed endwise between the said creasing or folding wheels, whereby collars or similar articles can be creased, folded, or partly folded progressively from end to end, in a curved line, substantially as herein described.

We also claim a combination of two rotary creasing or folding wheels, a device for supporting and guiding a collar or similar article in a curved course while being passed endwise between the said creasing or folding wheels, and an additional folding or pressing mechanism, whereby collars or similar articles can have a crease, fold, or partial fold made therein, progressively from end to end in a curved line, and also have such crease, fold, or partial fold increased, pressed, or finished, progressively from one end to the other, all at a continuous operation, substantially as herein described.

We also claim the combination of a yielding edge presser, G, curved pattern edge guide, D, side support, C, or side supports, c c', and creasing or folding wheels, A, B, either with or without an additional folding or pressing mechanism, substantially as herein described.

We also claim the combination of two creasing or folding wheels, A, B, and two folding or pressing rollers, F F', arranged so as to revolve in a plane perpendicular, or nearly so, to that in which the said creasing or folding wheels turn, and form wheel, with inner and outer guides between the said wheels and rollers, substantially as described.

And we also claim the combination of a rotary guide, I, and a grooved or flaring guide, H, with two rotary rollers, F F', substantially as herein described.

51,245.—Seat for Harvesters, etc.—Thomas S. Brown (assignor to himself and John P. Adriance), Poughkeepsie, New York:

I claim constructing the support, B, of rider's seat for harvesters, mowing machines, and other agricultural implements—a spring bar or plate twisted in such a manner that the support will yield or give in two different planes at right angles with each other, and admit of the yielding of the seat in any direction, substantially as set forth.

51,246.—Device for Lubricating Carriage Axles.—N. B. Brown (assignor to himself and Elbridge Sims), Antwerp, New York:

I claim the spring valve, a, in combination with the slotted receiver, A, applied and operating as described.

51,247.—Fire Engine and Pump.—John N. Dennison (assignor to himself, Francis H. Gould and Roscoe J. Gould), Newark, N. J.:

First, I claim the arrangement of the cylinders, B C, constructed as described within the valve chamber, a, stop cocks, l m n, partition, e, and pipe, n', operating in the manner and for the purpose herein specified.

Second, The valves or stop cocks, l, n in combination with the pistons, D E, chamber, a, and partitions a b, constructed and operating substantially as and for the purpose set forth.

51,248.—Machine Drill.—Nelson P. Eddy (assignor to himself and William P. Hawes), Fall River, Mass.:

I claim combining with a machine drill, a feed table constructed and operating, substantially as described for the purposes specified.

51,249.—Broom.—Daniel P. Farnham (assignor to himself and Moses P. Farnham), Rock County, Ill.:

I claim elastic wire jaws, D and D', attached to the handle, substantially as described, and operated by a looped lever, F, and auxiliary springs, E and E', in combination with the socket, B, handle, A, and spring catch, t', or its equivalent, when the whole are constructed, arranged, and used, substantially as and for the purposes described.

51,250.—Oil Can.—J. L. Holt (assignor to himself and J. M. Thompson), Springfield, Mass.:

I claim the arrangement of the can, a, having connecting tubes, b, and ball and socket valve, g, in combination with an oil can, operating substantially as and for the purpose specified.

51,251.—Fish Hook.—Job Johnson and Hezekiah Howarth (assignors to Job Johnson), Brooklyn, N. Y.:

We claim the spear connected to the line in combination with the spring and with the hook, substantially as specified, whereby the spring causes the hook and spear to come towards each other when the fish bites at the bait, as set forth.

51,252.—Sirup Fount or Cup.—G. H. Knight and F. Millward (assignors to George H. Knight), Cincinnati, Ohio:

First, We claim a sirup fount having the following elements to wit—a containing vessel whose spout communicates at or near its bottom, a plunger or piston, and a retracting spring, or its equivalent.

Second, In combination with the elements of the preceding clause, we claim a vertically reciprocating and submerged disk or plunger, whose descending stroke terminates at or near the bottom of the vessel, substantially as set forth.

Third, In combination with the elements of the two foregoing clauses, we claim an enlargement of the vessel, or equivalent device, at or near the upper position of the plunger, for the purpose explained.

51,253.—Carriage Shackle.—Wilson W. Knowles (assignor to himself, Julius B. Savage, and Willis B. Smith), Southington, Conn.:

I claim constructing the shackles to receive the clip bar, substantially as and for the purpose herein set forth.

51,254.—Method of Priming Metallic Cartridges.—Timothy J. Powers (assignor to J. P. Fitch and J. R. Van Vechten), New York City:

I claim the employment for depositing the fulminate priming around the interior of a cartridge shell, of a spindle upon which the said priming is first placed, and the revolution of which throws the said priming directly into its place by centrifugal force, substantially as herein specified.

51,255.—Machine for Making Cartridge Cases.—Timothy J. Powers (assignor to J. P. Fitch and J. R. Van Vechten), New York City:

First, I claim, in a machine for drawing metallic cartridge shells or other similar articles of metal, the employment of several mandrels operating successively or in rotation in combination with one die or set of dies, substantially as and for the purpose herein described.

Second, I claim the arrangement of the mandrel or mandrels in a machine for drawing cartridge shells or other similar articles in an upright position, with the point upward, substantially as and for the purpose herein specified.

Third, I claim the construction of a mandrel on which cartridge shells or other similar articles are to be drawn with a shoulder, c, having a sharp cutting edge operating substantially as herein described, in combination with the drawing die or dies to cut off the waste metal from the edges of the shell or other article, after the drawing operation is completed, substantially as herein set forth.

Fourth, I claim the cylindrical cam, H, having a groove, b, of the form herein described, operating in combination with a series of pins, d d, in the table, D, which carries the drawing mandrels, to produce the intermittent rotary movement of the said table, and to lock the table in fixed positions during the intermission in its rotary movement, substantially as herein set forth.

51,256.—Horse Shoe Nail Machine.—Silas S. Putnam and Lucius H. Dwelley (assignors to S. S. Putnam & Co.), Dorchester, Mass.:

We claim the adjustable feeding nippers, m n, operated by a mechanism, substantially as described, so as to carry the nail rod into the machine as set forth.

We also claim, in combination with the above, the dog, e', on the shaft, S, operating substantially as set forth.

We also claim in machines for forging horse shoe and other wrought nails, cutting off the finished nail without moving the rod from its normal position, by a mechanism substantially as described.

We also claim arresting the hammers automatically after a certain number of blows and retaining them open while the nail is being cut off and the rod fed into the machine by mechanism substantially as described.

We also claim the blocks, h, so hinged as to swing out on the pins, j, as centers, in combination with the set screws, g, and springs, e, substantially as set forth.

We also claim the furnace, M, in combination with the feeding nippers, m n, and hammers, J K, operating substantially as set forth.

We also claim the cutters, T W, in combination with the connecting rods, b' and V, the lever, Q, and cam wheel, R, operating substantially as described.

We also claim the ring, Y, in combination with the hammers, J K, frame, X, connecting rod, m', lever, Z, and cam wheel, K, operating substantially as set forth.

We also claim adjusting the nippers, m n, to the size of the rod, being operated upon by means of the set screw 20 and block 19, substantially as described.

51,257.—Watch Key.—George W. Remington (assignor to himself and George H. Remington), North Providence, R. I.:

I claim the combination with the key-spindle, A, having a loosely turning casing, C, or its equivalent operating upon its ratchet, D, by a spring pawl, F, of one or more pressure springs so arranged upon it as to bear and operate upon the collar of its ratchet, substantially in the manner described and for the purpose specified.

I also claim, in combination with the above, the sliding collar, M, of the key spindle arranged with regard to the pressure springs, g g, thereof, so as to operate substantially as and for the purpose specified.

51,258.—Hammer or Burr for Facing Mill Stones.—Lewis Sauers (assignor to himself and H. Shaffner), Mount Joy, Pa.:

I claim a series of bits or blades 1, 2, 3, 4, or more, provided with a central hole, D, for the reception of a handle, B, constructed in the manner and for the purpose specified.

I claim the diagonally jointed box plate, A' A'', provided with three holes, in combination with the blades, 1, 2, 3, 4, shouldered handled iron, B E, and wedge, C, arranged in the manner and for the purpose specified.

51,259.—Mosquito Bar.—Langdon Sawyer (assignor to Benjamin F. Sawyer), Springfield, Vt.:

First, I claim the coiled spring, e m, in combination with the socket, b, and the standard, A A, combined and operating substantially as above described.

Second, The frame, F, constructed as above set forth, composed of the center bar, a, with its loops, m m, the transverse bars, I I, with their loops or slots, k k k', the semicircular arms, j j, with their loops or slots, k k k', and the spring, n, combined with the extension bar, b, and operating substantially as above set forth.

Third, This extension bar, b, in combination with the frame, F, constructed as above described and operating as above substantially set forth.

Fourth, The combination of the standard, A A, the extension bar, b, and the frame, F, constructed substantially as above described, constituting a mosquito bar, as herein before described.

54,260.—Grinding Mill.—Thomas J. Sloan, New York City, assignor to John G. Sloan, Paris, France:

I claim the combination of the series of driven saws for grinding, the two series being mounted on two shafts geared to rotate with equal velocity, and the series of clearing saws being of greater diameter than, and extending into the space between the grinding saws, substantially as and for the purpose specified.

The combination of the series of grinding saws with the feed roller and the interposed rest bar, and pressure plates as the equivalent thereof, substantially as and for the purpose specified.

In combination with a series of driven or inclined saws for grinding as described, the means or the equivalent thereof for giving to the feeding mechanism a lateral reciprocating motion for the purpose of presenting the material equally to all the saws as set forth.

54,261.—Grinding Mill.—Thomas J. Sloan, New York City, assignor to John G. Sloan, Paris, France:

I claim the combination of the series of clearing disks with the series of grinding or reducing saws when the periphery of the disks is made to travel faster than the periphery of the saws, substantially as and for the purpose described.

And I also claim giving to the feeder box a reciprocating motion, substantially as described in combination with the series of circular saws set with their planes at right angles with their axis of rotation, and having spaces between them, substantially as and for the purpose specified.

54,262.—Grinding Mill.—Thomas J. Sloan, New York City, assignor to John G. Sloan, Paris, France:

I claim the combination of the series of saws with the series of disks formed with recesses or buckets in their peripheries for carrying and holding the grain to and while it is subjected to the action of the saws, the saws rotating at a higher velocity than the disks, substantially as and for the purposes described.

I also claim the hopper for supplying the grain to the buckets in the series of disks, in combination with the series of disks and the series of saws, substantially as and for the purpose described.

And, finally, I claim, in combination with the series of saws and with the series of disks constructing the lower part of the hopper with an overflow and inclined surface leading thereto, substantially as and for the purpose described.

54,263.—Grain Separator.—Charles G. and William Stoll (assignor to Charles G. Stoll), East New York, N. Y.:

I claim the combination of the sieve, E, with the closed box, A, and fan blower, I, or other equivalent devices, substantially as described, so that the air forced into the said box has no way of escape except through the apertures in the sieve, and it is compelled to act on the material placed on said sieve with its full force.

The yielding spring valve, F, in combination with the long, narrow discharge opening in the bottom of the hopper, and with the sieve, E, constructed and operating substantially as and for the purpose set forth.

The closed box, J, to which the air has access from below in combination with the fan, I, box, A, and sieve, E, constructed and operating substantially as and for the purpose described.

The adjustable valve or partitions, R, in the compartments, Q, of the box, A, in combination with the sieve, E, constructed and operating, substantially as and for the purpose set forth.

The air valve, V, in the bottom of the box, A, in combination with the blower and sieve, constructed and operating substantially as and for the purpose described.

54,264.—Banjo.—William B. Tilton (assignor to W. Nash), New York City:

I claim securing the parchment head to and within the cylinder or rim of a banjo or other similar musical instrument, by means of two annular rings, B and C, when arranged together and with regard to the parchment head and the banjo rim so as to operate substantially in the manner described and for the purpose specified.

I also claim so arranging and securing the ring, C, to which the parchment head is fastened within the banjo rim that it can be adjusted in position, substantially as and for the purpose described.

54,265.—Tweezer.—James M. White (assignor to himself and David King), Springfield, Ohio:

I claim the peculiar arrangement of tweezer for blacksmith forges consisting of two parts, A and B, united by the bolts, E, and having the hemispherical cup, F, resting upon legs, D, permanently attached to it which rests upon the, F, rotten piece, B, which has also a slide, C, in the bottom, the several parts being constructed and arranged substantially as and for the purpose set forth.

54,266.—Method for Preparing Magnesium for Burning.—Charles H. Wing, Newton Mass., assignor to the American Magnesium Co., Boston, Mass.:

I claim the forming of magnesium wire or ribbon into the spiral coils herein described.

54,267.—Method of Purifying Hydrocarbon Oils.—John Fordred, Blackheath, England:

I claim the employment of a solution of caustic soda or potash as a preliminary treatment or process of purification of the crude oil or the distilled oils or hydrocarbons resulting from the distillation of coal, shale, or peat at a low temperature.

54,268.—Method of Ventilating Mill Stones.—A. D. Lagoney, Paris, France:

I claim the combination of the two cones, M, N, air-conducting box, P, spouts, P', P', pipes, T, S, and stuffing boxes, Q, R, the whole arranged in relation with each other and applied to a pair of millstones, substantially as and for the purpose herein specified.

54,269.—Roller Temple for Looms.—J. Mathis, Dornbirn, Austria, assignor to H. Kayser, New York City:

First, I claim a temple composed of a series of wheels, a, set in an oblique position, substantially as and for the purpose herein shown and described.

Second, The eccentric shoulders, E, and the disks, d, which separate the oblique wheels, a, substantially as and for the purpose set forth.

54,270.—Cards for Carding Machine.—William Turner, Samuel Shore, and William Halliwell, Rochester, England:

We claim in tooth and stapler cards used in carding machines, the system of making the prongs or legs of each staple or tooth of different lengths.

54,271.—Method of Preparing Threads for Part-colored Printing and for Properly Weaving the Same.—Stanislans Vigoureux, Paris, France:

I claim the method herein described, of preparing threads for part-colored printing, and of retaining them in their proper relative position for weaving for the purpose of preventing the marring or disfiguring of designs or patterns.

REISSUES.

2,233.—Bank and Safe Door Knob.—Lewis Lillie, Troy, N. Y. Patented July 5, 1859.

First, I claim the employment of the switch or bar, D, and the nut, C, or any equivalent thereof, arranged upon and combined with the knob bolt or spindle, B, in the manner substantially as and for the purposes herein described and set forth.

Second, The tapering or conical spindle, B, in combination with a door of an iron or metallic safe vault or other structure so as to prevent the lock or lock bolt switch, by which the door thereof is fastened therein, from being driven from such door, from the outside of the same, by any burglar, in the manner substantially as herein described and set forth.

Third, The employment of said tapering or conical spindle, B, in combination with the lock case, C, of the lock, P, or any equivalent thereof, in the manner and for the purposes substantially as herein described and set forth.

Fourth, The employment of the tapering or conical spindle, B, or any equivalent thereof, when used in the manner and for the purposes substantially as herein described and set forth.

DESIGNS.

2,294.—Ornament for the Head.—Sarah E. Cook, Philadelphia, Penn.:

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

PATENT-OFFICE DECISIONS.

Application for a patent for Improvement in Drilling Wells.

E. Foote, Examiner-in-chief.—The continuous rotary motion of a shaft is made to give the reciprocating movement of the drill in a manner that is ingenious, simple, and effective. To the shaft is attached a ratchet wheel, and by it, turning loosely on the shaft, is what is termed a crank, to which the rope from the drill is attached. On the crank is a pawl with its spring, against which the ratchet teeth act and carry forward the crank. The drill is thus raised to its full height and the crank passes the center, when the weight falling, carries the crank and pawl faster than the wheel, and imparts the blow. The wheel and pawl then reconnect, and the weight is again raised.

In the principle of this invention the applicant has been anticipated by a part of the drop press of Milo Peck, patented in May, 1857. The effect of this is to limit the applicant's claims to the particular arrangement and combination he has made to effect a specific object. The claims presented in the specification seem to us to be so limited as to present sufficient invention and utility to entitle the applicant to the patent asked for.

When a real improvement has been produced we are disposed to regard an applicant's case with liberality. The device that has been supposed to interfere with this is adapted to another purpose, and is not suited to operate a drill. In making the particular application and adaptation, the applicant has displayed invention and rendered an important service.

The decision of the Examiner is reversed.
Washington, D. C., Feb. 7, 1866.

Application for a patent for Improvement in Feeding Devices in machines for planing lumber.

E. Foote, Examiner-in-chief.—Both the upper and lower rolls that feed the boards into a planing machine are, in the applicant's device, operated by bevel gears, and the two are connected by a sliding rod that admits of their adjustment to different thicknesses of lumber. The positive motion to both rolls and the provision for their necessary adjustment without effecting the gearing is the improvement claimed, and it is said to be of much practical importance. The invention was found to be anticipated by the feeding device in the planing machine of Lorenzo Vance, patented in March, 1864, and the applicant requested that an interference might be declared to give him an opportunity to show that his invention was first made. This the Examiner declined to do on the ground that the applicant's claim and specification did not sufficiently distinguish his device from a still older one, patented to Samuel Whiting in 1839. And this is the question appealed to us.

In Whiting's machine is found the sliding rod by which the adjustment is made, but the upper roller only is 'propelled by the bevel gears. The board, instead of being carried forward by two positive rolls pressing upon opposite surfaces, is moved by one only, which has also to overcome the friction of the lower roll. The arrangement of his rolls and their attachments is also less advantageous and practical than that of the applicant's. The first claim in the applicant's specification is for the combination with the feed rolls of the two sets of bevel gearing, F V H U, and the sliding shaft, G, substantially as and for the purposes described. It seems to us that this claim is appropriate, that it clearly points out the applicant's invention, and distinguishes it from Whiting's, and the Examiner's decision in regard to it must be overruled.

The second claim is for "the combination with the feed rolls for planing lumber of gearing so arranged and combined therewith as that the entire roll or either end can rise and fall without changing the pitch line of the gears by which it is driven, substantially as and for the purposes stated."

This claim is for the combination with the rolls of any kind of machinery or gearing that shall give them a certain property, that of rising or lowering without changing the pitch line of the gears. In an invention which consists solely of a specific form or arrangement of machinery, but little distinguishable from other forms of doing the same thing, this claim of functions or properties is improper, as we recently decided in the case of the interference between Tittman and Slep. Besides, this function embraced Whiting's device, for in his machine the roll rises and falls without changing the pitch line of the gear by which it is driven. The Examiner was therefore entirely right in holding that Whiting's device anticipated this claim.

The same remarks may be made in reference to the third claim.

The fourth claim, which is for the combination with the feed rolls, of mechanism for operating said rolls upon their axis and for elevating and lowering the top feed roll, substantially as herein described, may be regarded substantially the same as the first, expressed in different language—which to prevent misconception is sometimes allowable. Perhaps it is sometimes ambiguous. An amendment which which should make it say "mechanism for operating both rolls," would remove all difficulty.

The fifth and sixth claims do not appear to conflict with Whiting's device.

The Examiner's decision in reference to the second and third claims is affirmed. His decision in reference to the third, fourth, fifth, and sixth claims is reversed.
Washington, D. C., Jan. 1866.

Application for a patent for Improvement in Paper Ruling Machines.

H. Foote, Examiner-in-chief.—The applicant has made the penholder in these machines adjustable in every direction by screws and jam nuts. In the means used there is nothing new. They are all found in other instruments, and to some extent, in other ruling machines. They evince the skill of the accomplished mechanic rather than the creations of the inventor. The forms are new and skillful, but this does not authorize a patent for an invention.

The decision of the Examiner must be affirmed.
Washington, D. C., Feb. 1866.



N. C. G., of Mo.—Some years ago an offer was made through our paper for a machine to feed paper to a printing press, and several patents were granted for different modifications. It was found difficult to meet all the conditions required. The Philadelphia Inquirer is now printed on a self-feeding press Bullock's patent.

B. T. D., Mass., and M. S. M., La.—Straw hats are bleached by putting them in a tight box, at the bottom of which a quantity of sulphur is burning.

E. S. C., Ohio.—A worm wheel 8 inches in diameter, that runs 250 turns per minute, cannot help grinding in driving a spur wheel 24 inches diameter, because the velocity of the two surfaces is so unequal. Moreover, a worm wheel is not adapted to running at a high speed. Some other arrangement should be employed.

N. B. W., Ind.—All instruments that can be used in schools are exceedingly remunerative. You must be the judge as to the probability of yours becoming popular.

W. H. H., of Pa.—The size of the outside of a steam boiler has nothing to do with its power. The efficiency of them depends on their heating surface and the circulation of the water. Your boiler is 5 feet high and 4 feet diameter, and you ask us if you can get 16 horse-power out of it. If you have 250 square feet heating surface, and 8 square feet grate surface you can. Such a boiler is not large enough to drive two engines 8 in. piston, 14 in. stroke with 250 feet piston speed per minute, and 125 pounds pressure.

J. H. T., of N. Y.—Freezing food for preservation is practicable by the use of chemicals, but the cost of them is an insuperable objection.

S. H. W., of Col. Ter.—We are much obliged for your letter, but the subject has been fully discussed.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address **MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.**

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**RESULT OF THE VAN DE WATER WHEEL CHAL-
LENGE.**—MESSRS. EDITORS:—I see in your issue of the 24th
inst. a notice with the above heading, with a very one-sided state-
ment of a trial of my Water Wheel with Lefell & Co.'s, which was in
every way unfair. The wheel that Lefell & Co. put in Mr. Burbank's
mill was a new one, got up with great care, with polished steel buck-
ets, after his first one was beat, using twenty inches more water
than my wheel. According to Lefell & Co.'s table, twenty inches of
water under fifteen feet head gives 644 horse-power. Now, 644
horse-power under fifteen feet head ought to grind six and one half
barrels of wheat per hour, or thirty-six barrels in 24 hours
more than my wheel, and he only claims beating me 24 barrels in
24 hours, which would show the result of the trial to be in my fa-
vor. I am told by a party who knows all the particulars of the trial,
that the stones which my wheel run were not in good order, and
that it was an unfair trial. I had no notice, nor any one there to see
to my interest in the mill stones; my wheel generally drives all the
machinery in the mill except two small mills. My wheel was all
cast iron, rough as it came from the foundry, not polished buckets,
the first tried from that pattern, using twenty inches less water
under fifteen feet head, grinds twenty-four barrels flour less in twenty-
four hours than the Lefell wheel. If I had been in Lefell & Co.'s
place I should have kept quiet about that trial. I intend to build a
wheel venting the same amount of water as the Lefell wheel, when
I will let the public know the result. With regard to the challenge,
my offer is still open for Lefell & Co.'s acceptance; the Five Thousand
Dollars is still ready as I proposed, with a fair trial at grinding.
Below I give Mr. Burbank's certificate, saying my wheel used less
water than the Lefell wheel. The new Lefell wheel vents the same
as the old one. I see the certificate which Lefell & Co. publish says
they did not measure the amount of water used, that it was only as
fair a test as could be made without measuring water; as if the
amount of water used was of no importance in a trial of the power
of water wheels. Very respectfully,
HENRY VAN DE WATER.

Buffalo, N. Y., March 27, 1886.

ROCHESTER, Sept. 20, 1885.

HENRY VAN DE WATER.—Dear Sir:—I have now fully tested your
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bolting wheat and flour for said runs of stones. I most cordially
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wheel of the day using less water and doing more work than any
other Water Wheel known to me. It is proper to state that you
warranted your wheel to yield full as much power as the Ohio Double
American Turbine Water Wheel, built at Springfield, Ohio, with the
same number of inches of water. I am satisfied that your wheel
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inches less water. You can draw at sight on me for your pay for
the same. It is proper to state that the wheel is only 3 feet in
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G. W. BURBANK.

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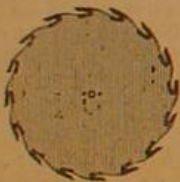
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In this engraving we have shown a new way of rocking the cradle, that is, by clock work. When the child is to be put to sleep, the mother winds the wheel work, A, at the end, just as a clock is wound. When this is done the wheels give motion to a vibrat-arm, B, which is driven by a small crank in the works aforesaid. This vibrating arm has two rods, C, at-

to the collar, B, so that the violent lashing to and fro which sometimes happens, is received on the elastic medium, and much reduced. The straps being connected to the spring by the sliding coupling, or collar, B, allow them to conform freely to all positions of the tongue, so that no cramping will take place. The straps passing over rollers in one of the snap hooks, C, also favors the proper disposition of the parts.

This arrangement is well adapted for all kinds of cultivators, mowers and reapers, as well as wheeled vehicles, inasmuch as it prevents the cultivators, etc., from jumping into the corn when driven close to

our own lines; it seems to present some advantages over the street boxes.—*Exchange.*

[What is the particular advantage in this? It is easy enough to drop letters in the street boxes now, but not so easy to get them delivered. If the Department would authorize men to deliver the letters promptly, it would be a great advantage to the business community.]

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Common crutches are very insecure. In slippery weather it is next to impossible to use them safely without great care. They are also noisy on floors, and cause mortification to sensitive persons by heralding their approach in public assemblies.

The crutch here shown, or the principal part of it, is a great improvement on the ordinary ones. It is not only noiseless, but perfectly secure in all kinds of weather and all conditions of surface. In detail, it consists of an elastic cushion of rubber, A, affixed to the end of the crutch a shaft and a steel center, B.

This center is capable of sliding up in the socket, C, when not in use, or held extended by moving the pin, D, on one side, so that it falls into a slot, E. In this condition it is a complete security against accidental slipping.

It was patented through the Scientific American Patent Agency, on April 18th, 1865. Address J. G. Bugbee, Bangor, Me., for further information.



ESSENCE OF COFFEE.—The Cincinnati *Gazette* announces that "pure essence of coffee" is now made in that city out of the "cheapest, dirtiest molasses." This molasses is boiled, cooled, and when hard, is broken and pulverized. Ground rye is then mixed with it, and a small box of the mixture, labelled "pure essence of coffee," is sold for eighty cents.

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FROM THE STEAM PRESS OF JOHN A. GRAY AND GREEN.

**HELMKAMP'S SELF-ROCKING CRADLE.**

tached to it, which work through tubular cases, D, against the floor, and thus impart the rocking motion. The wheel work will run a long time, and after starting requires no attention.

It was patented on Feb. 9th, 1864, by C. H. Helm-kamp, of Reading, Ohio, to whom address for further information. Rights for sale.

Improved Shock Arrester.

Every observing person must have noticed how severely horses are struck by the pole of the wagon when traveling on uneven ground. In cities especial-

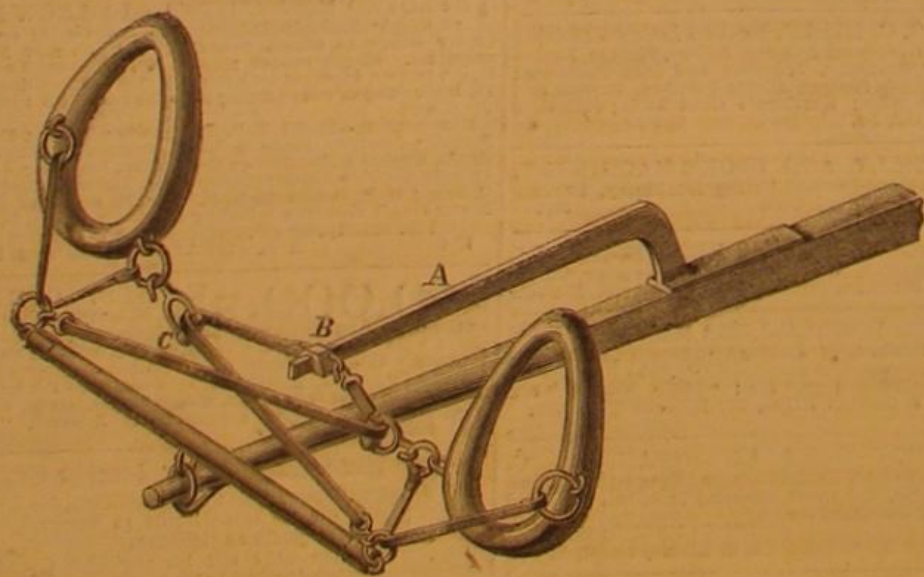
the hills, thus avoiding the waste which would occur from tearing it up.

Various parties who have tried it pronounce this arrangement to be very satisfactory. State, county or town rights will be sold by the inventor.

It was patented through the Scientific American Patent Agency Nov. 21, 1865, by F. D. Ladenberger. For further information, address him at Glenbeulah, Wis.

Letter Boxes on Horse Cars.

The Post Office Department has authorized the at-

**LADENBERGER'S SHOCK ARRESTER.**

ly, draft horses attached to heavy loads labor along as much inconvenienced and worried by the jerking of the pole, as by the work they are doing.

In this engraving our readers will see a preventive for the evil alluded to. It consists in attaching a spring, A, to the pole and connecting it by two straps

tachment to each car of the Philadelphia Union Passenger Railway Company of an iron letter box, with a wide mouth, in the exterior panel of the car. Persons on the line of the road can thus drop letters into the box as the car moves along. Perhaps this plan might be introduced with good results on some o-

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Vol. XIV.—No. 20.
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Improved Steam Gage.

The liability of ordinary steam gages, which work with springs, to get out of order, and, consequently, give incorrect results, led the inventor of this gage to construct one which should show the real pressure at all times, being controlled in its action by the same agent as the safety valve, namely, a weight.

In detail the gage consists of a central tube, A, which has a small hole, B, in it to admit steam to the interior of a receiver, C. The pressure comes on the inside of this and raises it. In rising it meets with an annular weight, D, which is placed at the top. This, of course, adds so much resistance to the further rise of the receiver, which is registered through a rack and pinion, E, on the face of the gage as usual. As the pressure increases the receiver continues to rise, and takes up other weights arranged above it, as clearly shown in the engraving; the additional pressure being, of course, registered as before.

In place of these weights the inventor proposes to use a series of cylinders disposed one within and over the other in an obvious manner; these would answer the same purpose, while the gage so made would have a much neater appearance. The central chamber, F, under the receiver, has a small hole at the bottom, which carries off the condensed water of the steam. This gage is claimed to be reliable under all circumstances. A patent is now pending on it through the Scientific American Patent Agency by Joshua Lowe, of Paterson, N. J., whom address for further information.

POWER REQUIRED TO START A TRAIN.

We had some discussion on this subject in Vol. XI, page 214. We extract this article from Zerah Colburn's new work on the locomotive:—

"The rail is the fulcrum upon which all the power of a locomotive is exerted; and all its motions, with reference to the train, or, in other words, to space, must be referred to this fulcrum. Many an engine-man has perceived this from his own observation, and has argued from it that an engine must be able to start a heavier load when the cranks are up or above the axle, than when they are below it. Now, although this conclusion is wholly wrong, it is supported by a plausible induction; and so plausible is this, that some engineers will have it that they know that they can get away better with a heavy load by starting with both cranks above the axle. They have, they say, a longer leverage, the rail being the fulcrum. The reason for this notion, although it is wholly fallacious, is worth examining.

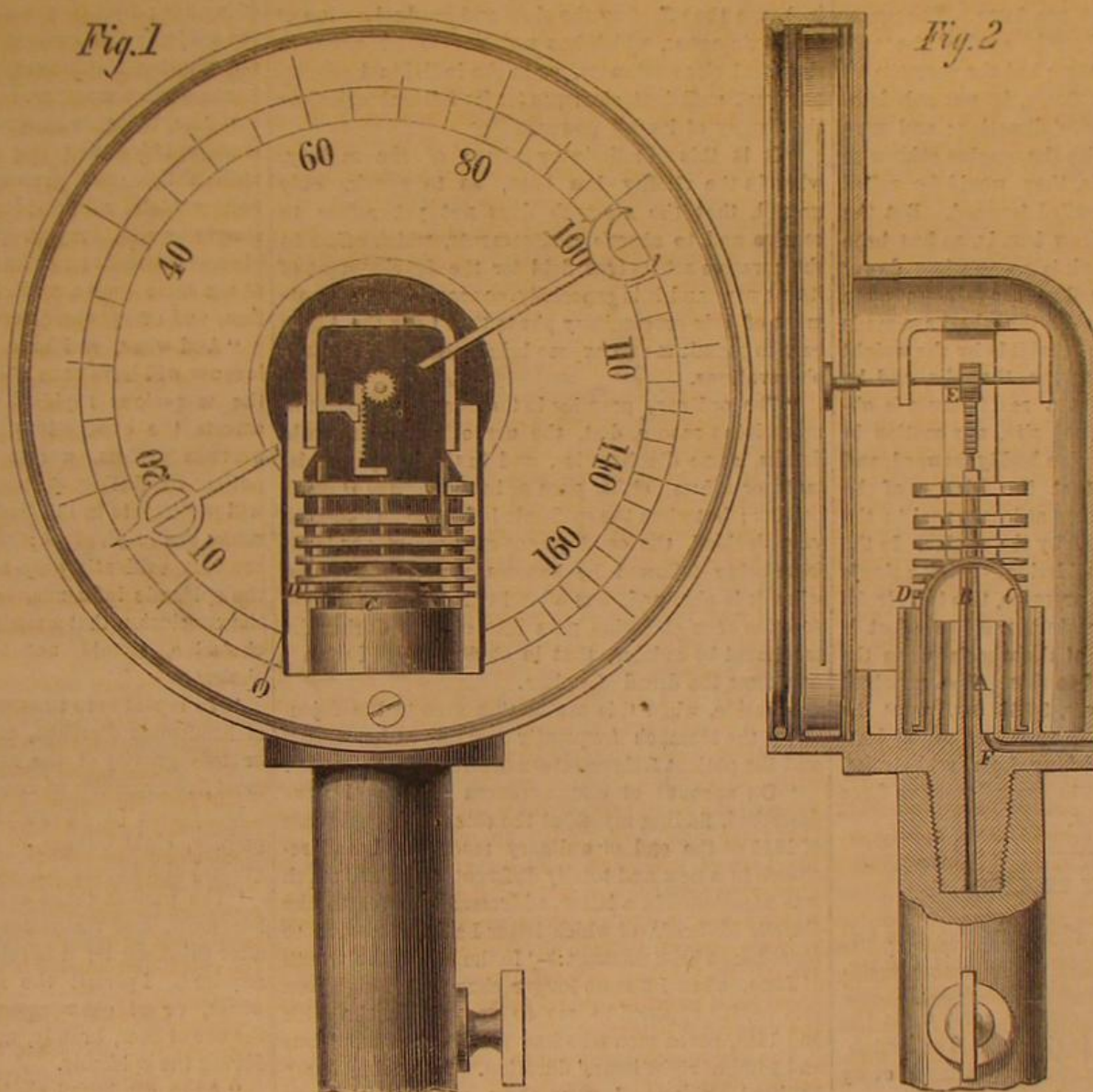
Let us suppose an engine with two feet stroke of

piston, and six feet driving wheels. The crank, from the center of the axle to the center of the wrist grasped by the connecting rod, is twelve inches long, and the radius, or half diameter of the wheel, is three feet. Let us, for the sake of simplicity, suppose but a single piston, and that the total pressure of the

of 6,667 lbs. at the axle, three feet from the rail; but this is overcome, with an excess of 3,333 lbs., by the pressure exerted upon the front cylinder cover and through the framing. So the forward pressure, effective for moving the engine as a whole, is 3,333 lbs. in either case—that is, whether the crank stand above or hang below the axle.

"The forces exerted through the cranks upon the driving axle may be perhaps better understood if we imagine the axle not to be closely embraced by its supports but to have a considerable 'slack' in its brasses, so as to permit of the direct movement of the axle, to a certain extent, independently of the pressure transmitted from the cylinder covers. Thus, with the crank down, and with an inch clear space between the surface of the axle bearing and its support toward the hind end of the engine, so that the axle could 'come and go' one inch without taking the engine with it, we should in the case already considered absolutely roll back the driving wheel, with a force at the axle of 6,667 lbs., and we should pull forward all that part of the engine over the axle with a force of 10,000 lbs. It would be only when the 'slack' between the axle and its support was taken up that the wheel would cease to roll back, and that the effective force, in a forward direction, would be 3,333

lbs. It must not be hastily supposed, from what has been said, that the total pressure of the axle against its support is, or can possibly be, greater or less than the pressure of the support against the axle. For in the above case we have computed a backward pressure of 6,667 lbs. of the axle against its support, and a forward pressure of apparently 10,000 lbs. through the same support against its axle. But, as the force exerted and the total resistance overcome must in all cases be equal to each other, an engine advancing with a force of 3,333 lbs. must be overcoming a resistance to that amount. This resistance may be represented by a weight of 3,333 lbs., hung over a pulley external to the engine, and attached by a chain to the back of the engine framing. So that, in the case when the crank is down, 3,333 lbs. of the 10,000 lbs. pressure upon the front cylinder cover will be directly expended upon the weight being lifted (or the train being drawn), and 6,667 lbs. only will be expended upon the opposite and equal resistance of the axle, which is being pushed backward by the steam acting through the piston rod and connecting rod. When the crank is above the axle, in the case supposed, the axle will be drawn forward with a force of 13,333 lbs., while the steam pressure upon the back cylinder cover, pushing the engine bodily backward over the axle, is 10,000 lbs. in addition to the weight



LOWE'S STEAM GAGE.

steam upon it is 10,000 lbs. When the crank stands upright over the axle, and is being pulled over by the piston in the direction to take the engine forward, we then have 10,000 lbs. exerted at the end of a lever four feet long from the rail, the resistance to be overcome at the axle being at the end of a lever three feet long, and therefore 13,333 lbs. But this is not the force with which the engine is moved forward; for opposed to it is a force of 10,000 lbs. exerted against the back cylinder cover, and transmitted through the framing of the engine to the driving axle. So only 3,333 lbs. of effective pressure is exerted to take the engine forward. Let the crank next be down, or hang vertically beneath the axle. If it were pushed from the cylinder by a force applied externally to the engine just as we might, when standing upon the ground, push the wheel of a carriage with the hand, the engine would be rolled backward. But instead of the 10,000 lbs. pressure upon the piston being effective in this manner, it is exerted at the end of a lever two feet long from its fulcrum on the rail, while it is opposed by a force of 10,000 lbs., exerted in the opposite or forward direction, through the front cylinder cover, framing, and axle boxes, and acting at the end of a lever three feet long. The backward pressure exerted by the piston at two feet from the rail, produces a backward pressure

of 3,333 lbs. hung over the pulley, and which weight we have taken in this case to represent the resistance of the train. So in the case supposed we have a pressure in opposite directions between the axle and its hind support of 6,667 lbs. when the crank is down, and of 13,333 between the axle and its front support, or the front of the axle box, when the crank is up, the effective pressure applied to the train being 3,333 lbs. in both cases, as already shown. In this case, therefore, the wear on the front side of the axle box and on one side of the axle, will be twice as much as on the back of the axle box and on the opposite side of the axle. This great excess of pressure and consequent wear on the front of the axle box, in running forward, has led many to suppose, without due consideration, that the axle is always pressing forward in its box when the engine is going forward. There is, therefore, a somewhat plausible foundation for the notion occasionally entertained among engineers, that they can start a train with more ease when the cranks are up than when they are down. The pressure exerted by the steam directly against the axle is then greater, as we have seen; but the pressure on the axle, when the crank is down, is not only less, but it is in an exactly opposite direction; and were the wheels unconnected with the engine otherwise than by the connecting rods, they would be rolled backward instead of being pulled forward. But the pull of the engine at the draw iron is, as has been seen, the same when the crank is up as when down. Although we speak of the rail as the fulcrum upon which the forces exerted through the wheel are made effective, it will be understood that it is by the weight with which the wheels press upon the rails, and by their consequent friction, that a real fulcrum is obtained. As long as they do not slip, any motion in the wheels must carry the engine bodily forward, and it is necessary, therefore, that the friction of the wheels upon the rails be always at least equal to the greatest tractive force exerted by the engine. In the case which we have been considering, that of a single piston with 10,000 lbs. steam pressure, two feet stroke and six feet wheels, the greatest tractive effort is 3,333 lbs., and the friction of the wheels upon the rails must be at least equal to this. The constant tractive force is not, however, 3,333 lbs., as at the ends of its strokes the piston exerts no useful force whatever—the effect diminishing from mid stroke, where it is the greatest. The mean tractive force will, in this case, be 2,112 lbs.

TREATMENT OF CHOLERA.

It is the opinion of every physician who has had any experience in the management of this disease, that its preliminary or premonitory stages present opportunities for its almost certain cure, when the proper remedies are applied in time. It is well established that the disease commences in almost every instance with a *painless diarrhea*, which because of its painlessness, is apt to be disregarded or considered of no consequence, but when neglected runs rapidly into the more serious stage, accompanied with vomiting, cramps, feeble pulse and collapse. But if taken in its very outset, upon the first indication of diarrhea, the stage called *cholera*, then the administration of appropriate remedies is almost sure to be successful in arresting its further progress.

At a recent session of the New York Academy of Medicine, at which the subject of cholera, its causes, progress, and treatment, were under discussion, Dr. John H. Griscom presented an elaborate paper, in which, among other matters, he gave a translation of an essay from the proceedings of the Academy of Medicine, of Paris, written by Dr. Worms, Physician-in-Chief of the Military Hospital of Gros Caillon. Dr. Griscom, who has witnessed every epidemic of cholera in this city, and had large experience in its treatment both in private and public capacity, considers the principle upon which the recommendation of Dr. Worms is founded as correct, and the success which appears to have attended it to be based upon sound physiological and pathological reasoning.

We give the essay alluded to, translated for the *SCIENTIFIC AMERICAN* from a French journal by Dr. Griscom, who for 28 years has been one of the physicians of the New York Hospital.

"The study of the numerous cholera epidemics

which have visited Europe within the past 35 years has not been sterile; it has furnished science with matter of incontestable importance. One of its most precious gifts is the establishment upon a positive basis of its prophylaxis and its relation to public hygiene, in localizing the toxic element, its transmission by the matter of morbid dejections, and in signaling as the most decided auxiliary of this poison, the emanations of animal and vegetable substances in a state of putrefaction, the gases from privies and from stagnant waters. Another ascertained fact, and not less important, is that sudden and severe attacks of cholera, without premonitory indications, are of very rare exception, and that in a great majority of cases, a characteristic trouble of the digestive functions, and simultaneously of those of innervation and circulation, always precede for some time, and announce the invasion of the grave form of cholera.

"It is impossible not to admit that these prodromic or premonitory troubles (justly entitled cholera), are the effect of the slow and gradual action of the toxic agent, which has not yet found either in the local circumstances, or in the individual predisposition, sufficient elements for its full extension, or the display of its full power.

"It is this preliminary phase of the malady, wherein the vitality has been, so to speak, only grazed, that the stomach does not yet refuse to receive and to absorb medicaments, which offers to the curative art its true field for the development of its power, and it is especially concerning the treatment of this premonitory phase that I ask the Academy to permit me to expose briefly the results of my observations.

"The ordinary practice in these cases consists in prescribing repose, diet, the use of warm aromatic drinks, some diaphoretics, and in the last place bismuth or opium, either pure or in the form of Dover's powder; but when the epidemic influence has become very decided, the employment of these means is far from being followed by success, and the success, when it is obtained, has often little duration; I have so often seen cholera pass into cholera during the treatment by opiates, that in cholera times I cannot overcome the dread of opium.

"Beside, when this medication arrests the dejections, the stomach frequently remains embarrassed, and the patient feels no return of strength or appetite.

"On account of circumstances such as I have described, finding myself at the close of the epidemic of 1849 at the end of ordinary resources, I had recourse to a new and totally different medicine, which was mentioned in a letter addressed July 7th to the *Gazette Medicale*, of which letter I ask permission to reproduce a brief passage:—'In the last of the month of June, when I was no longer charged with cholera service, it happened to me to receive on the 13th and 14th, seven men who had diarrhea, some of four and some of eight hours' duration. According to my habitual practice, I gave them an emetic (of two grammes of ipecac) and potions of two grammes of laudanum, also amygdaline and opiate lavements; but so far from seeing any amelioration follow this treatment, which had always succeeded with me in ordinary times, I must confess to an alarming aggravation; to the alvine dejections, which were frequent, vomiting was added; the evacuations assumed the choleraic character; the voice began to grow feeble and to diminish; the pulse became almost imperceptible, and the characteristic alteration of the face left no doubt of the nature of the affection.

"This is one of those forms of cholera often met with among feeble subjects at the commencement or the end of epidemics. I immediately placed all these patients on the use of *mineral lemonade* (giving them a double dose of acid) and suppressed all other medicines. The effect was most striking; the very next day the countenances were ameliorated, the dejections were diminished, the skin became warm, and I found in place of a slender and almost imperceptible pulse, one well-developed and resistant, announcing a remarkable return of vitality. Three of these patients have left the hospital, and the other four eat from a half to three-quarters of their allowance."

"This I wrote in July, 1849. Since that time in the visitation of cholera in 1853-'54, I have been enabled to apply to a much larger extent, in both the prodromic diarrhea and grave cholera, the method of

treatment of which, in 1849, I had made but an insufficient essay. Its success so far as cholera is concerned, has surpassed my expectations, the diarrhea, accompanied or not by vomitings, being arrested and cured with a promptitude altogether surprising. One may see, so to speak, the pulse rising, the skin becoming warm, the strength and appetite returning at the same time, and in a few days the patients finding themselves in a condition to return to duty.

"This result was so manifest that all the poor consumptives of my ward importuned for the same prescription of *mineral lemonade*, hoping from it the same efficacy for their colliquative diarrheas.

"Later still I have had occasion to prove the infallible fidelity of this simple means, and my most ardent wish is to see it in general use. I earnestly implore my honorable colleagues who hear me, not to regard me as influenced by an unreasonable enthusiasm, which would be wrong in a practitioner of my age; that they will suspend their judgment on the subject; the occasions for experimentation are not wanting at this moment, and I fear that they will become too numerous.

"Two, three, or at most four grammes [a gramme is about 15½ grains, troy measure] of sulphuric acid with a thousand grammes of water or a mucilaginous vehicle, with one hundred and fifty grammes of simple or raspberry sirup, makes a drink as agreeable and innocent as ordinary lemonade, and furnishes at the same time a medicine cheap, easy of preparation, and every where accessible.

"And when, as I have so often proved, my colleagues will have been able to convince themselves of the marvelous rapidity with which this lemonade arrests the evacuations, raises the pulse and the nervous system, warms the skin and gives to the patient the feeling of health, I doubt not that they will participate in the confidence with which its long usage has inspired me; as, moreover, these diarrheas are very evidently only an attenuated expression of the epidemic influence, they will naturally come to the conclusion that a medicament so powerful against cholera, should not be indifferent in confirmed cholera.

"To repeat here the mode of my practice, in cases of prodromic diarrhea, and according to the greater or less gravity of the case, I add three, four, or at most five grammes of concentrated sulphuric acid to a killogramme [a thousand grammes, equal to two pounds, eight ounces, one drachm and twenty-four grains] of a sweetened decoction of saleg.

"The patient takes every hour a glassful of this lemonade, and rinses his mouth two or three times after drinking it; it is seldom that four glasses are required. I permit the simultaneous use of white wines, or of champagne, but I expressly proscribe the use of beer, brandy, and alkaline mineral waters during the epidemic.

"As to confirmed cholera, my practice is almost equally simple. The patient is kept in the most complete repose. Shampooing is practiced only during the pain of cramps. Every half hour a glass of the lemonade (of from five to ten grammes of acid to a litre) [a litre is a fraction over two pints] is administered, taking advantage of the moment immediately after vomiting. He takes beside, at discretion, wine and ice.

"I think it useful to remark that the lemonade, which has a great power to suspend the alvine evacuations, produces a contrary effect upon the vomiting, increasing its frequency and duration; but this prolongation is not unfavorable, and is generally an indication of a happy termination."

Death of Mr. C. Wye Williams.

Men of science have been fast falling around us of late, and it is with regret we now add still another name to the list of those who have rested from their labors since the year began. Mr. Williams's name is too intimately connected with the principles of combustion, and his works are too well known, to need that we should point out seriatim all he has done. In fact, it is chiefly as an author that Mr. Williams is known, although he was a sound practical business man. He died on the 2nd inst., at his residence, the Nook, near Liverpool, in his eighty-seventh year. Mr. Williams was among the early mechanical improvers of mill work, having, in

1807, erected a linen mill in Ireland in which he used iron spur gearing. This was its first introduction into that country; it was cast by Edwards, of Belfast. In 1822 Mr. Williams patented, and brought out at his own expense, the Oldham leathering wheel, which was subsequently improved, and became known as the Morgan wheel. The City of Dublin Steam Packet Company owes its existence to Mr. Williams, in whose name the company was primarily made public. He also promoted the formation of a Transatlantic Steam Service, which, however, did not succeed of itself, but merged into the present Peninsular and Oriental Steam Company. Mr. Williams, at an early date, applied water-tight bulkheads to divide a ship into separate compartments. His last work, on "Heat and Steam," was completed when the author was in his eighty-first year, and while he was yet engaged upon the experiments of which the book was the result. In this work Mr. Williams originated the idea that water as such could have no other temperature than 32° deg., steam being the cause of any higher degree of heat. However much this theory may be open to dispute, and however easily it may even be disproved, it deserves credit for the care and earnestness Mr. Williams bestowed upon it. But its propounder has passed away, although his memory will long live in his work, and will long be cherished by the many to whom his urbanity and kindness had reached.—*Mechanics' Magazine.*

INCREASE OF EXAMINERS' PAY.

While we deprecate the enactment by the House of Representatives of the bill to tax inventors \$10 upon appeals from the decision of the primal Examiners to the Examiners-in-Chief, or Appeal Board, as usually termed, we regret to learn that the bill to increase the pay of the Examiners, and adjust the pay of acting Examiners, has been defeated.

The expense of living, during and since the war, renders it indispensable to the attaches of the Patent Office that their salaries be increased, and we hope to see the bill, which is reported in another column, adopted, or some similar bill enacted, before Congress adjourns. The work of the Examiners also increases in the same ratio as the business of the Office increases, and there is no reason why they should not receive a proper reward for their industry.

Give the appointments to industrious and competent men, and pay them liberally for their services. Thus the Patent Office will sustain its reputation, otherwise it will be in danger of lapsing into the dormant state which characterized it under some of the early Commissioners.

Pay liberally, employ honest and energetic examiners—those who will feel it a disgrace to let their work get far behind—and the inventor's interests will be promoted and the industry of the country advanced. The Patent Office has already a large fund of its own creating, and the receipts of fees from inventors is considerably more than adequate to meet its current expenses.

We hope that Congress will see the propriety of increasing the pay of the Examiners, and of adjusting the pay of those who have acted as Examiners without getting the lawful salary, which can easily be done from the receipts of the Office without imposing an additional tax upon the patentee.

Above all things, however, do not levy a tax upon the injured party to pay the expense of reviewing and often reversing the erroneous decision of the primal Examiner.

Curious Properties of Magnesium Amalgam.

At a recent meeting of the Chemical Society of London Professor Wanklyn read a paper "On Magnesium," detailing some experiments made conjointly by himself and Mr. E. T. Chapman. The authors found the magnesium ribbon of commerce to be remarkably pure, which was proved by the quantities of hydrogen evolved during the solution of known weights of the metal in certain diluted acids. The behavior of the metal in resisting the attack of chlorine, bromine, and iodine, was pointed out, and also the very singular properties of the magnesium amalgam, which decomposed water with even greater facility than sodium amalgam.

Professor Abel mentioned an observation of his own to effect that magnesium filings might be fused with nitrate or chlorate of potash without immediately undergoing oxidation, and only at a very high temperature, and long after the oxygen had been freely evolved, did it seem possible to start the ignition and brilliant combustion of the metal. This tardiness was discovered in attempting to employ metallic magnesium for certain pyrotechnic purposes.

Inefficient Pumps.

An inquiry is now being made in England as to the cause of the loss of the *London*, recently wrecked in the Bay of Biscay with great loss of life. It would appear that this vessel was lost through inefficient pumps. She was not leaky, but finally foundered and went down from defective pumps. A correspondent of the *London Morning Journal* says:—

The ship *London* is said to have shipped seas, but she is not proved to have leaked. Then I asked why the water in her was not pumped out? The answer is, because there was not an effective pump, properly fixed, in the ship, so as to enable them when she shipped a sea to do so. In that case what was to prevent the vessel from sinking, when the weather continued rough and the seas were continually entering her? The best ship ever built in that case must go down.

In evidence it came out that this vessel had a pump sufficient to throw over 4000 gallons of water per minute, or 70 hogsheads. This pump, then, was sufficient to keep the water out clear, or even if she had a hole in her side large enough for a man to get through. Then, what became of this pump? Was it worked? I conclude not, for this reason—it was connected with the ship's engine, and useless. Then, I say, this pump was not a fit one for a ship with 300 living beings on board. If the fire had not been put out, this engine, like all others, would be likely to be broken down in bad weather, and if the ship was making water and shipping seas she was bound to sink, as the pumps would then be useless. We are next told she had a donkey engine on deck, and a pump attached, but not a word was stated in evidence as to what quantity of water it would throw out per minute; but it did come out that even this pump was not worked on the first day. Then, I ask, what was done to clear the ship of water? Why, a comedian, the only energetic man that appeared to be in the ship, attempted, with the assistance of the passengers, to bail her out with buckets, and not a sailor came forward to assist them. No further explanation is wanted to prove that the ship sank with all her living freight for the want of effective pumps. Had she good pumping gear there would be no danger of the ship sinking. All this has been lost sight of through all the examinations. It was stated that the donkey engine was put to work the next day, but nothing said as to what quantity of water it threw out, which is evidence that this engine, like the good-natured passengers, were only attempting to dip out the sea with a limpet shell. I am aware it is easy to find fault, but I will not be contented with that, I will do my best to show those in power what ought to be done in all ships that carry passengers—first noticing, in all my experience I never saw a ship with good pumps and properly fixed. I have here to call the Lloyd's agents' attention to these points, and tell them that eight-tenths of all the ships that founder is from want of effective pumping powers. It is to be proved that the *London*, and likewise many other vessels that sank in the same storm, had no means of taking out the water but by buckets, and that amounts to little or nothing. I say, without fear of contradiction, that every large ship that goes to sea, whether built of iron or wood, should have one or more powerful donkey engines fixed upon the deck, with the fires so protected as to keep the water from extinguishing them. The engine, or engines, should either be fixed, or movable on tramroads, and connected to the pumps by belts, and worked so as to throw over 2000 gallons of water per minute. One of these pumps in the ship should be connected with the ship's engine, to be used if the engine was all right; if not, let the donkey engine drive one or two pumps at full speed; if it only threw out 1000 gallons of water per minute it would have saved the *London*. This may be proved by the quantity of water in the ship, which sunk her. Then, I say, a third pump should be placed in all ships, to be worked by hand. I will suppose it to be a 10-inch pump, fixed with a good fly-wheel, this would throw out 1000 gallons per minute if well worked; if worked only sparingly or easily it would throw out 500 gallons per minute; this would keep the ship clear of sea shipped. I will pass the lazy sailors as useless men, and ask a watchful public if they think the *London*, with her noble passengers, headed, I say, by the brave comedian, would not have used this hand pump with their greatest efforts, and would have prevented the ship and themselves from going to the bottom of the Bay of Biscay? But few are aware of the effects of such a quantity of water to be removed at the rate of only 500 gallons per minute; if they had done this they would have saved themselves and the ship and cargo had they only kept the ship up for two hours longer there was a chance of some passing vessel picking them up. It may be asked what is to be done with a fly-wheel on the deck of a ship? In answer I say, heave it down on the deck, and rig it up in quarter of an hour when wanted. To prove what I say on pumping and engines, let those interested go down to Greenwich and look at an engine there on four wheels, driving pumps by a belt, and throwing out 4000 gallons of water per minute from the main town drain, at a cost of 1s. per hour. An engine well constructed on a ship's deck is not only useful to prevent the ship from sinking, but in case of fire it can be used to subdue it, and to save the vessel from such calamity—that is if it were pro-

vided with proper gear. What sane man would send a good ship to sea without means to work a single pump, when such an engine as that at Greenwich can be had at 1s. per hour? I should recommend two donkey engines on the decks of every large ship, as these engines do all the heavy work of the ship.

No pump should ever be sent to sea driven by a belt, for so soon as the latter gets wet it stretches and becomes useless.—Eds.

Razors.

Engineers as a class were the first to head the modern "beard movement" in this country; but many may like to read the following extract from a little work by Mr. Kingsbury, a practical razor maker, of Bond street:—"The edge of a razor, a pen-knife, and every other very keen instrument, consists of a great number of minute points, commonly called teeth, which if the instrument is in itself good, and in good condition, follow each other through its whole extent with great order and closeness, and constitute by their unbroken regularity its excessive keenness. The edge of such an instrument acts on the beard, the skin or anything else, not so much by the direct application of weight or force as being drawn, even slightly, along it; because by this operation, the fine teeth of which it consists pass in quick succession, in the same direction, and over the same part of the substance. My readers will be convinced of this if they will make the following experiment on their glove or their hand, as they like best:—Let them hold the razor either perpendicularly or obliquely, and press on it with some considerable force in a direct line from right to left, and they will have no great reason to fear the consequences. But let them move it from that direction, let them draw it toward them, or push it from them, in the smallest degree, in the gentlest manner, and it will instantly make an incision. When they have made this experiment, they will be convinced of the truth of what I have asserted, namely, that in the operation of shaving, very little weight and even very little force are necessary." Hence it follows that the best razor will have the teeth of its edge set almost as regularly as a good saw, and that the best test in buying a razor is to examine the edge by means of a strong magnifying glass. This also explains the good effect on the keenness of a razor caused by dipping it in hot water, which necessarily clears the edges of any small clogging substances.—*London Engineer.*

Petroleum as Steam Fuel.

An important addition has just been made by Mr. C. J. Richardson to his petroleum boiler at Woolwich Dockyard—steam pipes have been so arranged that the waste steam may be conducted to the grate and burnt; it rises upward through the porous material, and flashes into flame at the surface. The effect of the steam is described as marvelous. Upon opening the furnace door the smoky flame of the coal oil is seen; then on the hot steam—for he first superheats it—being turned on, the flame in an instant is twice the size, the smoke disappears as if by magic, and a brilliant, white, active flame completely fills the fire place, fire boxes, and tubes. Mr. Richardson writes to us that "the chief fault in using petroleum as steam fuel is the smoke it makes; if badly used it makes smoke and soot in large quantities; sufficient to shame coal—our English oils do this worse than the natural petroleum. When steam is mixed with the vapor, the oxygen absorbs the superfluous carbon of the oil from a gas which burns along with the hydrogens. The hot steam is, however, a more powerful agent than I expected. It found out every faulty joint and screw of the petroleum troughs, and turned the oil out. The three first days my time was entirely taken up making good the mechanical defects."

[The use of steam in connection with burning petroleum oil is one of the peculiar features of Stevens's patent and system, an engraving of which was published in the *SCIENTIFIC AMERICAN*, Vol. XIV., page 12.—Eds.]

RUBIDIUM has been discovered in coffee, tea, tobacco, grapes, and crude tartar. Coffee is richer in this metal than tobacco, but, as in the case with tea, yields no lithium. The spectrum analysis was the one used. No rubidium was found in cocoa or cane sugar.

ROCKPORT, Mass., has almost a monopoly in the manufacture of isinglass. It is made from the sounds of the fish called hake, and the business is very active during the winter months.

Improved Caloric Engine.

From many parts of the country, correspondents are frequently writing to us requesting information on caloric engines and their adaptation to small manufactures. The engraving published herewith, represents the Ericsson caloric engine which has now been in practical use for many years, doing all kinds of work where only a moderate degree of power is required. The advantages arising from the use of such machines are that they are economical of fuel, use no water and can be worked by any one of common intelligence. They also warm the rooms in winter, thus saving the use of extra fuel for that purpose. They are entirely free from liability to explode and may be used on any floor of any building without increasing the rates of insurance. Many improvements suggested by a practical experience of ten years have been introduced, making them much more durable and efficient than when first offered to the public. For further particulars apply to the manufacturer whose advertisement is always to be found in our advertising columns. For a full account of what the engine is we quote from the report of an eminent consulting engineer who thoroughly investigated the subject for a firm in England who proposed to manufacture them. He says:

"The plan of the caloric engine is good, as regards its fitness for obtaining power directly from the dry heat of incandescent fuel, being properly fortified against its effects. Its mechanical arrangement for transmitting this power is also excellent, the parts being well proportioned, and having the necessary provision for adjustment, and compensation for wear. The furnace, or heater, is a cast-iron chamber, and is within the cylinder, and being constantly exposed to the action of dry heat, it may be regarded as undergoing a gradual deterioration; it is accordingly so constructed that when unfit for use it can be expeditiously replaced with a new one. This operation, however, is by no means so frequent as might be supposed of a heater lasting from two to six years.

"The engine has a good machine-like appearance, and is principally composed of cast iron, the use of which material enables the manufacturer to get them up at a small cost.

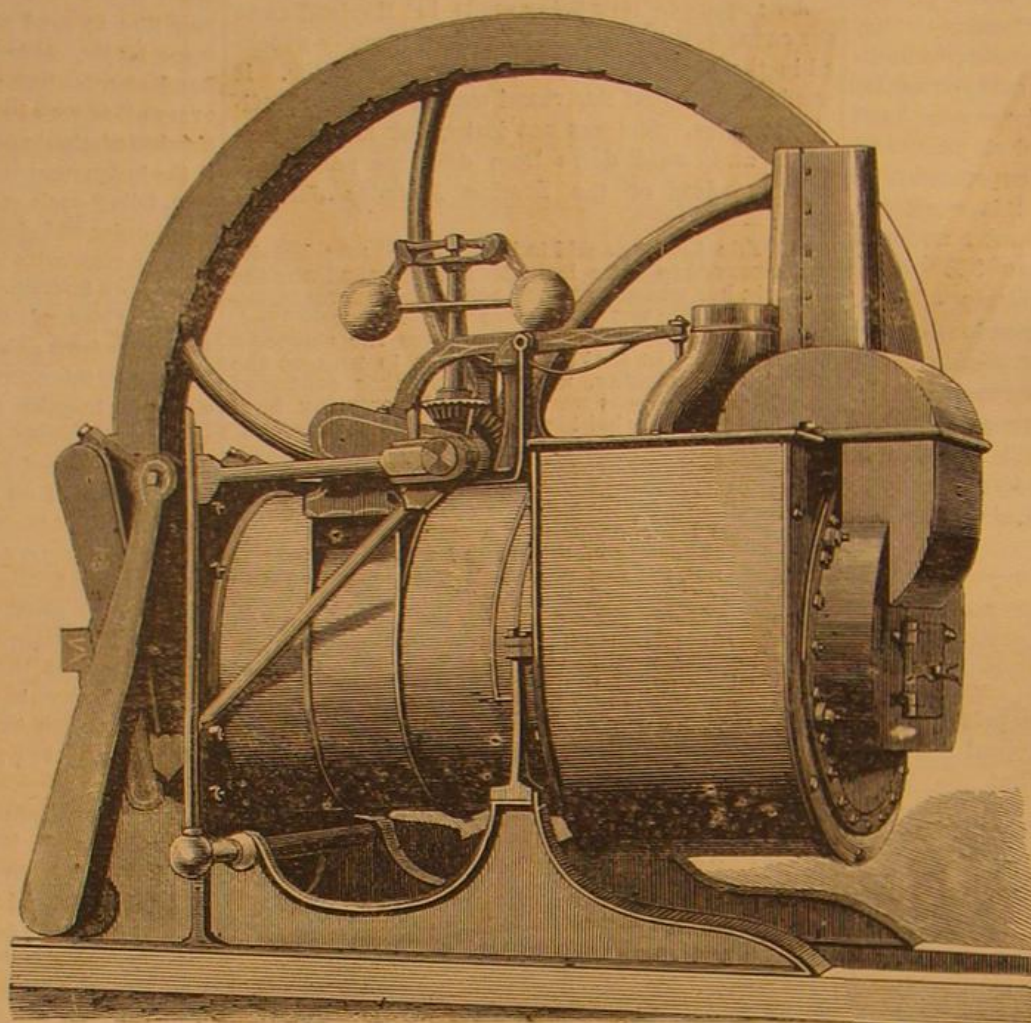
"In determining the question of economy in the production of power by this machine, reference must be had to the steam engine, because in both, power is produced by the consumption of fuel, thus presenting for both a common measure of cost.

"But in addition to the matter of fuel, there are other considerations which should not be lost sight of in this comparison: Steam engines are exceedingly variable as to their economic results, being affected in this respect by a number of independent circumstances, such as the arrangement of the boilers and of the furnace, draft of chimney, proportion and set of the operating valves, etc. A great deal is also dependent upon the skill and faithfulness of the attendant. And it is in view of these circumstances that some steam engines cost twice as much as others to produce the same amount of power. It is also worthy of notice, as a well-established fact, that small steam engines consume more fuel accordingly than larger ones, while at the same time they require more care and manipulation to run them properly, especially in managing the boiler and water-cool. The caloric engine is entirely free from all such difficulties, requiring no attention whatever after starting, except the occasional supply of fuel, and a little oil to the bearings and joints, while the speed is as regular as the vibrations of a pendulum.

"I have examined a number of these caloric engines

in operation, which were doing the work heretofore accomplished by small steam engines.

"They all gave complete satisfaction and apparently ample power for the purposes to which they were applied; but without experiment it is impossible to say what quantity of power they actually furnish respectively, but, judging by the appearance of things they all worked well and with surprising regularity evidently developing a much larger amount of power from a given quantity of coal than could be obtained



ERICSSON'S CALORIC ENGINE.

from steam engines as at present constructed, of corresponding powers. And being such that they may be placed in any location from which a chimney may be reached, and not requiring water or skilled attendance, they are particularly desirable as a driving power for small manufacturers, who are thereby enabled to conduct their operations in the business parts of the cities, by occupying upper lofts.

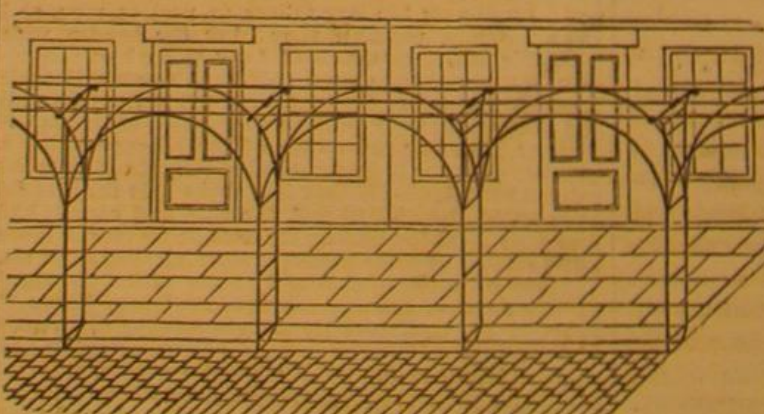
"No attention is required for them while running, beyond what is necessary to throw in a few coals occasionally, which is all that is required to keep up a constant and uniform motion—which considerations become of importance to those who require a small power only.

"As to the appreciation of this machine by the public, it may well be said that whereas it was a few years ago looked upon as a mere mechanical curiosity, it is now regarded and acknowledged as a reliable motive power."

Address Jas. A. Robinson, 164 Duane street and 136 Reade street, New York, for further information.

ELEVATED RAILWAY FOR STREETS.

We present herewith an engraving of a suspended



railroad, which we copy from Gillespie's "Manual of Road Making," published by A. S. Barnes & Co., No. 51 John street. The arrangement was suggested by the late Charles Ellett, Jr., in 1844, for an atmospheric

railroad. Prof. Gillespie makes the following remarks:—

"A railroad worked by a stationary engine, would be the most convenient method of relieving the rush of travel through Broadway. The railroad track should be supported on iron columns, out of the way of carriages, as in the figure. These columns might be placed on the edges of the sidewalks, where now are the lamp and awning posts, and by extending over the gutter they would have a base of three feet. Their lower extremities should be set in heavy masses of masonry. At top they should spread outward, a foot on each side, which would give sufficient width for the railroad track. The columns should be set at distances of 15 or 20 feet, and connected by flat arches. There would be no flooring over the street, and the rails would intercept no more light than do the boards which now connect the awning posts. No locomotives, or even horses, would pass over the road; but an endless rope would continually run over pulleys, and light cars would be under the most perfect control, and could be attached to it, or disengaged, at will, and stopped more easily than an ordinary omnibus. At the upper end of Broadway, a stationary engine, or the water power of the Croton, would easily and cheaply keep up the circulation, which would pass up one side of the street and down the other. At each corner might be a platform, to which there would be a short flight of steps from the sidewalk, the ascent of which would be very easy; or a certain number of corner houses might be used as depots, so that passengers might step into the cars from their second story windows.

As these cars would replace the omnibuses, the entire street would be left for miscellaneous travel."

FRYE'S BUCKLE

This buckle is one of that class which has no tongue, or rather no tongue which penetrates the strap, but in lieu of it a pawl or lever which holds the strap by jamming it between two contrasted openings.

Heretofore such buckles have been restricted to the use of straps of a certain thickness, otherwise they became inefficient. The inventor of this buckle claims that he has discovered a remedy for this trouble, and that straps of any thickness within reason can be used in it.

This is effected by making the pawl, A, of a different form from that commonly used. Instead of having the V-form it is made nearly flat, and is fitted with a short spur, B. This sticks into the strap and aids to draw the pawl to its seat, and also prevents any back movement from unbuckling it. No strain comes on the spur after the pawl is down to its seat. The entire patent is for sale.

A patent was procured on this invention through the Scientific American Patent Agency on Jan 23, 1866, by R. E. Frye; for further information address him at Manchester, N. H.

THE Chincha Islands do not exceed in extent two and a half square miles, yet for years past they have supplied guano to an average of four hundred ships per annum, the value of such cargoes in Europe being upward of £50,000.

Improved Bow Iron.

The ordinary method of constructing carriage bows requires considerable skill, and takes a good deal of time to fit them all properly. Usually the bows are made of wrought or malleable iron, and the subject of this invention is to simplify as well as reduce the cost of construction.

The irons, shown covered with leather in the engraving, are received in a casting, A, which is for convenience formed of two pieces, or sides, fastened together, but it may be made of one single piece as well. The bows are made of stout hoop iron, and the ends inserted between the sides, A, and there secured by rivets. As one of the bows must be stationary, ribs are cast on one of the sides, A, which forms a sort of pocket in which the end of the bow is received; thus holding it in the proper position.

It is claimed that this plan of making the bow iron is much cheaper and better than the common one.

It was patented Jan. 16, 1866, by H. M. Bidwell, of New Haven, Ct., whom address for further information.

Photography on Silk

The following formula for printing on silk is one that, on the whole, has given me the greatest satisfaction, and is identical with the one published by me two years ago:—

Pour 20 ounces of boiling water on 100 grains of chloride of ammonium, and 60 grains of Iceland moss.

When nearly cold filter and immerse the silk in it for 15 minutes. To sensitize, immerse the silk in a 20-grain solution of nitrate of silver for 16 minutes. Let the nitrate bath be rather acid. When dry, prepare for printing by attaching the silk to a piece of cardboard a little smaller than itself, by turning the edges over and fastening with small bits of gummed paper. Slightly overprint. Wash in two or three changes of water, and tone in a gold bath made thus:—20 ounces of water, 2 drachms acetate of soda, 4 grains chloride of gold, and a few grains of common whiting. Filter and keep for 24 hours before using. Let the prints be toned slightly bluer than they are required to be when finished. Rinse them in water, and fix in a solution of hypo., 4 ounces to the pint of water. 20 minutes is ample time for fixing. Wash well.—H. Cooper, *Photographic News*.

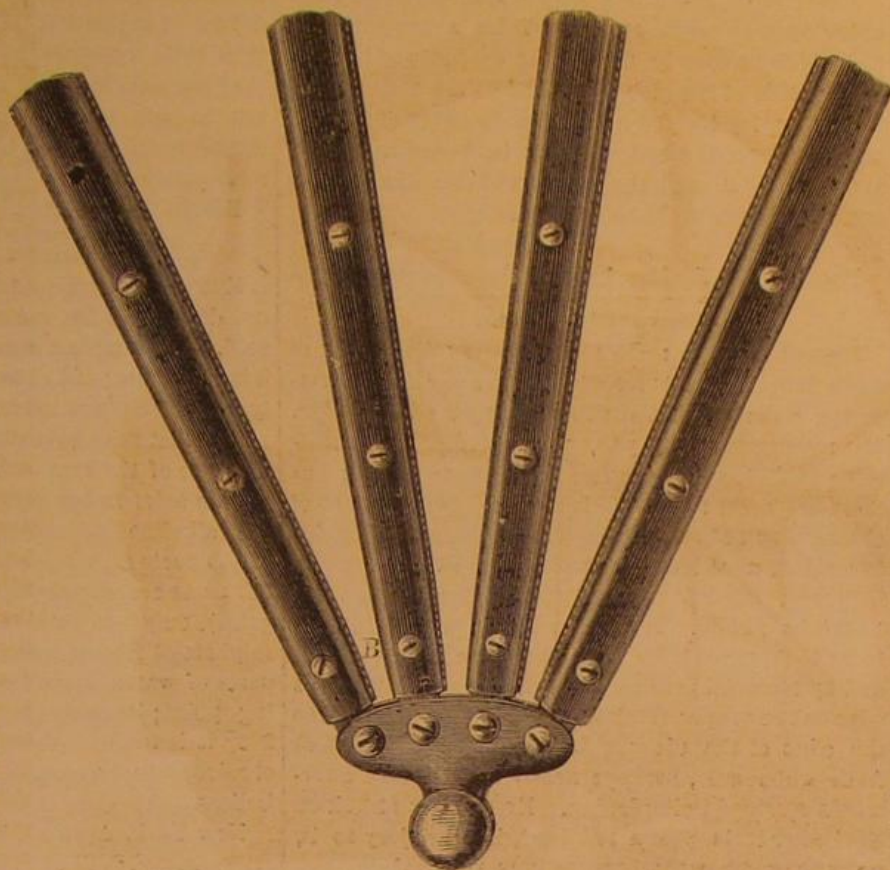
White Enamelled Plates for Photography.

In a paper read before the Philadelphia Photographic Society by Mr. Wenderoth, he gives the following as the method by which he prepares white tablets for photographs. He coats the plate—a ferrotype or a glass plate—with a solution of albumen one ounce, water five ounces. He then adds to plain collodion so much fine precipitated chalk as will make a covering so thick as to prevent the plate from being seen through it. It should be poured on in the same manner as ordinary collodion, and care taken to prevent lines from being formed. Before coating, the collodion should be well shaken up, and then allowed to subside for a minute or two, to allow the heavy particles to fall to the bottom. When quite dry, coat with twelve parts of albumen and eight parts of water, adding two grains of chloride of ammonium to each ounce of the solution. Sensitize for 30e minute in a seventy-grain ammonia-nitrate of silver bath, then fume, print, and tone in the usual manner.

Stomatoscope.

Among other novelties noticed in the *Med. Times and Gaz.*, is "a new instrument, to be termed the stomatoscope, exhibited last week to the Paris Surgical Socie-

ty by its inventor, Professor Burns, of Breslau. A platinum spiral were (inclosed in a box-wood cup, to prevent the transmission of heat), brought to a red heat by the passage of an electric current from two of Middelдорps' elements, is placed in the mouth behind the teeth. The light reflected by a very small mirror is sufficiently intense to render the jaw transparent, so as to allow of the vessel proceeding to the roots of the teeth, the smallest specks of caries, etc. becoming visible. By reason of the transparency, even the labial coronary artery may in some subjects be seen at the level of the commissure, and its course followed. The

**BIDWELL'S BOW IRON.**

instrument is therefore likely to form a useful means of exploration in dental affections.

ANDREWS & BURNHAM'S CARPET FASTENING.

Tacking down carpets is an antiquated and bad practice which ought to be abolished. Both the carpets and the floors are injured, thereby, and in some dwellings that have been occupied for years the boards are iron-clad. Tacks are always difficult to remove, and are, in many ways, not necessary to dwell upon, a weariness and vexation of spirit.



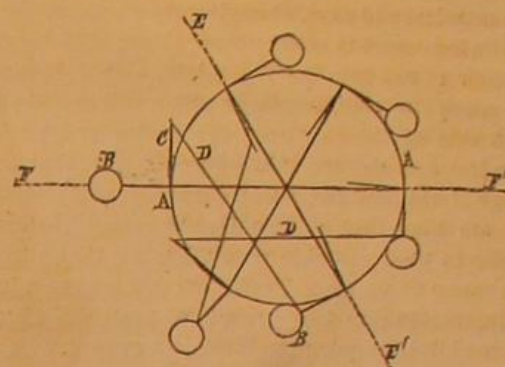
The fastening here shown is designed to be permanent. When once affixed to the floor it remains there and the carpet is slipped over it. It would be a great improvement in this fixture to have eyelets in the carpet which would prevent the wires from holding on one or two threads. A tack holds not so much by its body as its drawing into the wood. Carpets so put down can be taken up easily, swept, and put down again without going through the great labor of drawing tacks. We have no doubt but that housekeepers will appreciate this invention.

Patented August 29, 1865; address for further information J. P. Burnham, 1,159 Prairie avenue, Chicago, Ill.

**Perpetual Motion.**

MESSRS. EDITORS:—The idea of perpetual motion is so fascinating to some that I am induced to throw a little light on one that has occupied a considerable attention—the one called Leache's, and exhibited along the Canada line. A friend of mine, Mr. B., saw it, and believed and invested in it. He examined every part and pronounced it a genuine "perpetual motion." He then without L.'s knowledge came to my shop and built a larger one with a 30-inch wheel.

I inclose a diagram and description of this wonder:—



A A represents the balance wheel; B the motive balls; C the angle irons connecting balls to the wheel and to each other; D D are the cords connecting the angle irons. D is represented only on part of the balls. It was supposed that the balls would fall out when at the point, E, but they would not until near the point, F. Now, when the balls, B, fall off from the rim of the wheel, they would, by aid of the cords, D, draw in the opposite ball, but it would not "come to time;" only two balls would remain out while four were in, and the wheel would not stir.

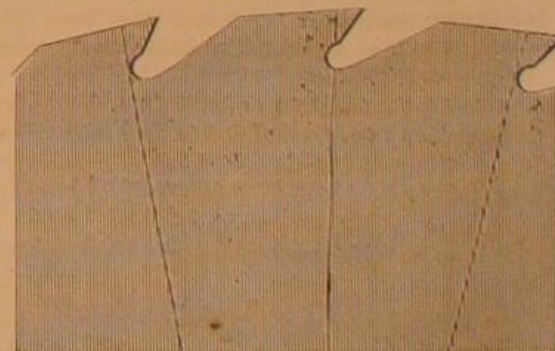
So much for this one; others compare favorably with it.

Brattleboro', Vt., April 27, 1866.

[This is one of the oldest forms of the delusion.—Eds.]

Sawing Lumber.

MESSRS. EDITORS:—In the *SCIENTIFIC AMERICAN* of March 31, page 212, I see an article from F. M. E., asking for information in regard to running circular saws. I have to say, that, first of all, the saw should run true on the mandrel, which is not always the case. The saw should range into the carriage half an inch in twenty feet. The mandrel should have nearly one-eighth of an inch end play. The guides should be one-sixteenth of an inch from the saw, or a little nearer, perhaps, in hard wood. The teeth should be



one inch and a quarter long, or deep, from the point. The under side of the tooth should range about eight inches from the center for hard wood, and ten inches for soft wood; or, if a large saw, twelve inches will not be too much.

I use a patent gummer, and cut out no more between the teeth than is necessary, leaving the tooth as strong as possible, as in the diagram. The top of the tooth should range one-fourth of an inch below the point of the next tooth back of it. I stand on the front side of the saw to file, and file all the teeth alike, nearly square across, but not quite, making the corners of the teeth on the side of the saw toward the carriage a trifle the shortest; this contracts the range of the saw into the carriage. When the teeth wear off on the side, pointed like a pegging awl, they must be swedged out or filed off and set again.

I have sawed lumber so smooth that you could scarcely count the cuts of the saw on it; and the smallest feed I have is three-fourths of an inch to each revolution of the saw. It requires less set for hard wood than for soft.

Years of experience have taught me that this is the proper way to keep a saw in order to do good work, and I find no difficulty in doing good work in all kinds of timber.

I also noticed on page 245, at the close of the piece written by T. D. Lakin, you asked the following question: "What is the object of giving end play to the mandrel?" I will answer: To make it self-adjusting, so as to range, the same as the governor on a steam engine as to speed or motion. When the saw is in operation, and is running out at the log, the log will crowd against the center of the saw; this will push the mandrel endways, changing the range of the saw as the front part is held by the guides; this will cause the saw to run into the log again, and if it runs in too much the slab, board, or plank will crowd on the back side of the saw near the center and push the mandrel out toward the log; this will change the range of the saw out again. This is very essential.

I am glad that this subject is brought before the public in your valuable paper, hoping that a free interchange of views and opinions will lead to a better understanding in this branch of business, where so much skill is required to become a master.

I do not approve of the shape of the teeth as T. D. Lakin represents them; they are too hooking and too cross-cutting. I wonder at the proceeding of some sawyers. If they file an up and down saw, they will file it nearly square across, and about straight on the under side, not hooking in the least; but a circular saw they file beveling enough to cut stove wood, with twice as much hook as it should have. I know of no reason why the teeth on one kind of saw should be different from those of another, when they are designed for the same kind of business. I am satisfied that saw teeth after the pattern I sent you will prove highly beneficial when they are thoroughly tested.

J. W. CHURCHILL.

Pittston, Pa., April 9, 1866.

Cure for Cholera.

MESSRS. EDITORS:—I send to you below the recipe of the Liverpool Dock Committee of 1849, for the cure of cholera. It was shown that 157 men of the north works, and 93 men at the dock yards who had been attacked by diarrhea or cholera, had taken the medicine prescribed, and the whole of them had recovered. Ten men of the north works, and thirteen at the dock yards, similarly attacked, but who had not taken the medicine, had died. In not a single case had the prescription failed.

Recipe for Diarrhea and Cholera.—Three drachms of spirits of camphor; three drachms of laudanum; three drachms of oil of turpentine; thirty drops of oil of peppermint.

Mix, and take a teaspoonful in a glass of weak brandy and water for diarrhea, and a tablespoonful in weak brandy and water for cholera.

Lose no time in sending for medical attendance when attacked, and inform the doctor of what has been taken.

Medical men assert, and experience shows, that this is an excellent remedy and well worth being kept on hand by every family.

W. W. HUBBELL.

Philadelphia, April 28, 1866.

Visibility of Steam.

MESSRS. EDITORS:—Will you, for the benefit of a certain party, answer the following question: Whether the vapor that a person can see coming out of an exhaust pipe from a steam boiler is, properly speaking, called steam?

LORENZO D. REDFIELD.

New Haven, April 30, 1866.

[Steam is the vapor of water; that seen coming out of the exhaust of a steam engine is steam, commonly speaking. Steam under pressure, confined, is invisible, and can only be seen when mixed with atmospheric air.—Eds.]

Board Measure.

MESSRS. EDITORS:—I find that there is considerable difference in the manner of reckoning the number of feet, in-board measure, which a log will contain. In most of the books or tables the compilers have put down the number of boards which can be

sawed from a log, allowing for saw cuts as well as slabbing; but none that I have seen give the number of feet, allowing only for a fair deduction for slabbing.

I have worked it in this manner. Multiply the diameter of the log by 3, divide this product by 4, then multiply the quotient by the length of the log, and the product will be the number of feet, board measure. For example, suppose a log measures 16 feet long by 12 inches through, $12 \times 3 = 36 \div 4 = 9 \times 16$ feet = 144 feet.

I have found out a very simple plan to avoid reckoning even as much as this. Take a lumberman's rod which he uses in finding the contents of boards, use the side of it which is marked as the same length as the log, lay the rod across the diameter of the log, and whatever the rod calls for in board measure, multiply by 9 and the result will be exactly the same as I have reckoned it, above.

HEBER WELLS.

Paterson, N. J., May 1, 1866.

Hardening Dies.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of April 28th, James Ayres desires information on tempering a die so that it will not crack on the edge. The reasons given by you, undoubtedly, have something to do towards causing the edges to crack; but there are other reasons. In the first place, the steel chosen may not be suitable for that purpose; again, in forging, most likely the smith cuts off a piece one inch and one-half from a two-inch bar, about what he thinks will do. He makes it that, and flattens it to an inch, then holds it on the edge of the anvil, and by repeated heating and hammering reduces the edge to the proper thickness. In doing so I presume the edge of the die was frequently bent back and forth when cold, perhaps nearly broken, and afterwards strained in hardening. Every blow struck on steel after it is past a red heat, is an injury to it, no matter for what purpose it is used. Many mechanics pound away on a chisel or a turning tool until nearly stone cold. When the tool breaks or is not satisfactory (which is sure to be the case), then the steel is bad, or not tempered good, when it is the forging, and nothing else. Perhaps Mr. Ayres makes his die too hot, and yet not uniformly so. If I had a die of the description given, to temper, I would keep it as cool as possible on the edges, unless I used the edge for cutting purposes. Then I should make the edge hot by not leaving it long in the fire. When dipped in water it should not be taken out until cold, as the edge cools first, and consequently shrinks from the outer edge (that being hard), and the heavier part hot when taken from the water. The expansion of the middle causes the outside to give way, as the heat travels back. You are right, Messrs. Editors, when you say cold water is as good as anything to temper in; you might say the best thing. All this humbugging about composition baths, and things of that sort ought to be (and is by some) classed with Salem witchcraft. Some years ago I made pistol work. When I commenced, the boss said the man who did the work before me annealed it in a cast-iron box, and thereby spoiled it. Some mysterious agency passed from the cast iron through the charcoal dust and entered the steel, and thereby converted it to cast iron. I said to my employer, I could remedy all that, and did. I hung up a horse shoe over the door. Of course, I simply did not burn the steel.

P. MCCORMICK.

Newark, N. J., April 30th, 1866.

[There are some who will differ with Mr. McCormick about hammering steel nearly cold. We will for one. We have never had better cutting tools than those hammered well at a black heat and tempered properly. If a die or other tool is put in the water and held at one point until it is half black and half red, it will in most cases crack at the water line. It naturally does so because it is pulled asunder from the effect of contraction drawing one way and expansion urging in another. The proper way is to keep the article moving slightly until it is cool enough.—Eds.]

Tax on Inventors.

MESSRS. EDITORS:—I see by the report, that on a motion of Mr. Jenckes, of R. I., the House of Representatives at Washington has passed a bill imposing a fine of ten dollars for an appeal from the primary

Examiners in the Patent Office to the Board of Appeals. I hope this bill will not pass the Senate.

Inventors have to pay fees enough now, but to be obliged to pay a fine of ten dollars for the want of brains or a want of appreciation in a primary Examiner, is rather too bad. The Patent Office is the inventor's trustee; it is making money; it is abundantly able to employ competent talent, and to afford every facility to its *cestui qui trusts*, in obtaining what the law says they ought to have. To put on additional burdens now, argues a want of any proper consideration of the duties and responsibilities of the Office. I suppose it is merely to get rid of trouble. It is their business to take trouble. That is what they are paid for, and that is what the law intends; but to add to the burdens of inventors, only to diminish the burdens of lazy or incompetent Examiners, is simply abominable.

AN INVENTOR.

Boston, May 3, 1866.

Hot and Cold Solutions.

MESSRS. EDITORS:—"F. T. E." asks, why salt does not dissolve in hot water in larger quantities than in cold. The simplest answer to such questions is, that it is its nature; and chemistry obeys its laws as rigidly as nature obeys hers.

Different salts have different points of solution; an instance of the vast difference in the behaviour of certain salts in hot and cold water is that of one of the alkaline salts of which 60 parts are soluble in 100 parts of water at a temperature of 57°, at 97° 833 parts are dissolved, while at 219° (the boiling point), only 445 parts are in solution. Again, the sulphate of lime is sparingly soluble, requiring 400 parts of water to one for its solution above the boiling point; its solubility rapidly decreases, until at 300° it is totally insoluble; hence the large amounts of calcareous deposits in, and so destructive to, steam boilers.

H. H. W.

New York, April 27, 1866.

The Metrical System—A Farmer's Experience.

MESSRS. EDITORS:—In your issue of March 31st, a correspondent seems to be afflicted at the prospect of the introduction of a rational and enlightened system of weighing and measuring. Out West a farmer carried a load of wheat to the railway depot, and sold it for \$1 50 per bushel. The load weighed 2,230 lbs. The clerk, after some calculation, says, "You have 36 bushels and 10 lbs." The farmer demurred; it then came out 37 bushels and 10 lbs. The farmer next took a load of oats into the city, and sold them at 50 cents to feed a banker's horse. They were weighed on the city scales; the check was delivered in the bank to a man who had a gray hair here and there. After a little legerdemain, he said, "You have 34 bushels and 20 lbs.;" the farmer demurred; the calculations were gone over again, when a mistake of one in the column of hundreds was discovered equal to 3 bushels and 4 lbs. Again the farmer carried wheat to the depot; the accountant made a mistake of 30 cents in figuring up the price of the odd pounds, which often give more trouble than all the rest of the load. When challenged, he said it would take a school teacher to make the calculations.

They are some of the vestiges of slavery, and when our teachers become learned enough to know how to exercise themselves to keep their consciences void of offence and not to offend one of the little ones by unseemable services, our absurd system will cease to exist in the land.

J. E.

Verona, Wis., April 20, 1866.

A Bill to Fine Inventors for Appealing from one Set of Examiners to another Set.

MESSRS. EDITORS:—I see that the House of Representatives has passed a bill adding ten dollars to each case appealed to the Board of Examiners-in-Chief in the Patent Office.

Now, I am very sure that if Congress understood the facts in the case, they would not add this unnecessary burden to the difficulties of inventors. When this Board was established in 1861, the same law that established it, added five dollars to the fees to be paid in every case filed, whether appealed or not. This was done for the very purpose of paying the increased expenses of the Office, in consequence of the creation of the Board, and the increase of salary of the Commissioner, Chief Clerk and Librarian.

There were filed last year about ten thousand applications, the increased fee on which paid, of course, fifty thousand dollars. The whole expense of the Board and increase of salaries was but a trifle over twelve thousand dollars. It will thus be seen, that the inventors have already paid four times the increase in the expense to the Office. Not only this; under the operation of the law as it now stands, the Office has accumulated, within the past two years, a surplus fund of nearly one hundred and fifty thousand dollars! What reason, then, is there why this addition of \$10 should be made to the fees? There is no good reason whatever; and for one I enter my protest against it, and call on the Senate to protect us from this wrong.

AN INVENTOR.

New York, May 4, 1866.

Bills Concerning Patentees.

On the 2d of May, the following bills were reported in the House of Representatives:—

THE PATENT OFFICE AND PARIS EXHIBITION.

The regular order of business, being the call of committees for reports, was then taken up.

Mr. Jenckes from the Committee on Patents, reported a bill providing that upon appealing the first time from the decision of primary Examiners to the Examiner-in-Chief in the Patent Office, the applicant shall pay a fee of ten dollars.

The bill was considered and passed.

Mr. Jenckes, from the same Committee, also reported a bill to give increased pay to the Examiners and Assistant Examiners of Patents, from April, 1861, to August, 1865.

Mr. Washburne, of Illinois, required an explanation, which brought out the fact that the bill was to pay certain clerks for performing the duties of a higher grade.

Mr. Harding, of Illinois, compared it to an effort to pay colonels who act as brigadier-generals the pay of the higher rank, and moved to lay the bill on table.

The motion was agreed to.

Mr. Chanler from the same Committee, reported a joint resolution authorizing the Secretary of the Interior to appoint three Commissioners to examine and report on the patented machinery and inventions that may be exhibited at the Paris Exhibition of 1867, with power to employ the necessary draughtsmen and photographers, the expenses not to exceed fifteen thousand dollars.

Mr. Washburne, of Illinois, opposed the joint resolution, arguing that there was no necessity for it, and that it was only an attempt to draw money out of the Treasury to pay the expenses of three high-flown and elegant gentlemen who wished to visit Paris in 1867.

Mr. Boutwell stated that it was the rule in foreign countries to send to the Patent Office drawings of patents issued there, at a very trifling expense.

Mr. Chanler admitted that was so, but said there was considerable delay in sending drawings, and that this was a question of time. Drawings of patents were sometimes not received for three years.

Considerable debate ensued, after which on motion of Mr. Stevens, the joint resolution was laid on the table.

TYLER COTTON PRESS PATENT.

Mr. Hubbard, Connecticut, from the same Committee, reported a bill for the relief Philos B. Tyler, looking to the extension of his patent for an improvement in cotton presses, the same as though the patent had not been already extended.

The bill was opposed by Messrs. Upson and Washburne, of Illinois, and supported by Messrs. Hubbard, of Connecticut, Dawes and Broomall; the debate showing that the patent had been enjoyed for fourteen years, and that the patentee had received over \$23,000 for his invention.

Mr. Washburne, of Illinois, moved to lay the bill on the table. The vote resulted: yeas, 68; nays, 59. So the bill was laid on the table.

NEW INVENTIONS.

Hermetically Sealing Fruit Cans and other Vessels.—This invention relates to a new and improved mode of "hermetically sealing" cans, jars, or other vessels in which fruits, vegetables, meats, milk or other articles of food or other substances are placed, for the purpose of being preserved from decomposition or decay, and it consists in placing the vessel containing the fruit or other article of food or other substance which it is desired to preserve, within any air-tight chamber or receiver, from which the air, as well as that of the vessel containing the fruit, etc., is exhausted by means of an air pump, to the proper or requisite degree, producing a vacuum, or partially so, therein, and then hermetically sealing, in any proper manner, the vessel containing the fruit, etc., while in such vacuum, when the vacuum being destroyed, the vessel so sealed is removed from the chamber in which it was placed and its contents either or not subjected to the action of heat in any of the ordinary modes now practiced therefor, according as may be desired or deemed best. W. K. Lewis and J. W. Bailey, of Boston, Mass., are the inventors.

Centrifugal Governors for Steam Engines.—In this invention the balls are arranged so as to swing in planes, not radial to the center as hitherto, but at an angle of 45 degrees, or nearly so, whereby all the forces are economized and made to act in unison with each other. The swing of the balls is similar to that of a pendulum, their movement being in harmony with the motion of the governor, and not in planes across and antagonistic to it, as is now the case, with the ordinary centrifugal governors. By this means, the inertia in conjunction with the centrifugal forces causes the balls to fall to the rear of the point of suspension, thus acting to close the valve, while the momentum and dead weight are equally free to gain upon the point of suspension to open the valve. The great defect in hanging the balls so as to swing in radial lines from the shaft is that they are forced to retain their positions relative to the points of suspension, though at every variation is the speed of the engine the balls have a tendency to change such position with regard to the governor shaft, that is to advance or to fall to the rear of their points of suspension, but as the radial mode of suspension will not permit it, a force is consequently lost, which if economized, as it is in this invention, would be quick and effective in operation, but as it is so checked, a "jam" or straining and binding of the joints is produced, that greatly obstructs and prevents the free action of the little force remaining. David Shive, of Philadelphia, is the inventor.

Printing Press.—This invention relates to a new and improved printing press for printing both sides of a sheet simultaneously or during one passage of the latter through the press. The invention consists in a novel and improved means employed for operating the platens and in an improved inking and feeding mechanism; nearly all the parts being made to operate automatically from a single driving shaft, the necessary dwells allowed the platens to give the ink rollers an opportunity to pass over the forms, after each impression, and the feed mechanism made to work intermittently, or during the time only that the forms are free from or not in contact with the beds. The object of this invention is to obtain a simple and economical press for the purpose specified, and which will operate smoothly and well, and not be liable to get out of repair or have its parts become deranged by use. Martin G. Imbach, New York City, is the inventor.

Burial Cases.—This invention relates to a further improvement in coffins to that for which a patent was issued to Mr. Fogg on the 6th day of February, 1866, the said improvement being made applicable to a straight-sided coffin or burial casket, whose lid is secured by hinges or the like, to one edge of the case, and opening so as to display the whole interior of the casket. The present invention consists in removing a piece from nearly the whole of one side of the casket, which piece is secured to the lid—which latter opens like an ordinary trunk or hinged box lid. Julian A. Fogg, Salem, Mass., is the inventor.

Locks.—This invention relates to a lock which is locked and unlocked by means of a key with a blinged bit. This key is introduced through a tubular key hole which revolves in a socket in the back plate, and to the inner side of which a disk is attached which carries a guard for the purpose of tilting the bit of key as the same emerges from the inner end of the key hole, and which also carries a nose for the purpose of pushing back the bolt or latch. Said disk is held in position and prevented from turning spontaneously, or from being turned with another instrument besides the key, by one or more tumblers, which are adjusted by the bit of the key when the lock is to be unlocked. Charles Claude, 96 Walker street, New York City, is the inventor.

Apparatus for Elevating Water.—The object of this invention is to raise water by the action of the waves. It consists in a floating vessel or buoy, having a large area of surface placed in the water along a coast where the waves and swell will have free access to it, the vessel having an open tube fixed in its bottom, which tube is carried upward within a large tube, which is connected with a reservoir fixed above the waves, or with a pipe that is conducted into a reservoir on the shore. Each of these tubes is provided with a check valve to prevent the return of the water. The patentee calls this invention a buoy pump. It will be useful in supplying water for driving a water wheel or other purposes, and can be applied at any coast where there is a continual swell of the water and where there are waves. The floating vessel is guided within a frame or by means of the standards which support the upper tube or reservoir. A. N. Shattuck, San Francisco, Cal., is the inventor.

Head Block for Saw Mills.—This invention consists first in a novel and improved manner of operating the uprights or knee pieces of the head block, whereby the same may be moved a comparatively long distance under the short movement of the operating lever. The invention consists, second, in having the shaft by which the uprights or knee pieces are driven forward in sections and connected by clutches, so that one or more of the uprights or knee pieces may be moved as occasion may require. The invention consists, third, in an improved means of graduating the set of the log to the saw, and, fourth, in an improved mode of dogging the log to the uprights or knee pieces. J. M. Stanton and F. Stanton, Manchester, Hillsborough Co., N. H., is the inventor.

Clock and Watch Escapement.—This invention relates to escapements of clocks and watches, and consists in constructing the pallet in two parts, each mounted in a different axis, and pointing in the same direction, their faces moving in parallel arcs. They are connected to each other by means of arms fixed on their axis and extending toward each other, their ends being united to form a point, whereby the motion of each pallet is regulated and controlled by the other. The invention further consists in making the escape wheel take hold of the pallets on the inside of their faces, and work outward from their centers of motion, the power increasing as the escape wheel moves until it leaves the pallets, whereas in the old escapement the escape wheel takes hold on the outside of the acting face of one of the pallets, the power consequently diminishing until it leaves the pallet. Benjamin Bacon, Morrison, Whiteside Co., Ill., is the inventor.

NEW PUBLICATIONS.

GENERAL NOTICES OF CHEMISTRY.—By Edmund C. Evans, M.D.—Published by Lippincott of Philadelphia. This is the title of a work of over 400 pages, translated from the French of Pellingre Fremy. It is, as its title and preface, by its author, indicate, intended for "persons, who unaccustomed to scientific studies, wish to acquire a general knowledge of chemistry and its principal applications." "Among the numerous facts which compose this science, we have chosen those which recommend themselves by their importance in the arts; these we have attempted to make clear by freeing them from formulas and details purely scientific which we have given in other works." There are but few persons who received their education forty years ago who have any knowledge of chemistry; lawyers, clergymen, retired merchants, farmers and the general reader can from this work acquire a general knowledge of chemistry without puzzling their brains over symbols and formulas, which to those ignorant of chemistry seem like algebraic problems.

THERE are seventeen manufactories of paper collars in New England, and each girl employed makes about one thousand of them daily.

Improved Expanding Mandrel.

Every machinist must at some time have found trouble with the ordinary mandrels in use. Not only with mandrels, but with taps, rimmers, and similar tools. It often happens in shops where much repairing is done, as on railroads, that a great deal might be saved if the thread of a tapped hole could be made a little larger, when worn, instead of making it an eighth bigger, as is the usual plan in the absence of anything better for the purpose. The same remark applies to rimmers and boring tools; if the rimmer could cut a little larger the hole could be made round. And so on through a great many incidental cases within the experience of all.

The subject of the present illustration is a tool that supplies the want in question. In detail, it is an arbor, A, having any number of grooves, five in the present instance—fitted with keys, cutters, or expanding tools, B, according to the nature of the work or office of the tool.

A screw thread is cut on the body of the mandrel, and a portion of it is left in the center, as at C, to strengthen and prevent springing. The cutters are beveled at each end, and confined in their places by nuts, D, so that it is only necessary to slacken them off and slide the cutters down in the tapered grooves to expand or contract their outside diameters, and thus adapt them to all kinds of work. This can readily be made a most useful implement, as before stated.

It was patented through the Scientific American Patent Agency Dec. 19, 1865, by John Critchley, of Portsmouth, N. H. For further information address him at that place.

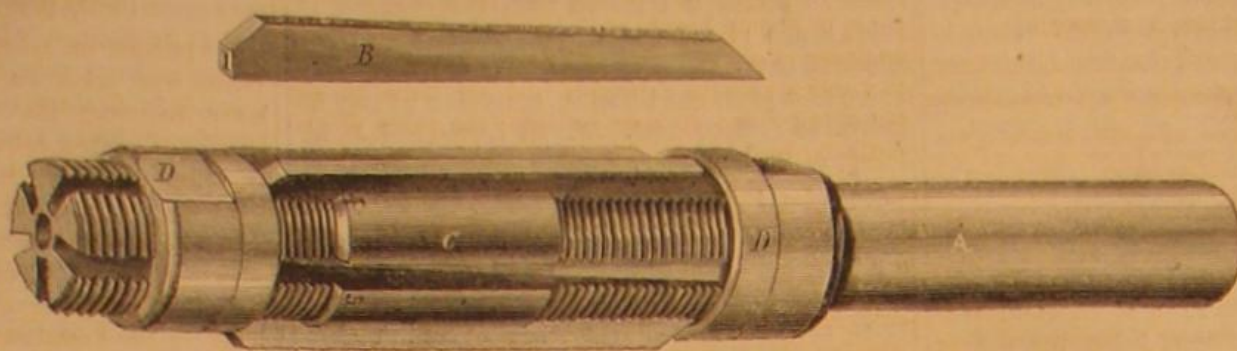
St. Elmo's Fire.

On the morning of the 7th of last month the curious phenomenon known as "St. Elmo's fire," was observed in the Irish Channel, by Captain Briggs, of the steamer *Talbot*. About one o'clock A. M. on that day the *Talbot* fell in, off the Isle of Man, with a heavy snow storm, which lasted three hours, during nearly the whole of which time from each mast head of the vessel, and also from each gaff end, a beautiful blue light was seen to proceed. During a part of the time a similar light proceeded from the stem head, and this light, being in an accessible position, was closely examined by Captain Briggs. "I found," he says, "that the light which appeared large at a distance, was made up of a number of jets, each of which expanded to the size of half-a-crown, appeared of a beautiful violet color, and made a slight hissing noise. Placing my hand in contact with one of the jets, a sensible warmth was felt, and three jets attached themselves to as many fingers, but I could observe no smell whatever. The jets were not permanent, but sometimes went out, returning again when the snow was heaviest. This was from one to three A. M. At daylight I carefully examined the place, but no discoloration of the paint was to be seen. The stem in this part is wood, with iron plates bolted on each side, and it appeared to me that the jets came out between the wood and the iron. The barometer stood at 29.1 inch. The ship is an iron one, but I did not observe any alteration or other effect upon the compasses. I have seen the same phenomenon abroad, but never before in these latitudes." Professor Frankland, of the Royal Institution, who has communicated Captain Briggs's account to the *Philosophical Magazine*, mentions that a thunder storm passed over Cheshire on the evening of the 6th, and points out that the brisk discharge seen by Captain Briggs to issue from various parts of his ship indicates a negative charge either in the surrounding atmosphere or in the snow flakes which were falling so thickly at the time.—*Mechanics' Magazine*.

INCREASED TAX UPON INVENTORS.

The Commissioner of Patents in his Annual Report to Congress, recommended an amendment to the law, providing that upon all appeals from the primary Examiners to the Examiners-in-Chief, that a fee of \$10 be

required of the appellant. The Committee on Patents reported to the House a bill based upon the Commissioner's recommendation, which was considered and passed. On January 1, 1866, there were over \$130,000 surplus to the credit of the patent fund, which has been extracted from the pockets of inventors. There is, therefore, no good reason why this extra tax should be put upon this useful class of our citizens for the right to appeal.

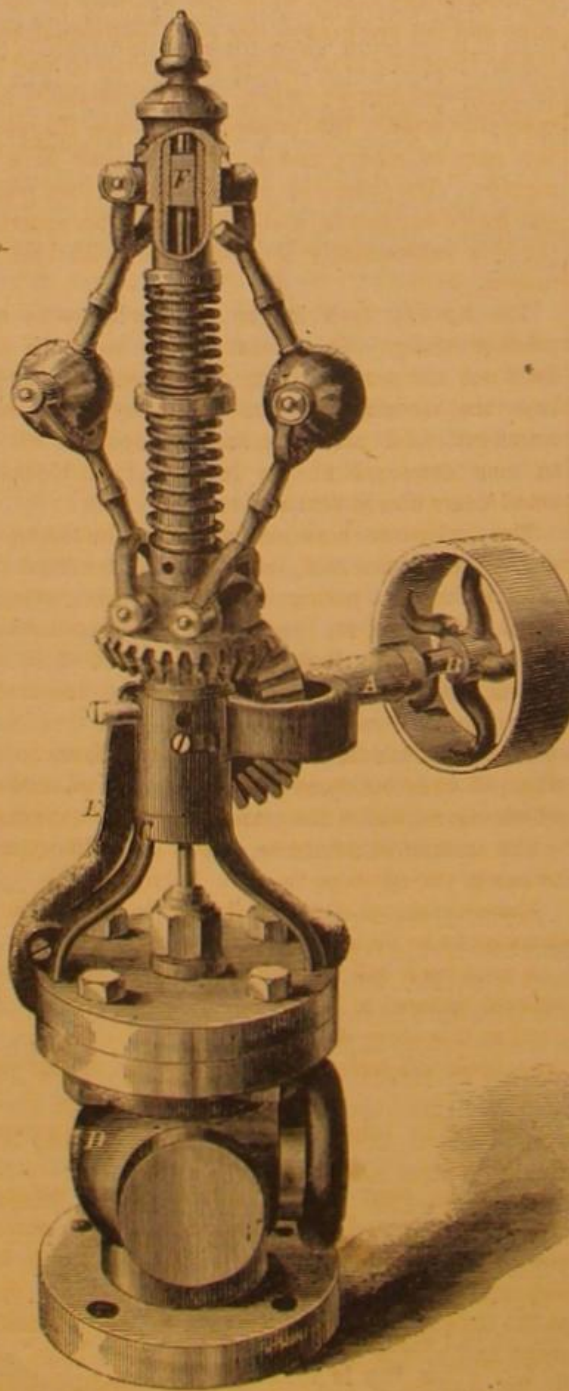
**CRITCHLEY'S EXPANDING MANDREL.**

Applicants for patents now pay enough for their privileges. We hope, therefore, that the Senate Committee will report against the House bill.

The measure is uncalled for, and we consider it unjust. If the Patent Office was running behind in its expenditures, then there would be some reason for the proposed bill. Instead of this, the surplus to the patent fund is constantly increasing.

BROWN'S SELF-CLOSING GOVERNOR.

When governor belts become unlaced and slip off the pulley, the engine runs away, and in a short time



gets up such a velocity as to greatly injure the work and machines. It is desirable to avoid such disasters, and the simplest and most direct agent for the purpose is the best.

The one here shown is the essence of simplicity

The plan consists in making the bearing, A, the driving shaft, B, runs in, movable horizontally on the frame, C. When at work, the tension of the belt holds the pulley, shaft, and valve in the chest, D, below, in their proper position for driving the balls, and for supplying steam to the cylinder; but so soon as the belt slips off the bearing, A, is thrown around by the spring, E, acting on it, turning the valve in the chest by a square, F, formed on it at the top, so that the openings through which it receives steam are closed, stopping the engine directly. The valve can be set so as to close only partially instead of wholly, and thus maintain a moderate speed on the engine. These governors can be quickly applied to any engine, old or new, and will prove very satisfactory. Rights for Western and Pacific States for sale.

For further information

address Messrs. A. & F. Brown & Co., Nos. 57 to 61 Lewis street, New York.

EXPERIMENTS WITH NITRO-GLYCERIN OR BLASTING OIL.

On the afternoon of the 5th, Mr. Nobel, the Swedish engineer and inventor, who has now become famous in connection with nitro-glycerin, conducted a series of experiments at Nolte's quarry, on Eighty-third street in this city, with the design of showing that his blasting oil is not so dangerous as it is reputed to be. The gentlemen present, about twenty in number, appeared to be pretty well satisfied with the demonstrations, and several of them who had had previous experience on the subject, seemed to fully indorse Mr. Nobel's statements. At the end of the experiments there was no fear of being near the oil, and the packages were freely handled by some who at the beginning were careful to keep at a very respectful distance; it reminded one of the ancient fable of the fox and the lion.

The experiments were as follows:—A small quantity of the oil was poured upon a flat piece of iron and struck with a hammer. A sharp explosion was the consequence, but an examination showed that only the oil directly under the face of the hammer was consumed. A small vial of the oil was packed with dust saturated with an inflammable substance, in small wooden box. The saw dust was set on fire by means of a fuse, and in a few moments the oil exploded, with a loud report, and the box was apparently annihilated. A lighted match was applied to a small quantity of the oil, and it appeared that in that way it could not be exploded. Wood naphtha (methyl alcohol) was dissolved in the oil, and it was shown that neither by heat nor by percussion could the mixture be exploded. When the mixture was washed with water, the naphtha was thereby separated, and the oil resumed its ordinary explosive properties. The concluding experiments were to illustrate the practical use of the oil in blasting.

The experiments lasted about two hours, no accident occurred, and all passed off very smoothly, with the exception of the final tests, where there was some delay on account of the attempt to use fuses which were not properly prepared for burning under water.

We understand that the experiments are shortly to be repeated and on a larger scale.

MR. BECKWITH, Commissioner for the United States to the Paris Exposition, writes to Secretary Seward that there are as many assistant commissioners with him as he wants, and that persons really desirous of assisting the United States exhibition at that great fair can do so best at home.

STARCH PASTE.—This paste is often used by photographers for mounting their prints; but it is very apt to turn sour and moldy after keeping for a short time. If a little alcohol be mixed with the starch immediately after it has been dissolved, fermentation will be prevented, and the starch will keep good for a long time.

Scientific American.

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WHISTLES AS SIGNALS ON TRAINS.

One of the most extraordinary things to an American is the mystery and difficulty they make in England about communicating between the engineer and passengers on a railway train. In this country, as our readers well know, the cars are one large apartment on wheels, but in England they are different, being like several stage coaches coupled together, each car consisting of three or more compartments. This affords special facilities to murderers and other agreeable persons who are not slow to take advantage of them, as criminal records show. All sorts of ingenious and impracticable schemes have been devised to communicate between the engineer and conductor or "guard," as he is called, but the simplest and most effective has not been tried, or if tried, meets with little favor. That is, the plan in vogue here, consisting of a bell and a cord which runs the whole length of the train and to be found on every railroad in our land.

It must not be supposed that this plan is not tried because it is unknown, but it is left untried for some reasons not stated. Whether the passengers would ring the bell "for fun," or whether the murderers, if left alone, would steal the rope, does not appear; it is sufficient to know that British ingenuity has not as yet solved the problem of communicating between the engineer of a train and the passengers on it.

The latest proposition is that the engineer should be signalled by sound. To make the sound the inventor uses compressed air and a whistle. He compresses the air with a pair of bellows and he places the whistle in front of "a reflector" (which is probably a deflector) to throw the sound forward; the whistle machinery being in the guard's "van." This van, a curious misnomer, is in the rear, being 300 feet from the engineer.

At a recent experiment with this machine (the speed of the train was about thirty miles an hour) the engineer heard the sound with difficulty on the foot board of the engine, although the whistles em-

ployed were four inches in diameter and were heard distinctly two miles in the rear.

Of course they were; that was the place to hear them. The Engineer says: "On the foot plate we heard the whistle very distinctly while the speed did not exceed 25 miles per hour, but in the open country at higher speed it became indistinct, though never totally lost. In cuttings it was at all times heard plainly, but the position of the hearer exerted considerable influence; thus when standing under the lee of the fire-box, which was large and high, it could be plainly heard, while it was inaudible to the engineer looking out." We are also further told that this apparatus is simple and not liable to get out of order and it may yet take the place of the ordinary signal cord. That is in England.

THE RIGHT KIND OF A GROCERY.

The old proverb says, "one cannot eat their cake and have it," but there seems to be a doubt whether this is literally true. That it is only partially so is daily proved at a certain store in this city. Some good and thoughtful men of the Novelty Iron Works, deeming the principle of a mutual benefit society good as applied to a grocery store, have opened one at the corner of Twelfth street and Dry Dock street, where they sell provisions to men employed at the Novelty Works only.

Last Tuesday we went into this store, and it was pleasant to see the neatness and order which prevailed. Everything was clean and wholesome, and the stock was palpably of the best quality. This scheme is very different from such affairs in general. Usually individuals are called upon to take stock in such enterprises to the extent they may deem an advantage. The concern is then embarked in business, with as much risk and interference from competition as any other, while the chances of its decline and fall are greater, for each individual stockholder thinks he of all others is the man to lead it up to profit and renown, when in all probability he is specially unfit. The consequences are disgust on the part of others, and a total collapse in a few months. The failure of co-operation is then pointed out by its opponents, and every one who entertains the idea subsequently is confronted with this precedent.

The Novelty Iron Works grocery store is quite another thing. No one takes any stock in it, at least not the parties chiefly interested. The object, says the circular before us, is to buy at wholesale, articles of food needed in families, and to sell only to men employed at the Novelty Iron Works, in small quantities at retail prices.

The difference between the cost (including expenses) of articles sold, and amount received from sales will be the saving or profit. This saving or profit will be entirely the property of the purchasers, and once in three months will be divided in cash among the purchasers in proportion to the amount of purchases by each man.

Each man wishing to make his purchases in this way will write his name and number on an envelope, which can be had of the gate keeper on Avenue D.

The amount of money he wishes to trade out must be put in the envelope in even dollars.

These envelopes with the money in, are to be put in a box to be found at each gate at Avenue D.

A pass book will then be sent to each man with his amount entered in his book. This book will then be good at this store until the money is used up. The pass book will have printed directions on the inside cover.

Care will be taken that all weights and measures are correct.

It will be seen from this that if the business is properly conducted by the managers, they will succeed, and that in any event the workman loses nothing, for he gets the market value of his dollar at the time of purchase. Thus it is that the cake is eaten and part of it saved, for if a man buys a loaf of bread only, at the end of three months he gets his *pro rata* profit on it, and we all know that half a loaf is better than no bread. Further, the more money a man lays out at this grocery, the larger his dividend will be; therefore the largest eaters make the most money.

If this logic is defective it is the fault of the benevo-

lent founders of this scheme, for it follows from the facts.

It is needless for us to say that it has our hearty good wishes; therefore we won't say so, but it is very clear that the cost of living can in this way be reduced to the lowest point.

In all large manufacturing towns a plan like this well managed would be inestimable, and they are wise who take advantage of it.

ANOTHER TAX ON GENIUS.

We publish on another page a letter from an inventor who takes exceptions to the bill before Congress requiring the Commissioner of Patents to exact a fee of ten dollars in all rejected cases, before an appeal can be made to the Appeal Board.

We do not fully concur with the writer in the implication that the Examiners are lazy or incompetent; but every one who does business at the Patent Office knows that a great many erroneous decisions are made by the Examiners, and it was to remedy this evil that the Appeal Board was created, and much good has resulted from it. The number of decisions which this Board reverses is most convincing evidence that it is vitally important to inventors that it be continued; but we cannot see why the inventor should be taxed an extra fee for its support, when it was created for the primal object of correcting the Office's own errors, by reviewing the decisions of those Examiners to whose opinions an inventor might take exceptions.

The Appeal Board is constituted of intelligent scientific gentlemen, and has the power of vastly benefiting the inventor; but the receipts of the Patent Office are more than adequate to meet its expenditures, and we think it not only inexpedient, but unjust to inventors to impose a further tax upon them.

We concur with our correspondent in hoping that the bill will not become a law.

SODIUM AMALGAM.

Sodium amalgam has been pretty well known for about sixty years. Several distinguished chemists, among whom was Sir Humphrey Davy, at the beginning of this century, busied themselves with studying it, and it was reasonably supposed that nothing of importance would be added to what they taught us of its properties. Yet the fact is that quite recently we have learned something about sodium amalgam that is practically worth more than all that we previously knew. It will now be taken out of the old curiosity shop and put in the market place; instead of being only a source of amusement and instruction to beginners in chemistry, it will minister to one of the strongest desires of men.

Sodium and mercury being both metals, have a wonderful affinity for each other. When they are brought together, there is a grand clash of atoms, so Prof. Tyndall would express it, and there is smoke and loud sounds, and flame, and intense heat; the experiment is a dangerous one, unless made on a very small scale. When the sodium amalgam is brought into contact with almost any metallic salt, the sodium seizes the oxygen, chlorine, or sulphur, and the mercury lays hold of the metal; in this way amalgams of iron, platinum and other metals which ordinarily do not combine with mercury, may be made. If sodium amalgam be put into a solution of sal-ammoniac, the amalgam, without losing its metallic appearance, increases prodigiously in size, and reminds one now-a-days of Pharaoh's serpents; this curious experiment suggested the famous ammonium theory, which is discussed in every text book on chemistry. A very little sodium makes a solid amalgam; 1 part sodium to 50 parts mercury, gives a consistency of butter; 1 sodium to 30 mercury gives a solid, not so tough, but otherwise much resembling zinc. But these facts are not new, and we proceed to those which are the object of this article.

Dr. Henry Wurtz, now of this city; but formerly of the Patent Office, is the discoverer of the new uses of sodium amalgam. From patent examiner, he has become an inventor; we congratulate him on his auspicious beginning. Dr. Wurtz has found that when a very little sodium is added to ordinary mercury, the affinity of the mercury for metals generally

is so increased, that for use in the arts this mixture acts almost like a new substance. Gold and silver miners have long complained that their mercury was too feeble in solvent power, was liable to "fleur" and to get "sick," etc.; that the gold is often in a condition, as in Colorado, where it slips through the fingers of any device set to catch it. Dr. Wurtz's invention is said to be a complete remedy for all these ills. Whenever sodium amalgam touches gold it sticks to it and does not let it go; it sticketh like a brother; to gold and silver it is as adhesive as tar to a contraband. Sodium amalgam is sometimes called magnetic amalgam.

Dr. Wurtz has found other uses of sodium amalgam; we have space only to allude to them. He proposes to solidify mercury by means of sodium, and transport it in solid blocks, and when the mercury is to be used, the sodium is removed by a simple process. If a broom be made of iron wire, and charged with the amalgam, it is very useful for sweeping together mercury which has been spilled. Every little particle sticks to the broom, from which it may be shaken off at pleasure. An iron brush may be used like a paint brush, in amalgamating zinc plates for the battery, etc.

Mr. William Crookes, the able editor of the *Chemical News*, appears independently to have discovered the useful properties of sodium amalgam. But there is little doubt that Dr. Wurtz is the original and first inventor. He antedates Mr. Crookes eight months by his patent, and there is evidence that he has been investigating the subject for several years.

COLLAPSE OF AN ENGLISH BOILER FLUE.

The *London Engineer* of the 13th ult., publishes a handsome engraving of a boiler which collapsed a flue in the brewery of Messrs. Bass & Co., Burton-on-Trent, England.

The boiler was one of a class comparatively unknown in this country, the Cornish boiler, but very popular in England. A Cornish boiler is one tube inside of another, a single flue boiler we should call it, with the grate bars in one end of the tube.

The boiler which gave out was 32 feet long and 7 feet in diameter inside, while the tube was 4 feet in diameter and but $\frac{7}{16}$ ths of an inch thick; in addition it was out of round by 2 inches.

The safety valves were loaded to a pressure of 50 pounds per square inch, and the sides of the flue were shut together by the pressure, so that it looked like the figure 8.

"The whole boiler was torn off its seating, and launched about 7 or 8 feet. This effect was doubtless due to the reactive force of the steam, which probably issued a contrary direction to that in which the boiler was driven. One end of the engine house was made a complete wreck—some of the bricks being sent eighty yards. The flue tube was found collapsed from one end to the other, bending at the angle iron at the back end of the shell, and at some of the other transverse seams of rivets. We have stated that it was fed by an injector, and a sort of attempt was made at the inquest to show that, as it was shut off, this accounted for a lack of water and consequent collapse. It is also true that the same witness stated that the top of the flue, for a space of four feet, bore evident marks of having been overheated. Mr. R. B. Longridge, chief engineer to the Boiler Insurance Company, Manchester, however, plainly contradicted this evidence, attributing the collapse "entirely to over pressure," as the flue could not safely bear a working pressure of more than 40 lbs. Mr. L. E. Fletcher, the chief engineer of the Manchester Association for the Prevention of Boiler Explosions, was not examined at the inquest, but, as the result of a personal investigation, he writes, in his report for last July:—"There could be no doubt that the explosion resulted entirely from the weakness of the flue, which was insufficient for any pressure above 30 lbs., but could have been made perfectly safe at 60 lbs. or even at a much higher pressure, by the introduction of flanged seams, or incircling hoops of T iron, or bridge rail section, applied at the ring seams of rivets. There are also other means for strengthening furnace flues, such as water pockets, or water tubes, etc., but since these strengthening pockets or water tubes cannot extend into the furnace, it is well to supplement them at

that part with flanged seams or T iron hoops. After boilers are completed and set to work, the furnace tubes can readily be strengthened with angle iron hoops made in segments so as to be passed into the boiler through the manhole, and fixed to the tube when in place."

Mr. Bass, M. P., has made himself conspicuous by legislative measures against the noisy nuisance of barrel organs. Would it be inappropriate to ask him to direct his faculties to the prevention of the more serious noises made by boiler explosions?

AN UNPALATABLE TRUTH.

After a large number of broadside ironclad ships of war have been built in England on the old fashioned plan, necessitating the expenditure of millions of pounds, practical men there discover that they are useless, and that in the event of any contest with a nation possessing invulnerable ships—monitors for instance, they stand no chance of success.

"Coming events cast their shadows before," and we find such men as John Bourne, one of the first engineers in England, beside others, advocating the monitor system as the one good thing that has been tried and not found wanting.

"A naval architect" writes to the *Mechanics' Magazine*, "I am glad to find that you are drawing attention to the penetrable character of our ironclad navy, and to its utter fatality in the case of a maritime war when opposed to monitors of the American construction, such as the *Puritan*, *Dictator*, *Monadnock*, etc.," and the letter concludes by averring that the monitors are the only safe vessels at sea and that they have repeatedly sunk ships equal to the English ironclads.

These statements are all true, and it must be an unpleasant reflection for those in authority to know that they have been walking blindly and that the expensive experiments they have made in the way of vessels are thrown away.

We have no wish that the English Government should adopt our plan of constructing war vessels, but that those who shape public opinion on these points are preparing the way for them is an unmistakable conclusion.

Novel Application of Turpentine as a Fuel.

On the 18th of February, Capt. Shpacovski, professor at the Paul Military School, exhibited at the Old Admiralty, St. Petersburg, certain applications of combustible fluids, reduced to dust or spray by means of an apparatus which he calls a pulverizer. This process enables the inventor to burn every particle of the fluid; he effects this in a lamp of a peculiar construction. The flame produced by turpentine spray in the apparatus is enormous, and reaches a height of two feet, rushing through the burner with a noise similar to that of steam escaping from a pipe. The color of the flame is a whitish yellow; the temperature is equal to that of molten steel (1,040 deg. Reaumur, equal to 1,300 deg. Centigrade.) The quantity of turpentine burnt in the lamp in one hour with the pulverizer is from two to five pounds Russian, which, at three copecks per pound, costs from six to fifteen copecks. Mr. Shpacovski began his experiments by melting a bundle of fine steel wires. This was soon brought to a red heat, and in a few seconds began to melt and then to burn, throwing out sparks. The inventor then applied the flame in a horizontal jet to a piece of copper weighing five zolotniks, which was equally melted (copper melts at about 873 deg. Reaumur, or 1,090 deg. Centigrade). He also exhibited a crucible to melt from five to ten pounds of the same metal. Among other experiments some were made to illustrate the application of the process to the charring of timber used in the construction of ships. The wood was not destroyed, being only carbonized to the depth of $\frac{1}{16}$ th of an inch. After exhibiting a lamp with four pulverizers, giving a flame of $3\frac{1}{2}$ feet in height, and 4 inches diameter, Mr. Shpacovski described his steamboat, the boilers of which are heated by pulverized turpentine. This boat, about 24 feet long by 3 feet beam, with an engine of 2-horse power, runs six knots per hour; her boilers are heated by four pulverizers, fed by pipes from a reservoir placed in the bows. The consumption was 3 lbs. per horse power per hour; but

Mr. Shpacovski is now building a boat of 6-horse power, with an improved boiler, and expects to reduce the consumption of turpentine to $1\frac{1}{2}$ lb. or 2 lbs. per horse power per hour. He has orders for twenty similar steamboats for St. Petersburg and neighborhood; most of them are intended for the passenger traffic on the canals. It is needless to state that the new fuel is more expensive, weight for weight, than coal; but it is claimed that this will be more than compensated by the saving which will be effected on the quantity consumed by means of the new process. Suppose, for instance, a frigate anchored in the roads off Cronstadt; a boat is sent ashore for provisions. The ordinary coal boilers must be fired two hours before hand, and when the boat is alongside the wharf the fires must be kept up till she returns; so that for a trip of half an hour, going and coming, fuel must be burned during four hours. If the boat be fitted with the pulverizer it need only be ignited ten minutes before starting, and altogether fuel will be required for fifty minutes, the expense for a steamboat of 12-horse power being about sixty copecks. Mr. Shpacovski also exhibited a new signal apparatus, giving a very strong light. —*London Engineer*.

Copper Photographs.

A. M. Mialerit-Becknell, who writes from St. John the Baptist, in Louisiana, communicates to *Cosmos*, a very simple process for producing photographs on copper plate. The author takes a smooth and perfectly clean copper plate and dips it for 30 seconds into a bath composed of sulphate of copper 125 grains, common salt 75 grains, water 2 ounces, acidulated with a few drops of acid, any acid whatever. As soon as withdrawn the plate is well washed, and then dried with a soft clean cloth. The plate is then ready for exposure in a frame under a glass negative. In good sunlight five or ten minutes' exposure is sufficient, but in cloudy weather a longer time is required. To fix the picture it is only necessary to dip the plate into a solution of hypo containing a little chloride of silver. A bath which has been used for paper proofs will do, but it must be filtered clear. After a few seconds' immersion the parts of the picture that were reddish whiten, and at the same time the shadows take a violet tint, passing away to black. As soon as this occurs the plate must be taken out, well washed, and dried over a spirit lamp. As the blacks are formed of a very fine powder the plate must be varnished to preserve the picture. The author supposes that a layer of protochloride of copper formed in the bath constitutes the sensitive surface, and he thinks that in the hypo and chloride of silver bath the unacted-on protochloride is dissolved, and silver is deposited on the bare copper. —*Chemical News*.

Pumping Ships by Force of Wind.

In 1862, in reviewing the nautical models at the International Exhibition, we noticed a plan for giving motion to cranks of pumps by the medium of a screw, dragging in the water, turning a long rod, and by bevil gearing working pumps in-board. We stated at the time, that the wind that drove the ship to gain this motion would also turn the sails of an improvised windmill, which would answer the purpose sought to be attained in a more simple manner.

The master of the *Providence* caught at our suggestion, rigged two wings, and fixed them to a deck pump. It succeeded admirably. Captain Kerr, of the *White Star*, it is stated in the *Shipping and Mercantile Gazette* of Monday last, kept his pumps going from shortly after leaving Melbourne to his arrival in the Channel, and by this contrivance the leak of upwards of one foot per hour was kept under. A leak of this description would have worn out his crew, whereas the sails of the windmill would actually help to propel the ship. —*Mitchell's Journal*.

[Just so, and a man can lift himself up by his pantloons if he is only able. —*Eds.*]

A GENERAL convention of all the railroad presidents, chief engineers and general superintendents in the United States is to be held in Philadelphia on the 4th of July next, for an interchange of views in regard to railroad construction, management, and operation. The chief officers of the British Provinces have been invited to attend and participate in the deliberations.

THE THIRD LECTURE OF PROFESSOR DOREMUS'S COURSE.

The third and last lecture of Professor Doremus's course on "Views of Life through the Medium of Natural Science," was delivered in the evening of Saturday, April 21, before the same large audience that had listened with so much interest to the other lectures of the course. The subject of the first lecture was heat, of the second light, and of the third electricity and magnetism, with a glance at the relation of the imponderable forces to each other.

ELECTRON.

The speaker commenced by taking up a large and fine specimen of amber, which he rubbed upon the sleeve of his coat, and showed that it would then pick up light pieces of paper from the table. He stated that this mysterious property of amber was discovered by Thales, of Miletus, six hundred years before the Christian era; as the Greek name of amber is electron, the attractive force received the name of electricity. The nature of this force is as mysterious and wonderful to us as it was to the ancients who first discovered it, but we have accumulated a vast mass of facts in relation to its operation. We now know that instead of being confined to the friction of a single substance, it is developed in every change of form of every substance in nature.

HYDRO-ELECTRICITY.

When water is condensed from the gaseous state of steam, electricity is developed in enormous quantities. With galvanic electricity, we consider it extraordinary to obtain a spark ten or twelve inches in length, but with a suitable apparatus hydro-electricity has been collected of such intensity that it would leap a chasm, from one electrode to another, of nine feet!

THE VOLTAIC BATTERY.

The voltaic circuit was described in a previous lecture. The speaker exhibited several modifications of that, and finally one of two fluids—dilute sulphuric acid, and a solution of bicromate of potash—in which for the platinum plate was substituted carbon powerfully compressed and cemented in a mass by paraffine. At the back of the stage were seen several hundred of these cups, forming the most powerful battery ever collected on this continent. Two ribbons of copper, an inch and a half in width, were employed to connect the opposite poles of this battery, and whenever, in moving them about the stage they accidentally touched each other, the copper instantly flashed into a bright green flame. When the zinc of one cup is connected by a metallic conductor with the carbon of the adjacent cup, and so on through the battery, though the quantity of electricity is not increased, its intensity is augmented; it will overcome greater resistance, but will not decompose a larger quantity of any compound. By connecting the several zinc plates with each other, and the several carbon plates with each other, and then joining the two combinations, the quantity is augmented without any increase in the intensity. With the large number of cups in this battery, they may be so grouped as to give any desired quantity, or intensity, or both combined.

ELECTROLYSIS.

The two copper ribbons of the battery were connected with two wires, which had been fixed in the bottom of a jar of water, and so soon as the connection was made, bubbles of gas began to rise so rapidly as to give the liquid a white turbid appearance. The speaker explained that these bubbles were oxygen and hydrogen gases, the two elements that compose water being separated by the electric current. The decomposition of any compound by the electric current is called electrolysis. The neatness of all modes of decomposing water is by electrolysis. If one electrode is introduced into the mouth of one bell glass or inverted jar, and the other into the mouth of another jar—both being in one vessel—the hydrogen gas is all collected in one jar, and the oxygen in the other. The hydrogen always is of just twice the volume of the oxygen, though the oxygen weighs eight times more than the hydrogen—showing that water is composed of eight parts by weight of oxygen to one of hydrogen, and that the specific gravity of oxygen gas is sixteen times that of hydrogen.

AMMONIUM AMALGAM.

So far as we know, all metals are simple sub-

stances—none of them having ever been decomposed; but some doubt has been thrown on this view of the simple constitution of the metals by the fact that we have one compound substance which exhibits many of the properties of metals. This substance is ammonium, and it is composed of hydrogen and nitrogen in the proportion of one atom of nitrogen to four of hydrogen—the composition of ammonia being one atom of nitrogen to three of hydrogen. Among the properties which ammonium has in common with metals is that of forming an amalgam with mercury.

A tall beaker glass was exhibited containing a solution of chloride of ammonium, and into this was dropped a few pellets of the amalgam of mercury and sodium. Instantly the most violent action took place; the chlorine entered into combination with the sodium to form common salt, and the ammonium formed an amalgam with the mercury, increasing its volume enormously.

MAGNETISM.

Long before the commencement of authentic history, it was known that a certain natural mineral, if delicately suspended, would point one part toward the north and the other toward the south. This mineral was called by the Greeks magnet, from Magnesia, the place where they found it. We now know that it is a certain oxide of iron which occurs in various parts of the earth. If this mineral is rubbed upon a piece of steel, it imparts its peculiar property to the steel; and thus is constructed the mariner's compass—that wonderful little instrument upon which all distant navigation depends.

PARAMAGNETISM AND DIAMAGNETISM.

It was long supposed that iron was the only substance which was affected by this mysterious force, but it was found that nickel and some other metals were slightly attracted by magnets, and the researches of Faraday have demonstrated that all substances are affected in one way or another by the power of magnetism. A needle of iron, if suspended near a magnet, assumes a position parallel with the magnet, while a needle of copper arranges itself in a position diametrically across the magnet, and Faraday found all substances acting in one of these two ways. Those that become parallel with the magnet he called paramagnetic, and those which swing diametrically across the magnet he called diamagnetic. Not only are simple elements found to belong to one of these classes, but compound substances also—even organic compounds—a piece of bread or an apple—and the various gases.

A copper wheel was exhibited suspended between the poles of an electromagnet, and the lecturer stated that if the wheel was made to rotate when the current was not passing around the core of the magnet, the wheel would run without apparent resistance, but so soon as the current was formed, a strange resistance was experienced, as if the wheel was pressing between two pieces of cheese. If, overcoming this resistance, the wheel was made to rotate, it would grow rapidly warm, and eventually red hot.

THE MOST DELICATE THERMOMETER.

If two bars of metal of different kinds, for instance, a bar of bismuth and a bar of antimony, be soldered together at one end, the opposite ends being connected by an electric conductor, then if the soldered end of the bars be heated an electric current will pass through them.

By collecting a number of these pairs the electricity is increased, and such a combination is called a thermo-electric pile. By passing the current thus generated around a bar of soft iron, we, of course, produce an electro-magnet, in which both the electricity and magnetism are generated by heat. By having the magnet act upon the short arm of a long index, we have an instrument which will indicate more minute changes of temperature than any other.

The lecturer held up a brass box about a cubic inch in dimensions, and stated that that contained a series of several small bars arranged as a thermo-electric pile. When it was properly shielded from lateral rays, if the human hand was presented to its face at a distance of forty feet, the index instantly moved!

THE GEISLER TUBES.

If two wires are placed parallel and near each other, at the instant a current of electricity is pass-

ed through one wire, an induced current passes for a moment through the second wire, but in the opposite direction from the first. The induced current instantly ceases, but if the primary current is broken, a second induced current passes momentarily through the adjacent wire, but in the opposite direction from the first induced current. By winding the wire for the primary current in a coil or helix, and coiling around it a finer wire for the induced current, with suitable mechanism for automatic breaking and closing the primary circuit, we may obtain a rapid succession of induced currents. Such an arrangement is called a Ruhmkorff coil.

A very large Ruhmkorff coil was exhibited, and the old gentleman who made it, Mr. Ritchie, of Boston, was introduced to the audience. The lecturer stated that the outer wire for the induced current was twenty-five miles in length, and the instrument was of such power that Mr. Ruhmkorff had declined to attempt its construction.

The lights were now turned down, and Mr. Ritchie proceeded to exhibit the passage of electricity from his large coil through the tubes of attenuated gases, that have been named after Mr. Geisler. The delicate flash and play of these yellow, violet and rosy lights no pen can describe; many who witnessed them considered the exhibition worth the high cost of the whole course of lectures.

A SCIENTIFIC MIRACLE.

Among the various matters introduced for illustration in the course of the lecture was a description of the constitution of gun-cotton. It was stated, that by treating cotton, linen, or any other vegetable fiber composed principally of cellulose, with nitric acid, the acid lost one equivalent of oxygen, becoming NO_2 , and this was substituted for a portion of the hydrogen of the cellulose. This change introduced a large quantity of oxygen into the compound, thus making it more inflammable. This change is as readily wrought in linen as in cotton, so we may have gun-linen, as well as gun-cotton.

The lecturer said that he treated a linen handkerchief with nitric acid, making it into gun-linen, and threw it into the wash with his other clothes. His servant girl washed and dried it, of course without perceiving any difference in its character. She then laid it upon the table to iron it, but at the first touch of the hot iron, the handkerchief vanished with a light flash, leaving no trace behind.

THE CLOSE.

With an eloquent tribute to the enlightened enterprise of the Mercantile Library Association, and with a cordial acknowledgment of the zeal and efficiency of his assistants, Professor Doremus took a graceful farewell of his large audience.

American Riflemen's League.

The various rifle clubs and associations of the United States have formed a general organization with the purpose of stimulating a friendly intercourse among members of rifle practicing societies, in cultivating the art of rifle shooting, and in diffusing a knowledge of the use of fire-arms generally among the nation, similar to the organization of Germany and Switzerland, at the annual gatherings of which tens of thousands of the best marksmen of the world congregate for the purpose designated. The second annual convocation of the League of the United States will be held at Chicago this year, commencing on the 13th of June, and continuing for five days. Preparations upon the most extensive scale, and at an enormous outlay, are in contemplation to accommodate the riflemen from all parts of the Union.

Safety Apparatus for Steam Boilers.

The invention of Mr. J. M. Courtault, of Brooking, consists in the employment of a copper or other suitable metal tube, carried through the upper part of the boiler, and descending below the proper working level therein, and in connecting to the upper part of the tube carried to a greater or lesser height from the top of the boiler a rod, which, by the expansion of the tube, acts upon a safety valve, when the water falls below the proper level, and allows steam to escape from the boiler.—*Mining Journal*.

[This gage is an American invention and has been in use in this country for some time. It is owned by Messrs. Carpenter & Van Riper. It works very satisfactorily.—Eds.]

The adjustable gears, r, o, in combination with the fixed gear, w, for operating the endless band or giving a reciprocating motion thereto, as set forth.

[This invention relates to a new and improved automatic raking device for harvesters, whereby the cut grain may be raked from the platform in the most efficient manner, and without in the least interfering with the cutting mechanism or any of the working parts of the harvester.]

54,299.—Truss.—James Coop, Pittsburg, Pa.:

I claim the arrangement of the flanged headed standards, e, e, slide, C, and set screws, d, in combination with the hoop, A, constructed in the manner and for the purpose herein specified.

The helix springs, f, f, with their crowns fixed to points of the standards and their base ends hooked or secured to the pads in such manner as to allow of rotative elasticity without rotative displacement of the pads and when acting as elastic universal joints for supporting the pads, substantially in the manner and for the purpose set forth.

[This improvement consists first, in the manner of attaching the pad or pads to the hoop of a truss, so that they may readily set at any degree or plane of rotation; and second, in an improved method of suspending the pads to their standards, whereby they are held at any particular plane of rotation in an elastic manner, so as to accommodate themselves to any sudden or undue strain, be it a rotative or side strain.]

54,300.—Pump for Deep Wells.—Robert Cornelius, Philadelphia, Pa.:

First, I claim a slide valve adapted for the passage of the gas, in combination with valve gear operated upon by or through the piston rod for opening and closing the passages of said valve, substantially as described.

Second, A slide valve opened and closed by projections on the barrel or chamber of the pump, substantially as described.

Third, The combination of the slide valve, and the friction springs, O O', for operating the same, substantially as described.

54,301.—Process for Manufacturing Dolls.—Frank E. Darrow, Bristol, Conn.:

I claim the process of saturating raw hide for forming it into a desired form or shape, substantially in the manner as and for the purpose described.

54,302.—Grape Vine Protector.—Jacob S. Davis, La Porte, Ind.:

First, I claim the arrangement of wings, A A, hinged as described to the upright, B, when provided with suitable trellises, H H, operating substantially as and for the purposes specified and shown.

Second, I claim the combinations of the wings, A A, upright, B, and H, D, arranged and operating as and for the purposes set forth.

Third, I claim providing the wings, A A, the movable trellises, H H, for the purposes specified.

54,303.—Method of Extracting Oil from Leather, Etc.—John A. Dean, Easton, Mass.:

I claim as my own invention and discovery, the process of making the composition and the new combination of the materials above enumerated.

54,304.—Medical Compound.—Honore De Lapaturette:

I claim a medical compound made of the ingredients hereinbefore specified.

54,305.—Stop Cock.—William H. De Valin, Sacramento, Cal.:

First, in steam, water or gas cocks, constructed and arranged, substantially as herein described, I claim the recess in the plug in combination with a chamber, within the case but outside of the plug so as allow steam, water or gas to pass through and press against the plug in such manner as to prevent leakage as set forth.

Second, in combination with the recessed plug and outside chamber, or the equivalent thereof, I claim the employment of a spring to maintain the plug in position when not under pressure.

Third, The combination of a recessed plug and outside chamber with an agitator fast to the plug and projecting into said chamber, as and for the purposes set forth.

54,306.—Water and Wine Cooler.—Joseph Dietschy, Alton, Ill.:

I claim a combined water and liquor cooler, constructed substantially as described with the parts, A B C and H.

54,307.—Tile Kiln.—John B. Dixon, Geneva, N. Y.:

I claim the combination of the flues, E, opening near the top of and within the kiln, A, with the open door, C, and return flues, F, connected with the chimney, H, the whole being arranged and employed substantially as and for the purpose set forth.

54,308.—Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa.:

First, I claim the combination of the wood and straw pulp digester, the water motor, and the force pump whereby the escaping water under pressure, forces fresh water in at the top.

Second, The combination of the digester, A, the water motor, the pump and the heater at K, whereby the escaping water both heats and forces in the fresh water.

Third, The combination of the digester, A, the water motor and pump, the heater, K, and the heater, E, whereby the escaping water forces in fresh water, which absorbs the heat from the escaping water, and is further heated before it enters the top of the digester.

54,309.—Process of Separating the Fibers of Palm, Palmetto, Etc., for the Manufacture of Paper Pulp.—John W. Dixon, Philadelphia, Pa.:

First, I claim the treatment of the palm, dwarf palm or palmetto, by highly heated water, under pressure in a close digester, substantially as above described for preparing it for spinning or paper making.

Second, The treatment of palm, dwarf palm or palmetto, by submitting it to a highly treated water, under pressure, in a closed digester, and then to the action of chlorine or chloride of lime to bleach it.

54,310.—Machine for Rolling, Shaping and Forging File Blanks, Flyers and other Metallic Articles of Small Dimensions.—James Dodge, Waterford, N. Y.:

First, I claim the novel combination in one machine of one or more pairs of jaws or levers containing dies and matrices with rollers for rolling and forging file blanks of any desired form, flyers and other metallic articles, constructed and arranged for operation substantially as described.

Second, I claim governing the rotation of the rollers and movement of the jaws, so as to stop and start such rotation and movement at any desired time or position by means of the apparatus described, or by other mechanical equivalents.

Third, I claim the combination and use of the wedges and springs constructed and arranged as described for regulating the distance of the rollers.

Fourth, I claim the general construction and arrangement and combination of the apparatus for rolling, shaping and forging file blanks, flyers and other metallic articles of small dimensions, as hereinbefore described.

54,311.—Machinery for Hammering Heads of Axes.—Levi Dodge, Waterford, N. Y.:

First, I claim the finishing of axes by the use of dies closing upon the cheeks and heads in combination with a pin, the whole being constructed as described and operating simultaneously to give the axe its ultimate form and smooth finish, substantially as set forth.

Second, I claim the combination with the dies constructed and arranged as described, of a yielding support or spring in the applied manner, substantially as herein shown and set forth.

54,312.—Carpet Wadding.—Thomas H. Dunham, Boston, Mass.:

I claim a wadding composed of a bat or layer of fibrous materials and having either upon one or both of its sides a layer or sheet of paper in which the exterior of the fibrous bat is embedded while the paper is in the condition of partially hardened pulp, which adheres to the fiber and holds it in place without the use of starch, paste or adhesive gums.

54,313.—Buckle.—Augustus R. Egbert, Philadelphia, Pa.:

I claim the construction of the buckle with the extended angular ends and raised center as herein described, and for the purposes set forth.

54,314.—Seat and Back for Chairs.—William S. Farmer, New York City:

I claim the employment of sheets of raw hide in the bottoms and backs of chairs and other articles of furniture, for sitting and reclining purposes when perforated and embossed, substantially as herein set forth.

54,315.—Horse Hoe.—S. Phelon Fish, Litchfield, N. Y.:

I claim in combination with a central plow carried by, and adjustable on the beam, the side plows carried by and made adjustable on a divided frame which is also carried on by and made adjustable on the beam, substantially as and for the purpose herein described.

54,316.—Wood Bending Machine.—John Fishbough, Tiffin, Ohio:

First, I claim shrinking and shortening all the fibers of a bar of wood by means of the devices which are used for clamping the pattern and wood upon the mill, A, and the devices used for bending such about its pattern, substantially as described.

Second, The method substantially as described of bending wood into curved forms to wit, by first bowing or arching it, and thence bending it about the pattern in a converse direction to that in which it was first bent, or bowed, substantially as set forth.

Third, The construction and arrangement of the shouldered blocks, C C, hooked screws, g, g, nuts, g' g' connecting strip, F, having enlargements formed on its ends and the recessed sill, A, all used together substantially as described.

Fourth, So constructing the pattern and the follower and combining the same, that the expansion of the pattern is effected by the descent of the follower, G, and its contraction insured by the ascent of the follower, substantially as described.

54,317.—Cultivator.—Wm. D. Fisher, Freeport, Ill.:

I claim the arrangement and combination of the drops, C, equalizer, E, adjustable frame, A, regulating lever, G, and fenders, J, when arranged as herein described and for the purposes set forth.

54,318.—Boiler Tube.—Benajah Fitts, Newark, N. J.:

I claim the cap, O, over the end of the tube, H, leaving openings, P P, or other means substantially the same for the purpose of allowing free egress of the water from within the tube and at the same time prevent the steam formed under and around the end of the tube from passing into it, as set forth and described.

54,319.—Soap Stone Stove.—James H. Flagg, Perkinsville, Vt.:

First, I claim the stovepipe or flue bored out of a solid piece of soap stone, as and for the purpose herein described.

Second, I also claim in joining the panels and plates of stoves made of soap stone or other mineral substance, the use of angle irons, B, constructed and applied substantially as described.

Third, I also claim securing linings in stoves by means of the irons which secure the outside plates and panels, the posts, a, a, of such irons being either flared, as shown in Fig. 4, or left straight as in Fig. 5, substantially as described.

54,320.—Newspaper File.—J. W. Foard, San Francisco, Cal.:

I claim the short recess at the bottom of the file, in combination with the movable nut whereby the hinge is operated, the latter enabling one to adjust the file at that end to any desired thickness of paper.

54,321.—Burial Casket.—Julian A. Fogg, Salem, Mass.:

I claim removing from the side of a coffin or burial casket whose lid opens backward, so much of its front side as is required to sufficiently expose the person of the corpse, the said removed portion being attached to the lid in such manner that when the lid is closed, it will fit into its proper place and the casket be as effectually closed as were it of the ordinary construction.

54,322.—Grain Spout.—A. D. Foote, Berlin, Wis.:

First, in the operation of loading vessels with grain, I claim providing for discharging the grain from an inclined spout at or nearly at right angles to the line of such spout, substantially as described.

Second, The combination of one or more curved sectional grain spouts, B, with the discharge spout of an elevator, substantially as described.

Third, Providing for depositing grain at either one or both ends of a car or vessel at pleasure from a grain spout, substantially as described.

54,323.—Combined Corset and Bustle.—Lavinia H. Foy, Worcester, Mass.:

First, I claim the combination with a corset, of a series of eyelet holes, c, or their equivalent and a detachable bustle, B, substantially as and for the purposes set forth.

Second, The combination with the back and sides of a corset of one or more rows of eyelet holes, c, transversely to the line of junction of the corset in the rear, substantially as and for the purposes set forth.

Third, The combination with the rim or bustle, B, of the coiled spring, e, substantially as set forth.

Fourth, Making the rim or bustle, B, from a bias-cut piece of cloth, in combination with inserting an elastic, C, or its equivalent, for the purposes stated.

54,324.—Button.—Charles A. French, Boston, Mass.:

I claim the combination of the stud, B, shouldered shank, a b d, and washers or eyelets, e f, substantially as and for the purpose described.

54,325.—Beehive.—Austin Fuller, Plymouth, Ind.:

First, I claim the arrangement of a beehive having a double case, A B, with dead air spaces between them, and having on the front only double doors, A' B', both of which are hinged to the external case, and having also the sloping sides, I, terminating with a funnel formed mouth closed when desired by the perforated slide, K, and having also doors, F, located as described, substantially as and for the purposes set forth.

Second, In combination with the sloping sides, I, I claim the plates, L and L', substantially as and for the purpose set forth.

54,326.—Preparation of Court Plaster.—Lyman C. Gale, Chicago, Ill.:

I claim the assortment of the various forms of plaster above described, and put up in boxes or packages, as set forth.

54,327.—Planking Clamp.—Wesley Glen, Philadelphia, Pa.:

I claim the combination of the knee or brace, D, having set screw, E, and pawl screw, G, and hooks, A, the screw shaft, H, and flanged screw sleeve, J, arranged in the back or upper end of the hooks upon said shaft so as to operate upon the hooks, substantially as and for the purpose described.

[The object sought to be secured by this clamp, is to economize time in planking, and in the building of staging.]

54,328.—Pneumatic Pump.—Henry Gottfried, New York City:

First, I claim the employment of a yielding head, M, or heads, M', arranged in the cylinder of air pumps in a manner to co-operate with the main piston for the purpose herein shown and described.

Second, The employment and arrangement of the air chamber, s, and passage, q, to the reservoir or discharge pipe in combination with the yielding head, M, the whole operating and for the purpose herein shown and described.

Third, The combination and arrangement of the drop-valve, r, in the passage, q, and with the yielding head, M, operating in the manner and for the purpose herein described.

Fourth, The employment of the delivery valve, n, arranged in the yielding head, M, for the purpose of simplifying the construction in producing an air tight joint between the yielding head and piston when brought together.

54,329.—Roll for Manufacturing Three-headed Railroad Rails.—James Gower, Ironton, Ohio:

I claim the arrangement of rolls, Figs. 1 and 2, and mandrels, A A', or their equivalents for the manufacture of three-headed railroad rails, substantially as set forth.

54,330.—Head Block to Saw Mills.—Henry H. Gridley, Auburn, N. Y.:

First I claim giving the described "set" to the head blocks of a saw mill automatically, by the means substantially as above described.

Second, Also the combination of the lever, E, with the cam, a, with

the stationary rod or trip arm which it passes, as and for the purpose described.

Third, A set of the mechanism whereby the "set" may be given to the head blocks of a saw mill automatically in combination with the hand lever to operate said mechanism by hand, as may be desired, substantially as above described.

54,331.—Balanced Slide Valve.—John R. Grout, Detroit, Mich.:

I claim First, The recess or chamber, h, formed in the upper face of the valve, substantially as and for the purpose set forth.

Second, The counter-balancing chamber, i, in the upper face of the valve, e, in combination with the openings, l, l, from exhaust chamber, h, for the purpose substantially as herein described.

Third, The recesses in the chest cover and the chamber, h, in the upper face of the valve in combination with openings, i, l, and exhaust chamber, g, operating substantially as herein set forth.

Fourth, The wire bar, i, constructed and arranged to operate, substantially as herein described.

54,332.—Broom Head.—Samuel B. Gurnsey, Chicago, Ill.:

I claim the combination of the bar, E provided with hooks, e, e, the rod, F, and broom head, A, when arranged so as to tighten the broom corn independent of the broom handle, substantially in the manner specified and shown.

54,333.—Car Brake.—Sive Guilbert, New York City:

I claim the chains, d, and bolts, e, in combination with the screws, c, and with the platform of a car constructed and operating substantially as and for the purpose set forth.

54,334.—Well Curb.—Christopher Gullmann, Poughkeepsie, N. Y.:

I claim the arrangement of a ball or disk governor, E, in combination with the windlass shaft, B, and well curb, A, constructed and operating substantially as and for the purpose described.

[This invention consists in the arrangement of a ball or disk governor in combination with the windlass shaft of a well curb in such a manner that by the action of the air against the balls or disks the speed of the descending bucket is checked, said balls or disks being secured to swinging arms so that the same are allowed to fly out, if the speed of the governor increases, and that the resistance of the air is made to act on longer levers and consequently with increased power if the speed of the governor is larger than if said speed is small.]

54,335.—Elastic Cushion and Guard for the Feet of Horses.—William H. Hall, New Gloucester, Maine:

I claim the use of the elastic inner shoe and guard when cut or cast into the form herein described, for the purpose set forth.

54,336.—Engine Governor.—William J. Hallefass, Brooklyn, N. Y.:

I claim the governor, A A, when in combination with the inclined planes, f, actuation rollers, i, j, and a valve stem, k, arranged and operating substantially in the manner and for the purpose set forth.

54,337.—Portable Cooking Apparatus by Lamps, Etc.—C. A. Harper, Little Rock, Arkansas:

I claim the boiler, A, oven C, and burner, E, when constructed, arranged and combined substantially as herein described and set forth.

54,338.—Broom Head.—John Harris, Marquette, Wis.:

I claim the combination of the crescent shaped socket, A, projecting handle socket, a, arms, b b, serrated bars, C C, clamp jaws, B B', screw, c, and nut, d, all constructed, arranged and employed as and for the purpose specified.

[This invention consists in a combination of parts to produce a broom and brush head, in which the broom corn or bristles can be very easily inserted and clamped and held securely.]

54,339.—Process for Preparing Wood for Boots and Shoes.—Robert T. Havens, Wilmington, Ohio. Antedated April 16, 1866:

I claim the process as described for the purpose of producing flexible wood for boots and shoes, as specified.

54,340.—Evaporator.—B. K. Hawley, Normal, Ill.:

I claim first, In apparatus for evaporating the juice of sorghum or other substances forming an evaporating pan above and down each side of the furnace, substantially as described.

Second, I also claim forming two pans side by side behind the furnace, and passing the furnace flue directly through them to the chimney, when the said flues are controlled by separate dampers or set of dampers for the flues of each of the back pans, substantially as shown and described.

54,341.—Tinman's Forming Tools.—William H. Henderson, Franklin, Ind. Antedated April 16, 1866:

I claim in combination with frame, A, the gaging side, g, vibrating clamp, B, arms, c, springs, d, edging clamp, C, and disk, e, as above described and for the purpose set forth.

54,342.—Tinner's Edging Tools.—William H. Henderson, Franklin, Ind. Antedated April 16, 1866:

I claim, in combination with frame, A, the gaging side, g, vibrating clamp, B, arms, c, springs, d, edging clamp, C, and disk, e, as above described and for the purpose set forth.

54,343.—Churn.—Silas Hewitt, Seneca Falls, N. Y.:

I claim First, The beaters, x y, in combination with the triangular brake, G, as and for the purpose specified.

Second, I claim the shifting gear, L, in combination with the gears, P Q, and beaters, x y, as and for the purpose specified.

Third, I claim the bridge, H', for supporting the zinc bottom as described.

Fourth, I claim the blocks, K, in each corner for the purpose set forth.

54,344.—Skate.—Benjamin H. Hibler, Newport, Ky.:

I claim a skate composed of the following elements, to wit: An elastic plate or sole, A, bent so as to present a vertical shoulder or abutment, A', a divided runner, B C, a heel clip, H d e, and an adjusting screw, G, the whole being combined and adapted to operate as set forth.

54,345.—Compositions for Disinfecting and Preserving.—John Hickson and Lyman L. Wilkinson, Auburn, N. Y.:

We claim the compound No. 1 and 2, when made, substantially as above set forth.

54,346.—Steam, Water, or other Pipe.—Edward H. Hill, Worcester, Mass.:

I claim an improved article of manufacture, a pipe for water, steam and other purposes, made as described and shown in the accompanying drawings.

54,347.—Filtering Faucets.—George Hillegass, Philadelphia, Pa.:

I claim constructing the reversible spigot of a faucet with a chamber and dovetailed allic, C, so arranged as to secure a filter, felt, or other material, E, or screw, E', across the chamber through which the fluid must flow in passing through the faucet, substantially in the manner and for the purpose set forth.

54,348.—Bolt Fastening.—J. M. Hopkins, New York City:

I claim the combination of the crank shaft, D, bolt, H, and thumb pieces or buttons, L M, when connected and arranged together so as to operate substantially in the manner described, and for the purpose specified.

[This invention relates to a new and improved bolt, especially adapted as a fastening for doors of book cases, closets, window sashes, and many other similar purposes, and it consists in a novel arrangement of parts in connection with the bolt, whereby it can be thrown out or drawn in with the utmost ease and facility, and by simply pressing with the fingers or thumb of the hand upon certain portions of the bolt connections.]

54,349.—Grate Bar.—David Houston, New York City:

I claim, and desire to secure, by letters patent, the bearing bar, b, connected to the grate bar, a, at or near its center, and resting at its ends upon the same bearers as the ends of the bar, a, but discon-

needed from said bar, a, at its ends so as to allow the grate bar to expand independently of the bearing bar, as set forth.

54,350.—Flush Bolt.—J. M. Hopkins, New York City:

I claim the combination of the bolt, B, lever, H, thumb lever, M, and a coiled or other suitable spring with the connecting rod, E, when arranged together so as to operate substantially in the manner described, and for the purpose specified.

[This invention consists in a novel arrangement and connection of devices with the bolt, whereby many important advantages are secured.]

54,351.—Straw Cutter.—L. B. Hoyt, Cedar Falls, Iowa:

I claim the combination and arrangement of the rollers, C, D, which is, F, J, disk, G, and knife, I, as and for the purpose specified, and in combination therewith, I claim the guide, M, as set forth.

54,352.—Bench Vise.—Harrison P. Hood, Lowell, Mass.:

I claim in the said improved bench vise, as made with the jaw carriers, A, B, applied to the bar, C, as set forth, the arrangement of the clamp lever on the jaw carrier, B, substantially as specified, the spindle being joined to the said lever and extended upward through the bar, C, and jaw carrier as explained.

54,353.—Burglar Alarm.—Edmund Hoole, New York City:

I claim the dovetail tapering slots, D, situated opposite to each other in the frame or base plate, A, of a burglar alarm, in combination with the tapering dovetail plate, E, substantially as and for the purpose specified.

54,354.—Sash Supporter and Fastener.—James Hopkins, Madison, Wis.:

First, I claim the brace, A, having its upper end the heavier, and provided with the inclined corrugated cam face when constructed in the form shown, and arranged to operate as set forth.

Second, the combination of the stud, O, provided with the journal the shoulder screw, C, and the double faced cam or brace, A, all arranged and operating as herein described.

54,355.—Apparatus for Washing Kaolin, Etc.—Duane Hull, Newburgh, N. Y.:

I claim the brakes, C, C', Fig. 1 and the said brakes, C, C', working on a hinge or joint, for the purpose set forth.

54,356.—Dies for Making Hatter Irons.—Bradley Hall, Westport, Conn.:

I claim the pair of dies, Figs. 2 and 3, constructed and arranged in the manner and for the purpose substantially as herein described.

54,357.—Printing Press.—Martin J. Imbach, New York City:

I claim First, The operating in a two bed printing press for printing both sides of sheets simultaneously of the beds, by means of levers, G, G', so arranged and connected with the beds, that the latter will move simultaneously in opposite directions, and both give the impression at once at opposite sides of the sheet, substantially as described.

Second, The employment or use in connection with said beds of movable wrist pins, V, attached to slides and operated by eccentrics, or arranged in any equivalent way, so as to operate the levers, G, in such manner as to give the necessary "dwell" or cessation of movement to the beds, substantially as and for the purpose specified.

Third, The placing of the journals of the ink rollers, A', in rods, B', pivoted to radius arms, C', and connected with springs, h, said parts being placed in such a position relatively with the forms on the platens, that the rollers may pass over the forms, and properly ink the same, substantially as set forth.

Fourth, Operating the ink rollers, A', through the medium of the rods, F, arms, C', C', and cams, L', when said ink rollers, thus operated, are used in combination with a press provided with two beds arranged substantially as described.

54,358.—Apparatus for Continuous Distillation.—William G. W. Jaeger, Baltimore, Md.:

I claim, First, Feeding a still by means of a feed pipe passing up therein through its bottom, substantially as shown and described.

Second, I also claim discharging the heavy oils, and the residuous matter resulting from the process of distillation in a continuous flow through the bottom of a still, substantially as shown and described.

Third, I claim in distilling a paratus the following elements or principles of operation: 1. That the heavier oils and residuous matters are discharged therefrom as fast as they reach the bottom of the still, 2. That such matters are cooled or reduced to a comparatively low temperature before they are finally discharged or brought in contact with the atmosphere, and, 3. That the still is kept continuously charged by a supply which is led up through and heated by the matters so discharged therefrom, substantially as described.

Fourth, I also claim passing the supply oil or liquid to a still through the residuum and heavy oils discharged therefrom, substantially as described.

Fifth, I also claim controlling the flow of the oils and residuous matters discharged from the bottom of a still by means of a faucet or faucets in pipes through which they pass, substantially as shown and described.

Sixth, I also claim reducing the temperature of the oil going down the still, and increasing the temperature of the incoming supply of oil or other liquid by running the pipe of the one within the other, substantially as shown.

Seventh, I also claim the open supply pipe, W, in combination with the pipe, S, leading from the bottom of the upper still, L, and the feed pipe, P, leading to the lower still, O, substantially as above shown.

Eighth, I also claim controlling the flow of the supply oil or other liquid into the feed pipe, P, by means of a valve, W, substantially as above shown and described.

Ninth, I also claim in combination in a distilling apparatus, the use of an open float, or floats, substantially as described, the feed pipe, P, and the vertical supply pipe, V, whose upper open end communicates with the overflow chamber, substantially as shown.

Tenth, I also claim driving off the benzine, and lighter oils and water from the oil to be distilled by means of the heat which radiates from the top of the main still and steam chamber, G, substantially as described.

Eleventh, I also claim interposing a water and steam chamber, or water and steam pipes, between the upper and lower stills for the purpose of regulating the temperature in the upper still, substantially as and for the purpose above described.

Twelfth, I claim in combination feeding oil or other liquid to a still continuously, and at a temperature made to approximate to that of the charge as described, and at the same time discharging the heavier oils and residuous matters continuously, as they are thrown down towards the bottom of the still, substantially as shown and described.

Thirteenth, I also claim in combination, the lower still, O, the upper still, L, and the water and steam chamber, G, with or without a circulating pipe, M, substantially as described.

Fourteenth, I also claim connecting the water and steam chamber, G, to the boiler, substantially as and for the purpose above described.

Fifteenth, I also claim raising the temperature and controlling the flow of oil or other liquid, as it passes into the upper still, substantially in the manner above described.

Sixteenth, I also claim in combination, the open pipe, V, the pipe, S, the tube, T, and the overflow chamber, H, substantially as described.

Seventeenth, I also claim conducting the supply of oil or other liquid into the upper still through a hot water and steam chamber, substantially as described.

Eighteenth, I also claim the transparent receiving chamber, A, or equivalent apparatus to receive the heavy oils, and other matters discharged from the bottom of a still, substantially as described, with or without a gas or vapor escape pipe.

Nineteenth, I also claim the receiver, d, constructed substantially as described with a refrigerating apparatus connected thereto for cooling the matters discharged from the still before final escape, substantially as described.

Twentieth, I also claim providing the transparent chamber, and the receiver, d, one or both, with vents or vapor and gas escape pipes, b, and g, substantially as described.

Twenty-first, I also claim applying a refrigerating apparatus to the pipe, Y, behind the transparent receiving chamber, A, substantially as described.

Twenty-second, I also claim in combination, the regulating faucet, x, in the pipe which delivers the discharged heavy oils, and residuous matters into chamber, A, the transparent chamber, A, and the trap pipe, C, substantially as set forth.

Twenty-third, I also claim in combination, the transparent chamber, A, its vent pipe, b, the trap pipe, C, and the receiver, d, substantially as set forth.

Twenty-fourth, I also claim placing a cooling device beneath the receiving chamber, A, substantially as above described.

Twenty-fifth, I also claim in combination the chamber, A, provided with a vapor or gas pipe as shown, and the trap pipe, C, or its equivalent, substantially as shown.

Twenty-sixth, I also claim in combination the chamber, A, provided with a vapor or gas pipe, as shown; the cooling device, Z, and a trap pipe, C, or its equivalent, substantially as shown.

Twenty-seventh, I also claim in a distilling apparatus extending the boiler upwards around the smoke stack or flue as shown at F, substantially as and for the purpose above described.

Twenty-eighth, I also claim in a distilling apparatus drawing off from the bottom of the still continuously, or as often as required, the heavy oils and residuous matters of the charge, and at the same time feeding the still as the charge is reduced, by a supply through a pipe which traverses or passes through that portion of the charge which is being withdrawn, substantially as described.

Twenty-ninth, I also claim in a distilling apparatus, conducting the flames or products of combustion from the fire chamber or chambers towards the center of the bottom of the still, or place of discharge, substantially as shown.

Thirtieth, I claim the use in a distilling apparatus of a float or floats made with a vent pipe as above shown, or equivalent device, either with or without a valve, substantially as above set forth.

Thirty-first, I also claim the application to a hollow float of a pipe rising therefrom with or without an outwardly opening valve, substantially as and for the purpose described.

Thirty-second, I also claim cleaning the bottom of still during distillation by means of a scraper or scrapers, operated from without, substantially as shown and described.

Thirty-third, I also claim in the ways, 16 and 17, severally constructed and applied as shown, for the purpose of raising the scraper from the bottom, m, on its return movement.

Thirty-fourth, I also claim placing a water jacket, 24, or equivalent device between the end of the still, and the stuffing box, 14, substantially as shown and described.

Thirty-fifth, I also claim using the overflow waste water from the condenser for raising the temperature of the fresh oil or other liquid while on its way to a still by passing the same through the water in the chamber, B, substantially as described.

Thirty-sixth, I also claim passing the overflow waste water of the condenser (after it leaves the chamber, y), through a water jacket surrounding the goose neck, h, and thence through a water chamber, B, between the said goose neck, h, and the overflow chamber, 11, for the purpose of re-heating it, substantially as described.

Thirty-seventh, I also claim the use of the supply chamber, 1, which receives the oil, or other liquid after it has traversed the water chamber, y, and through which the heated water from chamber, B, is led in a pipe, n, substantially as and for the purpose above described.

Thirty-eighth, I also claim the double furnaces, A, A, combined and operating substantially as and for the purpose described.

54,359.—Beer Faucet.—Jacob Jahraus, Buffalo, N. Y.:

First, I claim making the discharge nozzle, C, an extension of the key chamber, B, and locating the pump barrel, E, therein, in combination with the key, D, and plunger, F, arranged and operating in the manner described.

Second, Extending the key passage, D', downward to each end thereof on the opposite sides of the discharge nozzle extension of the key chamber, as described.

Third, Forming the key chamber cap, G, with a cup, g', for the purpose set forth.

Fourth, The holes, b', in the key as set forth.

Fifth, The combination of the button, f2, with the perforations, f1, for the purpose set forth.

54,360.—Machine for Graining Morocco.—George R. Johnson, Wilmington, Del.:

I claim for graining morocco, a moving table and a swinging one, operating together, substantially as described.

54,361.—Animal Trap.—Samuel F. Jones, St. Paul, Ind.:

I claim the angular vibrating platform, E, treadles, F, coiled spring, v, hoops, a, catches, r, and shatter, G, when constructed and arranged in the manner and operated for the purpose substantially as set forth.

54,362.—Machine for forming Pen-holder Springs.—John Keith, Worcester, Mass.:

I claim, First, The combination of the lever, G, having cams, o, p, with spindle, D, and the forming rod, E, substantially as set forth.

Second, The combination with spindle, D, and forming rod, E, of the springs, c and d, and rod, e, substantially as set forth.

Third, The combination with spindle, D, and forming rod, E, of pin, i, springs c and d, and screw, b, as and for the purpose set forth.

Fourth, The combination of the forming rod, E, with spindle, D, springs c and d, and die, L, the parts being constructed and arranged for joint operation, in the manner set forth.

54,363.—Mode of Stopping and Starting Cars.—James E. Kelsey, Providence, R. I.:

I claim First, The arrangement of the rod, N, connected above and below the fore and hind axles to their respective friction wheels, so as to give the reverse motion on the said wheels, by the same longitudinal motion of the rod, substantially as described.

Second, I claim the S-shaped spring connecting the pawl, and the rod, N, substantially as and for the purpose described.

Third, The combination of the ratchet teeth on the wheel, B, the pawl, Q, the spring, P, rod, N, spring, T, and friction wheel, D, operating substantially as described.

Fourth, The combination of the rod, N, spring, T, and the friction wheels, D, D, of the respective axles constructed and operating as described.

Fifth, The friction wheel, D, revolving by contact with the car wheel to simultaneously arrest the latter and compress the spring on the rod, n, substantially as described.

54,364.—Artificial Leg.—Hiram A. Kimball and Andrew J. Lawrence, Philadelphia, Pa.:

We claim, First, Forming a frictional joint, d, in artificial limbs by combining pure soft rubber with vulcanized gum, in the manner and for the purpose substantially as described.

Second, The two blocks, band c, in combination with the prolongation of the pitman, p, producing two opposite points of contact, r, and r', thereby relieving the axle pin from the strain or leverage of the foot; the same being constructed and arranged substantially as shown and described.

Third, The combination of the lever, w, with the soft packing, x, and the roller, y, for locking and unlocking the knee and lowering the toe, the several parts being arranged and constructed substantially as shown and described.

Fourth, The combination of the metallic spool, B, rubber packing, D, and the steel plates, F, F', to produce a slight lateral motion of the ankle joint, the whole constructed and arranged substantially as shown and described.

54,365.—Method of Applying Paint to Surfaces.—John W. Kingman, North Bridgewater, Mass. Antedated April 19, 1896.:

I claim the application of paint in form of a wash, or mixed with water, and the applying oil over it, before it has become dry, substantially as herein described.

54,366.—Sorghum Evaporator.—T. T. Kneeland, Tecumseh, Mich.:

I claim the pan, A, provided with a series of steam pipes, B, C, in combination with the gate, D, all arranged to operate in the manner, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved device for evaporating, by means of steam, the juice of the sugar cane, more particularly, the juice of the kind of sugar cane termed sorghum. The invention consists in the employment or use of a series of steam tubes, fitted within a shallow pan, provided with a gate, all arranged in such a manner that the juice may be evaporated expeditiously, and the necessary manipulation performed with the greatest facility.]

54,367.—Sewing Machine Guide.—Edward H. Knight, Washington, D. C.:

I claim an adjustable spring pressure pin or foot, constructed substantially as described, and adapted to press, at one point, upon the cloth outside of its line of seam, to deflect the same, but not by extreme pressure or penetration, to form a center of revolution.

I also claim the said spring pressure pin or foot as adjustable in a horizontal plane, substantially as described.

54,368.—Land Roller.—E. J. Knowlton, South Lyon, Mich.:

I claim, First, A land roller composed of two parts, C, C, having

the inner or adjoining ends of their axles fitted in an adjustable bearing or bar, D, substantially as and for the purpose set forth.

Second, the lever, I, in combination with the bar, D, substantially as and for the purpose specified.

Third, The plank or seat support, E, in combination with the bar, D, and rollers, O, C, arranged substantially as and for the purpose set forth.

[The object of this invention is to obtain a roller for rolling land which will be capable of conforming to the inequalities of the surface thereof, and also capable of being more readily turned than usual.]

54,369.—Pegging Jack.—George A. Knowlton, Natick, Mass.:

I claim the heel standard, D, made adjustable vertically, for the purpose set forth.

I also claim the spindle, I, substantially as and for the purpose described.

I also claim the lever, I, operating substantially as and for the purpose set forth.

I also claim connecting the lever, F, with the lever, I, by means of adjustable rods, G, H, or their equivalents, substantially as and for the purpose specified.

I also claim a heel standard, made adjustable vertically, as well as horizontally, in combination with a toe standard, made adjustable horizontally, substantially as and for the purpose described.

54,370.—Clover Harvester.—Elias Kramer, Alvirna, Pa.:

I claim the spirally arranged revolving shears B, H, in combination with the fingers, O, when curved on their upper faces, and having openings at their faces, substantially in the manner and for the purpose set forth.

Second, In combination with the wheel, Q, adjustably attached to the box, C, so as to regulate the height of the cut on the outer side, I claim the brace and guard, N, when adjustably attached to the axle of the wheel Q, by a slot and nut, substantially as and for the purpose set forth.

Third, In combination with the braces, D, D', hinged as described, I claim the cords, M, M', and hand lever, L, substantially as and for the purpose set forth.

54,371.—Sheep Rack.—S. Lahm, Canton, Ohio:

I claim the arrangement of the hinged covers, F, hinged rack, or rack boards, G, G', and hinged or sliding slides, E, C, with regard to said racks, and the grain troughs, H, so that the food may be appropriately distributed, and the sheep rack opened or closed, in whole or in part, as herein described, and for the purpose set forth.

54,372.—Harvester.—E. M. Krum, Nassau, N. Y.:

I claim hinging the finger beam of the cutting apparatus to the draft frame by means of eye bearings formed directly on the inner shoe, F, the crank shaft which drives the sickle and pendant brackets, E, E, which afford tubular bearings, pivots for the finger beam, both at front and rear of the cutting apparatus, substantially as described for the purpose set forth.

The combination of the inner hinged shoe, crank shaft and inclined jointed shaft, D, the said parts being constructed and arranged, and operating substantially as described.

Supporting the upper end of the inclined shaft, D, in a jointed bearing box, m, when this shaft is connected to the horizontal crank shaft, D', by a universal coupling, g, substantially as described.

The construction and arrangement of the tubular pivots, h, h, pendants, E, E, shoe, E, for the purpose of supporting a horizontal crank shaft, substantially as described, and for the purpose set forth.

The arrangement of the pitman box, j1, so as to be tightened by the end of the pitman, j, setting against a half bearing box i, substantially as and for the purpose shown and described.

The segment, J2, on the finger beam, G, in combination with the segment, J1, in the hand lever, J, and chain for enabling the attendant to adjust the finger beam to a vertical position, substantially as described.

54,373.—Barnyard Scraper.—Samuel W. Langdon, Fairfield, Iowa:

I claim the invention of the foregoing machine, and the combination of its different parts, as set forth above, and as shown by the accompanying drawings.

54,374.—Reaping and Mowing Machine.—Hiram R. Lavey, Bristol, Wis.:

I claim the arrangement of the spur wheels, E, F, and adjustable pinions, G, H, when constructed and operating, substantially as herein specified and shown.

I claim the combination and arrangement of the spur wheels, E, F, pinions, G, H, levers, I, J, and spring, h, i, operating substantially as and for the purpose shown and described.

I claim, in combination with the above the employment of the braces, i, g, as and for the purpose specified and described.

I claim the arrangement of the adjustable pinions, G, H, provided with the stops, b, c, with the shaft, K, provided with the projection, a, operating substantially as specified and shown.

I claim the combination of the slotted arm, r, slotted arc, s, support, p, and key, q, arranged and operating as specified and shown, in combination with said adjustable support, p, I claim the arrangement of the drum, m, and sliding bar, n, and reel, o, arranged and operating as specified.

54,375.—Enveloping Hemp or Flax, or Flax Waste with a Silver of longer Staple.—John Leinweber, Louisville, Ky.:

I claim the mode of enveloping the waste of hemp or flax in a silver of a longer staple, substantially as set forth.

The provision in, or attachment to, a hemp or flax carding machine of the flock feeding and distributing mechanism, I, J, K, L, substantially as described.

The flock feeder, capable of being partially rotated upon the shaft, H, for access to the delivering mechanism, in the manner explained.

54,376.—Annealing Box.—James E. Lewis, Sharpsburg, Pa.:

I claim constructing cast iron annealing boxes, as described, having the body of the box in a separate piece from the bottom and top, or cover, for the purpose of preventing its warping by the action of the annealing oven.

54,377.—Die for making T-head Bolts.—William J. Lewis, Pittsburg, Pa.:

I claim constructing the gripping dies of bolt-heading machines, with a double or single recess in the front, or that part farthest from the header, in addition to the one in which the header works, whereby the bolt head may be worked into proper shape by submitting it alternately to the action of both sides of the gripping dies.

I also claim the mode herein described for driving the pin off the bolt head, that is to say, first driving the rod to form the head and subsequently, compressing it laterally so as to throw the flash or pin, produced in slaving, in a line with the path of the header, so that on submitting the head to the action of the header a second time, the pin will be driven into the body of the bolt.

I also claim parting or separating the gripping dies on one side of a right line drawn longitudinally through the center of the header, so that the cylindrical hole, will be deeper in one die than the other, for the purpose of overlapping and driving off the pin produced on one side of the bolt by simply turning it on a half-way round to bring the opposite side into the deepest recess.

54,378.—Washing Machine.—Elijah A. Lucas, Bloomington, Ill.:

I claim communicating a rotary motion to the shaft, C, of a washing machine, from a vibrating segment, E, by means of a double rack bar, D, substantially as described.

Second, The combination of the pinion, d, on the shaft, C, the pinion, J, on frame, E, and the wheel or segment, F, with a bar, B, having teeth on two of its sides, in the construction of a washing machine, substantially as described.

54,379.—Jaw for Brooms and Gaff of Vessels.—Alfred Manning, Fair Haven, Conn.:

I claim the combination of the iron hinges, with the jaws, when each jaw is made in two parts, and the whole is constructed, arranged, and fitted for use, substantially as herein described and set forth.

54,380.—Stirrup.—Frank N. Martin, Cincinnati, Ohio:

First, I claim a stirrup composed of two distinct members, D, E, and D', hinged together at their upper portions, substantially as set forth.

Second, In this connection the rings or recessed portions, E, E', for the reception of pads, in the manner stated.

Third, the use of a spring clasp, Fig. 3, in the manner set forth.

54,381.—Gate.—Joseph Martin, New Oxford, Pa.:

First, I claim the arrangement of levers, J J', beneath the latch, h, which is used to hold the gate open, in combination with the pull ropes, S S', and overhanging beams, E F', substantially as described.

Second, The combination of levers, r' K', ropes, K r, beam, H, and pull ropes, S S', with the levers, J J', and latch, h, substantially as described.

54,382.—Solution to be applied to Cotton, Linen, and other Fabrics, to prevent them from burning.—John McGill, Boston, Mass.:

I claim the application of the aforesaid chemical to all combustible substances, materials, and fabrics, as in the above manner, and for the purpose set forth.

54,383.—Lock.—W. C. McGill, Cincinnati, Ohio:

I claim the plate, D, and springs, d, operating and constructed as and for the purpose heretofore described.

The plate, D, springs, d, and tube E, constructed and operating substantially as above described, and for the purpose set forth.

54,384.—Curtain Fixture.—Edward Mentz, Philadelphia, Pa.:

I claim the bracket, G', having in it the recess, P, and pulley, arranged substantially as described.

The centrally divided roller, B, secured upon the shade, A, by screws, c, in combination with the end pulleys, D D', substantially as described.

I claim operating a window shade by a cord, t, passing round pulley, D', on one side, over pulleys, m m, in the head, and down the other side round pulley, D, substantially as described.

54,385.—Window Blind.—Seth W. Merrill, Assabet, Mass.:

I claim the application of the connection bar, D, to the several slats at or near their ends, and so as to be capable of not only being moved up and down with them, but being turned over against the rear face of the contiguous side bar of the frame, in a manner, and so as to hold the slats open, as specified.

54,386.—Folding Table.—Frederick Mohr, Fond du Lac, Wis.:

I claim the leg, D D' C C', when constructed and operating, substantially in the manner and for the purposes set forth.

The combination and arrangement of the leaves, A A', center piece, R, and legs, D D' C C', substantially as and for the purposes set forth.

54,387.—Step Ladder.—Abner Moore, Jr., Hillsboro, Ohio:

I claim the slide, C, in combination with the arms, D, legs, B, and side pieces, A, substantially as specified.

[This invention consists in constructing a step ladder, with slots made in or through and parallel with the side pieces, into which are fitted slides, connected by strips or arms, to the legs of the ladder, and so arranged that when the legs are drawn from or pushed toward the ladder, the slide will work in the slot, whereby the legs can be drawn out from the steps, for a shorter or longer distance, as may be desired, and be braced without the use of hooks, or further manipulation than the mere act of drawing them out or pushing them toward the steps.]

54,388.—Egg Beater, Cake Cutter, and Nutmeg Grater.—Samuel C. Moore, Boston, Mass.:

I claim a case provided with a movable central shaft with radial spikes or pins, arranged spirally in the shaft forming an egg beater, substantially as described.

In combination with the egg beater above claimed, I claim the extension of the case at the lower end, forming a cake cutter, substantially as described.

And in combination with the egg beater and cake cutter described, I claim the nutmeg grater, arranged in the outer bottom, as described.

54,389.—Apparatus for Preparing Nitrous Oxide Gas.—Charles H. Moseley, Brooklyn, N. Y.:

I claim the combination of the portable box, A, with a set of nitrous oxide gas purifier jars, arranged and operating as herein before set forth.

I also claim in combination with the beak of the generating retort an elastic india-rubber or other non-conducting collar, K, for the purposes hereinbefore set forth.

I also claim the method of suspending the retort by means of an elastic tube attached to the end of the beak of the retort whereby I am enabled to dispense with the use of a retort stand, as hereinbefore set forth.

54,390.—Table Cover.—Albert L. Munson, New Haven, Conn.:

I claim a table cover made of nap-r, whether strengthened with cloth or not, ornamented substantially as described and for the purpose set forth.

54,391.—Broom Head.—G. R. Nebinger, Lewisberry, Pa.:

I claim a broom head consisting of the loop, C, constructed as shown and described, and used in combination with the handle, A, and cap, B, provided with the sleeve, b, all arranged and operating as herein set forth.

54,392.—Machine for Raking and Loading Hay.—Foster Nevergold and George Stackhouse, Pittsburg, Pa.:

We claim the arrangement of the pitman, y, rocking shaft, w, and sliding bearings, r r, in combination with the pin on, l, sliding rack, m, and pitman, p, operating so as to impart a compound motion to the raking rake, substantially as herein set forth.

54,393.—Animal Trap.—William H. Newby, Seymour, Ind.:

I claim the arrangement of the door, L, and spring, M, in combination with the tilting platform, B, the trap door, H, lever rod, C, and catch, q, constructed and operating in the manner and for the purpose herein specified.

54,394.—Oiler.—L. H. Olmstead, Stamford, Conn.:

First, I claim providing an oiler with an internal rod or tube, placed in line with the main discharge tube, and adapted to limit the movement of the flexible part of the can by coming directly in contact with the discharge tube in the manner and for the purpose herein specified.

Second, In combination with the internal tube, A, I claim a bearing or guide therefor, formed in and on the bottom of the can, substantially as described.

54,395.—Reed Musical Instrument.—Isaac T. Packard, Chicago, Ill.:

I claim an octave coupler for reed musical instruments, constructed with the levers, B and C, the fulcrums of which are at or near their rear ends, and their connection with each other is between their fulcrums, and the keys and tracker pins, upon which they operate.

Second, I claim the movable spring rail, H, when constructed and operating substantially as, and for the purpose herein set forth.

54,396.—Harvester.—Aaron Palmer, Brockport, N. Y.:

I claim, First, Forming a movable, self adjusting, single joint to connect the finger beam, by the medium of the shoe, E, to the hanger, G, without an intervening gate, by means of the grooves, g g, and pins, h h, or equivalent, when the said arrangement is used in combination with the pitman, M, passing through the eye of the grain side wheel, to operate the cutter, substantially as set forth.

Second, I also claim raising the finger bar from the ground, by the forward motion of the machine, by throwing the weight of said finger beam upon the periphery of the wheel, or upon an auxiliary rim of the same, by means of a connection, O, that connects it with any suitable mechanical arrangement for producing contact with the wheel or rim, substantially as described.

Third, I also claim a brake lever, P, and brake, p, in combination with a finger bar, B, and supporting wheel, A', in such a manner that the driver can raise the finger beam by merely bringing the rake in contact with the wheel, substantially as specified.

Fourth, Making the main frame, B, of a two wheeled harvester, tubular, to secure tightness and strength, and to allow the passage of the pitman, said frame being stationary or non-revolving and having the wheels turning on each end, substantially as described.

54,397.—Harvester Crank Motion.—Aaron Palmer, Brockport, N. Y.:

I claim retaining the box, H, upon the crank pin, l, by means of the

groove and flange, k l, arranged and operating substantially as described.

In combination with the box, H, and crank pin, l, I also claim the chamber, I, fitted with fibrous or other suitable packing, m, substantially as specified.

I also claim the revolving oil chamber, h, secured to the top of the balance wheel, in combination with the revolving shaft, A, and stationary box, c, substantially as and for the purpose herein set forth.

54,398.—Stamp Extractor.—Nathan Parish, Kalamazoo, Mich.:

I claim the arrangement of the lever, D, circular bar, E, ratchet, C, shaft, B, pawls, F F', and tackle, H, relatively to each other, and operating in the manner as described.

Second, I claim the movable bent, L, in combination with the lever, D, arranged and operating independently of the shaft, B, in the manner and for the purpose herein described.

54,399.—Pump.—John S. Patric, Victor, N. Y.:

I claim the cups, D E, one or both, in the formation of the piston head, constructed and arranged with the envelope, l, and operating substantially in the manner and for the purposes set forth.

54,400.—Cooking Stove.—Samuel Pierce, Cambridge, Mass.:

I claim, First, The combination of the flue, F, when placed over the fire box, A, with the said fire box, and with flues, E, by means of dampers, b, operating substantially as described, and for the purpose stated.

Second, The air flues, G, formed of the double oven plates, passing over and round the oven, and behind the fire box, enabling the current of air flowing in them to be intensely heated, so as to heat the interior oven plates behind the ash pit, and render equable the atmosphere of the oven, by discharging the hot air through holes, thus ventilating the oven.

Third, The combination of the air flues, G, with their holes, e, as just described, and with the oven, O, with holes, f, and flue, B, behind the fire box, having its holes at g, in the fire box, to make the hot blast, and effectually consume the gases, substantially as described.

Fourth, The holes, g k, at the back of the fire box, above and below the outlet thereof, arranged and combined with respect to the combustion chamber over the fire pot, substantially as and for the purpose described.

Fifth, Forming the bottom and back of the stove of double plates with an inner space, when the interior one of such doubled plates is pierced with holes, l, as drawn, for the purpose of having ashes drift through said holes and between the plates, to form a non-conducting back and bottom, substantially as described.

54,401.—Piano Seat.—Lewis Pastawka, and Anton Krasinski, Boston, Mass.:

We claim, First, The combination of seat, h, and its standards, n, with frame or stand, a, and wheel, p, all constructed as described, so that the seat may be raised or lowered, by screw or wheel, as specified.

Second, The whole piano seat constructed in the manner and for the purposes set forth.

54,402.—Peat Machine.—Nathaniel F. Potter, Providence, R. I.:

I claim, First, The use of one or more receiving and delivering pockets, F, in combination with a tempering mill, substantially as described, for the purposes specified.

Second, Combining with a mill for tempering peat or other material a scraper, G, operating in the manner described, for the purposes specified.

Third, Double set of driving gears, d d' e e', and the clutch, f, when the same are combined with the sweep of a tempering mill, substantially as described.

54,403.—Grain Separator.—T. J. Price, South Union, Ky.:

I claim the combination of the rockers, B B, with a fanning mill, as and for the purposes specified.

54,404.—Paper Collars, Etc.—George W. Ray, Springfield, Mass.:

I claim as a new article of manufacture, paper, embossed and enamelled whether before or after its conversion into articles of wearing apparel, all substantially as herein described.

54,405.—Machine for Bending Wood.—James N. Ray, Indianapolis, Ind.:

First, In a machine for bending wood, I claim the former, A, Figs. 1 and 2, when constructed as herein described, and operated as herein set forth.

Second, I claim the combination of the former, A, the strap, S, the nib, N, the clamp, C, and the wedge, W, whether the wedge be used as shown at W or at O, substantially as and for the purposes herein set forth.

54,406.—Harvester Rake.—Adam R. Reese, Phillipsburgh, N. J.:

I claim the combination in a two wheeled hinged joint of the vertical rake shaft, mounted upon the finger beam and driven from the main frame with the cam ring and rake arms, when arranged and operating as described, whereby I am enabled to locate the driver's seat outside of the path described by the rake arms, as set forth.

I also claim in combination of the finger beam and main frame with the tubular, x, shaped frame, G G', as described, for the purpose of supporting and bracing the rake shaft.

54,407.—Wind Mill.—Lewis Reese, Rolling Prairie, Ind.:

I claim the combination and arrangement of the lever M, cords, b c, weighted vessel, Q, and vessel, R, operating substantially as and for the purpose specified.

54,408.—Paper Shirts.—Helen M. Remington, Springfield, Mass.:

I claim, First, As a new article of manufacture, a paper shirt

Second, Forming the same materials composed of two thicknesses of paper, prepared by the insertion of the compounds described, or their equivalents, substantially in the manner and for the purpose described.

Third, In combination with the said shirt threads, a, etc., applied substantially as set forth.

Fourth, The hook, b, constructed and combined with the shirt, substantially in the manner and for the purpose set forth.

54,409.—Furnace.—George E. Reynolds, Philadelphia, Pa.:

I claim a detachable block, H, adapted to the fore plate of a furnace, substantially as and for the purpose herein set forth.

54,410.—Carriage.—Uel Reynolds, New York City:

I claim the pivot, i, and socket, K, applied substantially as specified, between the axle and head block, in combination with the brace, m, and pivot, o, substantially as and for the purposes specified.

54,411.—Elastic Chain.—Celins E. Richards, North Attleboro, Mass.:

I claim my improved elastic link (or chain, composed of a series of such links), the same having its parts, A B C, constructed, arranged, and applied together, and so connected as to operate when applied to a cable, substantially in manner as set forth.

54,412.—Method of Extracting Precious Metal from Ores.—Van Buren Ryerson, New York City:

I claim the process of decomposing the sulphurets found in admixture in the ores of gold and silver, by subjecting said ores in the pulverized or granulated state, to the action of superheated steam, so as to convert the sulphurets in sulphates and sulphites, substantially as and for the purpose described.

And I also claim, in combination with the said process for decomposing said ores, the process substantially as herein described, of amalgamating the particles of precious metals with mercury.

54,413.—Atmospheric Hammer.—John Robertson, New York City:

First, I claim, in combination with the cylinder hammer head and piston, applied and operating as herein before specified, the provision for raising and lowering the piston rod, and shortening or increasing its effective length while the hammer is in operation, substantially as herein set forth.

Second, I claim, in combination with the hammering apparatus, constructed as described, a variable crank, substantially as shown.

54,414.—Apparatus for Refining Petroleum.—William H. Sangster, Buffalo, N. Y.:

First, I claim the partition, A, or its equivalent, when constructed as and for the purpose herein substantially described and set forth.

Second, In combination therewith, the plate B, or the equivalent thereof, as and for the purpose described.

54,415.—Grate Bar.—Horace B. Scofield, New York City:

I claim a grate bar for furnaces, formed with a straight upper sur-

face, and a rib on its under side, corrugated in the manner and for the purposes specified.

54,416.—Frame for Printing Photographic Pictures.—T. E. Sexton, Wilmington, Del.:

I claim a strip, F, applied to and rendered adjustable in a photograph frame, substantially as and for the purpose herein set forth.

54,417.—Filter for Well Tube.—William A. Sharpe, Syracuse, N. Y.:

First, I claim the rings, A A, having the parts, e e, attached for the purpose described.

Second, The combination of the rings, A A, and frame work, B B C D, substantially as described.

54,418.—Apparatus for Raising Water by Waves.—A. N. Shattuck, San Francisco, Cal.:

I claim the buoy pump made to act by the agitation of the water, substantially as above described, consisting of a floating vessel, A, its tube, B, combined with a fixed tube, C, both tubes being provided with check valves, and the floating vessel, A, being guided in any suitable frame, as above set forth.

54,419.—Hoisting Apparatus.—Henry F. Shaw, West Roxbury, Mass.:

First, I claim the general combination and arrangement of the differential pulleys and chains, substantially as described, and for the purpose set forth.

Second, The latch, I, or its mechanical equivalent, working as described, and for the purpose set forth.

Third, The holding pin or lock, H, or its mechanical equivalent, in combination with the driving pulleys, R and S, substantially as described and for the purpose set forth.

54,420.—Pump.—John W. Sheaffer, Sterling, Ill.:

I claim the valve boxes, L and J, provided with the hook, N, and ball, O, when constructed and operating substantially as and for the purposes set forth.

54,421.—Harrow and Cultivator Combined.—A. S. Sheffer, West Donegal Township, Pa.:

I claim the specific combination of the adjustable handles, F, on the side pieces, A, also made adjustable at the apex, by bolts, H I, and central jaw piece only, together with the arrangement of the curved flat and narrow shares or spikes, s, inverted and operated in the manner shown, and for the purpose specified.

54,422.—Fruit Basket.—P. R. Shelton, Prattsburg, N. Y. Antedated April 21, 1866:

I claim a fruit basket, made substantially as herein described.

54,423.—Steam Engine Governor.—David Shire, Philadelphia, Pa.:

I claim suspending the balls, A A, by rigid arms, h h, connected to the spindle, B, by means of j, into consisting of the cylinders, f f, and the mandrels, g g, or their equivalents, arranged in relation to the said spindle, arms, and bolts, substantially as described and represented.

54,424.—Fluid Regulator.—Warren A. Simonds, Boston, Mass.:

First, I claim the combination of the cone, f, and rod, g, as and for the purpose described.

Second, The arrangement of the bevel gear, o and p, with the shaft, i, and valve stem, substantially as described, and for the purposes stated.

Third, The arrangement of the guide finger, r, with the slotted valve stem to prevent rotation of the valve or stem.

54,425.—Land Roller.—Albert S. Skiff, Trenton Falls, N. Y.:

I claim the construction of a land roller in sections, one section in advance of the other, and the frame in sections, connected by pivot joints, and so arranged as that the bearings of the inner ends of the rollers are supported by the opposite frame, thereby allowing the ends of the rollers to lap, as and for the purposes described.

Second, The use of the pivoted journal box, in combination with the frame and roller journal, as and for the purposes set forth.

54,426.—Composition for Painting Metallic Roofs.—C. D. Smith, Chicago, Ill.:

I claim as a new article of manufacture, a composition made of petroleum oil, coal tar, asphaltum, gum shellac, india-rubber, and benzine, prepared in the proportions and manner as above described and for the purposes specified.

54,427.—Cooking Range.—Mrs. O. Smith, Chicago, Ill.:

I claim the combination of the fire boxes, U T, with the ovens, R Q S 13 13, when the latter are arranged in relation to the former, and to each other, as shown and described.

54,428.—Revolving Condenser.—James F. Spence, Williamsburgh, N. Y.:

First, I claim a revolving condenser, constructed and applied in combination with a steam cylinder, substantially in the manner herein described, for the purpose specified.

54,429.—Process for Tempering Steel.—Ariel B. Sprout, Hughesville, Pa.:

I claim the use of a saponaceous or alkaline liquor, covered with a coat of oil, and heated to about the boiling point, and regulated and graduated in its strength to suit the different kind and quality of steel, article, or thing, to be tempered, substantially as herein described and set forth.

54,430.—Horse Rake Teeth.—A. B. Sprout, Hughesville, Pa.:

I claim constructing of steel or iron, a curved tooth for horse rakes, said tooth being a spring within itself, and tapering from the line, B, to the line, C, from the line, B, to the line, A, substantially as herein described and for the purpose set forth.

54,431.—Horse Hay Forks.—Ariel B. Sprout, Hughesville, Pa.:

I claim constructing and arranging the bars, A and B, in such manner that they may be used, either for elevating hay, or as hay shears, substantially as herein described.

54,432.—Head Blocks to Saw Mills.—J. M. and S. F. Stanton, Manchester, N. H.:

First, We claim the operating of the uprights or knee pieces, C, through the medium of pinions, D, gearing into racks, b, at the under side of the knee pieces and into the racks, c, of the blocks, B, substantially as and for the purpose specified.

I claim the arrangement of the sectional shaft, E, clutches, F, lever, G, rod, d, constructed and operating in the manner and for the purposes herein described.

The combination of the lever, Q, notched guide, R, pawl, P, pinion, D, rack, b, and rack, c, all arranged in the manner and for the purpose herein specified.

54,433.—Horse Power.—Nicholas Starr, Jr., Homer, N. Y.:

First, I claim the arrangement in the large reel, of placing the spokes in pairs, and connecting them by cross pieces which shall extend beyond the spokes, as and for the purposes described.

Second, I claim the weighted lever, l, in combination with the pulley, m.

Third, I claim the adjustable cap piece, f, in combination with the pulley, m, and lever, b, substantially as described.

Fourth, I claim the combination of the wheel, G, cone R, and reels, p p, when the same are arranged and operated substantially as above described.

54,434.—Curtain Fixture.—J. Stephens and W. B. Fay, Chicopee Falls, Mass.:

We claim as a new manufacture the spool, a, having a beveled periphery, b, in combination with the grooved lever pawl, c, substantially as herein described and set forth.

54,435.—Hay Fork.—Joshua B. Stewart, South Paris, Maine:

I claim a hay fork having a spring balance or weighing attachment applied to it in the manner, substantially as and for the purpose herein set forth.

[This invention consists in the application of a spring to a hay fork, in such a manner that it will serve as a balance or scale to indicate the weight of the hay taken up on the fork, so that a person, in loading a wagon or cart, or in pitching a given quantity of hay from one spot to another, may ascertain the weight thereof. The invention is more especially designed for farmers and others, who fre-

quently dispose of small quantities of hay—"jags"—and who are present simply guess at the weight, when hay scales are not convenient.]

54,436.—Portable Deflector for Car Windows.—J. C. Stoddard, Worcester, Mass.:

First, I claim a portable air and dust deflector, constructed and operating as set forth.
Second, The combination with the body of the deflector, of a hook at the top, and spring at the bottom, for retaining the same in place, substantially as set forth.
Third, The combination of the piece, F, and elastic spring, G, with the metal back, E, flanges, C, C, and loop, J, substantially as shown and described.

54,437.—Cheese Box.—Conrad Stoll, Mokena, Ill.:

First, I claim the combination of the circular revolving support, M, with a cheese box, substantially as herein described, and for the purpose set forth.
Second, A cheese box, constructed and arranged substantially as herein described, and for the purpose set forth.

[The object of this invention is to furnish a cheese box by means of which the cheese may be kept free from dust or insects, and by means of which any desired part of the cheese may be turned to the front or open part of the box, for convenience in cutting. And it consists in pivoting to the stationary bottom of the cheese box a circular revolving support or platform, upon which the cheese is placed. The front, top, and sides are so constructed as to be opened sufficiently for cutting the cheese, and the sides of the box are formed of alternate panels of glass and fine wire gauze, to admit the air and light, and yet exclude all insects, dusts, etc.]

54,438.—Submarine Explorer.—William Mont Storm, New York City:

First, I claim the hinged or "toggle" bolts with their clenching jaws and binding nuts, all combined and operating substantially as described for fastening in place the scuttle, O, and trap, Q.

Second, I claim the application of the three pressure gages, J, K, L, prepared and applied in the manner and for the purpose described.

Third, I claim the lookouts, F, constructed substantially as described, and combined with a water-tight lens, f, as described.

Fourth, I claim making the ballast ring of my explorer compound, to wit: of a permanently fixed portion, E, combined with a series of removable portions or sections, E', in the manner and for the purpose set forth.

Fifth, I claim the air purifying lining, R, R', to the working chamber of my explorer, constructed and operating substantially as described.

Sixth, I claim the combination of the annular sprinkler, h, cock, g', and pipe, i, operating together as described for the purpose described.

Seventh, I claim the application in conjunction with the lookouts, F, or their equivalent, of the deflectors, V, in the manner and for the purpose described.

Eighth, I claim in combination with my purifier, the water space at its bottom and the cock, S, constructed and operating in the manner and for the purpose described.

54,439.—Adjustable Cut-off and Horse-power Indicator.—Albert Stuckenrath, New York City:

First, I claim the right and left-hand screws, g, g', rod, h, index, j, and dial, K, in combination with the cut-off valves, E, E', and main valve, C, constructed and operating substantially as and for the purpose described.

Second, The dogs, l, levers, m, and arms, O, in combination with the cut-off valves, E, E', and main valve, C, constructed and operating substantially as and for the purpose set forth.

54,440.—Machine for Bending Tubes.—James Swevey, St. Louis, Mo.:

First, I claim the combination of the beam, A, having a mortise, a, in it, with the screw, f, when constructed as and for the purpose set forth.

Second, I claim the sheaves, d, d, in combination with the chain, g, or its equivalent, and the screw, f.

54,441.—Planing Machine.—Sylvanus J. Talbot, Milford, N. H.:

I claim the sliding frame, P', swinging frame, P', and connecting bar, R', constructed as described in combination with each other, and with a board matching machine, substantially as and for the purpose set forth.

54,442.—Magnesium Lamp.—Robert H. Thurston, Providence, R. I.:

First, I claim the use of the feed roller, B, as a surface on which to burn a strip of wire of magnesium, substantially as described.

Second, The combination of the stationary scraper, K, with the roller, B, substantially as described and for the purposes specified.

54,443.—Spring Bed Bottom.—Lynan S. Tingley, Pawtucket, R. I.:

I claim connecting the tops of the several springs of a spring bed bottom, by a cord going loosely through eye bolts in the inside faces of the frame, A, substantially as described.

I also claim adjusting the springs of a bed bottom so as to prevent unevenness when there is a disparity in the weight of its occupants, substantially as described.

I also claim the heart plates, K, in combination with the inside slotted bars, J, on each end of the frame, substantially as and for the purpose described.

[The object of this invention is to improve spring bed bottoms, and the invention consists in several particulars, one of which is making it capable of being folded, for convenience of carriage and storage along the middle of its length; another is adjusting the springs to a greater or less tension on either side, or half of the bed independent of the other side, so as to keep both sides at about the same elevation notwithstanding any difference in the weight of the occupants; another is connecting the tops of the springs by a system of cording to keep them vertical: another is taking the strain, when the bed is occupied, off the hinges, by means of heart plates, interposed between two of the bars, that serve to adjust the tension of the springs.]

54,444.—Flour Barrel.—William H. Towers, New York City:

I claim a flour barrel provided with a sieve agitator and sliding cover, arranged and operating substantially in the manner and for the purpose above set forth.

54,445.—Shuttle and Bobbin for Looms.—Clemens Unverzagt, Richmond, Ind. Antedated April 30, 1866:

First, I claim a shuttle with a projection or rib upon one side, substantially as and for the purpose set forth.

Second, The lever spring, c, in combination with the beveled or conical head of the bobbin, B, when attached to a shuttle, in the manner and for the purpose described.

Third, The bobbin, B, provided with a conical head, c, substantially as and for the purpose described.

Fourth, The combination of the shuttle, A, projection, D, spring, E, and bobbin, B, all substantially as and for the purposes set forth and described.

54,446.—Straw Cutting Knife.—Grey Uttley, Petersburg, Va.:

I claim the construction of the blade of the knife, having the angular and vertical grooves on its face, to form the diagonal shaped teeth, as herein described and for the purposes set forth.

54,447.—Base Burning Stoves.—Jasper Van Wormer and Michael McGahey, Albany, N. Y.:

First, We claim an adjustable feeder, whereby the supply of coal may be increased or diminished, by raising or lowering the mouth of the feeder from or toward the grate of a stove, substantially as described and for the purpose set forth.

Second, The combination of an open flue extending entirely around the fire pot, and the outer shell of the stove with a magazine or feeder, as described and for the purposes set forth.

54,448.—Horse Rake.—Joshua A. Varney, Alton, N. H.:

First, I claim the shaft, I, provided with bars, K, K, and shafts J, J, in combination with the lever, F, F, arranged and applied substantially as

shown and described, for raising the rake teeth so that they may discharge their load.

Second, The rollers, d, in the lower ends of the rake teeth, E, substantially as and for the purpose specified.

Third, The combination of the bars, D, with the teeth, E, attached, and fitted on the rod, c, the shafts, I, J, J, bars, K, K, and levers, F, F, all arranged on a mounted frame, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved means for elevating the rake teeth, so that they may discharge their load, and also in a novel arrangement of the rake teeth, and in the application of rollers to the lower ends of the same, whereby it is believed that a superior horse rake is obtained, one which may be manipulated with the greatest facility, possess no parts liable to get out of repair, and which will not scratch up the earth and render the hay dusty, as is now the case, especially with the wire tooth rake.]

54,449.—Device for elevating straw from Thrashing Machines.—Gerret Vedder, Battle Creek, Mich.:

First, I claim the means substantially as herein described and shown, for elevating the straw carrier or stacker of thrashing machines.

Second, The combination of the spur wheels, f, f', and ratchet wheels, g, g', with the adjustable spur wheel, K, and the winding drums, d, d', separated and independently arranged and operating in conjunction with an adjustable straw stacker, substantially as described.

54,450.—Cards for Carding Machines.—Enoch Waite, Franklin City, Mass.:

I claim the improved manufacture of wool cards as made with its body or teeth, supporting part composed of layers of paper and cloth arranged and cemented together, substantially as specified.

54,451.—Corn Planter.—Elias M. Walker, Gallatin, Mo.:

I claim the peculiar manner in which corn planters are constructed as described in these drawings and specifications.

Second, The manner in which the plow-stock, corn-box and slide are combined, as described in the drawings and specifications.

Third, The manner in which the treadles are applied, combining the device of dropping by the foot or by the action of the wheels.

54,452.—Machine for Making Horse Shoes.—Washington Wallick, Philadelphia, Pa.:

First, I claim the combination of the lever, G, G', H, and the bending and cutting die, m, constructed and operating as described.

Second, The jaws, F, and P', and the former, O, for compressing the sides of the shoe, constructed and operating as described.

Third, The creaser and presser, R, in combination with the die, m, the jaws, F, and P', and the former, O.

Fourth, The mechanism for discharging the shoe, consisting of the lever, G, G', H, the pieces, S, S' and t, and the reacting spring arranged and operating as described.

54,453.—Gang Plow.—W. M. Watson, Tonica, Ill.:

I claim the combination in a gang plow of the hinged braces and bolts, e, e, e, e, or their equivalents, and side seat and support, n, m, K, all arranged substantially as and for the purpose set forth.

54,454.—Rock Drill.—Charles Hunter Webb, San Francisco, Cal.:

I claim the arrangement at an angle of 45 deg. of each end of the back of the cutters or dies, together with the arms or guides thereof, at the same angle of 45 deg. of each edge of the wedge by which the cutters or dies are driven at its points of contact with the cutters or dies, and also at the same angle of 45 deg. of the various slots in which the cutters or dies are made to traverse in their propulsion by the blow toward the rock and their recoil therefrom, each separately and the whole collectively for the purpose described, namely the effective delivery of the blow with the least amount of friction.

54,455.—Machine for Finishing the Ends of Pen Handle Tubes.—Samuel Wesson, Worcester, Mass.:

I claim the combination and arrangement of the external and internal holders, A, B, and the cutter, F, the latter and the internal holder being movable and provided with mechanism for operating them, substantially as described.

54,456.—Centrifugal Machine for Draining and Cleansing Sugar.—Charles O. West and John Carey, Martinsville, Ohio:

First, We claim making the screen of a centrifugal sugar mill, in the form of a frustum of a hollow cone for the purpose described.

Second, The distributing head, in combination with the screen of a centrifugal sugar mill.

Third, The adjustable hopper in combination with the screen of a centrifugal sugar mill.

Fourth, The induction pipe, K, in combination with a centrifugal sugar mill for cleansing the sugar by steam.

54,457.—Cross Head.—John West, Bethlehem, Pa.:

I claim the within described cross head consisting of the portion a, to which the piston rod is secured, the side pieces, b and b', transverse pieces, c and c', the pin, d, the sliding blocks, B and B', and screw studs, D, D, the whole being arranged as and for the purpose herein set forth.

54,458.—Washing Machine.—Abel C. Whittier, Lawrence, Mass.:

I claim the combination of the slotted arm, e, spur, H, slot in lever, I, levers, M, rods, N, and spring, o, for the purpose herein set forth and described.

54,459.—Fence.—Eli York, Windsor, Ill.:

I claim the manner herein described of constructing fences, whereby a strong and durable fence may be put up, without any essential preparation of the timber composing the fence, substantially as specified.

[The object of this invention is to construct a fence of such material as is usually found lying around when clearing off timber land, without the necessity of any carpentering or preparation of the material, and at the same time provide a strong and very durable fence.]

54,460.—Brick Press.—William Baker and Gaylord Martin, Schenectady, N. Y. assignors to Empire State Machine Company:

First, We claim providing a press box which is attached to a pug mill with a yielding gate, b, which will operate to relieve the press from obstructions, substantially as described.

Second, Constructing the bottom of the press bore of grate bars, g, of a loze ge shape, or of such shape that they will direct the clay, or other substance under pressure in said bore, toward the ends of the mold boxes, substantially as described.

54,461.—Manufacture of Varnish.—Edwin Battley (assignor to himself and James Crane), Mount Clare, N. J. Antedated April 16, 1866:

I claim a varnish compound in which creosote or carbolic acid is used as the solvent of the gum, such as rosin, substantially as set forth.

Also the composition of a rosin dissolved in carbolic acid with lamp black, substantially in and for the purpose specified.

54,462.—Waterproofing Cork and other Materials.—David E. Breinig (assignor to himself and A. C. Crondal), New York City:

I claim the use of metallic gum, such as herein described for treating cork, leather or other fabrics, in the manner and for the purpose substantially as set forth.

Also forming the metallic gum on the fabric by first dipping it in the alkaline solution, and afterward in the solution of the proper metallic salt as described.

54,463.—Picture Frame Clamp.—John A. H. Dunne, Boston, Mass., assignor to James E. Rogers, Chelsea, Mass.:

I claim the combination of the adjustable cross or bars, B, C, the sliders, the rope and the windlass, the whole being arranged and applied together, and to a table substantially as and so as to operate as and for the purposes specified.

54,464.—Brush.—Lemuel P. Faught, Foxboro, Mass., assignor to himself and William T. Cook, Boston, Mass.:

I claim the hollow metallic cone or thimble, D, substantially as and for the purpose set forth.

54,465.—Bobbin for Spinning, Etc.—Levi Ferguson, Lowell, Mass., assignor to himself and D. M. Weston, Boston, Mass.:

I claim the arrangement of the slit or slits entirely in the shank or body, and above the head of the bobbin, substantially as described.

54,466.—Harvester.—B. G. Fitzhugh (assignor to himself, John M. Griffiths and James Brewster), Baltimore, Md.:

I claim so combining locking arms with the wheels of a harvesting machine and with appliances substantially such as herein described, so that while the driver or conductor is in his seat stand or position, the locking arms shall be held out of action, and when he is thrown from or leaves his seat, stand or position, said locking arms shall be immediately thrown into action, as and for the purpose herein described.

54,467.—Hoisting Apparatus.—Samuel C. Goodsell and Dennis Frisbie (assignors to themselves H. D. Bigelow and David P. Calhoun), New Haven, Conn.:

We claim the combination the trip, T, with the two pawls, I and L, when constructed and arranged to operate so that the two said pawls act to hoist or lower, substantially as and for the purpose specified.

54,468.—Machinery for Making Eyelets.—Edwin E. Marsh (assignor to American Eyelet Company), Providence, R. I.:

First, I claim the use of a plunger, I, having a roughened surface as described in combination with the die in which the eyelet is formed, for the purposes specified.

Second, The use of a plunger capable of lateral contraction and expansion in combination with the die within which the eyelet is formed substantially as described for the purpose specified.

54,469.—Combined Steam and Water Motor.—Frank Millward (assignor to himself and Thomas H. Foulds), Cincinnati, Ohio:

First, I claim a reaction water wheel or turbine whose receding end is provided with a nozzle for the discharge into said wheel of steam, substantially as and for the purpose set forth.

Second, In the described combination with the reaction wheel or turbine, A, B, I claim the injector, D, C, substantially as set forth and for the purpose specified.

Third, I claim the tank, B, and supply pipe, C, C, in the described combination with the injector, D, C, and wheel, A, B, as set forth and for the purpose specified.

54,470.—Cupola Furnace.—Charles Truesdale (assignor to himself and Wm. Resor & Co.), Cincinnati, Ohio:

First, I claim the provision in a cupola or melting furnace of one or more vertical series of tweers with graduated or decreasing v-n-tages toward upper portion of the series, substantially as set forth.

Second, The arrangement of one or more vertical series of tweers which project beyond the common or general lining wall, and are protected by vertical pliers, substantially as set forth.

54,471.—Wrench.—C. C. Webb (assignor to himself, and Warren M. Smith), Springfield, Mass.:

I claim the combination of the jaw, B, bar, A, screw rod, E, E', handle, c, and nut, b, and head, F, substantially as specified.

54,472.—Blackening Brush.—Nathaniel G. Whitmore (assignor to himself and Edward L. Day), Mansfield, Mass.:

I claim a blackening brush, A, provided with a sliding drawer, a, substantially as and for the purposes set forth.

54,473.—Mop.—Moses H. Wiley (assignor to himself C. J. Cob and J. Ames), Bucksport, Maine:

I claim the arrangement and application of the mop and the two levers and one or more squeeze rollers, the whole being applied together so as to operate substantially as specified.

I also claim the arrangement of the mop, and the two levers as described.

54,474.—Rudder.—J. McGrigor Croft, London, Eng.:

I claim the application or form of diagonal curved or oblique blades to rudders, substantially in the manner and for the purposes above described.

54,475.—Refrigerator.—Charles Flack, Middlesex County, England:

First, I claim the combination as well as the arrangement of the cooling chamber, a, the chamber, c, for holding ice, the waste water receptacle, e, and the pipe or conduit, f, connecting the chambers, c and e, as set forth.

Second, I also claim the combination as well as the arrangement of the vessel, d (for holding water or a liquid), and its eduction pipe, d', with the ice chamber, C, and the cooling chamber, a, as explained.

Third, I also claim the combination as well as the arrangement of the vessel, d (for holding water or a liquid), and its eduction pipe d', with the ice chamber, c, and the cooling chamber, a, and the waste water chamber, e, the whole whole being substantially as set forth and represented.

54,476.—Machine for making Fillers for Cigars.—G. Albert Reiniger, Stuttgart, Kingdom of Wurtemberg:

First, I claim placing the journal boxes of the driving shaft above the endless aprons, E, F, instead of below as heretofore, substantially as and for the purpose specified.

Second, The vertical shaft, a', with arms, e', f', h, in combination with the cam, b', and the driving shaft and with the rock shaft, e', and the jaws of the receiving apparatus constructed and operating substantially as and for the purpose set forth.

Third, The lantern, p, in combination with the eccentric, h, on the driving shaft and with the receiving apparatus, K, and endless aprons, E, F, constructed and operating substantially as and for the purpose described.

Fourth, The gear wheels, s, t, v, and cogs, w, in the side of the rack, H, in combination with the lantern, p, and receiving apparatus, K, constructed and operating substantially as and for the purpose set forth.

Fifth, The gate, r, in combination with the endless aprons, E, F, knife, g, and receiving apparatus, K, constructed and operating substantially as and for the purpose specified.

54,477.—Composition for Fuel.—Francis Stoker, Lyons, France:

I claim the exclusive use, First, of the combustible substance or fuel, to whatever purpose it may be applied.

Second, Of the foot warmer, smoothing iron, stir-up apparatus and soldering iron, the whole substantially as herein before described, and illustrated on the accompanying drawings.

54,478.—Switch for Replacing Cars upon Tracks.—Nathan Pullman, New Oregon, Iowa:

First, I claim the shoes, E, attached to the cross bar, F, in combination with the beveled rails, C, on the movable rails, B, all arranged to operate as shown and described.

Second, In combination with the rails, B, I claim the chair, H, and the supplementary rails, D, arranged to operate as and for the purpose as set forth.

EXTENSIONS.

8,624.—Construction of Bridges.—Wendal Bollman, Baltimore, Md. Patented Jan. 6, 1852.:

I claim the combination of the tension rods, e, connecting the foot of each strut with each end of the stretcher, substantially as described, by which an independent support is given to the strut carried back directly to the abutment, while at the same time no lateral force or strain is brought upon the abutment, as herein fully set forth.

8,654.—Ornamental Connection of the Parts of an Iron Fence.—Henry Jenkins, Brooklyn, N. Y. Patented Jan. 13, 1852. Reissue No. 807. Dated Sept. 6, 1859:

I claim forming the ornament or cast iron connections for a railing fence, or other article of iron cast into a divided iron mould, substantially as and for the purposes specified.

8,659.—Buckwheat Fan.—Alfred Platt, Waterbury, Conn. Patented Jan. 13, 1852.:

I claim the method of separating the hulls from the kernels of buck-

wheat, by shaking them on a table or tables, made slightly concave or rough, substantially as specified, in combination with a current or currents of air blown over the surface of such table or tables, to carry off the hulls, whilst the kernels are retained or held back by the form of the surface of the table or tables, as specified.

8,683.—Ring Spinner.—Martha A. Dodge, Bedford, Mass., Administratrix of the Estate of Geo. H. Dodge, deceased. Patented Jan. 27, 1852.

I claim the combination of the standard or projection, B, with the ring and traveler, substantially in the manner and for the purpose of removing or loosening waste from the latter, as specified.

8,720.—Harvester.—B. Densmore, New York City. Patented Feb. 10, 1852. Reissued Jan. 28, 1862.

I claim, First, Hanging the driving wheel in a supplementary frame or its equivalent, which is hinged at one end to the main frame, while its opposite end may be adjusted and secured at various heights, or be left free, as desired, whereby the cutting apparatus may be held at any desired height for reaping, or be left free to accommodate itself to the undulations of the ground, for mowing, substantially as described.

Second, The employment, in a harvesting machine, of a wheel, provided with a crank and lever, for the purpose of raising and lowering the outer end of the finger-bar, to cut high or low, substantially as described.

8,724.—Grass Harvester.—Louisa R. Ketchum, Buffalo, N. Y., Administratrix of Estate of Wm. F. Ketchum, deceased. Buffalo, N. Y. Patented Feb. 10, 1852. Reissued Feb. 28, 1854. Re-reissued Jan. 2, 1857.

I claim, First, Extending the shoe, H, G, from the heel of the rack or finger bar upward and forward, and firmly connecting its continuation with the draught when the finger bar is located, as set forth, so that the power by which the machine is drawn, shall, through the shoe, be communicated to and draw forward, the heel of the rack or finger bar thus relieving the great strain which would otherwise come upon the lateral connections of the rack or finger bar with the wheel-frame, while the heel is enabled to slide over obstructions, substantially as shown.

Second, When the main wheel and inner end of the finger bar or rack, D, are located, relatively as described, I claim continuing the shoe, H, G, from the heel of the rack or finger bar upward and forward, until the upper end of its extension reaches a part of the machine which always runs above the mown grass, and which will keep the said grass down and prevent its rising over the point of the extended shoe, thus aiding the shoe to ride over the mown grass, even when accumulated before it, substantially as shown.

Third, Supporting the heel of the rack or finger bar sufficiently near the ground, and at a convenient distance laterally from the main wheel by arms extending upwards and forwards, and upwards and backwards therefrom, and connected with the frame or strong bars firmly bolted across the frame in front and rear of the said rack or finger bar, while the said frame and bars are elevated to pass over the cut grass, and the above parts are arranged, substantially as shown.

Fourth, Supporting the rack or finger bar at the side of and lower than the main frame by means of auxiliary framing in a fixed position at the side thereof, and extending downwards and forward, so that while the finger bar is held as near the ground as desired, and lower than the main frame, the main frame may be nearly horizontal, in the line of draught and at any convenient height, to avoid clogging or accommodate the diameter of the main wheel, as shown; such an auxiliary frame as a whole is shown in the drawings, composed of the bar, c, rods, E E I, and rack or finger bar, D; but its details may of course be varied, while the principle of my invention is retained.

Fifth, Supporting the rack or finger bar, D, in its position at the side of and lower than the main frame, by extending a strong bar, c, behind said rack or finger bar, firmly supported by said frame, and rigidly connecting said rack or finger bar to said bar, c, by a straight brace or braces, E E I, said frame being elevated, and said bar being elevated, and placed sufficiently in rear of said rack or finger bar, to avoid clogging, or lodging of the mown or falling grass against either, when said parts are arranged in relation to each other, substantially as shown.

Sixth, Supporting the outer end of the rack or finger bar by a rod extending downwards and forwards from the cross bar, c, to the finger bar, parallel or nearly so, to the face of the main wheel, when the frame and bar, c, are elevated above the rack or finger bar, in the manner and for the purposes contemplated in the last claim, to avoid the falling or clogging of the cut grass against such rod, as set forth.

8,769.—Drying Grain.—Henry G. Bulkley, Kalamazoo, Mich. Patented March 2, 1852. Reissued June 27, 1854.

I claim the method of seasoning or kiln-drying substances, by using steam in a vessel, which has an opening communicating with the atmosphere to limit the pressure for the purpose of transmitting calorific to the substances to be seasoned or kiln dried, or the vessel or vessels containing them, substantially as specified.

8,756.—Manufacture of Zinc White.—Martha M. Jones, Staten Island, N. Y., Administratrix of Estate of Samuel T. Jones, deceased. Patented Feb. 24, 1852.

I claim the use of a porous or fibrous bag or receiving chamber, with porous sides or bottom, or an air-tight chamber with a straining or porous bag adapted to the inside thereof, and used in connection either with a blowing or exhausting apparatus, so that the products of the distillation and oxygenation of zinc or other volatile metals may be separated from the accompanying air and gases, which latter will be forced, or otherwise drawn through the pores of the cloth bag or chamber, and escape into the atmosphere.

8,778.—Machines for Printing Floor Cloth.—Simeon Savage, Pomfret, N. Y. Patented March 2, 1852.

I claim the arrangement of the printing mechanism, the stamping down mechanism, and the mechanism for advancing the piece or strip of cloth, or of material to be printed or pressed, or stamped, such arrangement being as exhibited in the drawings, and as above described.

And I also claim the combination of the lip, bar or plate, y, the series of bent levers, a, a, etc., the slide bar, R or S, and the bar, c, as made and operated, substantially in manner and for the purpose of seizing the selvage edge of the cloth, and moving the piece, as described.

And I also claim the combination of mechanism for operating the closing carriage, or imparting to it its back and forth movements and necessary intervals of rest, the said combination consisting of the rotary shaft, O, with its circular disks, Q, R, and their projections, I, k, the four hook bars, L, P, together with the vibrating bars, n, o, as applied together, and operated substantially as specified.

8,789.—Canal Lock Gate.—Charles Neer, Brooklyn, E. D., N. Y. Patented March 9, 1852.

I claim, First, The opening of the lower gates of a canal or river lock, outwards or down stream, in combination with the means described, or their equivalent for operating them, for the double purpose of saving length in the lock chamber with the same walls, and for allowing the gates to be opened before the chamber is entirely empty, so that the escaping water may carry out with it the boat, raft, or other thing being passed through, with the least possible delay.

Second, I claim the standing gate at the head of the lock which forms with the breast wall of the lock, with the top of which it is level, a recess, or a chamber, through which the lock chamber may be filled, at any desired height above the bottom of the lock, and thus save length of lock wall.

Third, I claim, in combination with the stationary gate, the sinking head gate, extending across the lock, and reaching down a little below the top of the stationary gate when the gate is shut, and which sinks or slides into the recess formed in part by said stationary gate, and is on a level therewith when open, for passing boats, etc., for the purpose of saving in the length of the lock chamber, an amount nearly equal to the width of the gate.

Fourth, I claim the so placing of an adjustable batten or water strip on the bottom of a lock as that it may be operated upon by the pressure of the water within the lock chamber, and be forced up against the gate when prevented from being closed tight, by an intervening substance, substantially in the manner herein set forth and described.

8,810.—Pattern Card for Jacquard Looms.—Samuel F. Thomas, Laconia, N. H., and Eliza A. Adams, Townsend, Mass., Administratrix of Estate of Edward Everett, deceased. Patented March 16, 1852.

We claim the combination of the buttons with the metallic card, as described, the buttons being so riveted or attached to the card as to allow of their being turned for the purpose of closing or opening the holes, to which they are respectively attached.

8,848.—Smoothing Iron.—Nicholas Tallafiero, Augusta and William D. Cummings, Marysville, Ky. Patented March 30, 1852.

We claim the application (substantially as described) to a self heating smoothing iron, of a tube or chamber, J, at the bottom of the fire box, provided with a registered mouth or inlet, I, some distance above the bottom, and at its lower portion with distributing apertures, K, communicating with the fire, whereby the draft is applied from beneath and equally at every part, and placed under the control of the operator, without permitting the escape of ashes, or other refuse of combustion.

8,828.—Cracker Machine.—John McCollum, New York City. Patented March 23, 1852. Reissued May 31, 1859.

I claim the combination of adjustable springs with a cracker cutter and its resisting surface or bed, substantially as herein before described and substantially for the purposes herein before set forth.

8,832.—Air-Heating Stove.—J. M. Thatcher, New York City. Patented March 23, 1852. Reissued Sept. 11, 1855.

I claim making the bottom plates of the flue spaces of air-heating furnaces or stoves, for the passage of the products of combustion outward or inward, among or around the air passages, inclining inwards and downwards toward the fire chamber, substantially as described, for the purpose of facilitating the increase of the heating surface, without the inconvenience of the accumulation of ashes, soot, and other solid matter, in such plates, as set forth.

And I also claim the combination of the inverted domes or frustums, F I M, and plate, P, with the short tubes, b b f f i i l l, connecting them, substantially in the manner herein described, for the purpose of effecting the connection between the lower ends of the fire or draft flues, and carrying the air through them to the spaces between the cylinders or tubes.

8,861.—Smut Mill and Grain Separator.—Daniel Shaw, Elkhart, Ind. Patented April 6, 1852. Reissued Nov. 3, 1863.

I claim the offset, that is to say enlarging the space of the hollow trunk on the opposite side thereof from that at which the grain is admitted, in combination with the screen, e, spout, f, and the passage and valve, g, for taking the dust, etc., into the fan case, whereby the chaff and light grain, which will pass up the spout with the impurities, is effectually separated and delivered through the spout, f, substantially as herein fully set forth.

8,851.—Moth Trap to Beehives.—E. W. Phelps, Elizabeth, N. J. Patented April 6, 1852.

I claim the peculiar construction of the moth trap, as herein described, composed of a slide having the center groove and two side grooves, and the metallic hinged cover, arranged, all as set forth in the specification.

8,888.—Capping of Screws.—Charles T. Grilley, New Haven, Conn. Patented April 20, 1852.

I claim the attachment of a brass, copper, or other suitable metallic cap, to and its combination with, an iron-wood screw, substantially in the manner and by the process described in the foregoing specification (which I conceive to be the only practicable method in which the same can be usefully effected), whereby, and by means of the successive operations of punching or stamping, the neck is first cut through the shell, and then, after being adjusted to the groove or slot in the head of the screw, the sides thereof are driven down into and made to press closely against the sides of the slot, leaving the bottom of the groove or slot uncovered, so that the cap when closed round the head of the screw, will preserve its hold without liability to be turned or displaced by the screw driver, which works upon the iron surface at the bottom of the slot, and against the covered sides thereof, thereby furnishing to the public, at a comparatively small cost, a wood screw having all the beauty and finish of a brass, copper, or plated screw, in combination with the greatly superior strength of an iron one. The invention is equally applicable to steel screws, which may be capped in a similar way.

8,881.—Feed Apparatus of Planing Machines.—Joel Whitney, Winchester, Mass. Patented April 13, 1852.

I claim the arrangement by which the upper feed roll is allowed to yield to any inequalities in the board, and at the same time draw down upon the surface to which it has yielded, in proportion to the resistance to the cutting tools; that is, connecting the fixed shaft with the vertical sliding bearings of the upper feed roll, by means of the swinging, inclined, and vertical arms, m and k, the gears on the fixed shaft operating the lower feed roll, and also playing into the gears which move the upper feed roll, said latter gears having their bearings in the intersection or joint of the said arms, the arrangement being substantially as herein above set forth.

REISSUES.

2,234.—Cartridge Extractor for Fire-arms.—Henry Reynolds, Springfield, Mass. Patented Nov. 22, 1864.

First, I claim a cartridge shell ejector, consisting of a lever attached to the frame of the fire-arm, and so constructed and arranged that by a suitable movement, a portion of it is made to enter an opening in the chamber or chambers between the breech or rear end thereof, and the bottom of the cartridge shell, substantially as and for the purpose herein described.

Second, So beveling the bottom of the chamber of the fire-arm as to provide for the entrance of the lever between it and the rear end of the cartridge shell, substantially as herein described.

2,235.—Self-loading Fire-arm.—Spencer Repeating Rifle Company (assignees by Mesne assignments, of C. M. Spencer), Boston, Mass. Patented March 6, 1860.

First, I claim the combination of the rolling breech, E, the lever, G, and sliding locking bolt, F, the whole fitted and applied substantially as herein set forth.

Second, The slide, H, applied to the rolling breech, and operating in combination with the hammer, substantially as described.

Third, The rolling breech, E, constructed as described, to operate as a carrier block, to receive the cartridge from the magazine and deposit it in the chamber in the end of the barrel, and also to cut off all communication between the chamber and magazine when the piece is loaded.

Fourth, The serrated projection, u, constructed, arranged, and operating as described.

Fifth, The tongue, J, constructed, arranged, and operating as described.

2,236.—Breech-loading Fire-arm.—Rollin White, Lowell, Mass. Patented April 3, 1855.

First, I claim the movable breech, connecting with, and operating with the tumbler and hammer, and on the same fulcrum pin, substantially as herein described.

Second, The plate applied, substantially as described, to serve as a guide to conduct the cartridge into the open chamber, and as a guard to prevent the cartridge falling out at the rear of the chamber before the breech is liberated, as herein set forth.

Third, I claim making an aperture into the chamber, and constructing the hammer, or its equivalent, so that it will ignite the charge by striking the cartridge in front of the rear end thereof, substantially as and for the purpose specified.

DESIGNS.

2,295.—Frame of a Sewing and Embroidering Machine.—Joseph W. Bartlett, New York City.

2,296.—Picture Frame.—John H. Bellamy, Charlestown, Mass., assignor to self, Cyrus W. Stout, Boston, and Benj. Brown, Somerville, Mass.

2,297.—Weather Boarding.—John H. Clark and John Rhinesmith, Fort Wayne, Ind.

2,298.—Trade Mark.—Franklin O. Day and William S. Stewart, St. Louis, Mo.

2,299.—Trade Mark.—Franklin O. Day and William S. Stewart, St. Louis, Mo.

2,300.—Trade Mark.—Franklin O. Day and William S. Stewart, St. Louis, Mo.

2,301.—Hand Stamp.—H. H. Grosskoff, Philadelphia, Pa.

2,302.—Cook's Range.—Jno. Martin, Jacob Beesley, and John Currie (assignors to J. S. Clark), Philadelphia, Pa.

2,303.—Railing.—John McArthur, Philadelphia, Pa.

2,304.—Tobacco Pipe.—Louis Saarback, Philadelphia, Pa.

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REFERENCES.—David Bell, Locomotive Works; Frank Colligan, Portable Engine; Nagle & Weed, Stationary Engine; Sutton & Bro's, Engine & Machinery; Pratt & Co., Iron Works; Pierce & Co., Shingle Machine Manufacturers; Jas. Butman, Master Meeh. N. Y. C. Shop; M. E. Brown, M. M. N. Y. & E. Shop, of Buffalo; Tompkins & Co., S. Coleman & Badger & Co., Rochester, N. Y. Send for description circulars. Nut Taps supplied to order.

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Die Untzeichneten haben eine Anleihtung, die Erfindern das Verhalten anzeigt, um sich ihre Patente zu sichern, herauszugeben, und veröffentlichen solche gratis an die Hand.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Entziffern von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

Munn & Co., 37 Park Row, New-York.

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Improved Valve Gear.

The following description from the inventor will explain the nature and object of the invention illustrated in the annexed engraving very clearly:—

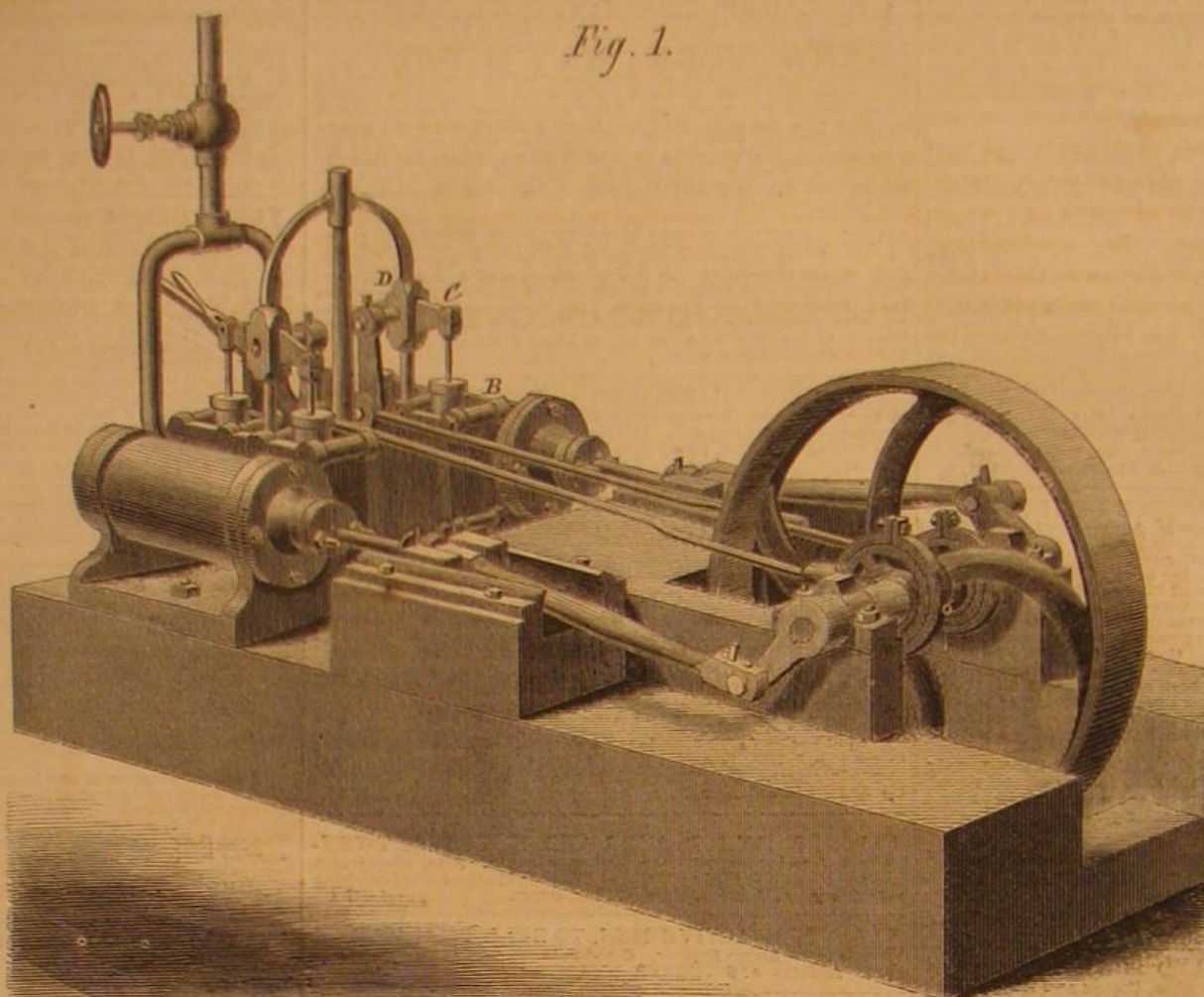
"The object of this invention is to reverse steam engines of any size, instantly, without shutting the throttle valve, and by a single eccentric, as in reversing, the valves are changed so that one edge of each valve is raised for one motion, and the opposite edges for the opposite motion, as in passing the valves over from one motion to the other, the exhaust ports in the valves open to the receiving ports in the cylinder, and consequently exhaust the steam that is in the cylinder at the time of changing, so that there is no steam shut up in the cylinder, and there are no sudden jars on the machinery in reversing instantly. In changing over from one motion to the other, the valves can be so stopped as to give them a small opening; by stopping the lever that moves the valves, at a little more than midway between the two motions; or it can throw the full working pressure instantly against the piston without danger to the machinery. By stopping on the center it will shut the steam entirely from the cylinder so that the engine can be stopped, started, or backed by the use of a single lever. In very large engines I balance the valves and gear by letting the end of the movable column run into the steam chest, and fitted with stuffing box, the same as a piston; so that there will be no trouble in working the engines, from locomotive to ocean steamers. Aside from the reversing, I consider it the most economical slide in use. In the first place, it is nearly balanced by taking steam on the inside of the valve as soon as it commenced to open to the steam, as there is no lap on the receiving side of the valves. In the second place, they take steam through two recesses in the seats on the opposite edge of the valves, both in the exhaust and receiving side of the valves, so that it gives a full opening on the commencement of the stroke, and remains the same to nearly the end, as the steam goes to the piston from the inside of the valve at the same time it takes from the outside; the opening receiving the same after the valve gets one-third of its throw; for after that it is closing on the inside as it opens on the outside; and by that means get the full rise of the steam through the whole length of the stroke with the same opening.

"I claim another advantage in exhausting: as there is no lap on the receiving side of the valve it is left full open to the exhaust as soon as it cuts off, and the exhaust port is made longer than the receiving port, thereby giving more opening to the exhaust, with the same throw of the valve. I also use an exhaust slide or movable seat on the exhaust side, so that by moving it above or below the line of the receiving part, I can exhaust the steam at any part of the stroke, without interfering with the working of the valve in any other respect, and making a variable expansion without any lap on the valve.

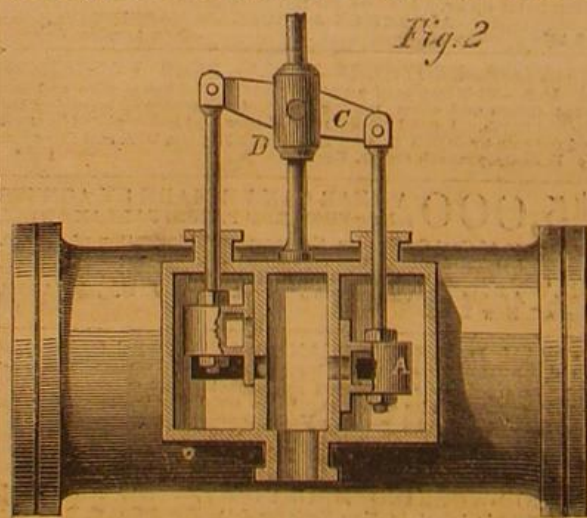
"In order to make a variable cut-off to work both ways alike, I would use two eccentrics with a short link, one set for full stroke and the other as short as desired, and to be used only for a cut-off, as the reversing is done by shifting the valves. This valve is useful for locomotives, as it gives a full port of steam when cutting off at less than one-third of the stroke, without giving the valve lead. The link can be short, as the eccentrics are so set that they work nearly in

the same direction, driving most of the throw. The link can be so arranged as to leave it stationary while reversing, so as to throw back on to full stroke when reversed, without moving the link.

"The arrangement consists in angular slide valves, A, working at right angles with the piston, one for the induction and eduction of steam at one end of the cylinder, and the other for the same purpose at the other. The valves are worked by means of a rock shaft supported on a movable column, D, running into the steam

**WOODRUFF'S VALVE GEAR.**

chest midway between the valves, with arms, C, extending so as to connect the valve rods at either end of the cylinder. The top, or opposite end of the movable column is supported by moving through an arched guide. The reversing consists in moving or passing the valves over the ports so that one end of each valve is used for going in one direction, and the opposite edge for the other direction. The operation is performed by connecting a lever to said column and working across the cylinder, or any other suitable



position, and the opposite end working through a segment with notches, so as to take a catch or spring to hold the valves when moved to the position for stopping, backing, or slowing the engine. A small model of a double engine is shown in the engraving, that was made simply for exhibition, and the reversing gear was arranged to accommodate the working of it. The cylinders stand only sixteen inches apart, from outside to outside, and are 2 inch bore and 4 inch stroke."

For further information, address the inventor, A. H. Woodruff, at Lansing, Iowa, by whom it was patented, through the Scientific American Patent Agency, on Dec. 27, 1864. Application for patent is pending in other improvements.

Water Fuel.

Few persons are aware of the large percentage of actual moisture that abounds in most fuels. The careful housewife, desirous to economize her fire, "backs" it up with cinders. The poor employ wet tan. And there are not many, I suppose, who have not watched the nailer with curious interest, when, after a good sprinkle with his handbroom, previously dipped in water, he had made his smithy fire glow again with a very few blasts of his bellows. The

Rev. M. Moule, of Dorchester, has had constructed a cooking stove, in which the combustion, to a certain extent, of water is attempted, but with what success I have no exact means of knowing. A year or two back some trials, in respect to the combustion of wet fuel, were reported in *Chambers' Edinburgh Journal*. The results were perfectly marvelous. Fuel containing actually, I believe, 70 per cent. of moisture was burnt in an arched brick stove or furnace. The heat produced was so intense as, if I recollect rightly, the thick wrought iron door having been previously closed, to raise to whiteness the arch of the oven. The fire, indeed, in the first instance, was lighted with dry fuel; but afterwards the wet fuel was exclusively resorted to. Surely, here are indications of no little importance in a country where the normal state of our natural fuel is one of excessive moisture.—

Cooking, heating, drying, lime and brick burning, wherein indeed vast quantities of water are burnt as it is, besides various other economic processes involving the application of heat, might probably be effected by the employment of wet fuel.—*London Morning Journal*.

["Water burning stoves" are no novelty. It has been shown by experiment that the heat obtained from the decomposition of water is exactly equal to the heat required to decompose it.—Eds.]

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The SCIENTIFIC AMERICAN is the largest and most widely circulated journal of its class in this country. Each number contains sixteen pages, with numerous illustrations. The numbers for a year make two volumes of 416 pages each. It also contains a full account of all the principal inventions and discoveries of the day. Also, valuable illustrated articles upon Tools and machinery used in Workshops, Manufactories, Steam and Mechanical Engineering, Woolen, Cotton, Chemical, Petroleum, and all other manufacturing and producing interests. Also, Fire-arms, War Implements, Ordnance, War Vessels, Railway Machinery, Electric, Chemical, and Mathematical Apparatus, Wood and Lumber Machinery, Hydraulics, Oil and Water Pumps, Water Wheels, Etc.; Household, Horticultural, and Farm Implements—this latter department being very full and of great value to Farmers and Gardeners. Articles embracing every department of Popular Science, which every body can understand and which every body likes to read.

Also, Reports of Scientific Societies, at home and abroad, Patent-law Decisions and Discussions, Practical Recipes Etc. It also contains an Official List of all the Patent Claims, a special feature of great value to Inventors and owners of Patents.

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Vol. XIV.—No. 21.
(NEW SERIES.)

NEW YORK, MAY 19, 1866.

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IN ADVANCE.

Improved Scraper.

If any one thinks it funny to work out a tax on the highway, they have only to get an ordinary wheelbarrow, or a scraper, and try it for half a day, when the mistake will be apparent. The wheelbarrow breaks the back and the scraper dislocates the arms; between the two the way of the road maker is hard.

We consider the apparatus shown in this engraving a vast improvement on both the antiquated machines alluded to previously, inasmuch as it does a great deal more, and man rides instead of trudges along at the tail of his team.

In detail it is a scraper with an iron bottom fastened at the front by chains, A, to the transverse shaft, B, and hung on a crank shaft, C, behind.

This method gives the driver complete control over the front and back, for he can elevate or depress it, either to take up or discharge the load.

Of course by driving along, the earth is thrown up naturally into the bottom of the scraper, and when full the whole can be raised clear of the surface and carried off to any desired point. The levers, D and E, enable the driver to elevate the scraper; the wheels in front, over which the chains pass, are eccentric so that they lift like arms; and there is a ratchet wheel and pawl at the end of the shaft the wheels are on, to hold the front edge of the scraper at any angle, or desired height. When the load is to be dumped there is a vertical rod, F, which serves to release the rear end of the scraper, thus enabling the driver to choose his own time and place for depositing the dirt.

All can see that this is a useful apparatus on highways or for farm use. It is also capital for a stone boat to carry away stones and can be employed for building railroads, canals, for grading and a variety of other purposes. The invention is covered by one patent, and application is pending by Theodore Blodgett, for another, through the Scientific American Patent Agency; for further information address the assignees of patent, Messrs. Walker & Judd, Belchertown, Mass. County, State and farm rights for sale.

Improved Wagon Brake.

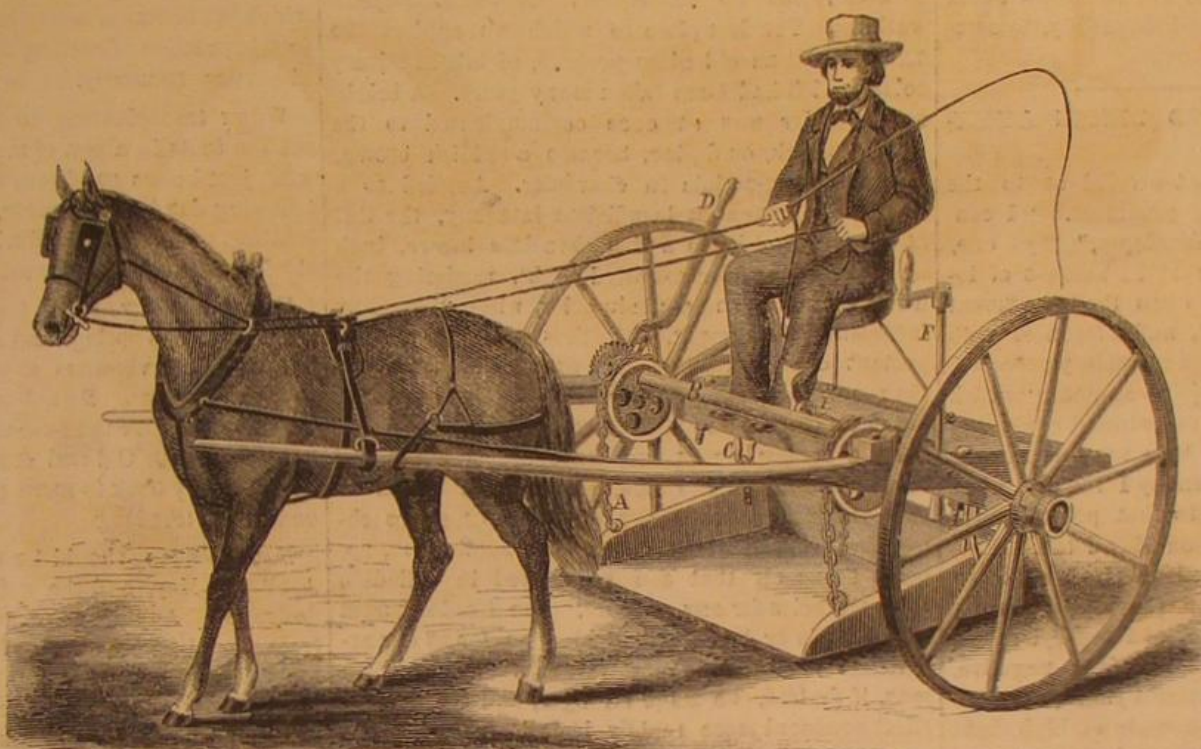
The accompanying engraving represents an improved wagon shoe lock, which the inventor claims to be superior to any device now used for locking wheels. The details are as follows:—

A is a block of hard wood bolted to the underside of the bed, its lower face slightly inclined from the

level of the wagon body. B is a crosshead having a reciprocating motion between two guides, C, which are bolted on the lower face of the block. On the outer end of the crosshead is a bar having the shoe, D, riveted or screwed to it, so that it can be replaced with little difficulty or delay when worn out. Near the upper end of the shoe bar is a crank, E, con-

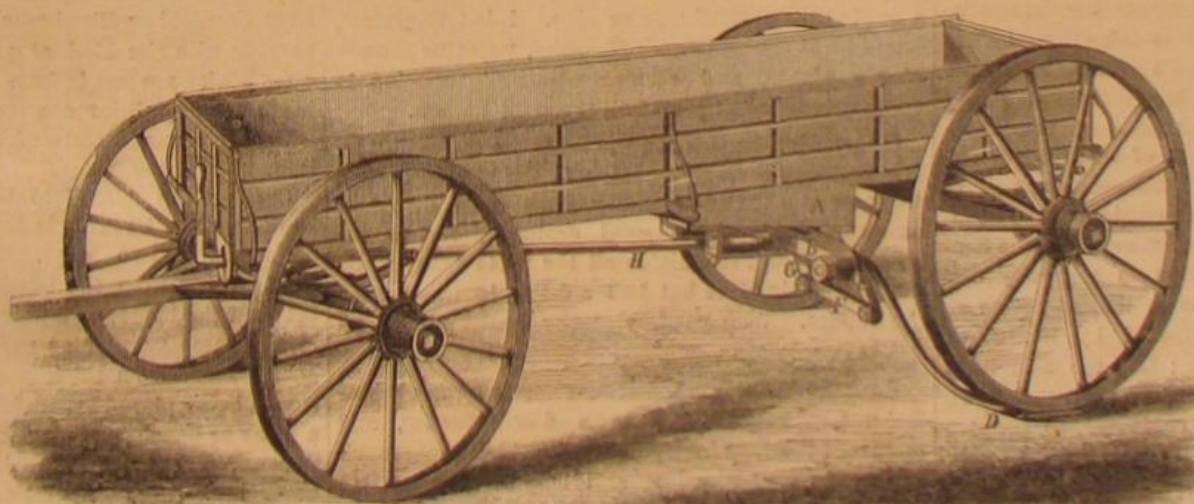
and the pin allowed to enter the hole in the plate, in which position the bar and shoe are thrown up under the rear axle, entirely out of the way.

The advantages claimed for this lock are, a complete preservation of the tire from grinding flat at any part of its surface; absence of strain on the spokes and felloes, while the wheel is secured as firmly from turning as though held by a chain; ease of manipulation, it being managed with one hand of the driver without dismounting from his seat; convenience as a "drag" in case of fracture of either rear wheel. If the rear wheel breaks, the empty or lightly-loaded wagon can be conveyed to a shop by using the lock after the style of the time-honored fence rail. Should the off wheel give out the rear one may be transferred to that side and proceed as before. Having no facilities for manufacturing, the right is for sale, entire or for States, by the inventor, Alex. Hamilton, 293 Pennsylvania avenue, Washington, D. C., by whom it was patented on Dec. 18, 1865.



BLODGETT'S ROAD SCRAPER.

nected by a link, F, to another crank, G, on the end of the handle, H. This handle is also capable of a rotary motion through a quarter of a turn, and when revolved necessarily rotates the shoe bar an equal distance. There is a plate secured to the forward end of the bed, through which passes the handle



HAMILTON'S WAGON BRAKE.

asforesaid. The hole has a slot cut in it, affording passage for a stud pin attached to the rod at a proper distance to retain it when drawn up and revolved, in which situation the pin is retained.

When it is desired to apply the lock, the handle is pulled forward, releasing the stud pin; a quarter turn is given the rod, which brings the pin opposite the slot, and through the intervention of the crank arms throws the shoe on the ground before the wheel. Both rods and the crosshead slide down as far as the guides will permit, which is a sufficient distance to interpose the shoe between the tire and the ground. In unlocking the wagon is backed until the wheel runs off the shoe, the handle is then pulled until the pin passes through the slot; a quarter turn is given,

is twenty-two hundred feet above the level of the sea, or fifteen hundred feet higher than low-water mark of the Ohio river at Pittsburg. Mr. Sigismund Loew, the engineer of the Connellsville Railroad Co., informs us that it will take six months more with the force now employed, to finish the tunnel in ample time for the completion of the whole road from Cumberland to Connellsville, should that distance be put under construction this spring.—Pittsburg Chronicle.

A Good Whitewash.

At this season people generally set their houses in order and prepare for the hot weather. As whitewash is in great request it may not be inappropriate to publish the following recipe. It is intended for

A Long Tunnel.

The miners working in the middle section of the Sand Patch Tunnel, on the Pittsburg and Connellsville Railroad, have met, thus piercing once more the great mountain barrier between the Ohio valley and the seaboard. The Sand-patch tunnel is four thousand seven hundred and fifty feet long, or one thousand feet longer than the Allegheny Mountain Tunnel of the Pennsylvania Railroad. It was commenced some ten years ago, is to accommodate a double track of rails all through, being twenty-two feet wide, and nineteen feet high. The greater portion of it goes through solid red sandstone, not requiring any brick arching for that distance. The grade of the tunnel

buildings or out door use but is also adapted for walls. Let us say here that we have never found anything equal to glue for fixing the lime on the walls. It should be liberally applied, say half a pound to a wash tub full of whitewash, and if well stirred it will never fail. There is no greater nuisance than whitewash that rubs off on everything that touches it.—We quote from the *Chemical Gazette*:—

"Take a clean water tight barrel, or other suitable cask, and put into it a half bushel of lime. Slack it by pouring boiling water over it, and in sufficient quantity to cover five inches deep, stirring it briskly till thoroughly slacked. When slacking has been effected, dissolve in water and add two pounds of sulphate of zinc and one of common salt. These will cause the wash to harden and prevent it cracking, which gives an unseemly appearance to the work. If desirable a beautiful cream color may be communicated to the above wash, by adding three pounds of yellow ochre. This wash may be applied with a common whitewash brush, and will be found much superior, both in appearance and durability, to common whitewash."

A NEW INTENSIFYING AND TONING AGENT.

Photographers are somewhat divided as to the propriety of using intensifying processes. "I consider that the most perfect developer," says one, "which produces exactly the right amount of intensity at the precise moment when the full amount of detail has been brought out, and dispenses with all necessity for intensifying by a secondary process." "I prefer the developer," rejoins another, "which permits the detail to be fully out without conferring much intensity, so that I can, by a second process, secure just the amount of intensity I require, when my sole attention is devoted to that point, undisturbed by the necessity of looking after detail."

On the whole, we are disposed to think that the best results are obtained when the conditions are such as render a slight amount of intensifying necessary; a fully exposed and harmonious negative, after receiving from such intensifying just that amount of vigor in the minute spots of high light which gives brilliancy to the whole, is, in our estimation, the best. Without entering into a detailed discussion of the subject, however, it will be universally admitted that there are occasions in the practice of every photographer when he must intensify, whether he desire it or not. The art is now rich in modes of obtaining density. Where a very slight amount of additional force is required, nothing exceeds the ordinary method with pyrogallol acid and silver; but if much piling up of the image be necessary, delicacy and sharpness are often slightly impaired, and stains and spots are occasionally caused. A large range of effects of intensifying may be secured by the various modes of employing bichloride of mercury; but most of these involve—especially in inexperienced hands—much risk of failure, and of subsequent deterioration in the negative; and are, in our estimation, generally to be condemned. The use of sulphides is generally disagreeable. Iodine is useful in a limited range of cases. Schlippe's salt, as proposed by Mr. Carey Lea, produced excellent effects; but the salt itself was not found in commerce, and it involved two operations, one with mercury or iodine, to prepare the plate, and then the application of the salt itself, to produce a scarlet or brown negative; there was also a risk of the deposit cracking into fissures in drying, and so spoiling the negative. Some other modes of intensifying have been proposed, but not generally practiced.

We have to bring a new agent under the attention of our readers, which appears to possess specific advantages which render it well worthy of attention, inasmuch as it is easy to use, very efficient as an intensifier for negatives, and is also a valuable toning agent for transparencies. Dr. Towler tried some successful experiments, and published a more definite formula, recommending a ten-grain solution of ferridcyanide of potassium, and a ten-grain solution of sulphate of uranium, to be mixed in equal proportions. Again we heard of experiments being tried with signal failure. We have, however, during the last week or two, tried a series of experiments

with the most satisfactory results, and we can now, not only explain how these may be secured, but also the cause of failure in the hands of some of those who have unsuccessfully tried the experiment. We will first state the formula and mode of working.

Take—
Ferridcyanide of potassium..... 10 grains
Water..... 1 ounce
Dissolve and mix with a solution of—
Persulphate of uranium..... 10 grains
Water..... 1 ounce

This mixture is a clear solution of a deep red brown color; and poured over a finished and washed negative, it at once changes the deposit (which, after simple iron development, is generally of a grayish color) into a rich non-actinic chocolate brown tint, and, if its action be continued, into a purple brown or warm black. This is effected without risk of stains or disadvantages of any kind that we have discovered. There is a remarkable similarity in color to that produced with Schlippe's salt, but the operation is much simpler, as the negative requires no preparation, and no subsequent treatment beyond washing. The first plate to which we applied the solution was an old glass positive, of bright silvery color, which had been taken many years. A bright scarlet color was at once communicated to the whites, which, on drying, became a reddish brown, but very non-actinic in character. Applied to a negative of somewhat insufficient intensity, the tint at once produced was a rich chocolate brown, both by reflected and transmitted light, rendering the negative more non-actinic in color, without sensibly increasing the deposit, and thus securing an important condition of delicacy as well as intensity, the requisite printing quality being obtained without piling up deposit and risking coarseness.

As a toning agent for transparencies nothing could be better. The rich, deep, warm brown at once assumed, or the deeper purple brown, approaching black, produced by a continued application, appears to us all that can be desired in collodion transparencies for any purpose. The freedom from risk or stain or injury of any kind, so far as our experience has gone, is most valuable. The solution may, if desired, be made stronger, and its deepest effect produced more rapidly if desired; but it appears to us that the strength we have indicated is the best for practical purposes. The solution may also be used over and over again, until its efficacy is exhausted.

ITEMS FOR LOVERS OF GARDENING.

We take the following interesting and timely suggestions from the *Horticulturist*:—

REMEMBER to pluck off any fruit that may set on a newly transplanted tree or vine. If left to perfect, it will be at the expense of healthy, vigorous growth of the plants, and corresponding depreciation in quantity and quality of fruit the next season.

GRAPE HOUSES.—When the roots are entire inside, it is better to thoroughly saturate the ground once a week, or as often as necessary, than to be dribbling on water daily. With good drainage, the former course wets and stimulates all the roots alike, while the latter only gives but half a drink to those near the surface. With good, vigorous, healthy roots, no failures need occur, in growing grapes inside.

DAHLIAS AND DOUBLE HOLLYHOCKS form elegant features as backgrounds to a flower border, and masses of them, at intervals, on the sides of approach roads, are very pleasing, and help to give variety and charm to the grounds. In planting out the dahlias, use but one stem at a place; set them about three feet apart, and as they grow, pinch back, so as to make them grow more like bushes than trees. The waste of water from the kitchen—soap-suds, etc.—is one of the best manures for the dahlia.

Hollyhocks have come to be equally beautiful in flower as the dahlia; and, as they can be left in the ground, will probably become more and more in vogue. They should be transplanted and divided about once in two years.

CHOICE OF ROSES.—Although the hybrid perpetual roses give bloom more or less during the season, and are perfectly hardy, so that they may be left out all winter, yet the beauty of a rose bed—one where buds and blossoms may daily be gathered—will be found to consist in having a large proportion of

Teas, Bengals and Bourbons. Novelties, i. e., new varieties, are brought out each season, one or more of which every amateur is expected to buy; but of the old sorts that have proved good with us we name Adam, Bougere, Caroline, Sombreuil, and Cels, as of Teas; Agrippina, Louis Philippe, and Lady Byron, as of Bengals; Bosanquet, Hermosa, Souvenir Malmaison, and Paul Joseph, as of the Bourbons. There are many others, perhaps, equally good, perhaps better, but the above small list embraces those that have always given us pleasure, as good growers and free bloomers.

FLOWERING SHRUBS, such as Weigela, and others that flower on the preceding year's growth, should be trimmed back immediately after they have done flowering in June. By so doing, the plants can be kept in just such shape as may be desired by the operator.

ROSES, as soon as the flowers have opened and bloomed one day, should have the decaying flower cut away; cutting back to a good strong bud, from which will come a new stem and flowers. Attention to this practice of cutting will keep plants blooming almost continuously.

WHEN transplanting tomatoes, egg plants, etc., set the roots in a pan of muddy water. Perform the work just before sundown, and few will fail. If the following day is a very clear, hot and sunny one, then it is best to shade them during the heat. Shingles, stuck on the south and west side, answer well.

Those who have peach trees should not fail to cut them back this spring, and so cause them to throw out new and vigorous shoots, and give improved shape to the tree. Do not cut, however, until about the usual time for the peach to bloom, but then head back severely. Old and scrawny trees will bear to be cut nearly back to mere stubs, or with limbs only one to two feet long.

FRUIT TREES should be carefully looked over in April and May, and the webs or cocoons of insects destroyed. Any appearance of black knot on young trees should be cut away. If the coccus or scale insects shows itself, wash the bodies at once with strong lye and sulphur. Some advise a wash of salt brine all over the tree at this time; we have never tried it, and therefore cannot speak knowingly of it, but intend to be able to do so another year.

THE white sugar beet, if grown in ground not too rich, we have found more delicate for the table than any other variety, if we except the bassano.

HOW FISHHOOKS ARE MADE.

The wire for making fishhooks is procured in coils from Sheffield or Birmingham, of different qualities, varying with the kind of goods required. All first-class hooks are made from the very best cast steel wire; other qualities are made of steel, but inferior; while the common sorts of large hooks are made of iron.

Cutting the wire into lengths suitable for the hook about to be made is the first operation, and is performed in two ways. The small and medium sizes are cut from the bundle or coil in quantities, between the blades of a pair of large upright shears, in the same manner as needle wires; but large sea hooks, made from thick wire, are cut singly, each length being placed separately upon a chisel fixed in a block or bench, and struck with a hammer. What are called "dubbed" hooks are "rubbed" after being cut,—that is, placed in a couple of iron rings, then made red hot, and rubbed backward and forward with an iron bar until the friction has made every wire straight. Hooks, in general, are not rubbed, but are at once taken to be "bearded" or barbed, which is thus performed: The bearder, sitting at a workbench in a good light, takes up three or four wires with his left hand, between the finger and thumb, and places the ends upon a piece of iron, somewhat like a very small anvil, fixed in the bench before him. In his right hands he holds the long handle of a knife of peculiar shape, the blade of which, having the edge turned from him, is placed flat upon the wires, the knife point at the same time being passed under a bent piece of iron firmly fixed, which enables him to obtain sufficient leverage to cut the soft wires and raise the barb, or "beard," this being done by pushing the handle forward,

while the point remains fixed, as described. It becomes a laborious operation in the case of very large sizes, requiring, not merely a forward motion of the arm, but a strong push with the body against the handle.

They are next taken by the filer, who makes the points. Each barbed wire is taken up separately, fixed in small pliers held by the left hand, then placed upon the end of a slip of box wood, and filed to the degree of sharpness required. This is a matter of great nicety and delicacy. Common hooks are pointed with one file, but the finer sorts require two or three, flat and half round. Large sea hooks have the ends flattened, and the burr cut off on each side with a sharp chisel into a roughly-shaped point, previous to being filed. The points of "dubbed" hooks are not filed, but ground upon a revolving stone, and this process is called "dubbing."

When the points are made, the "benders" proceed to operate upon them. A woman holds in her left hand a piece of wood, at the upper end of which is inserted a curve, or "bend" of steel, projecting slightly. Taking a wire in her right hand, she catches the beard upon one end of the steel curve, and pulls the wire round into the proper "hook" shape. For the large sizes, the "bends" are fixed, not held in the hand.

Nothing now is necessary to perfect the formation but "shanking," which is done in various ways. Hooks are flattened at the shank end by a workman, who holds the curved part in his left hand, rests the end upon the edge of a steel anvil, and strikes it one sharp blow with a hammer. Some are tapered at the end with a file, while others are simply curled round, or "bowed," to provide a fastening for the line.

With steel hooks, hardening is the next process; but iron ones require converting, or "pieing," before they will harden. The pie hole is a recess with a large, open chimney, and in this recess is placed an iron pot, filled with alternate layers of hooks and bone dust. At a little distance from the pot bricks are built up all round and the space filled with coal, which, when lighted, creates an intense heat, and to its action the hooks are exposed for about ten or twelve hours, allowed afterward to cool, and are then fit for hardening. To effect this, they are exposed to a great heat upon pans in a fire hole, and while red hot, poured into a caldron of oil. Small hooks are afterward tempered in a kind of frying pan, partly filled with drift sand, and placed over a fire. The larger ones are tempered in a closed oven, at a low heat.

When these operations are completed, they are taken to the scouring mill. It is occupied by a number of revolving barrels, driven by steam power, and containing water and soft soap, into which the hooks are put, and allowed to remain for two or three days. At the end of that time, the friction having worn them all bright, they are taken out, and dried in another revolving barrel, containing saw dust. Blueing, japanning, or tinning follows—of which the two latter are performed in the ordinary way, and the blueing is done by exposing them to a certain degree of heat in drift sand over a fire, in the same way as small hooks are tempered. Counting, papering, labeling, and packing complete the series, and the goods are then ready for the market.

Readers of the foregoing description can hardly fail to notice the extreme simplicity of most or all of the processes; and it seems strange that in such an age as ours there should be little improvement in the mode of production, as compared with the fire-side practice of amateurs two hundred years ago. In the "Secrets of Angling" the author describes the making of hooks (as practiced by himself) in the following terms:—"Soften your needles in a hot fire in a chafin. The instruments—First, an hold fast. Second, an hammer to flat the place for the beard. Third, a file to make the beard, and sharpen the point. Fourth, a bender, viz. a pin bended, put in the end of a stick, a handfull long. When they are made, lap them in the end of a wier, and heat them again, and temper them in oyle or butter."

THE Commissioner of Agriculture has received from Honduras, Central America, a swarm of stingless bees. These bees are easily swarmed, and are excellent honey makers.

(From the British Journal of Photography.)

On the Artistic Coloring of Photographic Portraits.

So difficult is the task of training a good colorist, that even the accomplished artist feels his inability in endeavoring to impart the information necessary to those he is wont to train in the knowledge whereby he is enabled to produce almost inimitable results. With the best intention he fails, feeling he cannot impart that which nature almost intuitively bestows, and he discovers that there is something more required than pigments, palette, and brush in the making of an artist.

But when the colorist, solemnly imbued with the truth of the photograph, and watching the fine management of its monochrome, from its high lights to its deepest shadows, can translate the same with a keen desire to imitate its inimitably delicate gradations into color; then indeed does the photograph as rendered on the ground glass of the camera serve as the true guide to the miniature colorist, and the result is a beautiful conjunction of nature and art to produce a faithful resemblance of the human face. Of course the taste of the artist will dictate to him to soften some of the harder lines rendered in the proof by the peculiar color of the original, or the furrows which time indents on the forehead, and which, by the concentration of the lines, may really appear deeper in the photograph than in the original.

Without attempting to go deeply into the philosophy of color, analytically or synthetically, it may not be out of place to give, however slight, an idea of how to proceed in coloring a photograph.

It is indispensable that you wash the proof well with a sponge, or, better, and ever at your command, sweep your tongue across it in order to remove any traces of grease or starch. As far as my experience goes the later method is preferable. In rubbing down the colors on the palette give all attention to the manner in which it is softened with the gum and water added. If you rub with careless quickness the colors are rendered useless, owing to the numerous air bells that rise, which, when applied to the surface of the picture, give it a coarse, inartistic, and anything but a pleasing aspect.

To color a good, clean print, you must, in the first wash on the face, use as much gum as will bring it nearly, although not quite, to the same gloss as the albumen surface; this wash to be composed of—for a person of ordinary complexion—a combination of rose madder and Indian yellow, or Venetian red alone. With these colors judiciously applied you can produce any complexion from the highest glow of health to the most sallow; the shadows to be warm, and in every case glazed even more than the albumen surface. Sepia, neutral tint, burnt umber, chrome yellow, and ivory black, if properly used, will give the blooming, graceful curls of the gentle queen of hearts, or the seared locks of the tottering dame of seventy, that life-like brilliancy which is characteristic of health or decay.

Should the photograph be clear and well-defined, for draperies and carpets (the coloring of which should ever be subservient to the figure), use transparent, but if the picture be deficient from under-development, use opaque. Of transparent colors for such purposes use the following:—Crimson lake and burnt sienna, Prussian blue and Indian yellow. Chrome yellow and Prussian blue also make an excellent wash for draperies, although not purely transparent.

For backgrounds, which should ever be made to softly recede from the figure, the following colors may be used with much purpose:—Cobalt blue, and a little Chinese white, which gives a good effect and altogether a pleasing result, vignetting it to your own taste with sepia or other browns. By way of finish, or to relieve an otherwise poor production, it is sometimes necessary to make what is termed an introduction; that is, a side opening in the background, where a neat landscape may be lightly sketched and colored, comprised of water, land, and sky, or a bit of woodland. These sometimes give a freshness to an otherwise dull picture, or serve to exclude some of those hideous backgrounds so much displayed in *cartes* generally. But in putting in draperies, carpets, plain or pictorial backgrounds, let them ever be subdued, and in quiet harmony with the figure, the head of which should ever be the principal attraction for the eye.

With these rather incomplete remarks I hope you will feel satisfied, as I assure you my *forte* does not lie in writing papers, nor do I possess the capacity to express in words that which I can render in color. The specimens I now show will, in some measure, serve as an apology, and embody my ideas of what artistic coloring as applied to photographs ought to be.

SCOTT ALEXANDER.

NEW ENGLAND INDUSTRY.

The following summary of New England items we copy from our excellent exchange the *Commercial Bulletin*:—

George Dwight, Jr., & Co., of Springfield, Mass., are manufacturing some steam pumps of larger size than heretofore made in the State. Three of them are to be placed in fire districts in New York City, and will be of the following dimensions:—Steam cylinder, 20 inches; water cylinder, 10 inches; 36 inch stroke.

E. J. Piper & Co., of Springfield, are manufacturing patterns of new copper-ore crushing machinery, which is to be used in the Lake Superior mines.

J. H. Walker & Co., boot manufacturers, of Worcester, Mass., are erecting a large addition to their old shop. The new building will be of brick, four stories high, 72 feet long, and 35 wide; the total length of their establishment will be 147 feet. When the improvements now going on are completed, the producing facilities of the firm will be nearly doubled; they will employ from 300 to 500 hands, and turn out 500 cases of boots per week.

The machine shop of Whitin Brothers, at Whitinsville, Mass., will employ over 1200 hands and will produce all kinds of cotton machinery except mules. The old shop is 306 feet long and 120 wide, and the new one will be 346 by 68, and four stories high. An ell is also building, 120 by 64 feet and four stories high—which will be used as a cotton mill—all the machinery manufactured in the shops being tested here.

The capital stock—\$100,000—of the American Button Company has been taken up, a large portion being subscribed for by Amherst, Mass., people. The work of manufacture will probably be commenced in this city.

The works of William H. Blanchard & Co., at Worcester, Mass., are now in complete operation in the manufacture of narrow fabrics, and are producing from 20,000 to 30,000 yards per day, of skirt tape, carpet binding, and corset binding. Their goods are of a very superior quality, and their success fully demonstrates the fact that narrow goods can be made at home as well as abroad.

L. J. Knowles & Brother, of Warren, Mass., are erecting a brick block in Worcester, 175 feet by 45 and five stories high, for their own use in the manufacture of their patent fancy loom.

At the foundry of the Charlestown, Mass., Navy Yard, an immense lathe-bed has just been cast. It is 60 feet long, 6½ feet wide, and weighs 50,000 pounds. When it is finished it will weigh 80,000 pounds.

The Saugatuck Manufacturing Company, of Wakefield, R. I., are about to build a new mill on the east side of the river.

Pratt & Spencer occupy a portion of the old Slater mill, at Pawtucket, R. I., as a manufactory of tapes and webbing for covering hoop-skirts. Another part of the mill is used by the Slater Hair Cloth Company. This building was erected nearly a hundred years ago, but is still in a good state of preservation.

The Lewiston, Me., Steam Mill is 92 by 56 feet, and has a sawing capacity of about 30,000 feet of long lumber per day. The number of hands employed is 46. The company owning this mill has a capital stock of \$50,000.

A company has been formed at Hartford, Conn., with a capital of \$100,000, for the manufacture of mills, pans, and other implements for making sugar and sirup from sorghum.

A company has leased a ledge in Danbury, Conn., which is composed of stone, that is specially fitted for the manufacture of sand paper, and will go into the business on a large scale.

A FULL of 250 lbs. is the maximum effort which a good horse can exert for a mile.

Improved Bolt Cutter.

We publish herewith the engraving and inventor's description of a new machine for cutting screw threads on bolts and in nuts. He says:—

"The revolving head in which the dies are fixed is the novel part of the invention, and is thus described as distinctly as possible without the use of detailed engravings:—

"Upon a hollow mandrel or spindle is rigidly fixed a die holder, A, provided with three slots to receive the dies; and extending back from these slots, and at right angles to them, and to the face of the die holder, are other slots in which are fixed small levers which operate to lift and open the dies, as further described below. A portion of the outer end or head of each die is made square and at right angles to its face; the remaining portion of its head is formed into an inclined plane, extending toward and prolonged beyond the back side of the die, thus forming a projection or hook on the back of the die; and when the dies are in place these projections rest on the outer ends of the small levers above-mentioned.

"In the rear of the die holder above described is a flange so made as to slide on the spindle, but made to rotate with it by means of a spline, or feather; and firmly fastened to this flange by means of two bolts passing through slots therein is a sliding ring or cylinder which encircles the die holder. This ring is provided with three internal ways or bearings, each of which being divided into six equal parts; every alternate part is made eccentric with the ring. The eccentric parts of the two inner (left hand) bearings are in similar position and relation to each other, and expand in the same direction with each other; but the eccentrics of the outer (right hand) bearing expand in a contrary direction. This arrangement of eccentrics is made to correspond to the reverse action of the levers, and the whole plan of the eccentrics is used to adjust the opening of the dies to the proper size, and thus to compensate for wear of dies.

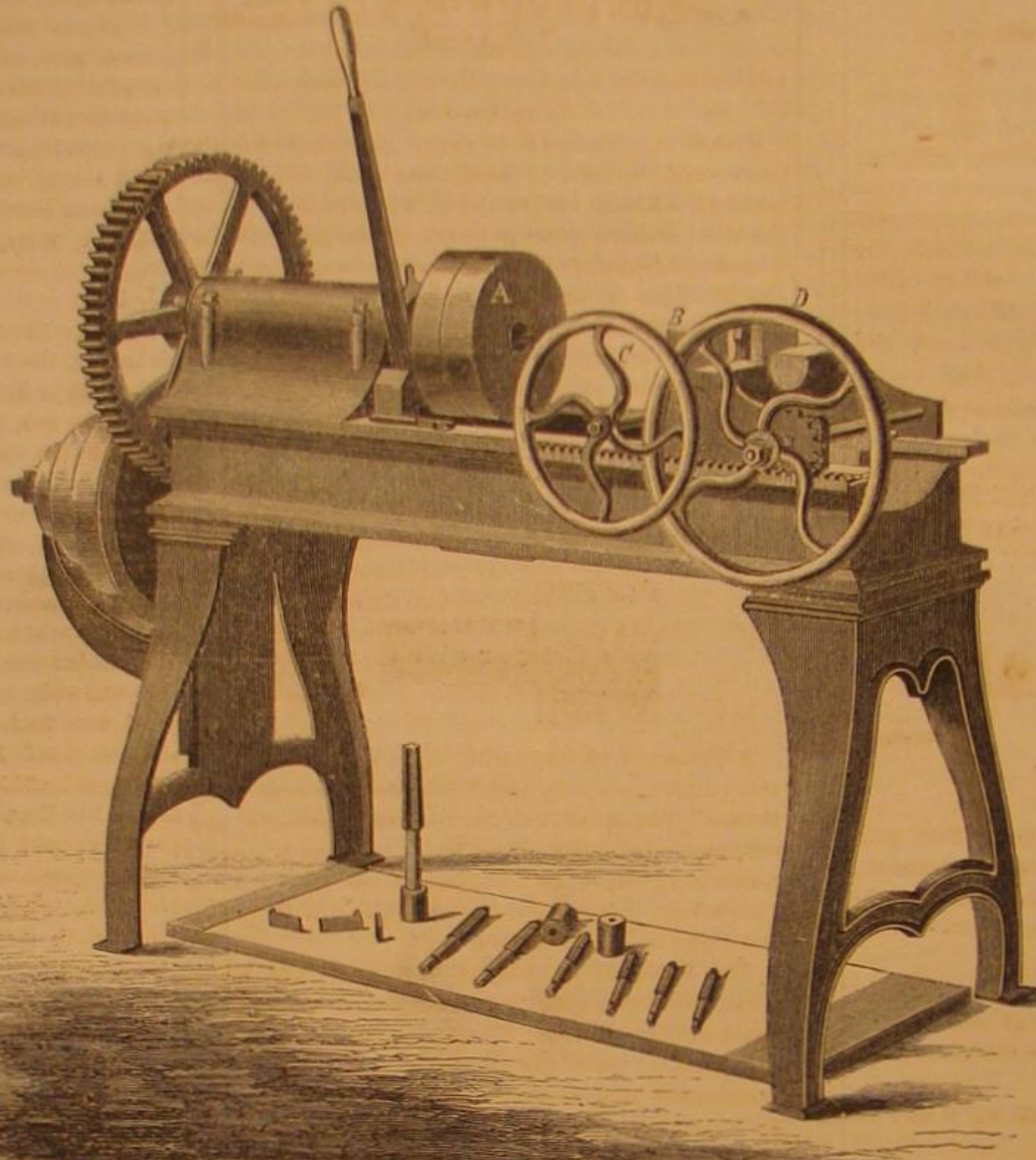
"A face plate or cap, which is secured to the face of the die holder, retains the dies in their respective slots. This face plate has a flange on its periphery, which shuts over a portion of the sliding ring to exclude chips, etc., from the working parts. Through this flange are openings corresponding to the die slots in the die holder, and through these openings (when the ring is carried to the left, as described below), the dies are passed into the die slots in the die holder, or withdrawn, as the case may be.

"The operation of the ring on the dies is this: when the back flange, to which the sliding ring is attached, is moved forward by means of the hand lever, the dies being supposed to be in place, the outer of the three bearings above mentioned comes in contact with the inclined plane of the dies, forcing them inward toward the common center till its face reaches the face plate, when the bearing rests firmly on the square end of the dies, and they are ready for the operation of cutting the thread on the bolt, and will receive the consequent pressure without yielding. The hand lever being carried back, the inner or middle bearing depresses the rear ends of the small levers—the outer bearing passing down the inclined plane of the dies simultaneously—and lifts the dies, thus opening them and allowing the withdrawal of the bolt on which the thread has been cut.

"A latch or stop at the rear of the back flange prevents the flange and attached sliding ring from passing so far back as to allow the ring to pass entirely off the projection on the back of the dies, so as to

liberate them; and so long as this stop is in place the dies cannot be removed. By simply throwing up the stop and moving the ring a trifle farther back, by the hand lever, the dies are made free and can be almost instantly withdrawn and others substituted.

"To adjust the dies for cutting smaller so as to compensate for wear, the slot screws at the back of the head, connecting the flange and sliding ring, are loosened, and the ring is turned upon the interior head or die holder, as an axis, so as to cause the eccentrics to act on the head of the dies and depress



MERRIMAN'S BOLT CUTTER.

them. A reverse motion, of course, would enlarge the opening of the dies.

"The bolts are held, for cutting the thread, in steel jaws D, operated by a right and left hand screw cut on the shaft of the hand wheel, C. The bolt carriage is moved forward and backward by a hand wheel, D, with rack and pinion.

"For tapping nuts a cylindrical tap holder is fitted to the central hole in the head (the dies being withdrawn), and a stud on the tap holder passes through and locks past a notch in the face plate into one of the die slots, thus holding the tap holder firmly in place. The tap holder is fitted with a square socket in its center, in which the shank of the tap fits.

"Three distinguishing advantages follow from the construction above described:—

1st. The screw is cut at a single operation and the dies are opened by the direct action of the hand lever to allow the bolt to be withdrawn. The movement of the lever to the right closes the dies ready for further use.

2d. The dies can be withdrawn in a few seconds and others inserted, without turning a nut or screw.

3d. The dies may be adjusted in a moment, with the most minute accuracy, to compensate for wear or any variation.

"The machine may be seen by calling on (or further particulars learned by addressing) S. C. Hills, No. 12 Platt street, New York; J. A. Merriman, general Western agent, 198 South Water street, Chicago, Ill., or the sole proprietors and manufacturers, H. B. Brown & Co., New Haven, Conn."

A CHILD in New Jefferson, Iowa, was fatally poisoned a few days ago by chewing pieces of an enameled paper collar. The enamel contains arsenic.

Induction Coils.

At a recent meeting of the Royal Scottish Society of Arts, held in their hall, George street, Edinburgh, Sheriff Hallard presiding, Dr. Ferguson read a paper on a new method of constructing induction coils, an abstract of which will be interesting to our readers. One peculiarity of the method consists in coiling the secondary wire round the primary coil, in lengths proportionate to the power of the primary coil at the point where the wire is coiled, there being least at the ends and most in the middle. By this construction,

the length of the spark given by the induction coil is not purchased, as it generally is, at the expense of its volume. Another peculiarity is that the wire is wound in two parts, separated by a diaphragm, and the poles stand at the same distance from the primary coil. Both poles are thus alike a power. In the usual arrangement one pole is weak and the other strong. A coil constructed on this method by Mr. Hart, of College street, was exhibited, which gave readily dense sparks of eight inches in length. The insulation of the coil has been so applied and protected as to secure the permanent power of the coil. The length of the wire on the secondary bobbin is nearly seven miles. Another paper on a new current interrupter for the induction coil, also by Dr. Ferguson, was read. In this contrivance a spiral of copper wire, free to oscillate in the middle, is fixed at its end to a rod of iron as a case. A wire soldered to the coil comes out at right angles from it, and being bent down at the end dips into a cup containing mercury. The battery connection is so arranged that when the dipping wire is in the cup the galvanic circuit is closed. On the closing of the circuit, the dipper is drawn out of the cup, and the circuit is thereby broken, and the coil, under the action

of its electricity, returns to its former position. The dipper is thus alternately lifted up and plunged into the cup, and a rapid series of interruptions is made. This interruption admits of a simple and perfect system of regulation, so that it can be made to move at any speed. It does away with the armature and spring of ordinary self-acting brakes, is quite continuous, and introduces almost no resistance into the primary circuit. The interruption was used with the coil, and several experiments illustrative of the merits of both were performed.—*Mechanics' Magazine.*

Cooper Union Night Schools.

The term of 1865-6 closed at this institution last month. Before the close each class was examined separately in the studies they had been pursuing during the term, and certificates were awarded according to the merit of the pupil. A certificate of the First Class being granted for superior ability and diligent attention; a certificate of the Second Class for ability and diligent attention, and a certificate of the Third Class for attention and good conduct.

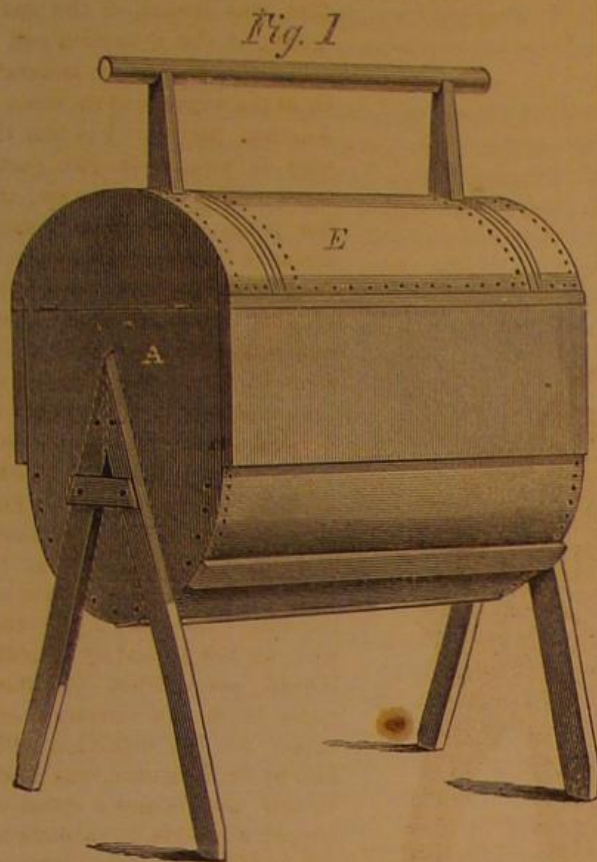
The annual reception of the Art Department takes place on the 30th inst., and the Annual Commencement on Thursday evening the 31st inst., where all who feel a pride in the advancement of our young men are invited.

MR. JOHN BOURNE, the eminent English engineer, in speaking of shot for use against ironclad ships, says they might be so made that a shot of small diameter could be attached to a wooden piston, and fired from a large gun which would give the small projectile great power and velocity. Such shot were made and used during our late war, with what success we do not know.

LUTES'S WASHING MACHINE.

Exactly how long man, or woman kind rather, were content to toil and moid over the washtub before they provided themselves with improved machines for the purpose, history does not record, but the horrors of washing day are within the memory of all. The reek of suds, the smell of boiling linen, the saponaceous vapors that lower darkly over all—who has not seen and smelt them? Who does not desire a release from them? One and all, we answer, forever and forever.

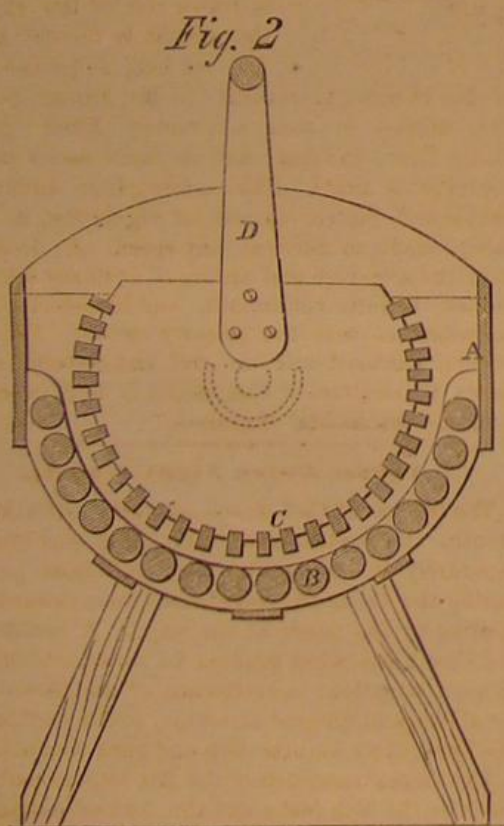
In many kitchens and laundries washing machines



have entirely supplanted the ancient affair, and after a few minutes of vigorous "swashing" about in a tub of hot suds, the garments are pronounced to be more thoroughly cleaned, by good housewives, than they could be by hand.

We give an illustration of a washing machine which the inventor claims to be an improvement on those in general use, by its convenience and rapidity of action.

It is a semicircular case, A, having a zinc bottom



and a series of rollers, B, disposed over the same as shown in Fig. 2. These turn freely on their axes. Inside of the case is a slotted rubber, C, which is hung on centers and is worked by the arm, D. When the clothes are put into this machine they are carried alternately up and down by the action of the rubber and the rollers, and thoroughly wrinkled, so to speak, which both loosens the dirt and squeezes it out. This, in connection with the hot suds, soon

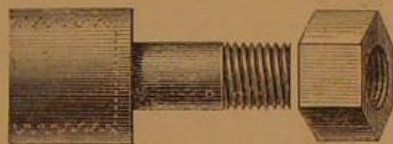
obtains the result expected. In order to avoid the evils of steam and the splash which would otherwise occur, the inventor makes a cover which is in three parts, leaving small openings the width of the handle, for the same to work in. The center, E, of the top can be lifted out to put in the clothes and the two end pieces turned back on hinges, thus affording easy access to the interior.

Patented April 10, 1866. For further information address Philip Lutes, Platte City, Mo.



Spur Chuck.

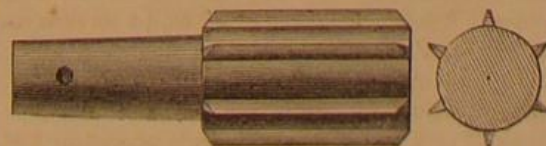
MESSRS. EDITORS:—Many contrivances are resorted to by wood turners, to hold their work fast to the mandrel, without disfiguring it, while turning it in the air. When a piece of plank has to be turned, it is not unfrequently held by a screw or gimlet-head chuck. This is very liable to cut out of the hole made for it, and it is very difficult to reverse the work, and turn the other side true to the first center. As many kinds of work allow the turner to drill a hole through the plank, a very efficient chuck is made with a shank of the size of the hole drilled; the wood is pushed on to it, and held fast by a screw on the end of the shank by means of a nut and washers of different thicknesses, as in the engraving.



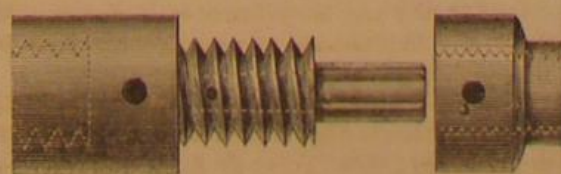
A variety of chucks, with drills to correspond, of this pattern, are very useful to a wood or even metal turner. The work can be reversed correctly, and ornamented on both sides; and I have made a great number of boxes and ornaments on this style of chuck; one was an oval work basket, with drilled work and eccentric cutting.

The last kind of chuck I have made, and which I call the "spur chuck," was suggested by an instrument called "the spur," employed in a manufactory of spools, to hold the drilled and rounded piece of wood while cutters shaped it, to hold the thread to be wound on it. The rapidity and firmness with which these prepared pieces were chucked and turned suggested the idea of using the same kind of spur to a chuck for a foot lathe. It has proved so handy and reliable a chuck for work, that I recommend its adoption by mechanics in general.

The "spur" is a steel bar, with six knife-shaped blades projecting about one-sixteenth of an inch. The blades are three-fourths of an inch long. The other end of the bar is made a trifle tapering, to fit a tapering hole in the chuck, and is fastened into the hole by a rivet or by solder; best of all, by both. The spur I describe will enter a three-eighth hole in soft wood, or a five-sixteenth hole in hard wood, such as rosewood. A view is here given.



Each turner will make the spurs of the strength and size he requires. The blades can be filed out, but are more accurately cut by a planing machine, and should be tempered to a blue color. The chuck, after it is put together, is here represented.



To use the chuck, bore a three eighths of an inch hole in a piece of plank, or in the end of a short stick of wood, the hole to be three-eighths of an inch deep. You now drive the wood on to the spur with a mallet, or, which is much better, force it up with

the screw of the back center, and then it is ready to turn; but previously put the loose nut on to the screw end of the chuck. Your work will rest against the large or small end of the nut, as you may wish it.

After turning your work, you force it off the spur by turning back the nut, and you can then reverse your work and turn the other side.

This is extremely useful for turning small patterns for the foundry; but I have used it for elaborate turning and machine cutting in hard wood, without the least shake. For very many purposes it is the most handy chuck I ever used. It is not necessary that the hole should go through the entire thickness of the wood, unless you wish to reverse it.

If any of your readers will take a short piece of pinion wire, and file the teeth sharp and a little tapering to make an entrance, then drill a hole in a piece of soft wood, drive in the pinion wire, and put the projecting end of the piece of pinion wire into a scroll chuck, they will get an idea of the efficiency of the "spur chuck."

E. J. W.

Lenox, Mass.

Gas Explosion.

MESSRS. EDITORS:—As I am suffering from a burn caused by the explosion of gas, it would be interesting to me to know your opinion in regard to the origin of the gas. I was at work on a copper cylinder four feet long by 16 inches diameter, with cast iron head; it was a dresser cylinder, used for drying yarn with steam, but had been used a number of years. Through the journals on each end is a half-inch hole to receive steam and let out condensed water. The arrangements in the cylinder being out of repair, I took off one of the journals. In doing this I took Tyler's burning fluid, composed principally of naphtha and suet, around the heads of four screw bolts, that were packed with lead and oil when put in; not a drop could possibly have got inside. The bolts being out and the journals fitting tight in a recess turned in the head of the cylinder, I put a little more around that to loosen them, also a few drops half way through the bolt holes to act between the journal and cylinder, to loosen them; after getting the journal off, it left about a three inch-hole. I rolled up my sleeves to my elbows so that I could get my hand in to adjust the scoop. After working nearly a half hour I took an oil lamp and in attempting to place it within the cylinder the gas that was within the cylinder exploded and blew the skin entirely from my arm between my wrist and elbow, and badly burned my hand.

There was about two quarts of water in the cylinder, which had been there since it was used. Now, was this gas produced by the fluid I used or could it be caused by this water becoming stagnant, and the two metals acting upon it or upon themselves, thereby producing a gas that would be so powerful as to make a report as loud as a gun? Can you give me the facts through your journal?

E. W. DEAN.

Norwich, Ct., April 30, 1866.

[To account for the explosive mixture it is only necessary to know that about an ounce of the naphtha got inside of the cylinder; this is the most plausible theory. The decomposition of water theory requires that the water of the cylinder should have been corrosive to iron. We have known of several similar accidents, where there was no doubt that naphtha or petroleum was the cause.—Eds.]

A Body Falling Through the Earth.

MESSRS. EDITORS:—Being a constant reader of the SCIENTIFIC AMERICAN, and having seen much on the subject in its columns, I would like to inquire of some of its readers that may know more on the subject than I do, what would be the shape of the line or figure described by a ball let fall through the earth from the equator, supposing the ball was to oscillate from side to side several times as it would in a vacuum?

A READER.

[It is not in the power of the present knowledge of mankind to answer this question. The motion of the ball would be modified by the rotation of the earth on its axis, by its revolution around the sun, and by the transitory motion of the solar system among the stars. It is probable that the motion of the solar system is in a vast orbit, the center being in the vicinity of the Pleiades, but the form of the

orbit, and the velocity of the motion are not yet definitely determined.

As the rotation of the earth upon its axis carries the surface at the equator from west to east with a velocity of about 17 miles per minute, a body having this velocity, dropped into a vertical hole, would soon come to parts having a less eastward velocity, and would strike against the east side of the hole.—*Eps.*

Confederate States Patent Office.

Messrs. Editors:—I made application to the Patent Office of the Confederate States, at Richmond, for an improved machine for turning irregular forms, for which a patent was granted me. The model and papers all went up, I suppose, in the evacuation and surrender. If the papers or model are in possession of the Patent Office at Washington, and if you can give me any information about them, I will be very thankful.

If it could be obtained I do not know whether it would be worth making application to the Patent Office at Washington, or not, under the circumstances. Please give me all the information you can consistently, with your views upon the matter.

JOHN L. HUDSON.

Cumming, April 25 1866.

[As much curiosity has been expressed in regard to the Confederate States Patent Office, and the records accumulated by that defunct institution, we have made some inquiries, the result of which is as follows: The Commissioner of the United States Patent Office, in June last, sent a commissioner to Richmond, Va., under the charge of Ex-Governor Farwell, of Wisconsin, one of the Principal Examiners of the Patent Office. He was furnished with orders from Major Generals Halleck and Terry, and thoroughly examined the matter, but without finding any specifications, drawings or models. They, together with the other records, are presumed to have been destroyed in the fire which desolated the city.—*Eps.*

How Taps are Made in New England.

Messrs. Editors:—In late numbers of the SCIENTIFIC AMERICAN, I notice several letters and answers about taps, their proper form, etc. In these matters of detail, I think the small shops of New England are well in advance of many large establishments elsewhere. The taps used here for threading nuts are made long enough to have a place turned down on each end to hold four nuts of the common thickness. The middle part is then threaded perfectly straight, after which the lathe is set tapering, and nearly all of the thread is turned away at the small end, while at the large end enough in number of the threads are left intact to insure a perfect size to every nut that passes over it. It is then fluted with four cutting edges, though for very small sizes three will do; the teeth are not made much "hooking" and the flutes, or channels, should be deep enough to prevent clogging by the chips from each nut. The teeth are cleared by filing on the back side.

These taps are used in a common lathe, and when made of good steel and well tempered, can be run at a comparatively high speed with no trouble from heating, if well oiled, and will thread thousands of nuts with no perceptible wear.

For almost every other work this form of tap is useless; the old way was to start the thread in the top of a hole, with a tapering tap. Then followed the plug tap with its few narrow flutes and formidable bearing of thread, and by dint of much labor it grubbed and tore its way to the bottom. All this is changed. We have learned better. We make a number of plug taps—say about a dozen—beginning as small as ever needed for that number of thread, and making the next one $\frac{1}{2}$ larger, and so on to the largest; making each one with its exact size in 8ths, 16ths, and 32ds. These, with several tapering ones to start them with, will embrace every size needed of that thread, and should not be tumbled about on a shelf or bench, or carried in the pockets of the workmen, to and fro, but arranged in a circle around a central knob in a handsomely turned block. They are then decidedly ornamental. The block can be carried to any part of the establishment, and the work easily and rapidly done, using one tap after another.

This method is of great advantage where the holes to be threaded are in a corner, or near a flange, necessitating a single one ended wrench. For this kind of work every possible form of tap has been made, but we find none so good, all things considered, as the square.

The form of thread is the strongest, and cuts easily, both backward and forward, and when old and dull, can be ground. The thread on each tap being about two diameters long, and cut a little tapering, the point being the largest, this will prevent binding like a wedge after the tap is worn by use. Two or three threads at the point must be chased smaller; they should not be squared quite down to a sharp corner. No tap should ever be polished between the threads after being cut, the peculiarly fine roughness left by a tool in cutting threads on steel being a decided advantage, filling its way through the work, making a smooth thread and preventing the sticky squeak so often heard in tapping hard substances.

Please excuse the length of this. It is by attention to these details that we are to arrive at that desirable, rapid working of iron, so slow at the best, which is to play so important a part in the advancement of civilization and the development of our country.

GEORGE E. FIELD.

New Market, N. H., May 2, 1866.

[We have no doubt but that our readers appreciate the value of these technical letters as much as we do. Nothing is more useful to all metal workers than an interchange of ideas relating to the practice of their trades. Though we may not always agree with the writers in all respects, we are willing to give them a hearing, and hope for a continuance of their favors.

We do not believe in making taps for Tom, Dick, and Harry to use, with odd thirty-seconds. We have seen great confusion from one man taking the wrong tap, while another cut the bolts or screws of the standard size. We have never found more reliable or better work for all purposes, than two taps will do—one taper and one plug.

A great mistake is made in drilling the holes for taps; but few consider it of much importance. Where a hole is of the right size the tap runs through readily; but where it is the least bit too small the bottom of the tap jams against the crown of the thread cut by it, and not only produces excessive friction, but injures it by straining.—*Eps.*

On Balloons.

Messrs. Editors:—I find in your last week's issue an interesting treatise on "Balloon Navigation," which gives much new information upon the subject. There is, however, a different point at issue in this question which is not given, and I should be pleased to be allowed to put on record some views given by a distinguished scientific engineer several years ago. The great primal trouble in the solution of air navigation arises from the persistency of aerobionts, in attempting to propel a balloon, a huge mass of a yielding nature wholly unadapted to the designed purpose. An elephant with wings in an apt illustration of what is attempted by balloon navigators. We find that the Almighty has given its inhabitants in other elements forms and powers perfectly adapted to its wants. "Man in designing vessels to navigate the waters, either by sail or steam, take as a guide the form of a fish, in its most essential details. So also in constructing bodies to navigate the air must we keep in view certain elements of form which we find in nature, and abandon the balloon system for a self-supporting and propelling combination. In other words, as birds raise themselves and move through air with their wings, so must the coming air propeller by its own mechanical power possess its lifting and propelling power combined. With a proportionately small area of surface in the body of the vessel, the resistance to air currents is very small, while the buoying and propelling power can be great and more immediate in its action."

While we have no motor which possesses the economy found in animals and birds, yet the present forces at our command can be applied to this principle with sufficient success to insure its further development. I venture the prediction, therefore, that balloon navigation will always remain an unsuccessful problem, while I am convinced that the principles of air navigation which I have given are ideas in

the right direction toward solving this interesting mode of traveling.

As these views possess much that is original, and of merit I would be pleased to have them put on record.

L. A. E.

New York City, May 9, 1866.

The Best Drill for Hard Wood.

Messrs. Editors:—Will some of the many readers of the SCIENTIFIC AMERICAN please inform me the best kind of drills, from $\frac{1}{8}$ inch down, for drilling endwise in hard and soft wood, from one to five inches in length, and to run perfectly straight.

West Meriden, Conn., May 6, 1866.

E. C.

Query for Painters.

Messrs. Editors:—I want to work at ornamental painting in oil colors, consequently must thin my colors with either naphtha or spirits of turpentine; but I cannot use either, as the smell makes me sick. Can you tell me of anything that I can use in their stead. The work is to be varnished, and the paint comes to no wear. I have heard say water and white vitriol was good.

J. S. C.

May 4, 1866.

How Does He Do It?

Locked up in a cell in the Henrico county jail, in Virginia, is a man named Chastain Hampton, who has been sent on by the justices on a charge of horse stealing. Hampton was fastened to the floor with an iron anklet, chain and ring, but in some mysterious way he smashed the anklet as if it was only a woman's garter. He was ironed again, with the same result as before; and so for seven times in succession did this thing happen, to the great bewilderment of the blacksmith who made them, who swears by hammer and anvil that Hampton must be the devil. No tools have been found in the cell by which the smashing could be done, unless they be concealed in his clothes, which, we believe, have not been searched. The clerk of the court, as soon as Hampton is left to himself, can hear the sound of his work in casting off his irons, which, by the way, it appears he does in derision of his keepers, and not with any view of making his escape.

[This is very hard to believe, nevertheless there are many strange things done in this world which seem impossible—the question is how does he do it?—*Eps.*

A New Scientific Toy.

There is a successor to "Pharaoh's serpents," called the "magic photograph." It is selling in Paris and London, in two envelopes; one containing pieces of white albumenized paper, the other slips of white blotting paper, of a corresponding size. One of the former is moistened with water, and a piece of paper from the other envelope, likewise wetted, is laid thereon when a beautiful photograph is immediately developed on its albumenized surface. Photographs have of course been printed in the usual manner on the albumenized slips, and then decolorized with bromic or iodic acid or some such agent; the other pieces of paper have been soaked in hyposulphite of soda, and the application of this reducing agent to the hidden photograph brings it again to view. The "serpents" emit a poisonous fume while burning, and the danger attending their use has driven them out of the market; but the "magic photograph" is safe as well as pleasant.

Gutta Percha Cement.

Dissolve a quantity of gutta percha in chloroform in quantity to make a fluid of honey-like consistence. When spread it will dry in a few moments. Heat the surfaces at a fire or gas flame until softened, and apply them together. Small patches of leather can be thus cemented on boots, etc., so as almost to defy detection, and some shoemakers employ it with great success for this purpose. It is water proof, and will answer almost anywhere unless exposed to heat, which softens it.

SEA WATER has a curious action on cast iron, converting it into a grey, porous mass, that grows rapidly hot in contact with air. Some canons fished up near Scotland became so hot that they could not be touched.

A VISIT TO THE OSWEGO STARCH WORKS.

The rapid progress of the American people in everything pertaining to the glory and happiness of a nation, is promoted chiefly by the grand idea of doing everything, not as good as other nations, but a little better, and on a scale that corresponds with the ambition of the people, foremost in liberty and in generosity of thought and application. It is this spirit that produced the needle threader and the sewing machine, when European savans thought such utopian ideas unworthy of a man's thought; the same spirit created ironclads superior to those produced by the genius and riches of Europe's potentates; the same that meets us wherever we turn within the busy boundaries of our Union.

Few ever reflect how needles, pins, or buttons are produced; being such common affairs, they seem hardly deserving of attention; nor will many be likely to bother their minds about the source and the manner of producing starch, that can be had at any grocer's for a few cents per pound, although it plays an important part in the wardrobe of the household, causing happiness or misery according to its timely or wrong application. As for the anxiety of mothers to have a good supply of arrowroot for their helpless darlings of "prepared starch for pudding," it is too well known to require even mentioning, and to explain briefly, how the progressive subject of the United States suggests that of pudding and starch, I would only say, that while we may justly be proud of a great many of our institutions, from our boot-blacks and newsboys, up to the boot factories in New England, and our newspapers all over the country, from the management of our endless farms up to that of our entire nation, we may also justly be proud of having the largest supply of raw material for the production of starch and of the largest factory in the world to producing the material in the most rational manner imaginable.

This factory is situated at Oswego, N. Y., on the river of that name, communicating by canal and lake with the great West and the busy East, while railroads in both directions afford all the benefits of those signal institutions.

With the exception of some flower mills this starch factory is the center of attraction of Oswego, for the substantial solidity of its construction, while the genius and capital lavished upon it are rarely equaled and never surpassed. The establishment occupies ten acres of ground, six of which are covered by brick buildings five stories high, one of which being surmounted by a tower gives it the appearance of a castle of by-gone days. This idea is increased by the high fire walls separating the factory from neighboring establishments, and the large ominous letters over the entrance, "No admittance." The spell of the ominous greeting above the entrance being broken by our gentlemanly guide, Mr. Thomson Kingsford, we entered the "old factory," erected by Mr. Thomas Kingsford in 1842, which was afterwards yearly enlarged until all available space was used up, and the "new factory," a few steps distant from the old one, was erected in proportions corresponding to the daily increasing demands of the establishment. At first sight the interior of the old factory reminds one of the man who "couldn't see the woods, there being so many trees in the way," such a profusion of tanks, and mills, and screens, and shafts with cogwheels and pipes meet the eye, in fact, a labyrinth of machinery, difficult for any one man to plan, and which could only be a result of periodical additions corresponding to the timely wants of the place. In the midst of this chaos of machinery iron pillars tower up, which support the grand structure; the pillars in the lower floors being fifteen inches in diameter and nearly two inches thick, decreasing in thickness and diameter as they rise to their elevated positions. On the top of each column iron branches spread out to support the tremendous weight of hundreds of tanks, filled with starch and water. Arriving upon the top floor, Mr. Kingsford had curiosity to know whether we easily got dizzy, and although the answer was in the negative, we thought it prudent to hold on to an iron rod while we looked down the "deepest corn bins of the world," five stories deep, crossed at different points by iron rods placed there for the better support or bracing of the structures, of which several are arranged side by side, having a

capacity of two million bushels of corn, this being the chief material used at the works for the production of starch. Capacious elevators are used to discharge the grain from boats into these receptacles, and to remove it again for the use of the works. The grain passes through enormous fan mills, where impurities that might endanger the mills, are removed. The grain passes right on to vats of enormous size, to be softened, so as to render the gluten and albumen more soluble, and enable the starch to be more easily separated from its impurities.

This process in former times occupied many days, even weeks, but it is now greatly facilitated. After this process the grain passes through a series of mills, consisting of burr stones, and heavy iron rollers, the works containing fifteen of the former, and six pair of the latter, which rattle away day and night unceasingly, changing the grain into pulp suitable for the extraction of the starch and its separation from the hull. This latter task is accomplished by a great number of screens or drum sieves, which perform their silent labors more perfect than human hands could do it even with the utmost attention and dexterity.

The refuse retained in the interior of the sieve drums, drops out at their ends freed from the white flour, the production of which is the object of all the heavy and intricate machinery employed. It falls through appropriate channels into vats, whence it is taken and used as food for cattle, being very nourishing, although not quite as fattening as the entire grain. The starch when washed out of the sieves, is deposited in vats, which cover several floors as far as the eye can reach, having a capacity of five million gallons. It now receives the washing of chemicals and water necessary for its purification, the latter being filtered for all purposes of the works, so that it is impossible either by accident or design to use anything but pure clean water within the establishment. Forty large force pumps are used, to supply the necessary quantity of water, and for pumping the starch water to its different points of destination. The pumps are supplied with hose on every floor, to be used as a guard against fire and are sufficient to throw torrents of water high above the works and to flood them in a comparatively short time, the entire machinery is run by the water power, afforded by the locality, while a steam engine of one hundred and fifty horse power is ready for use in very dry seasons. Shafts in parallel lines and on terraces at different heights, run through the entire length of the buildings over the vats, where the starch is stirred for the purpose of washing. The pleasing effect of these hundreds of wheels turning quickly and moving huge agitators in immense vats, filled with the heavy weight of starch and water or chemicals, apparently without any effort, can be better felt than described.

The purification of the starch depends more upon practical experience and personal skill than upon theory, and it is therefore superfluous, to say much on the process employed by Mr. Kingsford, who has the credit of being the very first who successfully produced corn starch in this country.

The purified starch has to be separated from the water, and for this purpose it is run into molds similar to those employed in the manufacture of glue, where it settles into solid cakes. From these molds the cakes are tipped out, broken into square pieces, which, after drying, weigh seven pounds, the size having been determined by long experience. These pieces are then placed into a brick kiln, where, at a low heat, the water is evaporated and the cakes are thus deprived of their impurities which appear in a yellow crust on the surface. As soon as this takes place, they are removed from their tropical resting place and scraped, which is done by hand with large knives. Freed from their yellow dress, the cakes are wrapped in blue paper and once more exposed to their turkish bath, where they remain until "dry crystallization," has taken place, i. e. the starch, and upon opening the paper it falls into crystalline pieces, in which form it is commonly sold.

The starch is then finished ready to be packed, which is done in different ways according to the quality of the starch and the purpose for which it is to be used.

The common grades of starch are packed into flour barrels and pounded in, in order to economize

space. This is done by hand as also the packing of the next better grade, called "silver gloss starch," which is placed in boxes holding exactly six of the packages as they are taken from the drying room.

These boxes are manufactured at the establishment in a separate building, containing a planing mill with all those accessory appendages for the successful accomplishment of its object. Four million feet of lumber are used annually in the manufacture of these boxes, the fastening of which consumes seventy thousand pounds of nails.

Next in order comes the corn starch for puddings, a good substitute for arrow root, for which it is frequently bought. This is put up in paper packages, tasty in appearance, by the dexterous hands of females, of whom a great number are employed in a separate building, set apart for the purpose.

Gypsies, searides, etc., don't seem, to have penetrated there yet, but the young ladies wear paper caps of their own manufacture, which protects their curls or waterfalls from the starch dust, floating about in the air.

The wrapping paper, used in this department, amounts to one hundred and sixty pounds a year. The number of packages put up during the day by any one girl, is on an average from fourteen to fifteen hundred.

In this department a machine for packing, or rather filling these paper packages with starch, deserves attention. It is one of the many patented machines of Kingsford, which ran a race with swift time. In the old manner the packages were filled by means of a square tin frame, and the starch was pounded in by hand. The dust created by this operation rendered the room similar to a grinding mill, while the loss of starch wasted in dust, was not inconsiderable. The new arrangement consists in a miniature mill or a series of mills, keeping the starch finely powdered. At the bottom of the paper is slipped over an attached metal frame corresponding in size and shape to the intended package.

The paper, by an automatic arrangement, is filled and pressed in a second, no dust arising, not even enough to soil the exterior of the packages. Another building contains a complete machine shop, where patterns of all the machinery used, are kept, so as to secure the works against any great loss of time by accident.

A spacious warehouse, four stories high, a separate building for offices, does not detract from the value and beauty of the works, where, with as much regularity as that of clock-work, twenty-five tons of dry starch can be turned out daily. The establishment gives employment to three hundred and fifty men, which, considering the great amount of labor-saving machinery, is certainly a formidable array.

As a cursory review of the works we may say, that the capacity of the mills is nearly a million of bushels of corn per annum. The coal used for the production of steam employed in the drying chambers, is obtained chiefly from Pennsylvania, and amounts to nearly three thousand tons annually.

The length of the shafting used in the works exceeds seven thousand feet, while nine hundred gear wheels constitute the clock-work driven by the untiring exertion of the Oswego river. Twenty-five thousand feet of gas pipe convey the steam through the drying rooms, while the length of those kept in readiness for use in the case of fire, measures over seven thousand feet. The amount of water the pumps can discharge through the same, is five thousand and four hundred gallons a minute, or three hundred and sixty thousand gallons an hour.

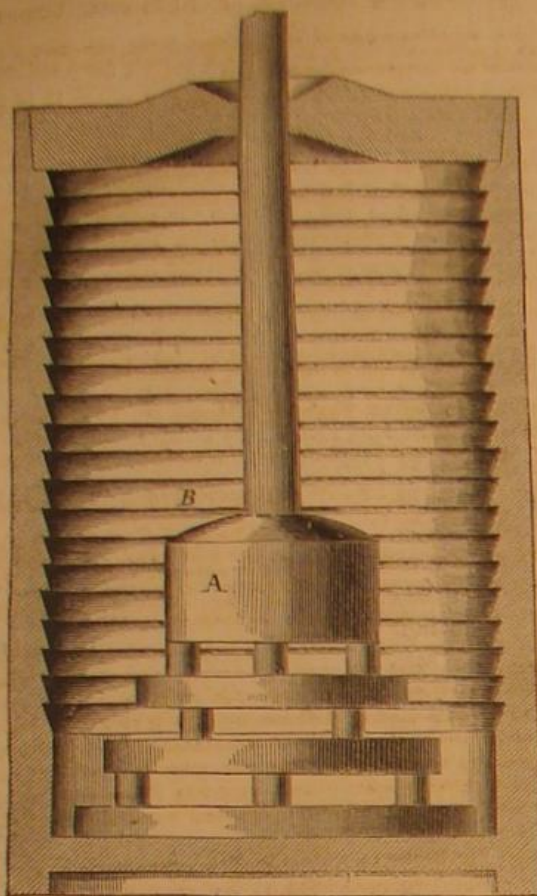
The gutters carrying the starch mixture to its appropriate receptacles, measure five miles in length, and give a fair idea of the extent of tanks and vats in the works.

The capital actually employed by the company, exceeds a million of dollars, which, in the face of the fact that they find always ready sale for all they produce, and have no accumulation stock on hand, is quite a desirable investment.

Although Piny mentions the production of starch on the Island of Obo, and Queen Elizabeth felt rather proud of the greenish yellow starch which stiffened her gorgeous ruffs, it was destined for the nineteenth century, and a little town of the Empire State, to show to the world perfection in this important branch of industry.

WHITE'S CHURN.

This engraving represents a new churn which would seem to be novel and efficient. In detail it consists of a dasher, A, which is an inverted hollow chamber, inwardly and outwardly of a pyramidal shape, having upon its exterior a series of steps diminishing in area. The walls of this dasher may be either open or pierced with holes for the passage of air and cream



to and fro as it is dashed up and down in the cream. In this way air is carried down with it at each stroke and the cream forcibly ejected through the holes in the dasher against the corrugated interior of the churn.

The interior of the churn is grooved or corrugated, as at B, to increase the friction of the cream thrown against it, and so aids in breaking the sack which contains butter. As the dasher descends, the cream, passing up through the central opening of each ring, is forced against the under surface of the one next above, and forcibly projected, as before, against the walls of the churn. The concussion thus produced has the effect before described.

The cream, in passing from one elevation to another during the ascent of the butter, is also subjected to the same action.

By this apparatus, under favorable circumstances, as regards temperature, etc., the butter may be produced and gathered in from two to five minutes.

An application is pending through the Scientific American Patent Agency by H. W. White, of Olney, Ill. For further information address him at that place.

SPECIAL NOTICES.

William McCord, of Sing Sing, N. Y., has petitioned for the extension of a patent granted to him on the 27th day of July, 1852, for an improvement in soaps.

Parties wishing to oppose the above extension must appear and show cause on the 9th day of July next, at 12 o'clock, M., when the petition will be heard.

Thomas Castor, of Philadelphia, Pa., has petitioned for the extension of a patent granted to him on the 3d day of August, 1852, for an improvement in dumping wagons.

Parties wishing to oppose the above extension must appear and show cause on the 16th day of August next, at 12 o'clock, M., when the petition will be heard.

Manufacture of Wafers.

The mode of making the best quality of wafers, as practiced by the English manufacturers, is as follows: Fine wheat flour is taken and mixed with white of eggs and isinglass into a very smooth paste; this is spread over the tin plates evenly, and dried in an oven, several of the plates being placed one over the

other to communicate a glossy surface to the wafers. When dry the sheets of paste thus formed are laid up in a pile, about an inch or more in depth, and cut into circular pieces by a hollow punch, which allows the wafers to pass up its tubular cavity and discharge themselves sideways as the cutting proceeds, which is effected with great rapidity. The variety of colors that are ordinarily communicated to wafers, is given to them in the paste, by the usual pigments in the dry powdered state, or previously dissolved in the water employed.

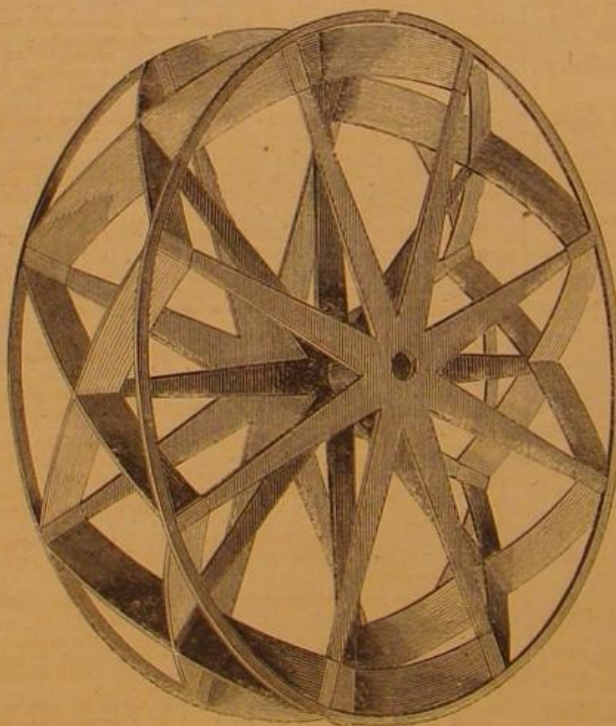
The French isinglass wafers, made in France, are formed of isinglass dissolved in water to the proper consistence, which is poured out upon plates of glass provided with borders, and laid upon a level table; to prevent the blue from sticking to the plates, a little ox gall, or other suitable material, is rubbed over them. Previous to the isinglass becoming quite dry, they are cut through along the borders. The leaves are then removed and cut out with hollow punches, as in the case of other wafers. The various colors are also communicated to them by pigments while in fluid state.

Improved Paddle Wheel.

Paddle wheels of the ordinary kind are objectionable from the quantity of water they raise behind and from the violent shock with which the buckets strike the water. It is argued that by disposing the paddles differently, so that the mechanical action is different, better results will be obtained.

This engraving shows a wheel designed to be more efficient than the ordinary wheel. To this end it has buckets placed diagonally across the face. They thus enter with little or no noise or jar, and leave the water freely, presenting no great areas of surface in a favorable position for raising the water behind.

A wheel constructed like this one is much stronger than the common wheel, requires less bracing, and is therefore lighter and cheaper.



CHOATE'S PADDLE WHEEL.

The proprietors and patentees desire to sell State rights or single rights for use on boats. It was patented through the Scientific American Patent Agency on October 10, 1865. Address Wm. Choate & Co., Newburyport, Mass., for further information.

THE BEAUMONT CONDENSING TEA AND COFFEE POT.

The almost universal use of tea and coffee affords a sufficient reason why any device to improve these beverages, or to reduce their cost, should and does command the attention and excite the interest of the public.

The art of making good tea and coffee, and the reason why so few excel in it, are not generally understood. The distinguished chemist, Baron Liebig, in a recent article upon coffee and its preparation, incidentally shows why the object sought is so seldom attained. After speaking of two methods of making coffee, viz., by filtration and infusion, he says of the third: "Boiling, as is the custom in the East, yields

excellent coffee," but, "if boiled long, the aromatic parts are volatilized, and the coffee is then rich in extract, but poor in aroma." Here, then, is the root of the whole difficulty—in making either tea or coffee, if the material be steeped or boiled long enough to obtain a large proportion of its extract, its aroma is disengaged or volatilized, and passes away with the vapor arising from the heated liquid.

That method or device, therefore, which shall in the most perfect manner condense and retain the



steam arising from the boiling tea or coffee in preparation for the table, must of necessity be the best method or device.

It is claimed for the article whose name heads this notice, that, in a greater degree than ever before attained, it does accomplish this object. With what degree of justice this claim is presented, our readers will be enabled to judge upon examination of the engraving and its accompanying description.

The body is that of an ordinary tea or coffee pot, with a cover or cap upon the spout. The filter, F, is a cup (with bottom of perforated tin) which can be taken out at pleasure, and in which the material is placed for steeping or boiling; this retains the grounds, and, in connection with the condensing principle, makes a clear beverage, without the use of eggs or other clarifying substance.

The condenser, C, is a movable cup, fitted to the top of the pot, to be filled with cold water when in use, formed of two cylinders; the inner one (closed at bottom and forming the cup) being connected with the outer one near the top, the space between the two cylinders forming the condensing chamber, c c, opening into the pot below, and having no other outlet; into this chamber the steam from the boiling liquid rises and is condensed upon the surface of both the inner and outer cylinders, and is thus prevented from escaping, thereby retaining the aroma, which indicates and in part forms the flavor of tea and coffee.

The proprietors claim for this invention great superiority in effectiveness—therefore in economy—on the ground that the condensing surface is much larger than in any other article for a similar purpose, this peculiarity making it highly valuable in the preparation of tea, the aroma of which is so much more delicate and difficult to retain than that of coffee.

It is also, as will be perceived, so simple in construction that it can be as conveniently used, as readily repaired, and as easily cleaned as any ordinary coffee pot.

For further information address the patentee, John Beaumont, Hartford, Conn., or the proprietors, Beaumont & Guernsey, New Britain, Conn.

We would call the attention of manufacturers and mill owners to the advertisement of the Gillespie Governor Co., of Boston, in another column. From the number of excellent testimonials we have seen from parties who have had this Governor in use, we are led to believe it possesses the qualifications the advertisements claim for it.

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SUPPLEMENT.

With the last four issues of the SCIENTIFIC AMERICAN, we have published a four-page supplement, which has been regularly sent to all our mail subscribers, and sufficient copies have been delivered to the American News Company to supply all those who receive their papers through agents. A supplement is also issued with the present number.

TAXING INVENTORS—AN UNJUST MEASURE.

On the 2d of May the House of Representatives was occupied in considering several different reports from the Committee on Patents, to which reference was made in our last number. The proposition of Mr. Chandler to authorize the Secretary of the Interior to appoint three commissioners to attend the Paris Exhibition, to report upon patented machines and inventions, at an expense not to exceed \$15,000, the amount to be paid out of the patent fund, was voted down. The subject, however, elicited considerable discussion. A bill was reported by Mr. Hubbard to allow the Commissioner of Patents to examine an application of Philos B. Tyler in reference to an extension of his patent for improved cotton presses. The question was debated by several members, and the bill was laid on the table. Mr. Jenckes reported a bill to pay Assistant Examiners for services rendered by them as Principal Examiners. This service was discharged at a time when the business of the Patent Office had greatly fallen off, and the Commissioner did not—in view of the then low condition of the patent fund—feel justified in raising the grade of service by appointing Principal Examiners to fill vacancies.

The funds now being ample, the Committee on Patents, backed by the indorsement of the Commissioner of Patents, unanimously recommend, as an act of justice, that the Assistant Examiners be paid out of the patent fund for the services actually rendered by them. Mr. Washburne, of Illinois, objects, a discussion ensues, and the bill is laid on the table.

Mr. Jenckes also reported a bill regulating appeals to the Examiners-in-Chief, providing that upon appeal from the Examiner to the Examiners-in-Chief, the appellant shall pay a fee of ten dollars.

Mr. Jenckes briefly argued the merits of the bill, based upon the assumption that the Appeal Board was overloaded with business, and that in view of the increased labor devolved on the Patent Office, there should be an increased fee.

This bill, by far the most objectionable one of the number mentioned, was passed without opposition or debate.

Such is a brief summary of one day's legislation in the House on matters relating to the Patent Office. Out of the surplus fund of the Patent Office, now upwards of \$130,000, it was proposed to create a scientific commission of three persons to visit and report upon the great French Exposition, thus adding vastly to the stores of technological science in the Patent Office. Out of the same fund it was also proposed to pay Examiners for services actually performed. Neither of these propositions could receive favorable consideration. No new taxes were to be levied to meet these expenses, and no appropriations from the funds of the Government were called for. The inventors—the applicants for patents—had supplied all the funds that were necessary to meet the expenses proposed, and after these charges were all paid, the Commissioner of Patents would then have upwards of \$100,000 surplus to the credit of the fund. When the proposition comes up to tax inventors still higher for the privilege of having their claims properly examined and disposed of, not a single member raises his voice against the unjust measure. There was no squeamishness on the subject. The whole thing was rushed through apparently without consideration on the part of the House. Where was Mr. Washburne at this important juncture, that he did not interpose his usual objection? We fear that he was absent just at the opportune moment, when Mr. Jenckes moved the previous question. Where was Mr. Harding, of Illinois, who was instrumental in breaking down the bill to pay Assistant Examiners by interposing a comparison which was as foreign to the subject as possible—and who was so sensitive about our "grinding and ponderous taxation," and expressed himself in reference to another bill, that he was "unwilling to add another dollar to our obligations unless it be for a measure of great national importance"?

At the time when Judge Mason assumed the duties of Commissioner of Patents, he undertook to hear and decide all cases of appeal. The labor thus self-imposed, though extraordinary, was thoroughly performed. But when Mr. Holt entered upon his duties as Commissioner, he soon found this labor perfectly herculean. It was impossible for him to attend to all appeal cases and discharge the usual functions of his office; and, with a view to relieve himself of such accumulations of labor which no one man could perform, he constituted out of his examining force a temporary Board of Appeals. This arrangement continued until the passage of the amendment act of March 2, 1861, which created a permanent Board of Examiners-in-Chief, to be appointed by the President; to which all appeals were to be taken. According to the last Annual Report of the Commissioner of Patents, 10,664 applications were made for patents in the year 1865, of which number 4,048 were rejected, and only 495 appeals were taken to the Board. We ask Senators and Representatives to consider whether this small number of appeals taken would indicate that many of them could justly be regarded as frivolous?

Let them also consider that for a considerable period of the year 1865 there were two vacancies in the Appeal Board, occasioned by the resignation of Messrs. Coombs and Theaker, leaving Mr. Hodges alone to hear and decide such cases. Is it right that inventors, who do not usually belong to the moneyed classes, should be taxed \$4,000 or \$5,000 a year additional to have their claims properly adjudicated at the Patent Office?

If this bill passes, applicants for patents, whose claims are rejected, cannot appeal either to the Examiners-in-Chief or to the Commissioner of Patents without paying an extra fee. They are to be charged for appeal from the erroneous decisions made by Examiners.

We say there is no justice whatever in such a proposition. If the existing patent fees were insufficient to meet the current expenses of the Office, the argument would be against our position; but as the matter now stands, we cannot but consider the proposition as a flagrant injustice.

Mr. Morrill, in his recent able argument in behalf of the tax bill, spoke energetically against all unnecessary taxation. We all admit, we all feel, the strength of his position. We therefore protest most earnestly against this additional levy of an unnecessary tax upon inventors. They do not need this extra squeeze.

DISINFECTANTS AND THE CHOLERA.

There is a very great demand at the present time for disinfectants; one would think from reading the advertising pages of the newspapers that there is nothing now more needed in every family. The old favorite chloride of lime, since the cholera advent, has been in such request that its price has advanced twenty-five per cent, and there is a probability that its present price will be doubled before the summer is over.

But happily we are not dependent upon chloride of lime; in fact, we may easily dispense with it altogether. The intelligent man who has made up his mind that his premises shall be more tidy, and that he will breathe only the sweet air, will not be required to resort to chloride of lime or any of the high-priced nostrums.

We submit, in the first place, that water, air and fire are excellent disinfectants, which cost very little, and are within the reach of every one. These are the natural remedies, and are almost universally applicable. It is very observable in this city that when these are properly used there is no need of chloride of lime. The better class of houses, containing all the modern improvements, are so constructed, that unless the occupants actually choose otherwise to have it, the air within them cannot be tainted. Everything that is not desirable to have around is at once started on its way, through the sewers to the sea, or up the tall chimneys into the upper air, to be dissipated by the winds. The Croton water and the ventilating chimneys here are the purifiers.

How different it is in and about some of the tenement houses, where everything is reeking with filth and alive with vermin. In front of these houses almost constantly you may find pools of stagnant water and boxes of decaying garbage. A blind man might walk through the streets, following only his nose, and unerringly point out all the places to which pestilence is invited. What these places need are water, air, and fire. One of the wisest acts of our very efficient Board of Health, was the removal, a few days since, of the inmates from one of these pestilence-breeding houses, which they then surrendered to the Fire Department for purification by water.

What our old-fashioned and modern cheap houses need, are better conveniences for washing and ventilation. In a large part of them, there is either imperfect connection with the sewers or none at all, and very few of them have any provision whatever for ventilation. Granted that the people who live in them care very little for cleanliness, would it not be well to so build the houses that cleanliness might be the easiest plan, or at least might be possible?

We have alluded to garbage, meaning by it, the worthless relics of vegetables and meats which of necessity are produced in the kitchen. The very simple and economical way of disposing of much of this, in this city, at least, is to put it into the fire. There is no easier place, and there is no nuisance about it. One would suppose from the quantities of such stuff which lies about the streets, that the fact that it will burn had not been discovered. It might perhaps be well for city councils to discuss the propriety of enacting laws which should require that all combustible garbage be consumed within the same building where it is produced. In the winter time, at least, when fires are constantly burning, everything which cannot be carried away by the sewers, might be burned up.

It is only where water, fire, or ventilation is inapplicable, that special disinfectants should be used. The cases of most importance, in the city, are water closets, which are not properly connected with the

sewers, and stables. The most available disinfectants for the first, are lime, chloride of lime, or common copperas, either in solution or powder; there is nothing so cheap as copperas which is at the same time efficient. For stables and similar places where the iron stains from copperas might be objectionable, the bisulphite of lime or soda ought to be furnished at a cheap enough rate.

The question of disinfectants involves the old story about cleanliness; "cleanliness is next to godliness." If people understand it, they will find as much virtue in the scrubbing brush, the whitewash brush, and soap and water, as in almost anything else.

THE FAILURE OF THE MACHINERY OF THE NEW SCREW FLEET.

The mismanagement of the Chief Engineer of the Navy, to use a mild expression, has long since become proverbial, and the practices of the Bureau is used as a byword in the scientific journals abroad. Some proofs of the incapacity of this man, who has designed the machinery for an entire navy on new-fangled theories of his own, condemning the designs of other engineers, have recently been brought to light which the affidavits of a thousand contractors and "experts" in the interest of the Steam Bureau, cannot cover up or gloss over.

It will be remembered by our readers that Mr. Isherwood caused the engines of the U. S. steamer *Pensacola*, designed by E. N. Dickerson, to be removed and replaced with a pair of his own design, even to the most minute detail. These engines have just been tried, and on the short trip from Baltimore—where they were built—to this port, have proved a complete failure.

On this short trial the cylinders were so cut as to require re-boring, the crank-pin journals were ruined by the extraordinary heating and consequent cutting, and the "brasses" had to be transported to the machine shop for re-boring. The crank pins are now being filed and scraped as near round as it is possible to get them, by means of the most expert mechanics the navy yard can command. The main bearings are so cut up that it is quite possible it will be necessary to renew them also.

In short, these new engines, planned by Isherwood for the *Pensacola*, in place of those he caused to be condemned and removed, have proved inefficient.

The *Pensacola*, it should be observed, was propelled to New Orleans, and through the ever-memorable passage of the forts which defended that place, with a pair of "condemned engines," while those which the chief of the Steam Bureau has planned to replace them, cannot propel the ship from Baltimore to New York without having repairs put on them which would disgrace an engine which had seen five years' service. It should also be borne in mind that the naval engines were constructed by Hazlehurst & Co., of Baltimore, one of the most careful and successful marine engine building firms in this country, and their construction in each stage was rigidly inspected by an engineer selected by the very man who planned them. If we were called upon to chronicle the fracture of any particular part, it would be difficult; but the defects of these engines are not due to either workmanship or material, but solely to the ignorance of first principles of the man who planned them. If a connecting rod, a crank shaft, or even the cylinder itself, had been fractured, it could easily be accounted for by defective materials; but when we find that on such a short trial, not only on the principal bearings of the engine are so completely worn out and cut to pieces, as to require renewal, but that the main cylinders themselves have to be re-bored at enormous expense and great delay, it is very plain that nothing less than the fact that the design is wrong will explain the matter.

Nearly every rule of screw engine construction, as proved by theory and practice, and adopted by all successful builders in the world, has been violated by him who presides over the steam branch of the navy.

Again, if it was simply one more Isherwood engine which has failed, we should pass it with a mere mention, but when it is remembered that *twenty pairs* of engines, on precisely the same plans as those which have just proved their worthlessness in the *Pensacola*, are now in process of construction for the new screw fleet, in the various engine building establishments on the Atlantic coast, it is quite a different matter;

for it one of these engines, and that one, too, built by one of the oldest and best establishments in the country, under guarantees which Isherwood squeezed into a contract, and the construction superintended by an inspector of Mr. Isherwood's appointing, who examined every detail with microscopic care before it was put in the engine, fails, it amounts to demonstration that the rest will follow suit.

Furthermore, when it is stated that the contractors, experts and engineers bolster up the worthless structures they are peculiarly interested in—notwithstanding which the engines stubbornly refuse to violate the laws they were built to defy—one may form a tolerably correct idea of the extent of this failure.

So alarmed was the chief of the Steam Bureau at the result in the *Pensacola*, that he posted in hot haste to New York, not only to push forward "without delay," the tinkering-up of the pioneer engine of the new fleet, but further and of greater importance to have the repairs carried on with the utmost secrecy; and he succeeded so well in the latter direction, that although the rejuvenation of his last exploit has been progressing for some time at the navy yard, it was only a day or two since that we had a chance to look at it—and a sorry spectacle it was.

Of course there is no reason to suppose that this engine will operate any better after it has been put again in the same condition that it was in when it started.

The Isherwood engines of the larger sloops of the *Wampanoag* class, in addition to defects peculiar to themselves, possess all the defects of those just alluded to, increased in proportion to their greater size, hence their failure may be expected to be even greater than that of the *Hassaloo* class, of which the Isherwood machine now in the *Pensacola* is an example.

PERPETUAL MOTION.

In our last issue we gave a letter and a diagram from a correspondent which illustrated a plan for a perpetually moving machine invented by a person in Vermont. The number of people engaged in chasing this mechanical "will o' the wisp" far outnumbered those sanguine mathematicians who have, or are just about to, "after years of toil" square the circle.

Surely any one, who did not wish to be deceived, could see that the machine alluded to at the beginning of this article was impractical. Six balls connected to levers jointed to the periphery of a fly wheel were so attached to each other by cords, that the centrifugal force of the balls generated in revolving the wheel one way would draw in the other balls on the opposite side and thus cause a preponderance of weight which would turn the wheel continually after it was once started. But, as our correspondent says, the balls did not fall out as they ought to have done, or at the proper time, and the wheel stood still. Undoubtedly there have been many more plausible schemes than this. An industrious German of our acquaintance after working hard for years accumulated quite a handsome sum to buy a home wherein to pass the winter of his days in peace and quietness. Unfortunately he dreamed one night that he had invented a perpetual motion. He acted on this dream. He bought a foot lathe, set it up in his bed room and worked on it in the intervals before and after his daily task by which he earned his living. He was not a poor mechanic by any means, but a man of first rate abilities, and he made a machine so near to a perpetual motion that he thought the next one with a few alterations would be "the long sought after."

He became so engrossed with this impossibility, that he absented himself from the shop and neglected his work so that he lost his place that he had filled for years. If any one asked him how his machine was getting on, he would answer cheerfully. "Oh, first rate, it runs ten hours now; I am going to put on another fly wheel and a pinion, then it will be done."

Fly wheels and pinions he was continually adding; now gearing the speed up, then letting it down, of course adding just so much labor to the main driving force and getting further and further from his ideal.

The machine got so full of fly wheels and pinions at last that he was obliged to shore the floor of the house up lest it should fall into the cellar.

One day the horrid truth came upon him with full force that he was a ruined man; that the more fly wheels he put on the worse he was off, and he fled to that resource of all cowards—rum—and drank himself to a sot.

Those who study this delusion are like travelers lost in the woods. They move in circles, and end where they began.

A force that will generate itself and move another force must be greater than itself; which is contrary to common sense and mathematics.

How many are there at this time floundering on this mechanical "bridge of asses?" How many are there whose minds are full of levers, springs, toggle joints, and balls that only need an impulse to set them in motion to swing through space forever, as the planets swing in their orbits? Not a few; sorrowfully we say not a few, because it is painful to see energies wasted on chimeras when there is so much real work to be done in the world.

TAX FOR EQUALIZING BOUNTIES.

The Secretary of the Treasury, in a letter to David A. Wells, Esq., Chairman of the U. S. Revenue Commission, states that the equalization of soldiers' bounties will require an expenditure on the part of the Government of from two hundred to three hundred millions of dollars. The Secretary wishes to know if the resources of the country can bear this additional debt, which will require an additional annual payment of interest of from fifteen to eighteen millions.

Mr. Wells, whose intimate knowledge of the taxable resources of the country is probably superior to that of any other citizen, replies in a very able letter, that, to meet the financial wants of the Government in the present critical period of our experience, and to guard our future prosperity, require that we borrow no more money—that to make this increased debt would require the re-adjustment of the present system of taxation, and the imposition of taxes upon many articles which would seriously affect the interests of the laboring and producing classes.

It is the purpose of the Government to lay a tax, so far as it is possible, upon articles usually regarded as luxuries, and to exempt such as are regarded as necessary for the wants of the people. This is the true theory, and is the one that has hitherto been urged in the SCIENTIFIC AMERICAN.

We publish in another column the estimated reduction in the internal revenue taxes, as reported to the House of Representatives.

The Locomotive Improved by Practice, not Theory.

Zerah Colburn in his excellent work on the locomotive, now publishing in England, and in this city by John Wiley, 535 Broadway, makes the following sensible remarks:—

It has been a favorite practice with writers upon the locomotive engine to deal with it geometrically and with reference to its dimensions. For the useful purpose of railways, however, even more depends upon the excellence of its structure; and it may be said that the stanchness of the boiler, the hardness of the cylinders and valve faces, the strength of the cylinder castings, and the general soundness of the engine as a whole, have really more to do with its successful working than any abstract consideration of "heating surfaces," and many of the quantitative refinements so often insisted upon. Even the geometrical accuracy desirable in the valve gear is important rather from what experience has shown than from any precise demonstrable relation to the motion of steam. To this day successful locomotive engineering owes far more to practice than to theory; and it should never be forgotten that the best proportions of locomotive engines, so far as engineers are agreed upon which are best, have been discovered by practical men, with little or no aid from theory, except in so far as theory may in itself be considered as the generalization of successful practice.

Work for Boys.

The *Northern Farmer* gives the following hints which may interest some boys who read the SCIENTIFIC AMERICAN. We think, however, that it is a mistake to set boys at work they don't understand, for they often spoil it and get scolded. The fault in such cases lies with those who gave them the work, for the nature of it ought to be explained beforehand. This the paragraph below does:—

"Now is the time for you to do something! We

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening last, May 3d, 1866, the President, Prof. S. D. Tillman, in the chair.

SMOKE CONSUMING STOVE.

Mr. Cochran presented to the Club a model of a smoke-consuming stove, constructed on the principle of Sir Humphrey Davy's safety lamp, a wire gauze of the size known as No. 11 preventing the rapid egress of the products of combustion, which in this manner were forced into longer and more intimate contact with the atmospheric oxygen which finds access through the ash pit, as in common stoves.

At a distance of two inches behind the grate bars a vertical partition of iron rises, between which and the outer shell of the stove the gases of combustion have to rise after passing the wire gauze in the lower part of this partition. The latter has a damper on the top, which is opened when soft coal is burned, when an increased draft is desirable. In such case, Mr. Cochran remarked, the gases burned entirely and left coke behind, which was afterward slowly consumed, producing considerable heat. A great fuss on the merits of this invention ensued, some thinking it more disadvantageous than otherwise.

ARTESIAN WELL BORER.

Mr. Walter Hyde next exhibited a model of a boring machine, adapted for artesian wells.

A continuous turning motion in one direction as well as the C-shaped drill formed its principal features. The former is accomplished by a swivel, suspended on a log chain. The swivel turns and twists the rope during its descent. As soon as the drill reaches rock, the swivel returns to its original position, and is ready at the next stroke to impart again the twisting motion. Another peculiarity of the same was a small pinion, facilitating the raising the heavy drill with but a small expenditure of force. The largest holes drilled were $4\frac{1}{2}$ to 6 inches in diameter.

MOUNTAINS WEARING AWAY.

Dr. Stevens spoke about the forces active in the formation of our mountains and valleys with special reference to the tract of land extending from New York State through Pennsylvania down to Delaware, of which section he presented charts, showing the Alleghany mountains, the Susquehanna coal fields, from which, according to best evidences, from 6,000 to 15,000 feet in height had been removed in the course of time.

ROOFING.

The subject of roofing, as selected for the evening, was then taken up. Mr. Robinson presented some samples of paper felt, saturated with coal tar, which was prepared by him in the following manner: He passes two sheets of the paper through a pair of iron rollers, while the surfaces of the paper in contact were fed with the bituminous composition which cemented them together. This double sheet was passed again through a set of rollers, where a third sheet under the same circumstances was cemented to the first two, producing a triple elastic waterproof sheet about one-eighth of an inch thick, which had some advantages over ordinary roofing felting. Among the latter it was stated that common felting made from woven fabrics, was not only more expensive than paper felting, but the pitch in the course of time generally passed through the meshes, exposing the cloth to the destroying influences of atmospheric changes. The paper being dense was impenetrable to the pitch, especially as the successive layers afforded a relative protection to each other. The paper for this purpose was made from the refuse material of paper mills, and answered the purpose as fully as a better grade of paper.

Mr. Robinson's machine could produce a mile of this paper in a day, its width being two feet. The bituminous material used consisted of coal tar or Trinidad pitch, containing sixty per cent of earthy matter, chiefly clay, although lime and fine sand had been used to advantage. In some roofing cements the proportion of earthy matter had been in-

creased to eighty per cent, which rendered it less inflammable.

In using this paper felt it was not necessary to use any gravel, which by its great weight, and in some localities by its scarcity, was found impractical. But it was a good practice to cover the paper with fine sand, although this was not necessary. Heat or cold had but little effect upon this paper, it being somewhat elastic, which prevented the bulging up, so frequent with tin roofs in summer, or the cracking of the same material in winter.

The paper has always to be laid upon smooth surfaces. Some attempts to cover damaged shingle roofs with it without removing the shingles, proved failures, the uneven surfaces of the shingles soon tearing the felting.

NEW INVENTIONS.

Organ.—This invention is what may be termed a "composition board," in combination with the keyboard or keyboards of an organ and with suitable buttons or finger pieces, in such a manner that by the aid of said buttons and "composition board," the player is enabled to put on or take off any desired combination of stops, without raising the hand from the keyboard. The composition board consists in a series of longitudinal and transverse slides and elbow levers, arranged in relation to each other and to a series of pneumatic levers connecting with the drawstops of the organ, in such a manner that by the action of each of the transverse slides one or more stops are opened and also one or more closed, and any desired combination of stops can be drawn out or pushed in by a simple pressure of the thumb or finger on one of the buttons or finger pieces. Instead of operating the valves of the pneumatic levers by means of the slides of the composition board, they may also be operated by a pedal which acts on a roller furnished with wipers, which by the intermediate action of suitable forked levers transmit the motion of said rollers to the stops. The pedal is provided with a spring pawl, which can be made to catch in the teeth of a serrated standard, and according to the position of the spring pawl, one or more of the pneumatic levers are brought into or out of action, and one or more drawstops of the organ are drawn out or pushed in. In organs with two or more keyboards, a spring button or finger piece is provided, which connects with a working spring catch and working lever in such a manner that by pressing in said spring button the position of the coupling is reversed; that is to say, when the keyboards are uncoupled, the operation of coupling the same is effected by a simple pressure of said button, and vice versa. Wm. Robjohn, New York City, is the inventor.

Sofa Bedstead.—This invention relates to a new and useful improvement in a sofa bedstead for which Letters Patent were granted bearing date February 21st, 1866. The improvement consists in a modification of the construction of the device, whereby the back surface of the cushion, which is in an elevated position and forms the back outer or rear portion of the back where the device is adjusted for use as a sofa, may be protected by a back board and preserved from abrasion and wear. The improvement also consists in a novel arrangement of the seat, cushion, clothes receptacle, and foot board, whereby a much more convenient as well as a neater and more ornamental piece of furniture is obtained. J. F. C. Pickhardt, New York City, is the inventor.

Low Water Detector.—This invention relates to certain improvements on a low water detector known in the trade as Ashcroft's patent Low Water Detector. This detector consists of a tube rising vertically from the boiler and terminating on its top in a spherical air chamber. From this vertical tube extends a horizontal arm which is closed at its outer end and from which rises a steam whistle. The channel leading through this horizontal tube, and forming the communication between the vertical tube and the steam whistle, is closed by a disk of easily fusible metal, and a stop cock in the vertical pipe serves to open and close the communication between the upper portion of said pipe and the steam boiler. By the improvements which form the subject matter of this present invention, the construction of this instrument

is considerably simplified, its cost reduced, and its operation improved. G. W. Hewett and J. B. Haley, Cincinnati, Hamilton county, Ohio, are the inventors.

Hand Power Loom.—This invention consists, among other things, in a novel mode of constructing and operating the treadle shaft and the treadles which depress the heddles so as to form the shed at proper intervals of time. The shed is made at the forward movement of the lay, the treadle shaft, through whose revolution the shed is made, being turned by a pawl set on the axle of said shaft, which pawl engages ratchet teeth formed on an end of the shaft, and is moved backward and forward with the lay, thereby rotating the shaft the distance from one ratchet tooth to another, and opening the shed in the warp. A Carter and R. Spake, Salem, Henry county, Iowa, are the inventors.

Combing Bristles.—The object of this invention is to prepare a machine for combing bristles and hog's hair. The bristles or hair are clamped in a frame which is reciprocated in a horizon plane so as alternately to approach and recede from reciprocating combs which operate on the bristles and straighten and clean them. The frame that holds the bristles is also capable of being moved to and fro transversely to its regular reciprocating motion, in order to change the position of the mass, with respect to the combs. The extent of the regular reciprocations of the frame can be changed by an adjusting screw without stopping the working of the machine. The combs are two in number and are set opposite to each other in the same vertical plane, being made to approach and recede from each other by means of eccentrics placed on the same shaft that drives the frame in which the bristles are held. The bristles are clamped to their frame by means of an eccentric roller and a movable plate that rests on them. Louis F. Lannay, Indianapolis, Marion Co., Ind., and William F. Parks, Baltimore, Baltimore Co., Md., are the inventors.

Steam Hammer.—First, this invention consists in attaching to the rear end of the hammer helve, by means of any suitable joint, one end of the lever, turning upon a fulcrum, and connected at its opposite end to the piston rod of the engine, so that the upward movement of the piston, within its cylinder, shall thereby raise the outer or hammer of the helve, which then falls not only from its own weight but also aided by the downward movement of the piston, striking and hammering with great force the iron or other metal placed upon the anvil. Second, attaching the lever to the hammer helve, by means of a joint, that will permit of the helve being adjusted with regard to the same, so that its hammer can be set in the proper position to hammer the metal to a level or any other desired shape. Third, connecting the lever or hammer helves or their shafts, with the valve or valves of the piston cylinder, by means of an arrangement of devices, susceptible of adjustment with regard to each other at pleasure, whereby a greater or lesser movement is given to the valves of the piston cylinder, consequently producing a proportionate increase or decrease in the upward movement of the piston within its cylinder, and thus regulating the height to which the hammer is lifted before falling, as may be deemed desirable or necessary. Edgar L. Kinsley, Cambridge, Middlesex Co., Mass., is the inventor.

An indestructible ink, which would be very useful for some purposes, may be made thus:—Dissolve thirty grains of sugar in thirty grains of water, to which add a few drops of concentrated sulphuric acid. Upon heating this mixture the sugar becomes carbonized by the acid, and when applied to the paper it leaves a coating of carbon which cannot be washed off. This stain is rendered more perfect by the decomposing action of the ink itself upon the paper, and thus it resists the action of chemical agents.

PLATINUM, being a soft metal, is not fit to receive a sharp edge for any practical purpose, except when subjected to a violent current, which instantly imparts to it a hard temper, similar to that of steel, but this hardness ceases with the current that produces it. At a white heat (1500 deg. Cent.), produced by electricity, a platinum blade will cut the flesh through in an instant, and its action may be regulated at pleasure by modifying the temperature.

The Tax Bill—Estimated Reductions.

The following is an official statement of the estimated reductions in the Internal Revenue Taxes as reported to the House of Representatives by the Ways and Means Committee:—

Animal Charcoal.....	\$3,000	Productions of stereo-	
Alum.....	3,000	typers, electrotypers,	
Beeswax.....	3,000	lithographers, and	
Barrels, Casks and Boxes	250,000	engravers.....	60,000
Brooms, slabs, and loops.	60,000	Photographs.....	25,000
Boots and shoes.....	4,400,000	Plows, cultivators, har-	
Brass, rolled sheet copper,		rows, straw and hay	
sheathing, and yellow		cutters, planters, seed	
metal.....	700,000	drills, horse-rakes,	
Building stone of all		and winnowing mills	1,500,000
kinds, burrstones and		Paints and colors.....	50,000
grindstones, monu-		Putty.....	40,000
ments, roofing slate,		Paraffine oil and crude	
slabs, and tiles.....	400,000	petroleum.....	2,100,000
Brick, draining tiles, and		Quinine, morphine, etc.	12,000
water pipes.....	282,000	Repairs.....	730,000
Bichromate of potash....	30,000	Railroad chairs, ship	
Blue vitriol and copperas	20,000	spikes, axe poles,	
coffins and burial cases..	50,000	horseshoes, rivets,	
Crucibles.....	10,000	horseshoe nails, nuts,	
Crates and baskets.....	15,000	washers, bolts, vises,	
Crutches, artificial limbs,		iron chains, anvil, etc.	
eyes, and teeth.....	25,000	anvils.....	350,000
Copper, lead, and tin.....	40,000	Roman and water cement	
Clothing.....	11,600,000	and lime.....	144,000
Feather beds, mattress-		Starch.....	100,000
es, etc.....	125,000	Saleratus, soda ash, caus-	
Fertilizers of all kinds....	100,000	tic, caustic soda crude	
Flasks and patterns.....	5,000	soda, bicarbonate of	
Gloves and mittens.....	30,000	soda, etc.....	50,000
Gold leaf and foil.....	32,000	Soap.....	30,000
Hulls of ships and other		Steel.....	300,000
vessels.....	500,000	Spelter.....	10,000
Hemp and jute, prepared		Sulphate of barytes....	30,000
for textile purposes....	25,000	Spindles and castings for	
Hubs, spokes, felloes,		locks and machinery	300,000
handles (wooden) for		Stoves, in part of cast	
tools and implements		iron and sheet iron,	
Income increase of exem-		or soap-stone.....	50,000
tion from \$500 to \$1,000	3,000,000	Sails, tents, awnings and	
Income reduction from 10		bags.....	125,000
per cent. to 5 per cent.		tin cases.....	25,000
on sums over \$10,000....	17,000,000	Umbrellas and parasols.	111,000
Iron, advanced beyond		Vegetable, mineral, and	
pigs, slabs, and loops....	400,000	fish oils.....	600,000
Iron, railroad, re-rolled..	582,000	Value of bullion used in	
Iron, pig.....	2,000,000	wares and watches....	20,000
Iron, railroad, re-rolled..	426,000	Vinegar.....	50,000
Iron castings for bridges.	100,000	White lead and whiting.	78,000
Iron malleable.....	100,000	Yeast powders, yarn and	
Keys, actions and strings		warp.....	400,000
for musical instru-		License.....	13,000
ments.....	125,000	Naphtha.....	5,000
Lamps and lanterns.....	50,000	Slaughtered animals....	1,200,000
Moldings for picture		Schedule A.....	1,339,000
frames, etc.....	5,000	Schedule C (Receipts)...	200,000
Mineral waters, etc.....	125,000	Freights.....	4,890,000
Mineral Coal of all kinds.	1,250,000	Salt.....	200,000
Metallic nickel, quicksil-		Soap, additional.....	300,000
ver, manganese, co-		Steam engines, etc.....	350,000
balt, etc.....	12,000	Tobacco.....	650,000
Metallic zinc.....	50,000	Tobacco sales.....	500,000
Masts, spars, and ship		Savings Banks.....	50,000
blocks.....	45,000	General Tax reduced	
Oxyd of zinc.....	60,000	from 6 to 5 per cent....	12,000,000
Paper, books, charts, and		Telegraphs.....	125,000
book-binding.....	2,072,000		

UNESTIMATED ARTICLES.

Bristles, Flavouring Extracts, Deerskins, Oakum, Verdigris, Illuminating gas, educational institutions, etc., etc.,	Paintings and statues, and groups of statuary, etc., Aniline colors, Bleaching powders, Tar, turpentine, Candle wicking.
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O. C., of Mass.—To bronze statues make green the following dip or wash. Wine vinegar, 2 qts; verditer green, 2 ozs.; sal ammoniac, 1 oz; salt, 2 oz; alum, ½ oz; French berries, 8 oz; boil all together and apply.

O. F. D. & Co., of Ohio.—You should not ask us to ascertain the relative power of your steam engine and find out what size water wheel will do the same work. Address any civil engineer and pay him a fee for doing it.

J. S., of Ill.—Although the conditions which affect your steam boiler may seem mysterious, depend upon it there is some cause which can be found out by patience. We don't believe in the mystery business. Is it not a change of the wind? Some boilers make steam freely when the wind blows in one direction, while in another they are almost useless. Observe and see. If this is so, you can remedy it by resetting the boiler. The scale you send us appears to be a strong alkali. Have you used anything to loosen it?

O. N. R., of N. Y.—We know of no way of removing India ink, except by making new flesh, cauterization, burning it with a hot iron will do it, but the result will be a scar.

E. S., of Ohio.—If paper be immersed in a strong solution of chloride of zinc it becomes converted into a species of vegetable parchment which is not easily wetted by water. The solution has a similar effect on cotton cloth, but we have not seen the recipe to which you allude.

D. B. of Bath.—“Would it be possible to set two iron rollers, with perfect surfaces, so closely together that, by rolling cream between them the membrane containing each globule of butter would be broken, thus requiring a slight stirring to unite the globules into a mass?” Yes. A claim on this principle has been patented.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine to accompany the claim at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MAY 8, 1866.

Reported Officially for the Scientific American

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.

54,479.—Sheep Holder for Shearing.—C. Albert, Harrisville, and J. J. Shank, West Salem, Ohio:

We claim the shaft, C, arms, d, loops, d', strap, m, in combination with the ratchet plate, F, pawls, b, and table, arranged in the manner and for the purpose set forth.

54,480.—Water Closet Seat.—Louis Alexander, New York City:

I claim the combination seat as constructed of several flaps, a, b, c, d, e, etc., with projecting flanges or ribs, in combination with suitable fastenings, g, constructed and operated substantially as and for the purpose set forth.

[This invention relates to the seat of a water closet, which is composed of three or more sections, combined with each other, and with suitable berths or partitions, in such a manner that each seat can be unlocked independent of the others, and that by unlocking the second seat, for instance, access is had to this seat alone, and to neither of the others, and thereby a combination seat is obtained, which is of great value, particularly for houses which are occupied by several families, and which gives each family its own seat, without requiring more than one closet.]

54,481.—Propeller.—John F. Allen, New York City:

First, I claim the arrangement of a propeller blade at the end of a vibrating shaft, which gives motion to said propeller blade, when said propeller does move at a regular and fixed pitch, during the whole length of its motion, and is capable of being operated by the action of the water against its surface, at the beginning of each stroke, in such a manner that thereby its forward edge shall always be brought forward to its line of motion independent of the direction in which this motion may be communicated, substantially as described.

Second, I claim the collar, F, with a projection, n, fastened to the propeller, in combination with the worm wheel, J, provided with a projection or stop, m, and operating together in the manner and for the purpose described.

Third, I claim the arrangement of the worm wheel, J, with a suitable stop or projection, m, operated by suitable gearing, for the purpose of regulating and altering the pitch of the propeller blade, substantially as set forth.

Fourth, I claim the arrangement described for changing the pitch of the propeller blade while in motion, so as to make said propeller act at the same time as a rudder for the vessel, substantially as set forth and specified.

54,482.—Scrubber and Tender.—Asa H. Allison, Charlottesville, Ind.:

First, I claim the tender, C, with the trough, D, and strap valve, E, substantially as and for the purposes set forth.

Second, The combination of the tender and scrubber, constructed and arranged substantially as and for the purpose set forth.

54,483.—Pump.—R. H. Andrews, Elizabethtown, Pa.:

I claim the combination and arrangement of the wheel, d, slide, e, connecting rod, g, and cylinder, h, for the purpose herein set forth.

54,484.—Protecting Pumps in Deep Wells.—Francis Armstrong, Pittsburgh, Pa.:

I claim the cups, a and b, when arranged and operated as, or substantially as and for the purpose set forth.

54,485.—Coupling for Carriage Felloes.—Haines Austin, East Liberty, Ohio:

I claim the combination and arrangement of the tube or box, A, with the conical male screw, C, and blocks, D D, (with semicircular female screws), marking in said box, for the purpose set forth, substantially as described.

54,486.—Grinding Mill.—J. W. Baldwin, Sidney, N. Y.:

I claim the screw, E, or equivalent detachable points, d, combined with the spindle, F, and ball, D, and arranged with the runner, A, substantially in the manner as and for the purpose herein set forth.

54,487.—Farm Gate.—A. G. Barnard, Seville, Ohio:

I claim the strip, D, and posts, E, in combination with the brace, C, and gate, A, cut out as at b, substantially as and for the purpose set forth.

54,488.—Composition for Gold Size.—Carl Bartholmæ, New York City:

First, I claim the use of glue in a composition for gold sizing, substantially as and for the purpose described.

Second, A composition made of the ingredients above specified, and mixed together, substantially as and for the purpose set forth.

[This invention relates to a composition which is intended to take the place of the varnish or size generally used in printing such parts of wall paper, or of fancy paper, which are to appear in gold color.]

54,489.—Method of Removing Sand Bars from Rivers.—Edwin Bell, St. Paul, Minn.:

First, I claim the removal of sand bars and similar obstructions in the manner and by the means, substantially as set forth.

Second, The wheels, G, having the shovels or prongs attached to the paddles when arranged to operate in combination with the boats or barges, A, as shown and described.

Third, I claim a series of boats or barges provided with the lee boards, B, and arranged to form a channel for the passage of the water for the purpose of controlling or directing the current as, and for the purpose set forth.

Fourth, I claim in combination with boats arranged as set forth, the wheel, C, and the cables, c, arranged and operating as described, for the purpose of controlling the movements of the boats, as herein set forth.

54,490.—Cage for Hoisting Purposes in Mines.—Henry Berry, Hugo Hochholzer and Frank Denver, Virginia City, Nevada:

First, We claim the a-lu-table arms, A, A, India-rubber springs, K K, or their equivalent, together with the head piece, B, pillow, E, and beveled shoulders, L L, in combination with the large arms, F F, and guides, G G, substantially as described for the purposes set forth.

Second, We claim the cap, C G, hung on hinges in combination with the braces, c' c', and head piece, B, substantially as described and for the purposes set forth.

54,491.—Apparatus for Forcing Air in Carburetted Machines.—J. F. Birchard, Milwaukee, Wis.:

I claim an air feeder open and exposed and constructed and operated, substantially as herein described.

54,492.—Compound Sirup.—Charles Birdsall, Jersey City, N. J.:

I claim the compound sirup, prepared with the materials, and as set forth.

54,493.—Vertical Hand Spinning Machine.—James Blaney, Lowell, Iowa:

I claim the application to the vertical spinner of all the apparatus delineated and shown in Fig. 2, of all accompanying drawings except that part marked x, and called in this specification the clamp.

Also the application to the above-named spinner of all the gearing shown, and delineated in Fig. 3 of the accompanying drawings, except those parts marked h and x, and called in this specification the main wheel and the clamp.

54,494.—Portable Fountain.—Thomas H. Bonham, Elizabethtown, Ohio:

I claim herein as new and of my invention, the arrangement of non-conducting refrigerator, A B C reservoir, F, feeder, G, pan, H and nozzle, I, of the whole forming a portable fountain, substantially as described.

54,495.—Compound Burning Fluid for Illumination.—Horatio B. Brace and William T. Swart, Canandaigua, N. Y.:

We claim a burning fluid for illuminating purposes, composed substantially of the ingredients above described, and in about the proportions herein contemplated.

54,496.—Ladies' Skirt Lifter.—Thomas H. Bradley, St. Louis, Mo.:

I claim a machine to be worn as a belt, for raising and lowering the skirts of ladies dresses with cords and tape, by means of a wheel having a case, axle crank with pulleys and guides attached.

54,497.—Quartz Pulverizing.—Henry A. Breed, Lynn, Mass.:

I claim the construction of rotating disk, f, with the openings, t, in the manner and for the purpose, substantially as described.

Also the letter or clearers, m, upon the periphery of the wheel, g, substantially as set forth.

54,498.—Broom Head.—Henry Buck, Harrisburg, Pa.:

I claim the arrangement of the bars, C C, perforated as described, and the ends of said bars formed substantially as shown, when used with a sliding adjustable clamp, for the ends of said bars, as and for the purpose specified.

Second, The arrangement of the keeper, D, with the socket, A, the trap, B, and the bars, C C, the several parts being constructed and used, as and for the purpose specified.

54,499.—Mode of Preparing Stone for Power Printing.—N. M. Buffinton, Fall River, Mass.:

I claim preparing stone substantially as herein described, so that the drawing, lettering or design upon the same may be used for letter-press printing, and that stereotypes and electrotypes may be produced from the same.

54,500.—Brick Machine.—E. P. H. Capron, Springfield, Ohio:

First, I claim constructing the wings, O, of the pressing wheel, as shown and described, for the purpose of drawing the clay inward, at the same time that it presses it downward into the cells.

Second, I claim the roller, a, located in the mouth of the finishing box, T, substantially as shown and described.

Third, In combination with the roller, a, I claim the scraper, m, arranged and operating as set forth.

Fourth, The finishing box, T, provided with the scrapers, c and d, constructed and arranged to operate substantially as set forth.

Fifth, The table, H, having the cells, N, formed therein and provided with the projecting shoulder, r, to support the follower, P, as shown and described.

Sixth, I claim providing the follower, P, with the set screws, j, arranged to operate in connection with the shoulders, r, of the cells, N, as and for the purpose set forth.

Seventh, I claim the track, I, extending only a part of the way around, for raising the brick out of the mold in combination with the revolving table, in which the followers are supported, entirely by the table, while passing under the pug or in h, or dropper for the purpose of reducing the friction and power required to operate the same.

Eighth, I claim constructing the follower, P, with the hinged hd, s, and lever, p, arranged to operate as shown and described.

Ninth, In combination with the follower, P, arranged as described, I claim the roller, n, for depressing the follower and opening the cell, as it passes under the hopper to receive the clay.

[This invention relates to a new and improved brick machine of that class in which a horizontal mold wheel is employed, and it consists in a novel arrangement of a mold wheel, pug mill, and mold-filling device, together with certain means for pressing the clay into the molds, and discharging the molded clay therefrom.]

54,501.—Hand Loom.—A. Carter and R. Spake, Salem, Iowa:

We claim, First, In hand-power looms operating the treadles through a system of slides, R, which are moved by pins or cogs on the treadle shaft, J, substantially as described.

Second, We also claim the combination of the rod, G, which extends from the lug, the pawl, H, the shaft, J, armed with pins or cogs, L, and the slides, R, substantially as shown and described.

54,502.—Tea Kettle.—William Caven, Cincinnati, Ohio:

In the described combination with the sockets, C C C, and flanged and perforated lid, D, e, I claim the winged rear lug, F G G', g' h, adapted to be secured in place by the ordinary bail, in the manner set forth.

54,503.—Combined Square and Level.—Orril R. Chaplin, Salem, Mass.:

I claim the combination of a movable tongue, B, and beam, C, affixed thereto, with the movable or hinged beam, D, substantially as described.

54,504.—Buckle.—Charles S. Cissna, Burlington, Iowa:

I claim the movable bolt, m, parallel with and in rear of the fixed cross piece, r, to which the tongue, B, is pivoted, all being combined and arranged substantially as shown and described.

54,505.—Scrubbing Brush.—William C. Cleveland, Cambridge, Mass.:

I claim combining with a brush block, one or more flexible rubbers applied and operating in connection with the bristles, substantially as described.

54,506.—Seeding Machine.—J. D. Cochran, Milford, N. H.:

I claim the vibrating hopper, D, placed on the pivoted plate, E, and operated through the medium of the cam, F, and spring, c substantially as an for the purpose set forth.

I also claim the oscillating cut-off bush, i, in combination with the vibrating hopper, D, all arranged to operate substantially as and for the purpose specified.

I also claim the adjustable seed-conveying spout, H, substantially as and for the purpose set forth.

I further claim the coverer, J, attached to the rear of the share, I, and having the spring, L, applied to it substantially as shown and described.

[This invention relates to a new and improved machine for planting seed in drills, and it consists in the employment or use of a vibrating hopper, in connection with a cut off fitted on a rock shaft and operated automatically from the hopper. The invention further consists in an adjustable seed-conveying spout and coverer whereby proper furrows may be made to receive the seed, and the latter suitably covered and the earth compacted upon it.]

54,507.—Corn Planter.—J. D. Cochran, N. H.:

I claim the strips, A A', with slide, F, attached and provided with the plates, B B, pivoted together as shown in combination with the hopper, D, provided with the partition, E, the slide and partition being provided with holes, and all arranged to operate substantially as set forth.

The manner of supplemental hopper, H, applied to the strip, A, in combination with the seed hopper, D, and slide, F, substantially as and for the purpose specified.

The plates, J J, in combination with the plates, B B, arranged to

operate in connection therewith, substantially as and for the purposes set forth.

[This invention relates to a new and improved corn planter of that class which are operated directly by hand and carried by the operator. The object of the invention is to obtain a simple device for the purpose specified, and one which may be manipulated with the greatest facility, sow or distribute a fertilizer with the corn and cover the same perfectly.]

54,508.—Shears.—P. F. Crouch, New York City:

First, I claim the blade, *a*, with a slot or mortise for the fulcrum, *f*, in combination with the handle, *b*, shear and handle, *b*, as set forth, whereby the blade, *a*, receives an endwise motion to act with a drawing, as specified.

Second, I claim the broad thin blade, *a*, blade, *c*, and spring, *i*, in combination with the handles, *b* and *c*, joint and slotted fulcrum, *f*, for the purposes as set forth.

54,509.—Scale Beam.—H. S. Cushing, Bloesburg, Pa.:

I claim the combination of the scale beam, *A*, the rotary cylinder, *B*, marked and divided longitudinally and transversely as shown, and the catch, *H*, and ratchet plate, *C*, for holding the cylinder stationary, substantially as shown and described.

[The object of this invention is to combine with a scale beam, a means of indicating to the eye, without reckoning, the value of fractions in the weight, as for instance, the value of fractions of a pound, where the pound is the unit of weight.]

54,510.—Apparatus for the Manufacture of Paper Pulp.—John W. Dixon and George Harding, Philadelphia, Pa.:

First, We claim the pump digester in combination with a lower perforated diaphragm, having a central pulp passage, a circulating tube or tubes, connecting the upper and lower parts of the digester.

Second, The pump digester, in combination with a lower perforated diaphragm, a central pump passage, a circulating tube and pump, to produce a circulation through the mass from bottom to top, or vice versa.

Third, The two valves, *D* and *E*, in the pump escape tube for withdrawing a portion of the contents without interfering with the operation with the digester.

Fourth, The charging pipe, *S*, with its double valve for introducing fresh material without disturbing the operation.

Fifth, We claim the combination of pump digester, circulating tube and pump, when the fire is applied directly beneath the digester.

Sixth, The continual forcing of fresh liquid below and upwards through the mass to be pulped, in combination with the introduction of the fresh charges of the material into the digester above, whereby the cleaner liquid would always be in contact with the pulp most cooked.

54,511.—Planing Machine.—Joseph Dixon, New York City:

I claim the combination of the cutter head, *A*, shaft, *B*, adjustable bed, *E*, indicator, *g*, and adjusting screw, *i*, substantially in the manner and for the purpose set forth.

[This invention relates to an improved method or device for regulating the vertical set of tongueing and grooving attachments in planing machines, which gives several desirable advantages over the present devices used for that purpose, and consists in fixing the knife-holding head rigidly to its shaft, and supporting the shaft on an adjustable or sliding bed plate, so that the adjustment of the knives or cutters may be made expeditiously and while the machine is in full motion, by adjusting the said bed plate; and which also admits of securing the knife-holding head to its shaft in a fixed manner, so as to be beyond liability of displacement by encountering knots, etc.; and further, allows the matching knives to be promptly removed out of the way when the planer is to be used for "surfacing," by dropping them below the surface of the planing bed.]

54,512.—Quartz Crusher.—M. B. Dodge, New York City:

I claim the combination of the wedges, *D*, with the boxes, *B*, of crushing rollers, when arranged to limit the approach of said rollers, as herein described.

[This invention consists in the application of soft wrought-iron plates to the working face of a quartz crusher, in such a manner that if a hammer, chisel, or other rigid substance passes in between the jaws of the crusher, the working faces of the jaws will indent sufficiently to permit such rigid substance to pass without injury to the machine; and furthermore, the soft wrought-iron faces are enabled to hug the lumps of quartz, thus preventing them from slipping, and causing them to be crushed with great rapidity.]

54,513.—Railway Switch.—J. E. P. Doyle, New York City:

First, I claim the combination of the revolving radial arms, *I J K L*, the revolving cylinder, *M N*, and the chains, *R S T U V W*, or their equivalents, with each other and with the switch, *B*, substantially as described and for the purpose set forth.

Second, The combination of the revolving cylinder, *G*, with the revolving signals, *Q*, with the revolving cylinder, *M N*, or either of, substantially as described, and for the purpose set forth.

Third, The combination of lever, *C*, and bar, *B'*, with the other with car, *A*, and with the radial arms, *I J K L*, substantially as described and for the purpose set forth.

[This invention has for its object to furnish an apparatus by means of which railroad switches and signals may be operated from and by the train while in motion. And it consists in placing near the track revolving posts, provided with extended arms, the said revolving posts being connected by chains with the switch and with the signals. The apparatus is operated by a lever projected from the train, which comes in contact with the extended arms of the revolving posts to arrange the switch as desired in advance of the train, and to rearrange it after the train has passed, the signals being changed by the same operation, so as to show the exact position in which the switch stands.]

54,514.—Table Fork.—Charles A. Dungen, New York City:

I claim a new and improved article of manufacture in forks, constructed and described as set forth.

54,515.—Machine for Embossing Napkin Rings.—Eli H. Eldridge and Thomas Leach, Taunton, Mass.:

We claim the above described chasing or embossing machine, constructed and arranged substantially as and for the purposes set forth.

54,516.—Sheet-metal Spoon.—James Fallows, Philadelphia, Pa.:

I claim a sheet-metal spoon, having a hollow handle, constructed of a single piece of sheet-metal, substantially as herein described and set forth for the purpose specified.

54,517.—Pepper Box.—James Fallow, Philadelphia, Pa.:

I claim a pepper box for table use, having its perforated cover constructed and applied so as to operate in combination therewith, substantially as and for the purpose described.

54,518.—Tile Mold.—Joseph C. Field, Buffalo, N. Y.:

First, I claim the removable core cylinder, *c*, in a mould for making tiles or pipes, as set forth and for the purpose specified.

Second, I claim the fixed shoulder on the bottom end of the core cylinder, in combination with the bell-shaped bottom of the outer flask or mold, for the purpose of forming a socket in one end of the tile or pipe, as and for the purposes described.

Third, I claim the use of the circular shoulders or projections on the surface of the stationary base plate, in combination with the cover, with its cross pieces on the top of the core, for the purpose of centering and preserving the requisite distance between the core and the outer flask or mold, in order to obtain a uniform thickness in the walls of the tile or pipe, arranged substantially as described and for the purposes set forth.

Fourth, I claim the use of the cross bars, *f* and *e*, and the lever, *r*, for the purpose of starting the cylinder core, substantially as described and for the purposes set forth.

Fifth, I claim the adjustable hopper, *O O*, substantially as described and for the purposes set forth.

Sixth, I claim molding vertically, with an adjustable core, *c*, and the other means herein described.

54,519.—Gearing for Lathes, etc.—Walter Fitzgerald, Boston, Mass.:

I claim the overhead driving and reversing gearing, constructed and operating substantially as described.

54,520.—Machine for Cutting Wire.—William H. Flinn, Nashua, N. H.:

I claim the application of the cap plate, *A*, and its perforated outer or cap plate, *B*, to the perforated disk, *B*, substantially in the manner as described, the case under such circumstances operating to support the plate, *B*, circumferentially.

I also claim the combination and arrangement of the case, *A*, the outer plate, *B*, the cap outer plate, *D*, the arm, *d*, and the cam lever, *C*.

I also claim the arrangement of the cage, *E*, with the cam lever, the perforated case, *A*, and the perforated disk, *B*, provided with an arm, *d*, or the same and a spring, *f*, as specified.

54,521.—Hernial Truss.—Adolph O. Forsberg, Cincinnati, Ohio:

I claim the hinged pad, *H*, having a positive and non-elastic adjustment, substantially as described.

54,522.—Mode of Attaching Cultivator Blades.—G. L. Fountain, New Milford, Ill.:

I claim the off-*t*, *B*, slot, *D*, and screw bolt, *E*, in combination with the standard, *C*, and blade, *A*, arranged in the manner and for the purposes substantially as set forth.

54,523.—Rubber Packing.—C. L. Frink, Rockville, Conn.:

I claim a rubber compound made of the ingredients herein specified, for the purposes set forth.

[This invention consists in a compound made of india rubber, sulphur, blacklead, or other suitable material generally used with rubber to give it consistency and to increase its weight; and metal filings, brass filing being used by preference, is made in such a manner that a compound is obtained which is not liable to stick when exposed to a great heat or to steam, and which is particularly fit for packing safety valves, globe valves, or other parts which are exposed to the action of steam, and which, when packed with ordinary rubber, require constant repair.]

54,524.—Hay Spreader.—C. R. Frink, Norwich, N. Y.:

First, I claim the metallic brackets, *E*, attached to the bar, *A*, and arranged as shown to serve as bearings for the axles, *F*, of the wheels, *G*, and also as bearings for the shafts, *J L*, of the wheels, *I*, and pinions, *K*, substantially as and for the purpose set forth.

Second, The arrangement of the sliding bearings, *a*, brackets, *E*, crank, shafts, *L*, with levers, *N O*, combined and operating in the manner and for the purpose herein specified.

Third, The putting of the forks, *R*, in boxes, *Q*, placed in the cranks, *M*, of the shafts, *L L*, and arranged in such a manner as to admit of the adjustment of the forks nearer to or further from the surface of the ground as may be desired.

[This invention relates to a new and improved device for spreading hay, and it consists in a novel manner of arranging the gearing, and hanging or applying the same to the machine, whereby the spreading forks may be readily thrown in and out of gear when desired, and the machine rendered very strong and durable. The invention also consists in a novel manner of securing the spreading forks to the crank shaft, whereby the former may be readily adjusted higher or lower, so as to work nearer to or further from the surface of the ground, as occasion may require.]

54,525.—Straw Cutter.—Clinton T. Frost, Medfield, Mass.:

I claim the combination of the spring, *d*, the knives, *C D*, the bar, *F*, and the lever, *G*, substantially in the manner and to operate as before described.

54,526.—Coal Stove.—William H. Gandey, Lambertville, N. J.:

I claim the fire pot, *F*, and chamber, *G*, in combination with the draught passages, *H*, draught spaces, *d*, external cylinder, *D*, and base, *A*, all arranged substantially in the manner and for the purpose herein set forth.

[The object of this invention is to obtain a stove of simple construction which will consume the smoke, and also radiate a large amount of heat from a given quantity of coal, the invention being applicable to all kind of stoves.]

54,527.—Fruit Gatherer.—Edward Gilliam, Alleghany City, Pa.:

I claim the combination of the basket, *A*, with the yoke, *B*, spring, *C*, and handle, *D*, constructed, arranged and operating substantially as herein described, and for the purpose set forth.

54,528.—Apparatus for Exterminating Insects.—Edward Gilliam, Alleghany City, Pa.:

I claim the arrangement of the furnace, *B*, bellows, *D*, pipes, *C* and *G*, and lever, *e* and *f*, constructed, arranged, and operating substantially as and herein described, and for the purpose set forth.

54,529.—Securing Boxes in Hubs.—William Greenleaf, Terre Haute, Ind.:

I claim the box, *B*, provided with a screw thread, *A*, at each end, in combination with the thimbles, *E*, provided with internal screws, *c*, to receive the screw threads, *a*, of the box, and connected to the bands, *C D*, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved mode of securing metal boxes in the hubs of wheels for vehicles, whereby the box is firmly secured in the hub with the greatest facility, and rendered capable of being readily detached whenever necessary, and at the same time admitting of the spokes being fitted more securely in the hub.]

54,530.—Medical Apparatus for Treating Diseases by Vacuum.—George Hadfield, Cincinnati, Ohio:

First, I claim, in a portable apparatus for treating diseases by exhaustion of the atmosphere, the arrangement of a receiver with a vase, *F*, the adjustable conical frames, *G*, and sides, *H*, and cloak, *I*, all constructed substantially as and for the purpose set forth.

Second, The arrangement of an air pump, *A*, with the pipes, *C* and *D*, the pipe, *E*, and a receiver, *B*, composed of several separable parts, *T G H*, and cloak, *I*, all constructed and combined, substantially as and for the purpose set forth.

54,531.—Burglar Alarm.—A. F. Hammond, Houston, Ohio:

I claim the combination of the wire, *I*, and the lever trigger, *C H*, with the detent, hammer, and detonating match-lighting arrangements, as described.

54,532.—Heating Stove.—Washington H. Harbaugh, Piqua, Ohio:

I claim, First, The arrangement of parts, the oven, *H*, door, *h*, vent, age, *k*, and cap, *L*, substantially as described, for a convertible cooking and warming, and ventilating stove.

Second, The chamber, *H I*, ventiducts, *J K K'*, doors, *h i*, and caps, *L k*, or their equivalents, for a convertible bakery and ventilating apparatus, as set forth.

Third, The provision of the supplementary shell, *E*, and its described accessories, as and for the purpose stated.

54,533.—Invalid Bedstead.—Peter W. Hardwick, Wayne County, Indiana:

I claim the independent frame, *B*, with its counter-balancing attachment.

54,534.—Cultivator.—A. S. Harrison, Clinton, Ill.:

I claim, First, The revolving agitator, with curved and pointed arms, in combination with the double inclined cylindrical hopper bottom, substantially as and for the purpose set forth.

Second, The hinged casing of the seeding wheel, in combination with said wheel, *f*, as and for the purposes described.

Third, The combination of the wings, *w*, with the gopher, *h*, as and for the purposes specified.

54,535.—Grinding Mill.—Edward Harrison, New Haven, Conn.:

I claim providing the faces or grinding surfaces of millstones, metal plates, etc., with grooves or channels, corresponding in position to the furrows required for said surfaces, and having the grooves or channels provided with a filling composed of a material softer than the stone or plate.

54,536.—Neck Tie.—W. H. Hart, Jr., Philadelphia, Pa.:

I claim a cravat holder provided with wings, *a a*, arms, *b b*, and slot, *m*, constructed and operating substantially as described.

[This invention relates to a new and improved holder for cravats, neck-ties, scarfs, and other similar articles of wearing apparel, by means of which they can be readily secured in position upon the neck of the person, and removed therefrom without injuring or soiling the collar in the least degree; said holder being also so formed that it can be readily attached to or detached from the cravat at pleasure.]

54,537.—Improved Mode of Propelling Cars on Railways.—Charles T. Harvey, Tarrytown, N. Y. Antedated April 6, 1866:

I claim, First, The use, in connection with a railway, of one or more series of continuous guide plates independent of (but parallel to) the rails for containing and guiding a propelling rope or chain; said plates having one or more openings between or in them, permitting car connections, and also egress of injurious accumulations, substantially as and for the purposes described.

Second, The combination and use of interior "friction slides" or projections with the aforementioned guide plates, substantially as and for the purpose described.

Third, The combination and use of the "ferrules" (so-called) whether pointed or adjustable, or permanently attached to or with the wire, or other rope or chain, substantially as described.

Fourth, The combination and use of the adjustable "friction rings" (so-called) with the ferrules, and ropes or chains aforementioned, substantially as described.

54,538.—Improved Method of Neutralizing Acid for Sheet Iron.—E. A. Harvey, Wilmington, Delaware:

I claim the process substantially as herein described, for removing or neutralizing the acid used in cleansing sheet iron or other articles by means of an alkaline solution applied under pressure in a close vessel to which rotary or other motion is applied to agitate the articles under treatment.

54,539.—Watch Die.—George Hastings, Waltham, Mass.:

I claim, as my invention, the watch hand die as made of the three pairs of plates, *A B B C C*, formed, arranged, and combined, substantially as specified.

54,540.—Oiler.—Charles J. Hauck, Williamsburgh, N. Y.:

I claim an oiler provided with a false bottom, *d*, protected and supported by the annular lip, *c*, in combination with the spring, *e*, applied substantially as and for the purposes described.

[This invention consists in the arrangement of a false bottom and spring in combination with an annular lip formed at the inner edge of a hole in the real bottom of an oiler, in such a manner that by said spring the false bottom is held down upon the lip, and the elasticity of said false bottom is thereby preserved; and furthermore, the false bottom is prevented from injury by the lip, and the oiler remains tight and in good working order for a long time.]

54,541.—Knife or Fork Back.—J. B. Hawley, New Haven, Conn.:

I claim the combination of the rack, *F*, with individual "salt" and "butter", *C D*, substantially as and for the purpose specified.

54,542.—Optical Instrument.—Laban Heath, Boston, Mass. Antedated, May 1, 1866:

I claim, as a new article of manufacture, the convertible optical instrument herein described, constructed, arranged, and operating substantially as set forth.

54,543.—Mangle or Rolling Press.—August Hermann, New Haven, Conn.:

I claim the mangle or rolling press consisting of a segment, circular bevel, and cover, with a treadle frame and radial bars operated by a circular reciprocating motion, substantially in the manner and for the purposes herein described.

54,544.—Low Water Detector.—G. W. Hewitt and J. B. Haley, Cincinnati, Ohio:

I claim a low water detector, constructed as described, as a new article of manufacture.

54,545.—Bed Bottom.—Abner Hitchcock, Wayne, Mich.:

I claim the combination and arrangement of the frames, *A* and *B*, the springs, *D* and *D'*, the beams, *C*, and the cross wires, *E*, substantially as and for the purpose set forth.

54,546.—Chair and Walker for Children.—Charles Holtz, Chicago, Ill.:

First, I claim in combination with a child's chair provided with the circular frame, *E F*, constructed as described, the employment of an annular revolving table, *G*, substantially as and for the purpose specified.

Second, I claim the combination and arrangement of the circular arm supports, *E F*, the circular frame, *A*, and removable seat, *C*, substantially as and for the purpose set forth.

Third, I claim the combination and arrangement of the frame, *A*, the removable seat, *C*, the arm supports, *E*, the removable segment, *F*, and revolving annular table, *G*, substantially in the manner and for the purposes shown and described.

54,547.—Saw Set.—James Hopkins, Oxford, New York:

I claim a sliding stirrup, *D*, substantially as herein described, when combined with the set screw, *c*, and stop, *b*, of a saw set, substantially in the manner and for the purpose herein set forth.

54,548.—Apparatus for Measuring Liquids.—Frank H. Houghton, Brooklyn, New York:

I claim the globe, *B*, with measure marks thereon, the valve and plug, *E*, and cock, *C*, with double ports, constructed, combined, and arranged, substantially as and for the purpose specified.

54,549.—Button.—David Howarth, Portland, Maine:

I claim an improvement upon B. P. Caston's invention, patented August 27, 1860, the spiral wire connected with a button, when said piece of wire after insertion into the cloth, is struck or pressed down flat on the inner side of the cloth, all substantially as and for the purpose set forth.

54,550.—Medical Compound.—James V. Hulse, Acra, N. Y.:

I claim the within described medicated compound, made as set forth.

54,551.—Piano Stool.—William A. Ingalls, Chicago, Ill.:

First, I claim the employment of the keys or braces, *E*, in a piano stool, arranged and operating substantially as and for the purposes set forth.

Second, The combination of an extended standard, *A*, with an upper joint, *C*, and a lower joint, *D*, when applied to a stool having removable legs, substantially as and for the purposes set forth and shown.

Third, The arrangement and combination of the upper lug, *C*, provided with the projection, *c*, and the lower lug, *D*, provided with the T shaped or double hooked projection, *d*, with the corresponding openings and recesses in the column, *A*, and the key or brace, *E*, substantially as set forth and specified.

54,552.—Cupola Furnace.—John and Thomas Insull, New Haven, Conn.:

We claim the hollow hoop or belt, *C C*, with its partition, *b b*, in combination with the blast pipes, *D* and *E*, and their tweers, when the whole is constructed, arranged, and fitted to operate, substantially as herein described.

54,553.—Illuminating Apparatus.—John H. Irwin, Chicago, Ill.:

I claim the combination of the air pipes, *B*, the oil reservoir, *C*, and an apparatus for forcing air through said pipes when constructed, arranged, substantially as and for the purpose specified.

54,554.—Manufacture of Elastic Packing.—Nathaniel Jenkins, Boston, Mass.:

I claim the composition above set forth, and its process of manu-

facture substantially as and for the purposes described, disclaiming the vulcanizing of rubber by means of heat and the method of mixing the ingredients otherwise than as applicable to this composition.

54,555.—Mode of Connecting the Joints of Stove Pipes and Water Conductors.—Ezra Johnson, Harmon, Maine:

I claim the application to stove pipes and water conductors of the clamp and bolt as herein described, to secure and make fast the connection, and to secure also the principle of this form of direct attachment and connection by rivet or its equivalent.

54,556.—Fastening for Buttons.—Josce Johnson, New York City:

First, I claim the button fastening, a, formed as shown in figures 1, 2, and 3, so as to compel the eye, b, of the button, to be held in the center of the fastening by the contact of the ends of said fastening therewith, as herein set forth.

Second, I also claim in connection with the above said ends, substantially as in the figure 1, so that both ends must be opened in order to liberate a button confined thereby.

54,557.—Water Elevator for Wells.—A. T. Jones, Stamford, Conn.:

First, I claim rotating the drum of a water elevator by means of a cam on the crank shaft acting on a radial moving friction block placed within a box on one end of the drum, constructed and operating substantially as described.

Second, I also claim the finger, J, of the cam, I, in combination with the horn, X, of the friction block, K, for the purpose of arresting the descent of the bucket, substantially as described.

Third, I also claim the socket N, within the box, H, of the drum, in combination with a spring, M, for the purpose of bringing the cam, I, into action against the block, substantially as described.

[This invention relates to water elevators applied in open wells in conjunction with buckets suspended in such wells from a rope or chain. It consists, among other things, in a novel way of making the balls of such buckets; also in a novel way of constructing and operating the parts which rotate the drum, so that the latter can be made to rotate with the shaft, and can be released so as not to be acted on by the shaft, and can also be restrained, as by the action of a brake, from turning under the weight of the bucket.]

54,558.—Water Drawer.—F. H. Jones, Attica, N. Y.:

First, I claim the brake, F, provided with lug, c, for the double purpose of a brake and of holding or securing the drum B, to the shaft, or locking it at will for the purposes, substantially as described.

Second, I claim the ratchet and pawl when constructed and operated, substantially as herein set forth.

54,559.—Broom Head.—Martin C. Kilgore, Washington, Iowa:

I claim a broom head constructed in two sections, constructed by opening D, and snake head, E, and having screws and thread, G, and projections, H, constructed, combined and arranged substantially as and for the purposes set forth.

54,560.—Steam Hammer.—Edgar L. Kinsley, Cambridge, Mass.:

First, I claim raising the hammer by means of a lever operating upon the rear ends of the hammer helve, and connected with the piston of the steam cylinder, arranged and operating substantially in the manner and for the purpose described.

Second, the stirrup, M, operating in combination with the helve, f, lever, l, and piston rod, p, and operating in the manner and for the purpose herein specified.

Third, the arrangement of the cam groove, d, arm, s, as applied to the valve of a steam engine and rod, v, and connecting said arm with the lifting lever or beam, l, or any part moving in unison therewith, substantially as herein described, for the purpose specified.

54,561.—Machines for Making Paper Collars.—Henry F. Knapp, New York City:

First, I claim operating the feed rolls by means of a ratchet wheel on one of the rolls, and a pawl actuated by the plate which carries the reciprocating cutters, substantially as herein specified.

Second, the combination of the angular edged adjustable cutters, I I, with knives, J, attached to a removable bar, J, and operating to shear off the waste and form the ends of collars, substantially as herein set forth.

Third, the projection, h, formed upon the reciprocating cutter, G, and operating to prevent the said knife from striking or riding upon the stationary knife, H, substantially as herein set forth, for the purpose specified.

Fourth, the arrangement of the feed rolls, E F, cutters, I I and J, and cutters, G and H, in relation with each other and the bed, A, and plate, B, substantially as and for the purpose herein specified.

54,562.—Tweezer.—John Krugbaum, Milton, Ohio:

First, I claim the piece, A, with its pipes, c, constructed substantially as described and for the purpose specified.

Second, the combination of the piece, C, with the piece A, substantially as described and for the purpose set forth.

Third, the part, B, with its pipe, f, and slide, g, in combination with the piece, A, substantially as described and for the purpose specified.

Fourth, the thumb, D, and arm, to support the part, C, substantially as described.

54,563.—Railroad Axle Box.—John G. Lahaye, Reading, Penn.:

First, I claim the combination of an axle box, having an oil chamber at the under side and an opening, t, when the said opening is arranged in front of the axle, and is surmounted by a flange, t, as and for the purpose described.

Second, the passage, n, in communicating with the chamber, p, and so situated that its upper end can be closed by the lid, H.

54,564.—Machine for Combing Bristles.—Louis F. Lannay, Indianapolis, and William F. Parks, Baltimore, Md.:

First, We claim the reciprocating table, F, for carrying the bristles or hog's hair to be operated, in combination with the eccentric, A, and the nut and screw which regulates the extent of the reciprocations produced by the eccentric, substantially as described.

Second, We also claim the devices for holding the bristles, arranged and combined as shown, to wit, the plates, L, the loose plate M, both having pins I, as shown, and the eccentric roller, M, for clamping the bristles between said plates, substantially as described.

Third, We also claim so making and arranging the plate, L, as that is capable of being moved transversely, lever, L2, substantially as described.

Fourth, We also claim the reciprocating combs, U V, moved from the same shaft in combination with the reciprocating table, F, substantially as described.

54,565.—Rotary Pump.—Henry Bedell Leach, Boston, Mass.:

First, I claim one or more inclined spiral scoops, E, revolving in a shell or casing, A, substantially in the manner and for the purpose set forth.

Second, I also claim the self-compensating balanced abutment, F, the curvature of one of its surfaces corresponding to and coming in contact with the outer surface of the scoop, E, and drum, B, while the curvature of its opposite surface coincides and comes in contact with the surface of the recess, y, provided for it in the casing, A, for the purpose set forth.

Third, I also claim the abutment, F, or its equivalent, when used in combination with one or more inclined spiral scoops, E, for producing behind the scoop or scoops a vacuum or partial vacuum.

Fourth, I also claim gradually decreasing the size of the spiral water way or ways, substantially as and for the purpose set forth.

Fifth, I also claim revolving the drum, B, by the revolution of the screw cylinder C, and scoop, E, for the purpose set forth.

Sixth, I also claim the segments, G H, as arranged between the scoop, E, and drum, B.

Seventh, I also claim a rotary pump consisting essentially of one or more spiral inclined scoops, E, revolving drum, B, segments, G H, abutment, F, and shell or casing, A, substantially as described.

54,566.—Oyster Cracker.—William P. Lyons, Portchester, N. Y.:

I claim the combination of the casing, A, lever handle, B, arm, G, terminating in a jaw, J, fixed jaw, K, of casing, A, when connected together, and arranged as and for the purposes described.

54,567.—Bed Bottom.—John Lynn and Jackson R. Crowell, Seneca Falls, N. Y.:

We claim the combination of the hook, C, double hook D, clasp, E, elastic band, F, and shield, G, when made substantially as specified, and applied as herein set forth.

54,568.—Apparatus for Treating Green Hides.—Lewis Mackey, Dunmore, Pa.:

I claim the wheel, D, in combination with the tan vat, said wheel being constructed substantially as described, that is to say, so constructed that the hides hang from the outside of the wheel and as the wheel revolves are alternately immersed in the tanning liquor and exposed to the air, substantially as described and for the purpose set forth.

54,569.—Regulating Attachment for Gas Burners.—William Maller, Bridgeport, Conn.:

First, I claim the click, N, or its equivalent, in combination with the regulating cap, D, and with the notches, I, or their equivalents, constructed and operating substantially as and for the purpose described.

Second, The cup-shaped depression, e, in the bottom end of the screw f, in combination with the diaphragm, b, gas chamber, B, and ourer, C, constructed and operating substantially as and for the purpose set forth.

Third, The secondary gas chamber, g, formed between the cap, D, and chamber, B, in combination with any burner or burners, substantially as and for the purpose described.

[This invention consists in the arrangement of a regulating cap and notched disk in combination with a suitable spring stop or click and with a gas burner, in such a manner that by said click and disk the cap can be adjusted to the number of feet to be burned per hour, said click being so arranged that this regulating can be effected in the dark by the sense of feeling.]

54,570.—Sad Iron.—Charles J. Mallon, Schoharie, N. Y.:

First, I claim attaching the handle, C, carrying a suspended shield to be standard B, by means of the button, E, pivoted to the under side thereof, in the manner and for the purpose herein specified.

Second, I claim the combination and arrangement of the handle, C, standards, B, arms, c, button, E, shield, U, and body, A, constructed and operating in the manner and for the purpose herein specified.

[This invention relates to a novel mode of attaching the handle of a sad iron which has suspended from it a shield for protecting the hand against the heat radiating from the iron, to standards or arms secured to the body of the iron, whereby the handle and shield may be detached from one iron and quickly attached to another, and with little or no difficulty.]

54,571.—Leather Splitting Machine.—Jeremiah A. Marden, Newburyport, Mass.:

I claim the shaft, J, in combination with the sectional rolls, K, the shaft driving the rolls by means of teeth and one or more grooves so substantially as described.

I also claim the guide, Q, substantially as and for the purpose set forth.

54,572.—Tool for Holding Glass Bottles.—Edward McArde, Cambridge, Mass.:

I claim the combination of the jaws, A, slotted plate, B, screw, D, and stock, C, all constructed and arranged substantially as described.

54,573.—Car Brake.—Samuel McCambridge, Philadelphia, Pa.:

I claim the combination of a continuous chain with the brake levers of a train of cars by means of the intermediate levers, G, and the sheave, f, and g, the said parts being arranged and operating substantially upon the principle and in the manner hereinbefore described and for the purpose specified.

54,574.—Attaching Thills to Vehicles.—Francis McCoy, West Philadelphia, Pa.:

I claim the yoke, E, with one end curved upward, forming a concave bed, E', for the head, A, of the shaft between the arms, B, of the band or clip, F, constructed and applied in the manner and for the purpose specified.

54,575.—Flour Sifter.—William C. McGill, Cincinnati, Ohio:

I claim in the described combination with the box or case, A, and sieve, B, the scraper, G, G' g' springs, F, elastic arm, E, shaft, C, and crank, c, arranged and operating substantially as and for the purposes herein set forth.

54,576.—Washing Machine.—Stephen McNamara, Chicago, Ill.:

First, I claim the employment of two disks of conical rollers, arranged and operating substantially as herein shown and described and for the purposes specified.

Second, I claim the combination of the two disks of rollers, P Q, the shaft, D, and the bevel wheels, H I J, or their equivalents, arranged and operating substantially as described and shown.

Third, I claim in combination with the above, the arrangement of the vertically adjustable frame, c, operating as and for the purpose described.

Fourth, I claim in combination with the above, the employment of the tub, A, and stationary frame, B, arranged as and for the purposes specified.

54,577.—Sewing Machine.—F. L. Melone, Granville, Ohio:

First, I claim the cam shaft, E, placed vertically beneath the bed of the machine with its cams, G and C' and its band wheel, H, and its crank for operating the connecting rod, F, which drives the reciprocating shuttle, all substantially as described.

Second, I also claim locking the presser bar to its proper position for work, by means of the spring bolt, B, constructed and applied, substantially as described.

Third, I also claim feeding the material in sewing machines by means of a feed wheel working on a slide beneath the cloth bed and having reciprocating motion in horizontal directions, the same being locked so as not to rotate when moved forward to give the feed, but being allowed to rotate so as not to carry the cloth back when it is returned to its former position, substantially as described.

54,578.—Washing Machine.—Benjamin F. Miller, New York City:

First, I claim the fingers, g, in combination with the box, a, mounted, as set forth for the purposes and substantially as specified.

Second, in combination with the box, a, mounted as specified, I claim the flanges, b, for the purposes and as set forth.

54,579.—Water Wheel.—Isaac Miner and D. J. Miner, Freehold, N. J.:

We claim the arrangement of the wheels, A A', placed within the curbs, B B', B'', communication passages, a a', supply passages, b b' b'', gates, c c c, discharge openings, d d' d'', gates, e e e, and penstock, C, relatively to each other, and operating in the manner and for the purpose herein specified.

[This invention consists in the employment or use of a plurality of wheels placed within curbs or cases arranged with gates in such a manner that altogether wheels may be acted upon by the same volume of water, the latter passing successively through the several curbs or cases, or any one or more of the wheels less than the whole number acted upon, as may be desired. The object of the invention is to obtain a greater amount of power from a given quantity than has been obtained.]

54,580.—Apparatus for Punching Corrugated Metal.—Mary Jane Montgomery, New York City:

I claim the apparatus for punching bolt or rivet holes in corrugated or curved metals, constructed and operating substantially as described.

54,581.—Rotary Pump.—John J. Morris, Cincinnati, Ohio:

First, I claim the tapering tongue, A', forming part of the cylinder in the described combination with a set screw, F, or its equivalent, substantially as described.

Second, The connecting pin or pins, L, or mechanical equivalent, and coiled spring or springs, J, as described and for the purposes specified.

54,582.—Horse Rake.—Washington Mosher, Pittstown, N. Y.:

I claim the bars, E E, pivoted to the front end of the handles, D D, in combination with the springs, F, and the bars, G G, on the rake head, substantially as and for the purpose set forth.

54,583.—Churn.—Horace Mott, Bellevue, Mich.:

I claim the rocking churn box, the sliding dasher gates, and the handles, arranged and used as and for the purpose specified.

54,584.—Shingling Gage.—E. P. Newbanks, Lincoln, Ill.:

I claim the shingle gage herein described, being composed of the frame, A, adjustable bar, B, and straps, E E, constructed and used as and for the purpose set forth.

54,585.—Attachment for Sleeves and Leggings.—John K. O'Neil, Kingston, N. Y.:

I claim the attachment for sleeves and legs of garments provided with the elastic cord, or braid, c, and the elastic or shirred strips, b b, substantially as and for the purposes specified.

54,586.—Process in Refining Sulphur.—Robert Oxland, San Francisco, Cal.:

I claim the use of chemical agents in the manner hereinbefore described either in substitution of the ordinary process of sublimation for refining sulphur or as supplementary thereto, for the completion of the refining operation.

54,587.—Preparation of Leather.—Moses W. Page, Franklin, N. H.:

I claim buffing the grain side instead of having the flesh side of the but or thick portion of the leather, substantially as and for the purpose set forth.

54,588.—Process of Tanning.—Moses W. Page, Franklin, N. H.:

I claim the within described process of tanning leather, substantially as set forth.

54,589.—Gearing.—S. W. Palmer and J. F. Palmer, Auburn, N. Y.:

We claim an improved gearing consisting of two or more disks or circular plates having teeth or cogs on their faces, so constructed and arranged that there may be two or more sets of teeth of cogs on each shaft to operate in transmitting motion from one shaft to another when said shafts are at a varying distance apart, substantially as herein described, and for the purpose set forth.

[This invention has for its object to furnish a gearing for transmitting motion from one shaft to another, when the said shafts operate at varying distances from each other, as in the case of clothes wringers, planing machines, etc., and it consists in attaching to the sides of the gear wheels, cogs formed in such a way that they will operate equally well upon each other when the shafts are at various distances apart. This gearing was illustrated in connection with Palmer's combined wringer and mangle, in No. 2, Vol. XIV. of this paper.]

54,590.—Method of Constructing Cast Iron Apparatus for Superheating Steam.—C. C. Parsons, Boston, Mass.:

I claim a steam superheater having a construction, substantially as described.

54,591.—Preparing Wisps for Brooms.—John E. Phillips, Philadelphia, Pa. Antedated Jan. 11, 1886:

I claim the herein described new article of manufacture consisting of a wisp for filling broom heads or clumps, constructed in the manner and retained in form by the means herein described or any equivalent means, substantially as set forth.

54,592.—Sofa Bedstead.—J. F. C. Pickhardt, New York City:

First, I claim the attaching of the cushion, D, by hinges, b, to a cross bar, C, of the side pieces, A A, in combination with the back board, C, and the cushion, E, attached by hinges, c, to D, substantially as and for the purpose specified.

Second, The foot board, J, attached by hinges, i, to a cross bar, d, of the posts, c, c, in such a manner as to admit of the foot board being folded downward and inward to be covered by the seat cushion when the device is used as a sofa, substantially as described.

Third, The clothes receptacle, I, connected by hinges, f, to the underside of the seat cushion, H, and arranged to work or rest upon the front pair of slides, G, substantially as and for the purpose set forth.

Fourth, The pillow, K, in combination with the cushions, D E, and cap piece, L, arranged substantially as and for the purpose specified.

54,593.—Universal Index.—Martin L. Powell, New Castle, Ind. Antedated May 1st, 1886:

I claim the construction, arrangement and combination of the movable and independent spring indexes, E, operating between the partitions, K, on each side of the plate, A, against the wings, J, as herein described and for the purposes set forth.

54,594.—Fruit Basket.—David H. Priest, Watertown, Mass.:

I claim a fruit gatherer or basket, constructed substantially as and for the purposes above set forth.

54,595.—Mosquito Guard for Bedsteads.—A. D. Puffer, Somerville, Mass.:

I claim the arrangement of the netting over the bars, or stretched bows, and so as to be distended by them around the head, a loose fringe or border of netting pending from the lower bar, and the frame being attached to the headboard of the bedstead, substantially as shown and described.

54,596.—Gate.—C. Purdy, Bedford, Ohio:

First, I claim centrally hanging the swing gate, B, to the laterally sliding gate, A, when constructed so as to operate conjointly as and for the purpose set forth.

Second, The sectional gate, A, in combination with the swinging section, B, catch, L, rod, I, and slide, g, in the manner substantially as and for the purpose set forth.

54,597.—Machine for Stirring and Dissolving Sugar in Sugar Refineries.—Thomas H. Quick, New York City:

I claim the combination and arrangement of the vibrating agitating blade, D, with the heater, A, and engine, E, substantially as herein set forth, and for the purpose specified.

54,598.—Sewer.—Theodore F. Randolph, Cincinnati, Ohio:

I claim the arrangement, in the catch basin of sewers, of movable receptacles, F F', formed and adapted to operate substantially as set forth.

54,599.—Machinery for Folding Tin.—Chas. H. Raymond, Woodstock, Vt.:

I claim the combination of the same, and the cam, m, and dangle, l, or equivalent mechanism, for effecting the elevation of the cap up to the level of the top of the upper jaw, under circumstances and for the purpose, substantially as specified.

54,600.—Breech-Loading Fire-arm.—Henry Reynolds, New Haven, Conn.:

I claim the arrangement of the cover, H, projecting piece, I, lug, f, hammer, C, in combination with the barrel, A, with its slot, F', and operating in the manner and for the purpose herein specified.

54,601.—Hat Block.—H. A. Robison, Cleveland, Ohio:

I claim making the forming block, C, of shell-like construction, fitting upon a core, c, and operating conjointly with said core, as and for the purpose set forth.

54,602.—Sewing Machine Braid Guide.—Thomas Robjohn, New York City. Antedated April 27, 1886:

I claim the combination of the toothed and recessed guide wheels, f f, in combination with the guide tube, d, or its equivalent, substantially as and for the purpose herein specified.

- 54,603.—Organ.**—William Robjohn, New York City:
First, The composition board, E, constructed of a series of longitudinal slides, g g', and a series of transverse slides, n n', etc., when the same is applied in combination with buttons or finger piece, and with pneumatic levers, B B', etc., etc., substantially in the manner and for the purpose described.
Second, The use of an ordinary air valve, D, of that class commonly known as D valves, in combination with the two parts, a and b, of a pneumatic lever, and with rods, c, connecting said parts, substantially as and for the purpose set forth.
Third, The spring pawl, w, and serrated standard, n, in combination with the treadle, h2, pedal, F, and with the slides, g g', etc., which serve to impart motion to the draw stops of an organ, substantially as and for the purpose described.
Fourth, The roller, G, with wipers, f f', etc., spring, s, and strap, r, in combination with the pedal, F, levers, u u', etc., and slide, g g', etc., substantially as and for the purpose set forth.
Fifth, The oscillating spring-dog, b2, and button or finger piece, z, in combination with the mechanism which serves to couple and uncouple, the several key boards, A, etc., constructed and operating substantially as and for the purpose described.
- 54,604.—Tooth Brush.**—Charles Rosefield, Washington, D. C.:
First, I claim the two brushes, A and B, connected and used substantially as herein set forth, for the purpose of cleansing the teeth upon both sides at one operation, as specified.
Second, In combination therewith, the handle, D, pivoted to the brush, substantially as and for the purpose specified.
- 54,605.—Machine for Rolling Spikes.**—Ambler J. Rogers, Kittanning, Pa.:
I claim the combination of the roll, C, with the table, D, said roll and table being constructed, arranged, and operating in the manner substantially as herein described, and for the purpose set forth.
- 54,606.—File Cutting Machine.**—John Rotherham and Joseph Holden, Middletown, N. Y.:
First, Giving to the chisel, F, a backward motion, in imitation to the hand cut, by means substantially as herein described, for the purpose set forth.
Second, The swiveled roller, n, applied in combination with the arms, E, chisels, F, and anvil, R, all constructed and arranged substantially as and for the purpose set forth.
- 54,607.—Paper Neck Tie.**—James Sangster and Oran W. Seely, Buffalo, N. Y.:
First, We claim the bow made of the parts, B and E, and folded, substantially as described.
Second, In combination therewith, the elastic band, A, as shown and described.
- 54,608.—Sawing Machine.**—Anton Saur and Albert B. Colton, Franklin, Ind.:
First, I claim the guide, I, formed as described, when attached permanently to the end of the counter bar, E, substantially in the manner and for the purpose set forth.
Second, I claim raising and lowering the counter bar, E, and saw, K, by means of a toggle joint, M, and hand lever, L, the whole being arranged to operate substantially as set forth.
Third, I claim the combination of the brake, O, rod, N, and lever, L, with the toggle joint, M, for the purpose of brining the brake, O, into action on the fly wheel, by the same movement that raises the saw, substantially in the manner set forth.
- 54,609.—Flour and Meal Sifter.**—Elijah H. Sears, Crystal Lake, Ill.:
I claim the arrangement of the drawer, C, and the notched pieces, D, lever, H, drawer, B, and frame, A, constructed and operating in the manner and for the purpose herein specified.
- 54,610.—Brick Machine.**—D. W. Seely and F. Jacobie, Albany, N. Y.:
First, We claim a horizontal, or nearly horizontal, feeding and grinding shaft, with knives or blades of a screw form, so arranged relatively that they force the clay or other material from both ends of the machine into the press box, notwithstanding the clay is only introduced into the grinding box at one end, substantially as described.
Second, The combination of a shaft, with right and left screw blades or knives, and a brick molding press, substantially as set forth.
Third, The means, substantially as herein described, for retaining the filled molds under pressure, and while under pressure forcing them out from under the press box, for the purpose set forth.
Fourth, Retaining the pressure on the filled molds during their removal from under the press box, by means substantially set forth.
Fifth, The means, substantially as herein described, for keeping the molds up to the bottom of the press box and allowing the molds to descend, clear of an obstruction, as they pass under the front part of the press box, as set forth.
Sixth, The slotted and perforated stem of the press follower, in combination with the link and walking beam, substantially as and for the purpose described.
- 54,611.—Harvester.**—John F. Sieberling, Doylestown, Ohio:
I claim the arrangement and combination with the broad flanged clutch, J, of the shaft lever, G, pin, v, and spring, E, or their equivalents, substantially in the manner and for the purposes set forth.
- 54,612.—Knife Cleaner.**—Andrew J. Sellon, Boston, Mass.:
I claim the knife cleaner composed of the elastic roller, the covered tablet, and the groove thereof, such tablet being provided with a handle, as specified.
I also claim the combination and arrangement of the abutment with the tablet and the elastic roller, arranged as specified.
- 54,613.—Spittoon for Railroad Cars.**—J. H. Seymour, Hagerstown, Md.:
I claim the combination of the bowl, A, cover, C, valve, D, lever, f, and rod, E, arranged in connection with the floor of the car, substantially as herein described.
- 54,614.—Fruit Box.**—James Shepard and B. B. Lewis, Bristol, Conn.:
We claim cutting the blank for a box obliquely with the grain of their wood or a veneer, substantially as and for the purpose herein specified.
- 54,615.—Pressure Head for Siphon and Force Pumps.**—Delle Shapley, St. Louis, Mo.:
First, The combination and arrangement of the feed pipe, D, and the annular valve, E, as herein set forth.
Second, The valve, E, in connection with the valve rods, F and c, or their equivalents, and with the chamber, A, when used as herein before set forth.
Third, The check valve, K, in connection with the valve, E, as herein before set forth.
- 54,616.—Blacking for Harness.**—Samuel Sherwood, New York City:
I claim the water-proof blacking composed of the ingredients herein specified in about the proportions set forth.
- 54,617.—Glass Blower Mold.**—Oliver P. Sheirle, Covington, Ky.:
First, I claim a mold for forming jars, etc., with channeled tops, having a downwardly opening bottom, two horizontally opening side parts, and two crease parts which open parallel with, but subsequently to said side parts, substantially as and for the purpose set forth.
Second, The arrangement of parts substantially as described, for the automatic opening first of the bottom and side parts, and subsequently of the crease parts, and for their simultaneous closure by the foot of the blowman or otherwise.
- 54,618.—Shutter Hinge.**—Joseph Elusser, Cincinnati, Ohio:
I claim the self-locking shutter hinges provided with the V-indented half collar, B C D, and locking edge, C, on its lower member, and one V-tooth, E, on its upper member, constructed and arranged as set forth.
- 54,619.—Teeth of Machine for Picking Cotton.**—Benjamin M. Smith, Brooklyn, N. Y.:
I claim the construction of the teeth of machinery, for picking, growing or open ing cotton or other fibrous material with grooves or notches, substantially as herein specified.
- 54,620.—Fastening Handles to Plated Ware.**—Henry G. Smith and E. Merier Pomeroy, West Meriden, Conn.:
We claim attaching handles and other projecting parts to cups, pitchers and other analogous vessels made of plated or solid metal by means of male and female screws when the screws are made and fitted in the manner, and for the purpose substantially as herein described and set forth.
- 54,621.—Machine for Spinning Metal.**—Charles F. Spaulding, St. Johnsbury, Vt.:
I claim the combination of the rotary die wheel, A, and the plate fastening ring, E, and devices for holding it to the wheel with the slide mandrel, G, its spinning wheel or wheels and mechanism for supporting and moving such mandrel longitudinally or toward and away from the die wheel, as specified.
And in combination therewith I claim a mechanism for effecting the vertical adjustment of the mandrel as specified. I also claim the holding ring, E, as made with the fastening arms extending from it as and for the purpose set forth.
I also claim the combination of the clamp ring, F, with the holding ring, E, the die wheel, A, and the mandrel, G, and its spinning wheel.
- 54,622.—Washing Machine.**—M. W. Staples, Saratoga Springs, N. Y.:
First, I claim the upright cylindrical revolving tub, C, constructed as described, in combination with the stationary tub, A, substantially as and for the purpose set forth.
Second, The combination with the shaft, D, and bar, E, with each other and with the tubs, C and A, substantially as described and for the purpose set forth.
Third, The combination of the gear wheels, L and M, with each other, with the shaft, H, and with the revolving tub, C, substantially as described and for the purpose set forth.
Fourth, The combination with the gear wheels, K and G, with each other, with the crank shaft, H, and vertical shaft, D, substantially as described and for the purpose set forth.
Fifth, The combination of the flanges, N, arms, O, uprights, P, and flanges, R, with each other, with the shaft, D, and with the tub, C, substantially as described and for the purpose set forth.
[This invention has for its object to furnish a machine by means of which clothes may be washed quickly and thoroughly, and without subjecting them to the strain and wear consequent upon the operation of friction rollers and similar devices. And it consists of a revolving vertical shaft, furnished with arms which carry the clothes, and a revolving cylindrical tub. The tub and shaft revolve in opposite directions, and are each furnished with flanges which throw the water into violent agitation, which thoroughly wash the clothes as they are carried around by the revolution of the shaft.]
- 54,623.—Shovel Plow.**—Timothy Terrell, Spring Hills, Ohio:
I claim the curved rear part of the beam, A, in combination with the brace, G, and standard, F, the latter being of double bevel form to receive the share, and all arranged substantially as and for the purpose herein set forth.
- 54,624.—Gun Stock and Barrel Attachment.**—David C. Thrasher, Freetown, Mass.:
I claim the combination and arrangement of the clamp and the lifting screw thereof with the d-retained tenon or tenons and the chamber applied to the stock and the barrel or barrels, substantially as described.
- 54,625.—Cotton Gin.**—Edward Towne, Washington, D. C.:
I claim the arrangement of the teeth in the separator, as and for the purposes described and set forth in this specification, viz.: So arranging them that no two or more teeth can seize upon the same fiber at the same time, and thereby break it by drawing it across the bars of the grating; and yet so arranging the teeth that all the interspaces between the bars of the grating will be penetrated alternately, so as to draw the cotton equally from all parts of the mass, as specified.
Second, I claim the studded or knobbed roller, F, or a set of such rollers operating in combination with the endless apron, E, as described, and for the purposes set forth in this specification.
Third, I claim in combination the revolving cylindrical receiver, H H, with its two gratings, a and b, operating together as and for the purposes described and set forth in this specification.
- 54,626.—Spirit Level.**—Andrew J. Vandergrift, Cincinnati, Ohio. Antedated April 25, 1866:
First, I claim forming liquid chamber, t, by turning or otherwise forming a uniform groove in metal or other suitable material, and providing the same with a transparent face, the same being fitted and hermetically sealed, forming a uniform liquid chamber, substantially in the manner and for the purpose set forth.
Second, Stocks, A, liquid chamber, t, circuitous liquid chamber, g z, dial plate, D, and segmentary dial plate, E E, all contained, in the manner and for the purpose set forth.
- 54,627.—Hay Loader.**—Frank Van Etten, Jackson, Mich.:
I claim the bent lever, E, having the fork, G, or rake, I, pivoted to the outer end of its lower arm, e, in combination with this lever, F, swivel standard, D, the cords and catch, and the bed piece B, connected to the arm, A, all being arranged and applied to a wagon or cart, to operate in the manner substantially as and for the purpose set forth.
[This invention relates to a new and improved device for loading wagons or carts with hay, and is designed to supersede the tedious and laborious work of pitching the hay on the wagon or cart by hand. The invention consists of a fork or rake and levers applied to a pivoted standard, which is secured to an arm attached to the vehicle, and all arranged in such a manner that the hay, as the wagon or cart is drawn along, will be taken up by the fork or rake either from the cock, winnow or swath, and by a simple manipulation on the part of the operator, deposited on the wagon or cart.]
- 54,628.—Manufacture of Artificial Stones for Grinding and Polishing Metals.**—Hartwich Von Unworth, New York City:
I claim the manufacture of artificial stones from the ingredients named and by the processes and for the purpose and in the manner substantially as herein described and set forth.
- 54,629.—Vacuum Pan.**—Christian Wahl, Chicago, Ill.:
I claim First, Evaporating liquids by passing them in a continuous current through an air-tight receiver or vacuum pan, placed in a horizontal position or nearly so, to which pan the requisite degree of heat is imparted by steam or any other suitable medium, substantially as and operating in the manner described.
Second, Connecting the vacuum pan with the condenser for the vapors arising from the evaporation of the liquid within the pan, by and through a series of pipes, or their equivalent, communicating with the said condenser, substantially in the manner described, and for the purpose specified.
- 54,630.—Reversing Attachment to Treadles.**—Alban Warth, Stapleton, N. Y.:
I claim the arrangement of the lever cam, E, spring, b, and the friction roller, b', and spring, c, in combination with the crank shaft, A, pin, a, and treadle, D, and operating in the manner and for the purpose herein specified.
- 54,631.—Clothes Wringer.**—Henry Whele, Hoboken, N. J.:
First, I claim the hollow metallic shafted rollers, K L, substantially as herein described and for the purpose specified.
Second, The mechanism for fastening the clothes wringer to the wash-tub as shown in Fig. 2, consisting of the links, l m n p, the longitudinal washer, q, the smooth nut, r, and pin, s, substantially as described, and for the purpose specified.
Third, The mechanism for fastening the clothes wringer to the wash-tub, as shown in Fig. 3, consisting of the links, l m n p, the washer, q, in combination with the nut, x y w, substantially as described and for the purpose specified.
- 54,632.—Churn.**—Hiram W. White, Olney, Ill.:
I claim the ashier, pyramidal or conical gradatory exterior and interior chamber, substantially as described and presented.
Second, The churn with its interior surface, corrugated or grooved, substantially as and for the purpose described.
- 54,633.—Corn Planter.**—Morris Wilkinson, Burlington, Mich.:
I claim forming a chamber for the portions of the axle, C, containing the seed cell, e, or for any equivalent seed cylinder, by means of the plow stock, G, and seed tube, J, when arranged relatively with each other, and with the axle and upper, and constructed and connected substantially in the manner and for the purpose herein described.
Second, I claim the employment of pivoted covers, S, in combination with the rods, R, and adjustable spring, M, substantially as, and for the purpose herein specified.
- 54,634.—Churn.**—Nimrod E. Wilson, Central Station, West Va.:
First I claim actuating a churn by means of one or more spiral springs communicating motion through wheels, M and I, and endless screws, K and H, substantially in the manner set forth.
Second, I claim giving an oscillating motion to the barrel of a churn by means of crank, F, and dasher, E, the churn being suspended on pivots, substantially in the manner and for the purpose set forth.
- 54,635.—Mode of Grinding Bones for Manure, Etc.**—Jacob Wister, Greencastle, Pa.:
I claim mixing hard plaster, plaster of paris or gypsum, or its equivalent, with bones and grinding such mixture for the purpose of facilitating the process of grinding and preventing the mill from gumming, substantially in the manner and for the purposes set forth.
- 54,636.—Pump.**—David S. Wood, Delevan, Wis.:
I claim the annular packing, P, applied around the piston, D, upon the upper ends of the interior cylinder, substantially as and for the purpose specified.
- 54,637.—Cultivator.**—Benjamin F. Young, Toulon, Ill.:
First, I claim the inside frame, B, and the mode of connecting it with the frame, A, constructed and operated substantially as described.
Second, The iron lever, F, hung upon a pivot by which the front shovels are swung to the right or left.
Third, The adjustable wooden wedges, I, together with the crooked iron rods, D, by which the front shovels are adjusted so as to throw the dirt to or from the corn.
Fourth, The side or gate, P, by which is adjusted the depth the shovels enter the ground.
- 54,638.—Machine for Making Carriage Axles.**—Calvin Young, Auburn, N. Y.:
I claim forming a solid swell or collar on axles and giving the bed or arm thereof a set by one and the same operation by means of a stationary and a movable clamping die that seize the bar or blank at points remote from its ends, and leaves uncontrolled that portion of the bar or blank from which the enlargement is to be made until the dies are about to meet, when said enlargement is jammed up into the proper form by said dies, substantially in the manner herein described and represented.
- 54,639.—Machine for Making Carriage Axles.**—Calvin Young, Auburn, N. Y.:
I claim forming a solid collar or shoulder on an axle by gripping the bar or blank of which the finished axle is made, at two points remote from its ends by gripping dies so as to leave a portion of said bar between the two sets of dies uncontrolled and free to expand laterally by end pressure applied to one of the gripping dies until near the end of the movement of said dies, when the expanded or swelled metal may be driven into the dies to give it better form and shape by means, substantially as herein described and represented.
- 54,640.—Cork Screw.**—John Adt (assignor to Ellisha Turner), Walcottville, Conn.:
I claim the slotted metallic case, a, in combination with the T, head, e, of the instrument, c, as and for the purpose specified.
- 54,641.—Gate.**—D. B. Baker (assignor to himself and P. S. Miller), Rollersville, Ohio:
I claim the braces, E E, so arranged that they will act as supports for sustaining the weight of the gate after it has passed its balancing point, substantially as specified.
- 54,642.—Corn and Seed Planter.**—James Campbell (assignor to himself and William Campbell), Harrison, Ohio:
First, I claim a grain box whose front portion is supported and pivoted upon a curved fender plate, F, and whose rear portion is supported in notched posts G G' g', substantially as described.
Second, The grain box, E o o', having the pivoted front and perforated rear portion in the described combination with the adjustable hook, P Q q', for the purpose set forth.
- 54,643.—Dies for Forming Gas Pipe.**—Joseph Fieldhouse, Dighton, Mass., assignor to the Dighton Furnace Company, Taunton, Mass.:
I claim the combination and arrangement of the edge guide, C, with the pipe forming and welding die or its equivalent, substantially as set forth.
- 54,644.—Baling Press.**—Dennis Frisbie and Samuel C. Goodsell (assignors to themselves and David P. Calhoun), New Haven, Conn.:
First, We claim the combination of the two pawls, S and S', having their eccentrics set opposite to each other, and upon the same shaft, with the platen of a press, when arranged to operate in the manner described so as to actuate the platen alternately at each end, substantially as and for the purpose specified.
Second, The combination of the hook, w, with the operating parts of a baling press, substantially as and for the purpose specified.
- 54,645.—Water Wheel.**—J. A. Hanson, Amsterdam, N. Y., assignor to himself, H. S. McElwain, Amsterdam, N. Y., and H. K. Kent, Pittsfield, Mass.:
I claim the buckets with the part, b, as described, lip c, rim, d, and supplementary portion, e, in combination with the hollow hub, a, of the wheel, B, arranged and operating in the manner and for the purpose herein described.
Second, The arrangement of the gate, C, sunken rack, g, pinion, D, and box, F, operating in the manner and for the purpose herein described.
- 54,646.—Eyelet Stock.**—John W. Hoard (assignor to himself, S. W. Young and R. A. Dennison), Bristol, R. I.:
I claim the stock prepared as herein described, that is to say the strip or band in which a series of cups or depressions is formed, approaching the form and size required for the finished eyelets, substantially as and for the purposes herein set forth.
- 54,647.—Arranging Vats for Tanning Leather.**—William La Dew, Norway, N. Y., assignor to himself and Horace U. Soper, Batavia, N. Y.:
First, I claim constructing a tan vat with slots or hooks, so that the leather may be hung in the tanning liquor, in combination with a movable wheel or other movable machinery, located in the bottom of the vat, to be operated either by hand or power, for the purpose of equalizing the strength of the tanning liquor, and imparting a motion to the leather hanging therein, constructed and arranged as described and for the purpose set forth.
Second, I claim placing in the bottom of the vat a movable wheel, with buckets or other movable machinery, so arranged as to be operated by hand or power, for the purpose of plunging up and agitating the tanning liquor, and also imparting a motion to the leather hanging therein, thus saving labor both in handling and laying away, constructed and arranged as described and for the purposes set forth.
- 54,648.—Harrow and Cultivator Combined.**—Jacob K. Minich (assignor to himself and Jacob R. Hoffer), Mount Joy, Pa. Antedated September 25, 1865:
I claim the construction and arrangement of the shovels, 1, 2, 3, and 4, 5, 6, in combination with the cultivator, c, and its slotted side wings, H, all arranged and operating in the manner and for the purpose specified.
- 54,649.—Scoop for Excavating.**—Augustus T. Morris, Bloomfield, N. J., assignor to himself and James Cummings, New York City:
First, I claim the construction of the frames, a', in combination with the cross plate, c', and block, w, for the shaft, b, substantially as and for the purpose specified.
Second, I claim the combination of the cross bar or shaft, e, with the frames, a', said shaft, e, being guided at its ends in said frames, a', as specified.

Third, I claim the plates, 24, attached to the frames, a', as set forth, and receiving the joints or hinges by which the scoops g, g, are attached, substantially as set forth.

Fourth, I claim the combination of two separate pairs of hinges, with the quadrant buckets as specified, so that the buckets shall open wider than the diameter of the buckets when closed, and increase the efficiency of the said bucket in excavating, as specified.

54,650.—Bit Brace.—Obed Peck, Southington, Conn., assignor to William A. Ives, New Haven, Conn.:

I claim the combination of the sleeve, C, with the socket, A, when the said sleeve is constructed with the vertical and inclined slot, a, and the socket provided with a pin, e, and arranged to operate in the manner and for the purpose substantially as specified.

54,651.—Roll for Wringers.—Hiram Robbins (assignor to himself and Thomas H. Foulds), Cincinnati, Ohio:

First, I claim a wringer roll composed of an external cylinder of rubber, and the longitudinally divided shaft, composed of the central rod, A, a', and the rounded or indented segments, B, B', substantially as and for the purpose set forth.

Second, in combination with the elements of the claim next preceding, I claim the guard or sheath, C, adapted to enable the insertion of the segments, B, B', in the manner explained.

54,652.—Manufacture of Mowing Machine Guards.—Abel Simonds (assignor to himself, B. Snow, Jr., Alvin A. Simonds and George F. Simonds), Fitchburg, Mass.:

I claim the above specified mode of hardening the knife supporting surface of a mowing machine guard, and protecting the lip of such guard from being hardened at the same time.

54,653.—Ice Pick, Nut Cracker, Etc.—George L. Witsel (assignor to Charles A. Waterman), Philadelphia, Pa.:

I claim combining and arranging in one tool or instrument, an ice pick, d, gas burner forceps, and pipe tongs, and nut cracker, e, tack and nail extractor, f, nail and tack hammer, g, meat thrasher, h, and plate lifter, k, substantially as and for the purpose herein specified and described.

4,654.—Steam Generator.—William Zellner, New York City, assignor to himself and M. M. Rounds, New Haven, Conn., and J. E. Jerold, Jersey City, N. J.:

I claim a steam generator having a portion of the boiler extended into the fire box, for the purpose of increasing the heating surface thereof and distributing the heat thereon, substantially as and for the purpose described.

54,655.—Compressed Air Bath.—Paul T. Ware, Toronto, Canada:

First, I claim in combination with the compressed air chamber, A, and exterior jacket, B, the heating coil, c, or its equivalent, for radiating warmth equally through the metallic sides or walls of said bath chamber, substantially as set forth.

Second, I claim the combination and arrangement of the steam chest, E, and compressed air coil, d, d, and valve, d', within the bath chamber, A, for warming and regulating the temperature of the condensed air before it enters the bath, substantially as shown and described.

Third, I claim in combination with a closed chamber or vessel for condensed air baths, and the pipes for the induction and eduction of air, water, etc., into and from the same, the employment of valves, r, r' and d', arranged within the bath chamber, so as to be controlled and operated exclusively by the patient confined therein, substantially as and for the purposes shown and described.

Fourth, I also claim in combination with a compressed air bath chamber, the safety valve, l', so arranged as to be inaccessible to the occupant of the bath, substantially as and for the purpose described.

Fifth, I also claim in combination with the air chamber, A, and water reservoirs, L and M, the pipes, u, u, or their equivalent, for the purpose of maintaining within said reservoirs, a pressure corresponding with that within the air bath, as and for the purpose set forth.

54,656.—Method of Boring Oil Wells.—James H. Clapham, New York City:

First, I claim the arrangement of the band wheel, d, crank pin, l, connecting rod, g, and slide, h, in the manner specified and for the purposes set forth.

Second, I claim the friction clutch, p, and rope barrel, n, in combination with the shaft, e, connecting rod, g, and slide, h, for operating the bearing tool, as specified, so that the said boring tool can be drawn up by the direct application of power to the tool rope, in the manner set forth.

Third, I claim the fork or slotted lever, r, actuating the temper screw progressively by motion from the pitman, as set forth.

Fourth, I claim the forks or slotted lever for rotating the rope clamp progressively by motion from the pitman, as set forth.

Fifth, I claim connecting the temper screw directly to the reciprocating crosshead, as specified, thereby dispensing with the slings heretofore employed for suspending the said temper screw.

Sixth, I claim the combination of the rope, m, clamp, l, with its rotating device, r' and s', temper screw, k, with its rotating device, r and s, and connecting yoke, l, and the windlass, n, arranged, constructed and operated as described, as and for the purpose set forth.

54,657.—Vessel for Petroleum, Etc.—Edward L. Allen, Fairhaven, Vt.:

First, I claim the employment of the wooden box or casing, A, in combination with the metal receptacle, B, and surrounding the same in the manner and for the purpose hereinbefore described and set forth.

Second, I also claim the employment in a reservoir for the reception of kerosene and other volatile oils of the bottom, E, so constructed as to incline downward in a conical or other shape or form, to the point where the discharge pipe, F, is inserted, substantially in the manner and for the purposes herein described and set forth.

REISSUES.

2,237.—Packing for Tubes of Condensers.—Horatio Allen, New York City. Patented July 20, 1858:

I claim making the joint formed by two metal surfaces (as in the joints of the tubes in the tube sheets of surface condensers and other similar instruments) tight, by inserting between the tube and tube sheet a tube of seasoned or compressed wood, made either in one or several pieces, relying on the expansion of the wood after being saturated by water to make the joint tight, and on the freedom of the metal tube to move endwise without impairing the tightness of the joint, to avoid injurious results from the expansion and contraction of the metal tube, all substantially in the manner and for the purpose herein set forth.

And I also claim and desire to secure by letters patent, closing at any desired point, the annular space formed where a tube passes through a long cylindrical hole, by surrounding the metal tube at that point by a tube of seasoned or compressed wood (in one or several pieces or staves) of such thickness that when saturated with water, it will fill water tight the annular space at that joint, substantially in the manner herein described.

2,238.—Revolving Fire-Arm.—Silas Crispin, New York City. Patented Oct. 3, 1865:

I claim in that class of fire-arms having a fixed barrel and many chambered rotatin' and bisected cylinder, with the parts swinging on a hinge of the frame forming the partial cartridge chambers. In each part of the cylinder with annual recesses to accommodate the fulminate flanch of a cartridge in combination with the means shown, or the equivalent, for allowing the said fulminate flanch of such cartridge to be exploded, as herein before set forth.

I also claim, in combination with a frame divided and hinged together as described, the employment of separate fixed centers or studs for the support of the revolving cylinder, one projecting forward from the rear, and the other backward from the forward portion of the said frame, as set forth.

I also claim the employment in combination with a hinged frame of two cylinder sections, the whole so constructed and arranged that the said cylinder sections may be swung or vibrated on the hinge toward and from each other, substantially as and for the purposes set forth.

2,239.—Lantern.—James E. Cross, James F. Dane, and William Westlake (assignees of William Westlake), Chicago, Ill. Patented Dec. 12, 1865:

I claim connecting the dome or lamp part of a lantern to the guard by means of a ring or rod of the guard, and the spring catches, or their equivalents, substantially as and for the purposes herein shown and specified.

2,240.—Tobacco Press.—Alexander Harthill, New York City, assignee of J. A. Bawel of Powhatan Court House, Va. Patented May 31, 1859:

First, I claim the process of pressing tobacco by passing it through

the channel or groove, C', with the follower, B', working therein, substantially as shown and described.

Second, The combination of the rollers, B and C, with the endless belt or apron, I, arranged to operate as set forth.

Third, The combination of the springs, s, the elbow levers, T and T', rods, a and x, with the treadles, H, arranged to operate as herein described.

Fourth, The roller, V, located in a suitable position to lubricate the channel, C', or the follower, B, and supplied with oil from any suitable reservoir, substantially as set forth.

Fifth, I claim the scraper, U, when arranged to operate in connection with the channel, C', for the purpose of keeping the latter free from adhering substances, as set forth.

DESIGNS.

2,305.—Trade Mark.—Perre A. Berthold and Macklet Thompson, St. Louis, Mo.

2,306.—Ace of Spades.—Isaac Levy, New York City.

2,307.—Pen.—Edward A. Marsh, (assignor to Gaylord Manufacturing Company), Chicopee, Mass.

2,308.—Coffin Handle.—C. L. Nelberg, (assignor to Sargent & Company), New Haven, Conn.

2,309.—Tobacco Pipe.—Louis Saarbach, Philadelphia, Pa.

2,310.—Coat or Hat Hook.—J. B. Sargent, (assignor to Sargent & Company), New Haven, Conn.

2,311.—Ladies' Hood.—John Taylor, Philadelphia, Pa.

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We desire to call the attention of Lumbermen and others using Engines and Machinery, to our
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They embrace all the latest and best improvements. Our Boilers are made of the best Cast Iron No. 1 Iron, thereby lessening the danger of explosion, and lasting much longer than those made of iron now in general use; and all the material is selected with great care, and the workmanship is the very best. The Testimonials we have from parties using our Mills and Machinery, are such as will be very satisfactory to any one, that in point of finish and material, we have no superiors.
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slide rest meets with approval from practical men. It is intended for small lathes and light work; will bore out any hole six inches in diameter and two and a half inches deep; will face flanges, turn a piece in the chuck, or round out a curve. Price \$10.
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This invention is applicable to all kinds of stoves, furnaces, and engines, consumes the smoke and gases of soft and hard coal, and saves from thirty to fifty per cent. of fuel. For State or County Rights apply to the Patentee.
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KELLEY & LAMB'S Improved Steam Engine Governor, the only Governor that will give the same speed, with high or low pressure of steam, or the engine being light or heavy loaded,—is considered by those who have used it to have no equal, and is warranted to give satisfaction. Send for Circular.
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CARVALHO'S IMPROVED SUPERHEATER, (illustrated on Page 98, SCIENTIFIC AMERICAN), furnishes pure steam of any required temperature, for all purposes, saving 25 per cent. of fuel. It is easily attached to any boiler, and is very durable. Agents wanted. Call upon or address
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A Large Assortment of American, European, and Foreign Photograph Views for the same! A Priced and Illustrated Catalogue, containing 15 Cuts and 56 Pages, will be sent free by Mail on application.
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REYNOLDS'S PATENT SWEEPS THE FIELD! New Improvements; Low Prices; Does not Clog; Has no Complications of Gates or Costly Flume Work; Compact for Shipment; Great Water Saver; THE ONLY WHEEL THAT EXCELS OVERSHOTS. Gold Medal awarded by American Institute for Superiority. Agents wanted in every county.
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21 13 Late TALCOT & UNDERHILL, No. 95 Liberty street.

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FOR SPRING TRADE.
A full Assortment of Tool Chests, all sizes, from \$2 up to \$110. Manufactured and for sale by
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KENDALL'S \$1 BAROMETER or Weather Indicator
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FROM 1 TO 20 HOISTING MACHINES,
That will hoist from 500 to 1500 lbs., and will hoist from 1 to 5 feet and raise or lower at the will of the operator.
They must be simple and cheap, as they are to be used on a continuous line of shafting. Address
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Prepared for Marine, Railway, and Manufacturing Machinery, of every description.
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HOISTING ENGINES, STEAM FIRE ENGINES, STEAM POWER, AND HAND PUMPS, SHAFTING, HANGERS, AND PULLEYS, Giffard's Injectors, Steam and Vacuum Gages, Blast Pressure Gages, Sewall's Siphonometers, Relliance Damper Regulators, Water Gages, Hydraulic Jacks, Dimpfel's Patent Fan Blower, ROEBLING'S PATENT WIRE ROPE for sale.
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STATE RIGHTS

of Chappell's Patent Toilet Glass, for sale. "One of the most ingenious inventions of the age; is a complete arrangement, designed for examining the sides and back part of the head, back, and shoulders, and is particularly for the use of ladies while making their toilets. It consists of an adjustable mirror, so arranged as to make the compound reflection complete, thus obviating the necessity of having aid in dressing, etc."—From the Highland Democrat. Address
G. CHAPPELL, Peekskill, N. Y. 20 4*

NOTICE.

TO WHOM IT MAY CONCERN.
All parties interested in the sale, or manufacture, of a so-called "Auxiliary Jaw," to be used in combination with ordinary wrenches, and which is claimed to be invented by T. C. Page of Rochester, N. Y., are hereby notified to desist from such sale or manufacture, the article being a direct infringement upon the patent granted by the United States to William Webster of Morrisania, N. Y., February 9th, 1864, for an "Improvement in Wrenches," and under which patent the undersigned are now and have for some time been manufacturing.
Sole owners and patentees of
"WEBSTER'S PATENT ORDINARY WRENCH"
for screwing-up and cutting-off pipes, rods, etc.
No. 17 Dey street,
New York, May 5, 1866. New York, 20 4

\$5,000 A YEAR CAN BE MADE BY AGENTS
selling TOPLIFF'S PERPETUAL LAMP WICK,
for the use of Coal Oil Lamps, the most useful invention of the age. NEEDS NO TRIMMING, consumes less oil, and gives more light than the common wicks. Samples sent for 20 cents, or two for 30 cents. Agents wanted everywhere. Address C. L. TOPLIFF, Box 773, New York. 18 11

WATER-WHEELS—MANUFACTURED BY AMERI-
CAN WATER-WHEEL CO., No. 31 Exchange street, Boston, Mass. This is admitted to be the most powerful wheel in the world. They are simple, and in a compact, portable form, rendering them the most suitable for the Southern and Western States. For particulars address as above. 10 13*

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FOR SALE.—THREE NEW PORTABLE ENGINES,
50, 15, and 8 Horse-power. Also, three Second-hand portable engines of 6, 8, and 15 Horse-power, at REED & COGSWELL, 78 New Store, 117 Liberty street, New York. 1*

LOW'S PATENT SHINGLE AND BARREL-HEAD

Machine is offered as the
BEST MACHINE IN USE.
Is very Simple and Durable; Easy to Operate; Does Better Work than can be done on any other Machine, and More of it. Men who use it, say as follows:
"Pelam & Randall, Dubuque, Iowa, say, 'We average 20,000 with one man daily.' C. K. & A. B. Worth, De Soto, Wis., say, 'We average 18,000 to 22,000 daily.' Hersey, Staples & Co., Stillwater, Minn., say, 'It saves 25 per cent. of sawing, and does better work.' Wm. C. Childs, Keokuk, Ind., says, 'We saw from 16,000 to 18,000 of hard wood per day.' Topping Bros. & Co., Muscoda, Ill., say, 'Your machine is incomparable as a Shingle or Barrel-head saw.' 'All the above are Single Saw, Hand Feed. We build Double Machine, and both Self and Hand Feed. Send for Circular, giving prices, and full description, and cut to
C. S. & S. BURT, Dunleith, Ill.,
Manufacturers, and Owners of Patent, or
S. J. AHERN, 88 Wall street, New York.
Wholesale and Retail Agent. 21 3

GOVERNORS.

THE GILLESPIE GOVERNOR COMPANY, OF BOS-

ton, are now manufacturing
GILLESPIE'S PATENT HYDRAULIC GOVERNOR,
for Water Wheels of every description.
After a test of five years' service, this Governor has proved itself far superior to any other hitherto in use. Of sufficient power and velocity to run the gate from open wide to close shut in from ten to twenty-five seconds, according to the size of the wheel, yet so extremely delicate in its action, and under such perfect control, that while it moves the gate instantly at any call, it will not run by.
Every Machine guaranteed to give entire satisfaction to the purchaser, or no sale.

TIMOTHY S. HOLTON, Selling Agent,
of Water Power Department, 13 Kilby street, Boston, Mass.
Also Manufacturers of
GILLESPIE'S GOVERNORS FOR MARINE AND STATIONARY
STEAM ENGINES.
Office 13 Kilby street, Boston, Mass. JOHN S. ROGERS, Treasurer.

For sale in New York by J. E. STEVENSON, 40 Dey street, and GEO. TALCOTT, 69 Liberty street.

TESTIMONIALS.

Laconia, N. H., Feb. 2, 1866.
TIMOTHY S. HOLTON:
Dear Sir:—The "Hydraulic Governor" which you put in operation in our mill gives perfect satisfaction. We shall order of you two more for our other mills as soon as we get the water wheels ready. I have been in the manufacturing business forty years; have used and experimented with all kinds of Governors for regulating water wheels that have come to my notice. I have always felt the want and necessity of a Governor to regulate instantaneously. In fact there have been thousands of dollars spent to arrive at just what your Governor accomplishes. We are now running seven sets of wooden machinery in the mill where your Governor is used. We can stop or start one-half or more of the machinery simultaneously, and it will regulate the quantity of water upon the wheel so rapidly that there is no inconvenience experienced in the variations of speed. It not only increases the production of the mill, but gives such even speed to the machinery that it is less liable to get out of order, consequently requires less repairs.
Most truly yours,
S. T. THOMAS.

Trenton, N. J., June 14, 1865.

Mr. J. E. GILLESPIE:
Sir:—We have used one of your Governors on our water wheel nearly three years. We run over two and one-half years without replenishing the oil. The power from our wheel is consumed chiefly in grinding and polishing. This kind of work has hitherto occasioned great and troublesome variations of speed. We find that your Governor obviates these difficulties. We recommend it as the only Governor within our knowledge that can regulate the speed of a water wheel which is used to do work requiring such great variations in power.
Yours truly,
FISHER & NORRIS.

Amsterdam, N. Y., April 28, 1866.

Mr. J. E. GILLESPIE:
Dear Sir:—I have had in use your Regulator since November, 1862, and find that it works to my entire satisfaction, doing all you claimed for it. When you proposed to regulate my twenty-four foot breast wheel, with my irregular machinery, I had very little confidence in your success, having tried so many different kinds and all failed to give me a regular and uniform speed, which yours does. We can now throw off and on our heavy pickers without noticing hardly a perceptible difference in the motion, and I unhesitatingly say it is the best Regulator I have ever seen.
Truly yours,
STEPHEN SANFORD.

Lowell, Mass., Jan. 5, 1866.

GILLESPIE GOVERNOR COMPANY:
Gentlemen:—We have given your Governor a fair and impartial trial, and are much more than satisfied with the result; it giving an uniformity of speed we believe never before attained by any other on a water wheel, and rivaling the most perfectly regulated steam engine. Our speed can not be forced down by throwing on our heaviest machines, several at a time, more than two turns on the main shaft, and that only for a few seconds. Our test of speed is broad drop box looms, running sixty-five picks per minute, with one hundred and twelve inches traverse of shuttle from box to box.
Truly yours,
L. W. FAULKNER & SON.

Wolcottville, Conn., Jan. 9, 1866.

MR. TIMOTHY S. HOLTON:
Dear Sir:—We will say that the success of a Regulator on our wheels (two three feet Cushman's), has always been a matter of much doubt in our minds, for the gates moved quite differently, and we apply power to a variety of machinery in a perfectly reckless and irregular manner, using more or less of any description in every part of our works without regard to the effect on any other portion; consequently those running small machines have been seriously annoyed by the fluctuations in speed, being unable to make as perfect goods as we wished, but now we find the Regulator automatically doing that which no human supervision could begin to do as effectually and quickly; so that every man in our employ is delighted to find he can run the machinery under his charge with uniform speed, hour after hour, no matter what else is going on.
The operations of the Governor satisfy us that you have furnished a perfect machine, thoroughly constructed and well finished through out. Very Respectfully yours,
TURNER & CLARK, Manufacturing Co.
S. L. CLARK, Treasurer.

Laurence, Mass., Jan. 3, 1866.

MR. TIMOTHY S. HOLTON, Agent:
Dear Sir:—We have had one of your Regulators in use for over a year, and we feel it a duty we owe you to say that it is as near perfection as a machine can be, and will add that money would not tempt us to be without one. Respectfully yours,
SAMUEL ROBINSON & CO.

South Easton, Penn., March 27, 1866.

MR. J. E. GILLESPIE:
Dear Sir:—In regard to your inquiry whether we can suggest any improvement in the construction of your Patent Governor, two of which we have had in constant use since the latter part of 1862, and during many months of that time in service day and night, we beg to say that we cannot but pronounce the Governor a most excellent application of an undoubtedly true principle. Neither machine has cost us a dime for repairs since the day they were set up; nor have we lost a moment of time by reason of any failure of either machine to do its work. The best evidence we can give of our appreciation of the merits of your Governor is the order herewith handed you for another. Wishing you success in the introduction of a most valuable invention, we are, truly yours,
STEWART & CO.

Medway, Mass., May 4, 1866.

GILLESPIE GOVERNOR CO.:
Gentlemen:—After a fair trial of one of your Regulators, we do not hesitate to recommend it as being the best Regulator we have ever seen. Very respectfully yours,
E. C. WILSON & CO.

THE HARRISON BOILER—A SAFE STEAM BOILER.

This new Steam Generator, combines essential advantages in Absolute Safety from explosion, in first cost and cost of repairs, durability, economy of fuel, facility of cleaning, and transportation, not possessed by any other boiler.

It is formed of a combination of cast-iron hollow spheres, each 8 inches in external diameter, and 3/4ths of an inch thick, connected by curved necks. These spheres are held together by wrought-iron bolts with caps at the ends. The form is the strongest known: its strength to resist internal pressure very great—unweakened as it is by punching or riveting, which lessens the strength of the wrought-iron boiler plate about forty per cent. Every boiler is tested by hydraulic pressure at 400 pounds to the square inch. It cannot be burst under any practicable steam pressure.

Under pressure which might cause rupture in ordinary boilers, every joint in this becomes a safety valve. No other steam generator possesses this property of relief under extreme pressure without injury to itself, and thus preventing disaster.

It is not affected by corrosion, which soon destroys the wrought-iron boiler. Most explosions occur from this cause. It has economy in fuel equal to the best boilers, arising from the large extent and nearness to the fire of its heating surface, as also from the waved line of this surface which, thoroughly mixing the gases, induces better combustion, and breaking the flame, causes the heat to be more effectively absorbed than in the ordinary tubular or cylinder boiler.

It sets up steam quickly, and with little fuel. It produces superheated steam without separate apparatus, and is not liable to priming or foaming.

It is a self-transported, and may be taken apart so that no piece need weigh more than eighty pounds. In difficult places of access, the largest boiler may be put through an opening one foot square. It is readily cleaned inside and out. Under ordinary circumstances, it is kept free from permanent deposit by blowing the water entirely out, under full pressure once a week. It requires no special skill in its management. Injured parts can be renewed with great facility, as they are uniform in shape and size. When renewed the entire boiler remains as good as new. The greater part of the boiler will never need renewal unless unfairly used.

A boiler can be increased to any extent by simply adding to its width, and being the multiplication of a single form, its strength remains the same for all sizes. It has less weight, and takes less than one-half the ground area of the ordinary cylinder boiler, without being increased in height.

Any kind of fuel may be used under this boiler, from the most expensive to the poorest.

Drawing and Specifications free of charge. For descriptive circulars or price address:

JOSEPH HARRISON, JR.,
Harrison Boiler Works, Gray's Ferry Road,
Adjoining U. S. Arsenal, Philadelphia.

17 13*

THE MOST VALUABLE MACHINE FOR BUILDERS

and Carpenters, Furniture, Carriage, Agricultural Implements, Sash and Door, Walrus and Straight Moulding, and Piano Manufacturers, complete for all kinds of irregular and straight work in wood, hard or soft, superior to all others, having the capacity of 20 good mechanics, called the Variety Moulding and Planing Machine. We own 9 patents covering the valuable inventions for machines with upright mandrels. We hear there are parties manufacturing machines in foreign countries on some one or more of our patents. We caution the public from purchasing such infringements. Our patents secure to us the machine with either iron or wooden table, through which are two upright mandrels, having cutters in each head held by a screw nut; also, combination collars, saving 75 per cent in cutters, feed table to plane and cut, iron or steel cutters, preventing wood from taking undue hold. Also guards acting as plane stocks, making it safe for a boy to run.

These machines are manufactured for America and Europe, only at the Hamilton Machine Works, No. 211 East Twenty-second street, New York. All communications addressed there will receive prompt attention. Agents solicited. Send for circular giving full description.

14 13

"POWER-LOOM WIRE CLOTHS" AND NETTINGS,
of all widths, grades, and meshes, and of the most superior quality, made by the CLINTON WIRE CLOTH COMPANY, Clinton, Mass. 10 52*

IMPROVED STATIONARY AND PORTABLE STEAM
Engines and Boilers, also Saw Mills, Cotton and Hay Presses, Corn and Flour Mills, on hand and in process of construction.
Marine Engines, Iron Steamers, Light-draft River Boats, Barges, Iron Bridges, Tanks, and general iron work constructed to order.
Address T. F. ROWLAND,
9 26* Continental Works, Greenpoint, Brooklyn, N. Y.

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MATCHING MACHINES, Patent Siding and Resawing Machines address J. A. FAY & CO., Cincinnati, Ohio. 3 1y

GROVER & BAKER'S HIGHEST PREMIUM ELAS-
TIC Sewing Machines, 495 Broadway, New York 1 1t

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Instructions address MUNN & CO., No. 37 Park Row, New York for TWENTY YEARS' Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN \$3 a year. 30,000 Patent Cases have been prepared by M. & Co.

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Regions, from 3 to 20-horse power, with large fire place independent steam feed pump, steam gage, and improved water heater. The most complete and best engines in the market. For particulars address WM. D. ANDREWS & BRO.,
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40 West Fourth street, Cincinnati. Orders for Provisions, Lard, Tallow, Grease, Oils, etc., carefully and promptly filled.
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Mortising Machines, Tenoning, Boring and Doweling Machines, Sash, Blind and Door Machinery, of the latest and most improved description, address J. A. FAY & CO., Cincinnati, Ohio. 6dt

WHEELER & WILSON, 625 BROADWAY, N. Y.,
Lock-stitch Sewing Machine and Button-hole Machine. 1t

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED
CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins, Air Pumps, Shafting, Pulleys, Gearing, Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON, 164 Duane street, cor. Hudson, New York. 10 1y

IRON CASTINGS AND STEAM BOILERS.—THE
HINKLEY AND WILLIAMS WORKS, No. 415 Harrison avenue, Boston, are prepared to manufacture common and gun-metal castings, of from ten pounds to thirty tons weight made in green sand, dry sand, or loam, as desired; also Flue and Tubular Boilers, and "Hinkley's Patent Boiler," for locomotive or stationary engines warranted to save a large percentage of fuel over any boiler now in use. 13 6*

PATENT POWER AND FOOT-PUNCHING PRESSES,
the best in market, manufactured by N. G. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. 17 10*

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Four Horse-power. Manufactured at the DRY DOCK IRON WORKS, No. 435 East Tenth Street, New York. 17 10*

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perior forged nuts by a new and economical process. For further particulars inquire of GEO. DUNHAM, Unionville, Conn. 18 8*

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Bolts of any length, with head of any shape used in the trade, made from inch round or square iron or under that size, are made per day of ten hours, by one man and boy, on Hardaway's Improved Patent Bolt Machine.

Our Spike Machine, for simplicity, durability, quality, and quantity of work turned out, is unequalled.

Our Rivet Machine is simple, durable, and does good work.

Shop and Territorial Rights for sale by Assignees of Hardaway & Sons.

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16 1t

ATMOSPHERIC TRIP HAMMERS.

Persons intending to erect, or those using hammers, are invited to call and examine Hotchkiss's Patent Hammer, made by CHARLES MERRILL & SONS, No. 556 Grand street, New York. They are very simple in construction require less power and repairs than any other hammer. The hammer moves in vertical slides; each blow is square and in the same place. For drawing or swaging they are unequalled, and many kinds of die work can be done quicker than with a drop. They are run with a belt, make but little noise, and can be used in any building without injuring the foundation or walls. The medium sizes, for working 2 to 4 inch square iron, occupy 28x56 inches floor room. Send for circular giving full particulars.

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ented and manufactured by Stant, Mills & Temple Dayton, Ohio, possesses new and valuable improvements, and remedies defects which exist in all other wheels classed under the name of turbine. Per cent of power equal to overshot water wheels. For descriptive circulars address STOUT, MILLS & TEMPLE, Dayton, Ohio or Oliver, Bro. & Co., agents, 45 Liberty street, N. Y., where sample wheels may be seen. 18 5*

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ly washed, thereby saving 50 per cent of the wear, and making them run easy and still. Use the Patent Washer Cutter, for cutting carriage washers, pump packing, etc. 18 10*

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\$250 A MONTH MADE WITH THE BEST STEN-

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Patent Alarm Drawer. Great inducements to good business men. Address A. S. TURNER, Willimantic, Conn. 9 13*

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Planers with new and important improvements, are manufactured by the Schenck Machine Co., Matawan, N. Y. T. J. B. SCHENCK, Treas. JOHN B. SCHENCK, Pres't. 17 1t

GOULD MACHINE COMPANY,

NEWARK N. J.
IRON AND WOOD-WORKING MACHINERY,
STEAM FIRE ENGINES.
SEND FOR A CATALOGUE. 13 13

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having the right to operate under five patents, are now selling Machinery and Territorial Rights to the same, to manufacture fuel of the best description for steam or domestic use. 12 26*

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Iron.—This iron is of a superior quality for locomotive and run parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars and boiler plates in stock and for sale by JOHN B. TAYLOR, sole agent for the U. S. and Canada, No. 18 Battery-march street, Boston. 1 23*

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[19 13*] H. B. SHAW, Alfred, Me.

FAN BLOWERS, OF DIFFERENT KINDS AND

sizes, in store for sale by LEACH BROTHERS,
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IMPORTANT TO RAIL ROAD TRAVELERS.—

THE PORTABLE RAILWAY HEAD-REST OR POCKET-BERTH. Patented July 4th, 1866. SUBSTANTIAL, SIMPLE, COMPACT. By means of the above invention, Railroad travelers may sleep at their pleasure, and ride days and nights continuously without experiencing fatigue. To Railway Companies, Railroad Agents, and Hotel Proprietors a liberal discount is made. Agents wanted in all the principal cities. Address JOHN R. HOOLE, Selling Agent, 19 13* No. 124 Nassau street, New York.

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other Machinery, Models for the Patent Office, built to order by HOLMKE & KNEELAND, Nos. 578, 580, and 582 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 11 1t

MANUFACTURERS OF TEXTILE FABRICS,

DUTCHER'S PATENT TEMPLES, adapted to weaving all kinds of goods. Also,
THOMPSON'S PATENT OIL CANS,
for oiling Machinery; neat and economical. Furnished by
21 13 eow* E. D. & G. DRAPER, Hopkendale, Mass.

TO DYERS AND INK MANUFACTURERS.—THE

Cheapest form in which you can buy "Tannin," for making a Black Dye, or Ink is N. Spencer Thomas's Extract of Hemlock Bark. It also colors a beautiful Tan Color. Price only Ten Cents per pound. Send for a Circular. Address the Manufacturer,
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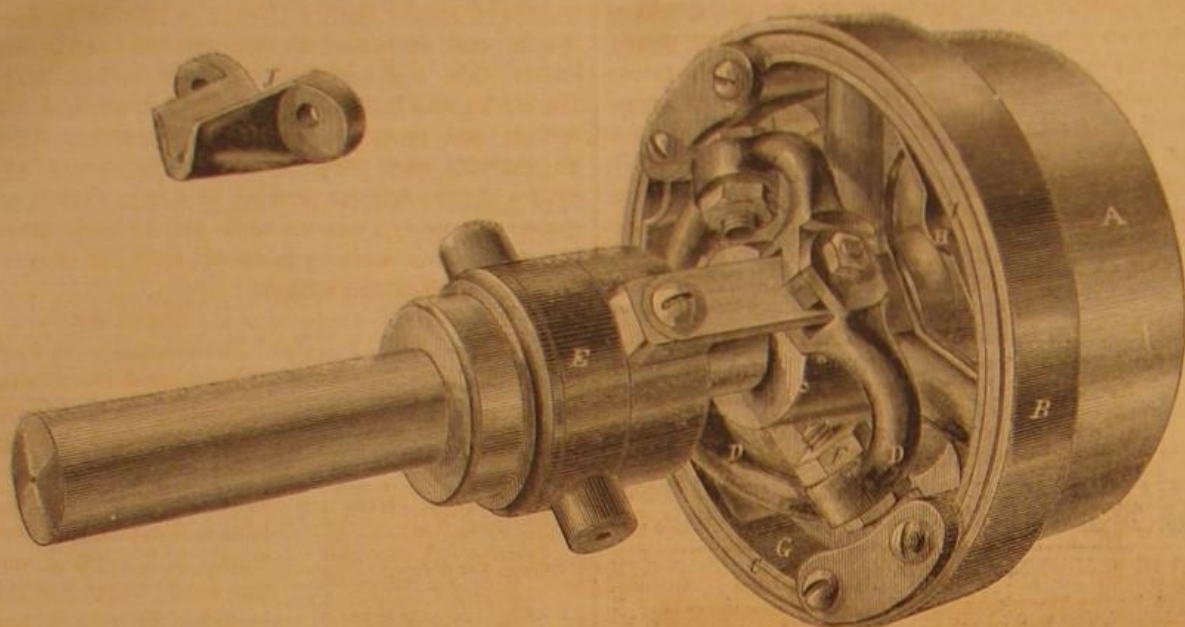
nebst den Regeln und der Geschäftsordnung der Patent-Office und Anweisungen für den Erfinder, um sich Patente zu sichern, in der Vereinigten Staaten sowohl als in Europa. Ferner Auszüge aus den Patent-Befehlen fremder Länder und darauf bezügliche Nachrichten; ebenfalls nützliche Winke für Erfinder und solche, welche patentreten wollen.

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Improved Friction Pulley.

Friction pulleys are coming into use gradually in shops. It is found that the reduced number of belts and the trouble of keeping them in order, fully compensates for whatever repairs are needed in the pulleys from time to time. We give herewith an illustration of a new friction pulley, which the inventor claims to be useful for a great variety of machines.

In detail this pulley consists of a belt wheel, A, and friction wheel, B, both fastened together but distinct from each other. Inside the friction wheel is a band, C, which drives the belt wheel, when thrown in contact with the friction wheel by the toggle joint, D. This joint is worked by a coupling, E, sliding on

**BROWN'S FRICTION PULLEY.**

the main shaft, and operated on by the shipping bar, common to all systems of pulleys and belts.

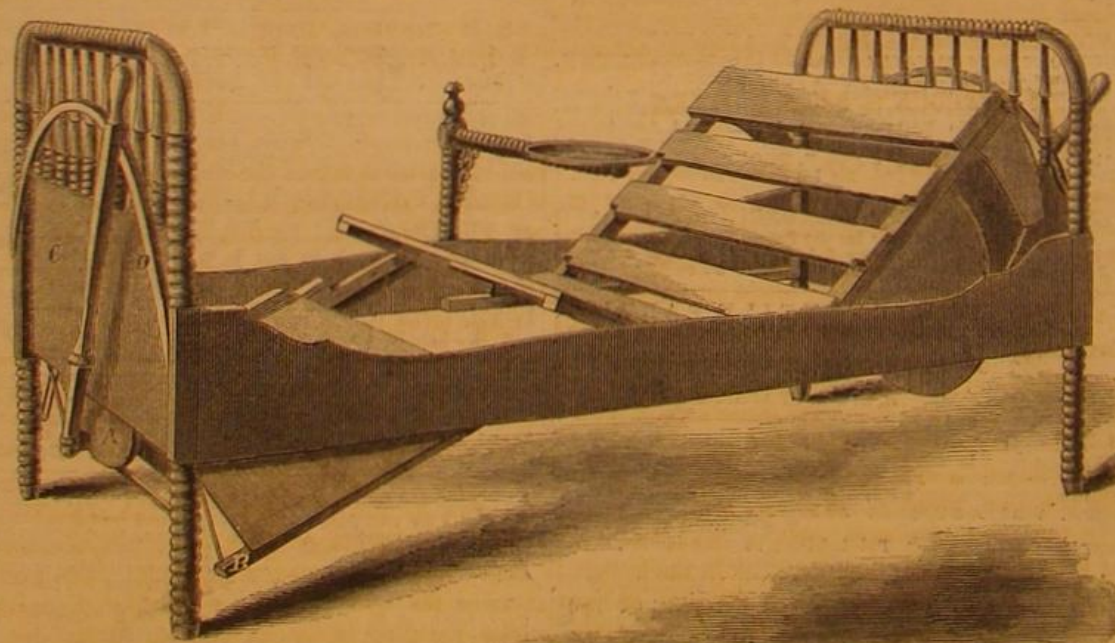
The toggle-joint arms are capable of accurate adjustment by means of nuts, F, so that the force with which the inner band, C, is pressed against the wheel, B, can be regulated. The end of these screws are wedge-shaped and work between the ends of the inner band, C, which is, of course, cut so that it can be forced into contact with the wheel, as before explained.

A ring, G, is also provided, which is held by screws so that it does not move. To this ring, springs, H, one on each side, are fixed, having holes through which screws, I, riveted to the band, C, pass. These

which work over a segment, D, provided with notches to hold them at any desired point. Any one can see from this arrangement that the head can be raised or the feet elevated; in short, any desired change can be instantly made, and as often as necessary. This will save a great deal of pain to sick people, and labor to the well who watch them.

It was patented through the Scientific American Patent Agency by O. P. Furman, on Nov. 22, 1864. For further information address Furman & Wells, Addison, N. Y.

BURNING OF THE NEW HAVEN CLOCK COMPANY BUILDINGS.—Last week one of the buildings of the New

**FURMAN'S INVALID BEDSTEAD.**

springs keep the band, C, from rubbing on the driving wheel, thus preventing them from grinding and wearing untrue when not in use.

When this pulley is used on screw cutting lathes a V-shaped casting shown, at J, is provided and fastened to the pulley to prevent the wedging screw from slipping out.

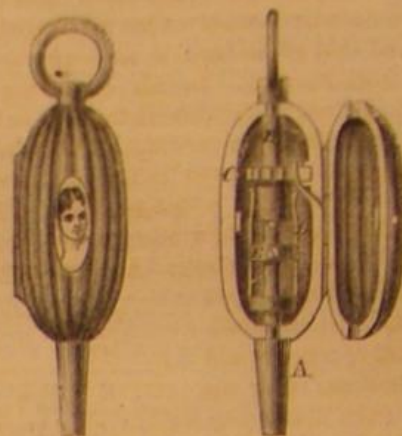
The invention was patented on Nov. 28, 1865, by W. H. Brown, of Worcester, Mass., whom address for further information.

Haven Clock Company was discovered to be on fire. The flames spread rapidly in spite of the fire department until all the buildings of the clock company—seven in number—were consumed. Seven dwelling houses in the vicinity were also destroyed with nearly all their contents. Twenty families are rendered homeless and about 200 workmen thrown out of employment. The total loss is estimated at \$200,000. The company had an insurance of \$146,000 on their manufactory. This was the most destructive conflagration ever experienced in New Haven.

REMINGTON'S WATCH KEY.

The accompanying engraving represents an improved watch key—one entirely harmless to the watch even in the hands of a child. Many persons have been annoyed by the frequent derangement of watches by overwinding, or by turning the key in the wrong direction, neither of which can occur by the use of this key. The details are as follows:—

The pipe, A, is fastened to the shaft, B, which has the usual swivel at its opposite end. Turning loosely upon the shaft is a ratchet wheel, C, having a neck on one side, or end of the same, with two or more of the sides of the neck flattened, as bearings for the spring, D. These springs are fastened on the shaft, B, with an arrangement for adjusting this



tension attached, as shown by the sliding collar, E. All is inserted in a case with bearings at each end for the shaft, B, to revolve in. A pawl or latch is hung to the inside of said case opposite the ratchet wheel, C, connecting with and turning the same; as the case is turned in winding the watch, the latch is kept in contact with the ratchet by a small spring.

It will be seen at a glance that this key will not strain a watch, as the springs, D, being of the proper tension, will readily open when the watch is wound clear up, and thus relieve the shaft, B. The case can easily be turned in the opposite direction in process of winding without detaching the fingers therefrom.

The key can be made right or left according to the position of the pipe. On one end of the shaft it is right, on the other it is left.

As the inventor is otherwise engaged, liberal arrangements will be entered into with parties for the manufacture and sale of this key. Patented through Scientific American Patent Agency, April 24th, 1866. Address Geo. H. Remington, Lock Box 154, Providence, R. I.

**INVENTORS, MANUFACTURERS.**

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Vol. XIV.—No. 22.
(NEW SERIES.)

NEW YORK, MAY 26, 1866.

\$3 PER ANNUM
IN ADVANCE.

Improved Steam Oven.

All housekeepers and cooks know that it is difficult to regulate the heat of ovens when coal or wood is used, and that great care is necessary to prevent the food from burning. In this engraving a steam oven is illustrated—one wherein the heat is furnished by steam at a moderate pressure, no fire being used in connection with the oven itself. Steam at 35 and 40 pounds pressure has a temperature of 280° and 290°, which is sufficient for all culinary purposes.

The details are as follows:—A brick arch is built to receive the steam pipes of any capacity required. A close coil of pipes is laid at the bottom, and an open coil over it and connected with it which fills the oven. The pipes of the open coil are the shelves on which are placed the articles to be baked, as shown in the engraving. The interior is lined with tin which, at the top and ends, has a space between it and the wall of about three inches, and does not extend quite to the bottom of the oven. At the top it is perforated with holes, letting the heated air pass above it, and in contact with the brick work. As it becomes cooled it descends along the sides, and passing below the lining into contact with the pipes again, rises, and thus establishes constant circulation of hot air. The front of the oven is constructed of tank iron with doors, and is secured to the brick work by anchor bolts laid in for the purpose. It is so made for convenience of building and repairing the coil. The steam enters the coil at the top and passes out at the bottom, to the trap, or onward to do other work.

A small upright boiler and engine, to do the work, and one of these ovens attached, would make a portable bakery of great value in all cities.

One of these ovens, two feet by six feet base, and five and a half feet high, may be seen in operation, capable of baking for a thousand people, at St. Luke's Hospital, corner of 54th street and Fifth avenue.

It was patented through the Scientific American Patent Agency on Jan 23, 1866. Rights for sale on favorable terms. Address for further information J. G. Whitlock, No. 954 Sixth avenue, New York.

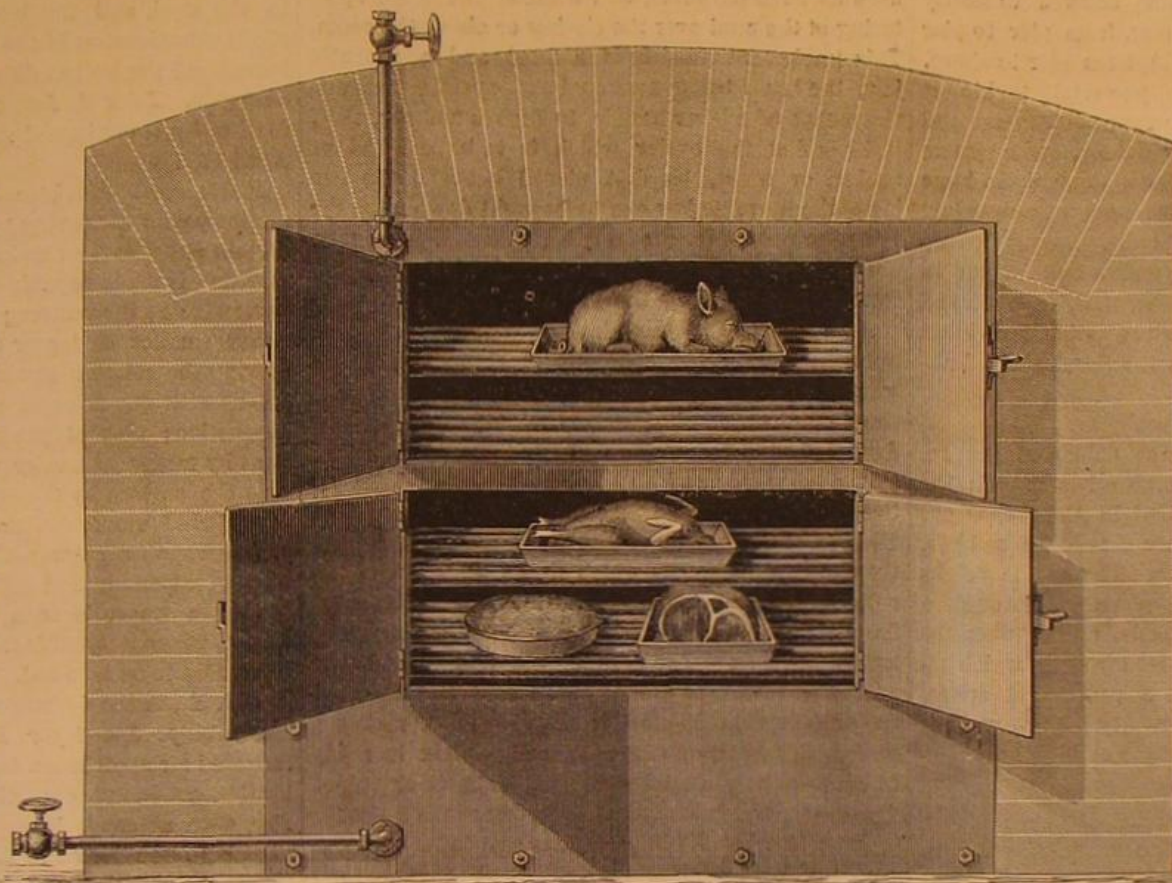
DESCRIPTION OF THE SUSPENSION BRIDGE AT CINCINNATI.

In 1856, John A. Roebling, of Trenton, N. J., who constructed the Niagara suspension bridge and many smaller ones of similar character, made a contract to build a suspension bridge across the Ohio River, connecting the cities of Cincinnati and Covington, at an estimated cost of \$1,750,000. The *Cincinnati Commercial* gives a complete and interesting account of the structure, from which we make some extracts:—

THE PIERS,

The foundation of the piers are of Indiana lime-

stone, and the piers themselves are of sandstone. The dimensions at the base are eighty-six feet by fifty-two feet; at the top (two hundred feet above) seventy-four feet by forty feet. There are thirty-two thousand perches of masonry in this piece of stonework. About one hundred feet above the bottom of the foundation is the floor of the main archery, across which the floor of the main bridge will run. Here the tower has the form of an arch from seventy-five feet, from floor to keystone, and forty feet in the clear at the base.



WHITLOCK'S STEAM OVEN.

THE ABUTMENTS AND ANCHORAGE.

Roadways of massive stonework, in the form of arches a portion of the way, lead from the first approaches to the bridge on either side—from Front street, in Cincinnati, and from Second street, in Covington. These abutments form the shore supports for the immense iron work of the links by which the cables are connected with the anchorage far beneath the ground surface, and below the shore ends of these abutments. There are in each of these abutments thirteen thousand perches of stone—twenty-six thousand in the total, which added to the sixty-four thousand in the piers or towers, give a grand total of ninety thousand perches of stone work in the bridge. From abutment to pier there is a distance of two hundred and eighty-one feet. From the beginning of the roadway on Front street, Cincinnati, and from Second street, Covington, there is, of course, a gradual ascent along the abutment and shore portion of the suspension to the pier, and then comes the slight descent and ascent produced by deflection of water suspension. Nearly fifty feet below the surface of the ground, under each side of both abutments, embedded in masonry, are the huge anchor plates—the primary supports of the bridge. These are large, square and flat cast iron plates into which the ends of the anchor bars are fastened, and they are covered with the masonry of the entire anchorage and abutments. These anchor bars are connecting pieces between the shoe, to which the end of the cable is fastened, and the anchor plates. There

are between each shoe and plate eight or nine lengths of anchor bars, sixteen side by side in each length, and each bar or strip ten feet long, nine inches wide, and one and one-third inches thick. The reader may imagine the size and strength of the sockets and cross bars used in connecting these lengths with each other, and with the shoe of the cable and the anchor. And all this iron work is repeated four times, once on each end of each cable. The cost of the masonry is about forty per cent of the entire cost of the bridge.

THE CABLE.

The abutments on both sides are now covered and surrounded with workshops, wherein nearly two hundred men are employed in forming the cables, finishing the iron work, and getting out the wood work for the bridge. There are but two cables, one on each side, running over a saddle on the top of both towers and ending in a shoe on each side. The work of making the cable is all done in temporary workshops on and about the anchorage of the Cincinnati side. In the yards around may be seen hundreds of coils of wire all from the manufactory of Johnson & Nephew, Manchester, Eng. This wire is No. 9, and is one-eighth of an inch in diameter. In each of these hundreds of coils there are from twelve to sixteen thousand feet. Every inch of wire receives three coats of lin-

seed oil before it enters the wire shop where the wire is spliced. In splicing it is filed, nicked, and wrapped with fine wire. In this shop there are a score of large drums, upon which the wire is coiled after being spliced.

Near the end of the abutment are wheels, receiving power from an engine below, by which an endless wire rope, an inch in diameter, is made to move in a complete circuit the entire length of the bridge, from shore to shore, on both sides. With this rope move the traveling wheels, one on each side—one going over with its load of wire while the other returns empty—the machinery being reversible, of course.

The traveling wheel is a curiosity. Seen from the shore or the river it looks much like a mammoth spider crawling along its web up to its den—the webs being aptly represented by the confusion (apparent) of wire supporting the temporary foot bridge, and the cable strands already completed. The traveling wheel, when it starts out from this side, is half encircled by one of these one-eighth inch wires—already secured to the shoe upon which the strand is being formed. As the wheel moves, revolving as the rope glides along, the lower wire remains stationary as it is laid along the strand, while the wheel, in paying out, pulls the upper portion along. The reader may illustrate this by taking a long piece of thread, tying the ends together to make it continuous, fastening the thread by a pin, at one end of the table, placing an empty spool within the circuit thus formed, throwing the thread over the spool and back

of the pin and then slowly rolling it along the table. Let the furthest end of the table represent the anchorage on the one side, and another pin the other shore, and he will find, when the spool arrives at that end, that two lengths of thread have been laid. These traveling wheels cross every eight minutes, and lay five tons of wire per day.

There are to be but two cables to this bridge, one on each side. Each cable is to be composed of seven strands, and each strand of seven hundred and forty of these one-eighth inch wires. Every strand is laid from shore to shore, fastened in its own shoes, one on each side, and each shoe is then sunk into its bed or socket, and thus firmly connected with the anchorage. The traveling wheels having laid these seven hundred and forty wires on each side, and all of these having been secured, they are bound about the entire length with wires, at intervals of nine inches. The men who do this work travel along the strand on a sliding platform from shore to shore, forcing the wires together tightly in a round shape, by means of powerful leverage, and then binding. Then follow the men with oil and paint.

ADJUSTING THE SHOES.

The strand having been thus completed, the shoes are let forward to their sockets in the anchorage connections, and the strand thus allowed to slowly fall to its place from shore to pier, from pier to pier across the river, and then again from pier to shore. In doing this, tremendously powerful tackle is brought into use on both sides—ropes of iron one and a half inches thick, any number of them, and a system of blocks and pulleys of heavy iron, done up in huge proportions. Four strands have been completed on either side—eight in all.

Each cable will be twelve and a half inches in diameter, composed of seven strands, each strand of seven hundred and forty wires, each individual wire having a strength of one thousand seven hundred pounds.

THE SADDLES.

The piers or towers hold these cables at the requisite altitude, with their massive heads. On the tops of these towers, embedded in the rocks, are plates of cast iron, on which are fixed the saddles, two on each—one for each cable. The saddle weighs 14,000 and the plates 17,000 pounds. Through a groove of the saddle runs the cable, and between the saddle and its plate are small iron rollers which allow of the moving of the plate a very slight space, in case of an extraordinary necessity. These saddles are to be covered with the thirty feet high ornamental turrets before mentioned.

THE SUSPENDERS.

Around a model of the cable, or a section of it, may be noticed an iron strap, four inches wide by one-half inch thick. Attached to this, where it is brought together, is a conical socket into which the end of the suspender is to be fastened by being spread and covered with lead. The suspender is a wire rope one and one-eighth inches thick, by which the bridgeway is connected with the cable and suspended therefrom. Every five feet, on each side, there is to be one of these powerful suspenders. In the very middle of the bridge, solid one and three-quarter-inch iron rods will take the place of the wire ropes. When the strands shall have been all finished they will be brought together, seven on each side, to form the cables; the straps will be shrunk on, red hot, and the suspender connections made. There will be six hundred and forty-eight of these straps, sockets and suspenders in the structure. The suspenders and connections are made at the Wire Works of Mr. Roebbling, Trenton, New Jersey.

THE BRIDGEWAY.

The construction of this portion of the improvement will be but a trifle in comparison with the stone and wire work. The total length including approaches from Front street, Cincinnati, and Second street, Covington, will be 2,252 feet; length of main span from center to center of towers, 1,057 feet; to each land suspension, 281 feet; width of bridge in the clear, 36 feet; height above low water, 100 feet; (and here the reader will have recalled to recollection the fight in the Legislature and Council, three or four years since, over the proposition by the company to have this reduced from one hundred and twenty to one hundred feet, and in which the company was finally successful, notwithstanding the immense op-

position.) There will be five hundred thousand feet of lumber in the bridgeway, all of which will be thoroughly soaked in tar in tanks on the Covington side, where the planing mill is located. The wrought-iron floor beams, the length of two of which makes the width of the bridge, are nineteen feet by five inches, and there will be two joined in one, in every five feet of the bridge—one to each suspender. The weight is twenty pounds per foot. These were made at the Buffalo Union Iron Works. Two iron trusses, ten feet high, will separate the foot roadways, one on each side, from the carriage ways; and flat-iron tracks, of accommodating width, will be laid for wheels to run upon. The wrought-iron girders, thirty feet long and twelve inches wide, will run the entire length, under the middle of the bridge. Ornamental iron railings will protect the foot passages on either side.

NEW INVENTIONS.

Oyster Cracker.—This invention relates to an ingenious implement, especially intended for the cracking or breaking of oysters and other shell fish, etc.—although it can be applied to the cracking of nuts,—whereby the oysters can be cracked and opened in much less time than with the knife now commonly used for such purposes, and without the least spattering of the mud over the clothes or about the room. This implement consists of a fixed and a movable jaw, the latter being arranged and operated through the means of a lever handle, in such a manner, that, if the end of the oyster which is to be cracked or broken or a nut, be first placed between the two jaws, the movable jaw can be brought down upon the oyster or nut, as the case may be, with sufficient pressure to break or crack it, as desired. W. P. Lyon, Portchester, N. Y., is the inventor.

Axle Box Cover.—Hundreds of tons of covers are annually lost on the railroads of this country, oil wasted, and brasses worn out, from the lack of a simple and economical means of adjustment. The first cost of an ordinary axle box is greatly enhanced by the labor required to produce a perfect joint between the cover and the outer surface of the box. The box is necessarily ridged along the parting from the variable manner in which flasks unite. The peculiarity of this invention is the use of an over flanged cover, fitting against a seat on the inner surface of the box. The core of the box after being pasted together, is blackwashed and smoothed on the surface intended for the seat. By this means a perfect seat is always insured, and the box is ready to be placed on an axle without filing or chipping. The cover, which is entered and removed in a similar manner to a hand-hold plate, has cast in its center a standing bolt, square for a short distance, beyond which a thread is cut to the end of the bolt. Over the square part of the bolt fits a cast iron bridge, and on the thread a bulb-handled nut. When both of these are in place, the point is burred, thus preventing the possibility of loss. The bulb handle counteracts any tendency to rotation by its weight. Even if rotation were possible, the cover could in no case be lost; it would always drop inside of the box. No wrench is required when oiling, or renewal of brass are necessary. The saving in first cost of a cover fitted on this plan over the ordinary arrangement of two bolts and lugs is more than one-half. The box is in successful operation on different roads. William S. Auchincloss, New York City, is the inventor.

Purifying Animal Coal.—In refining sugar, where animal coal or bone-black is used in the process, it is customary after the sirup or liquor has been filtered through the mass of coal, to reburn the coal in order to destroy the impurities collected in it from the liquor, and thus prepare it for being used again for filtering. But before the said coal can be used again, the dust and impurities found therein, and such as are produced in the process of combustion, should be removed, because if they are allowed to remain great danger results to the sugar. The devices and means used hitherto for removing the dust and other impurities from animal coal have not been efficient because they have not sufficed to remove the impurities and foreign substances therein after reburning. This invention consists in a novel construction of apparatus for treating the reburnt coal by the use of which dust and other impurities are efficiently removed,

and the same collected in a receiver so as not to be allowed to float through the atmosphere. Heretofore great complaints have been made by families residing in the vicinity of sugar refineries against the clouds of dust which often fill the air and settle upon the grounds and upon articles exposed in the air, thereby inflicting much loss and inconvenience upon laundresses and others. These complaints have threatened to effect the removal of sugar refineries from inhabited to uninhabited places, and their removal to such places would result in increased cost of carriage and labor, and in diminishing facilities for business. This invention does away with these complaints by removing their cause. Thomas H. Quick, 118 King street, New York City, is the inventor.

Button.—This invention consists in the arrangement of a pointed stud with a suitable shaped or curved groove, in combination with a pin or key projecting from the inner surface of the hollow shank of a button, with a suitable spring secured to the exterior or interior of said shank or to the exterior of a pointed stud, in such a manner that by means of the pointed stud the material to which the button is to be attached can be readily pierced, and by introducing said stud into the shank, and slightly turning it, the key is made to catch in the recess of the groove in the stud, and the button is securely held; by a slight compression of the spring the stud can be released and the button detached whenever it may be desirable. John M. Johnson, New York City (Box 4, Station F), is the inventor, and the patent was issued April 17, 1866.

Pantograph Machine.—This invention relates to pantographic engraving machines, and consists in certain novel devices and combinations whereby the machine is made capable of producing copies of the same size as the pattern; also of producing copies either smaller or larger than the pattern, but preserving the relative proportions; also of producing copies with any selected part of the outlines out of proportion; also of producing a series of parallel lines by means of a ruler which is made to advance over the pattern by the action of a pawl and ratchet. One of said novel devices is a transparent tracer, consisting of a glass with a dot on its surface, to be used instead of a metallic tracer. One advantage of such a tracer is seen in tracing from a paper sketch where a metallic tracer will obscure a portion of the line to be followed. Edmund Oldham, Brooklyn, N. Y., is the inventor.

Discharge Spout for Bottles, etc.—This device is intended for application to all kinds of apothecaries' bottles, graduates, etc., also to many household articles, such as cans, jugs, measures, etc. One of its ends is to be inserted in the head of the bottle, and this is the receiving end; the other is the discharging end, and it is tapered off so as to form a spout that will conduct the liquid from the bottle without any liability of the same being spilled. As further security against the above contingency, the spout is encircled with a continuous inclined trough arranged so that it will conduct back into the bottle any liquid which might run over upon the outside of the spout. A cap may be used for closing the spout, and in such case no other corking or stopping of the bottle will be necessary. Dr. L. B. Myers, of Elmore, Ohio, is the inventor, and the patent was issued on April 3, 1866.

Portable Fence.—This invention relates to a novel construction of a fence, especially intended for farm and garden uses, and it consists in constructing the fence in separate sections or parts in such a manner, and in so connecting them together, or to suitable posts, that the fence will accommodate or in other words, adjust itself to any irregularities in the surface of the ground which is to be fenced in by it, that is, whether more or less inclined or hilly; the peculiar manner of hanging or connecting the several sections of the fence to the posts, enabling them to turn or set at any desired angle or direction with regard to each other, according to the necessities or circumstances of the case. John Thompson, Williamsburgh, N. Y., is the inventor.

Machinery for the Treatment of Ores.—In this machine the ore is passed in through a constantly descending and continuous series of operations whose object is to pulverize and desulphurize the ores and thus extract the precious metal by amalgamation, by means of the fumes of mercury, and me-

chanical trituration. The successive devices consist of a stamping mill, a series of crushing rollers, a roasting furnace in which the ores are treated with alkali, a cold water tank, an amalgamator, an arastra and a second amalgamator. The fumes are condensed in a chamber and the water supply for that and other parts of the apparatus is derived from elevated tanks. For rights in said patent address the inventor, John A. Hitchings, 99 Bond street, Cleveland, Ohio.

A New Photographic Washing Apparatus.

The importance of having photographic prints thoroughly washed can never be too strongly insisted on. A breach of this duty proves disastrous not only to the permanency of the picture, but in many cases to the reputation of the photographer, and incidentally to our art-science itself. So much does it effect the photographer that it would not be difficult to point out instances in which once flourishing businesses have dwindled down to a serious extent through the bad reputation attached to the permanency of the prints issued. There are, indeed, few possessors of well-stocked albums who are not alive to this fact, that the otherwise high reputation attached to the name on the back of a photograph does not necessarily afford a proof that his photograph will resist the ravages of time for even a very limited number of years.

The majority of cases of photographic fading may be traced to the hyposulphite of soda, which, by so intimately associating itself with the fibers of the paper, is difficult of removal, and which, if not perfectly removed, induces an action by virtue of which the print eventually becomes destroyed. To remove the hyposulphite of soda in the most perfect manner, and in the shortest time possible, is to insure to photographs a longer tenure of existence than they otherwise would have held; and any means by which these requirements can be met, are entitled to the greatest consideration.

Availing ourselves of an invitation from Colonel Stuart Wortley to visit Rosslyn House, to see a new form of washing apparatus, we went and saw it in action. It proved to be an instrument invented and patented by Mr. John E. Grisdale.

Before entering upon a minute description of this washing machine, we may state that it is capable of washing a full charge of prints in twenty minutes, and that so perfectly that at the end of this time some ordinary tests for hyposulphite of soda fail to indicate its presence. But we shall allow its inventor to describe the washing apparatus in his own language. "My invention," he says, "relates to a peculiar construction and arrangement of centrifugal machinery or apparatus for washing photographic prints, and consists, according to one arrangement, in the employment of a peculiarly-constructed revolving drum in combination with a trough, in which such drum is partially immersed. The prints to be washed are taken from the water in which they have been placed on their removal from the fixing or other bath, and are packed in one or more piles, which piles are placed round the circumference of the drum, each pile being composed of alternate prints and sheets of wire gauze or other open or reticulated fabric, so that no two prints shall be in contact with each other. These piles are held in their places on the drum by means of open frames or gratings, which bear against the opposite surfaces of each pile, and are secured to the arms of the drum by screws or otherwise, the whole or a portion of such frames or gratings forming part of the drum itself. Or, according to another arrangement, the piles above described may be laid flat upon a disk, which is made to revolve either vertically or horizontally in a trough or cistern, provision being made in the horizontal arrangement for allowing the piles to be brought in or out of contact with the water as required; or in lieu of the photographic prints being disposed in the form of piles or packs round a drum or revolving disk, they may be laid separately and individually round the surface of a drum, a webbing of open or reticulated fabric being wound on such drum simultaneously with the placing of the prints thereon, so as to interpose a thickness of the fabric between each succeeding layer of prints. The process of washing consists in alternately driving out the moisture from the prints by the centrifugal action of the revolving drum or disk, and saturating the prints again. During the

first part of the process, the prints are not immersed, but when the second part of the process, namely, the saturation, is to be effected, the trough or cistern is to be supplied with water, or the prints may be brought down into the water, and caused to revolve therein and thoroughly saturated, when the water may be run off from the trough again, or the drum or disk elevated, and the moisture expelled by centrifugal force as before."

The instrument is neat and compact, and immediately strikes any intelligent observer by the efficiency of its action; for, by an amount of manual labor capable of being performed by a child, the drum is rotated with extreme rapidity, and the freshly-supplied water is forced through every pore of the prints, the consequence being the elimination of every trace of hyposulphite of soda in a very brief space of time.—*British Journal of Photography.*

HOW TO MAKE COFFEE.

BY PROFESSOR CHARLES A. SEELY.

In the capacity of *paterfamilias* and chemist I have made occasional descents into the kitchen, and so have become interested and somewhat skilled in affairs which to most men are profound mysteries. These visits have been profitable, for in consequence of them practical changes have been brought about, which, in the course of a year, will effect the saving of a handsome amount in time and money, and, what is of more consequence, they have furnished material for serious reflection. The preparation of food, though one of the most ancient of the useful arts, and perhaps the art of arts, as Prof. Blot would have it, is yet very far from being perfected. It is only in the nineteenth century that science and inventive genius have been zealously employed for its improvement; with what effect they have been so employed almost any person who can look back from the shady side of forty can tell. What changes in forty years! The dear old chimney corner, the pot hooks, the bake kettle, the brick oven, the Yankee baker exist only among the fairy remembrances of childhood. What will come in the next forty years! But I reluctantly dismiss these thoughts to fulfill the promise which the title of this article indicates.

The virtue of coffee consists in its volatile aroma and its fixed extractive matter. The happy combination of these with hot water is the problem for the coffee maker. This happy combination, in my opinion, when realized in perfection, implies that all the aroma and all the extractive matter of the ground coffee be got into the hot water, and retained there. It seems to me that no argument is required to show that any aroma which escapes into the air, or any extractive matter left in the grounds is so much virtue wasted. Now, to get at the same time the whole of these constituents of coffee has seemed very difficult. If boiling water be filtered through ground coffee—this is the French plan—the aroma is promptly extracted, and very little else, for the fixed matter needs more coaxing. If the ground coffee be boiled a long time in water—the Turkish and more common American plan—the aroma escapes with the steam. The French waste the extractive matter; the Turks, the aroma. The plan which secures one of the ingredients allows the other to escape.

Baron Liebig has investigated this subject, and those who have read his interesting paper published in the *SCIENTIFIC AMERICAN* a short time since, will perceive that so far I have only repeated his ideas. He proposes to avoid the difficulties in the case in this way:—He boils three-fourths of the ground coffee, and thus secures all the extractive matter from that; the other fourth he adds after the boiling, and secures the aroma from that. I know that Liebig's coffee is excellent, for I have made it; but I respectfully submit that it is not the perfect coffee, it is not the happy combination, which we are seeking for. Liebig loses aroma from three-fourths of his coffee, and extractive matter from one-fourth.

I now propose a plan which on reflection and after a considerable experience I find to be nearer perfection. My coffee making is a continuous process, and may be carried on for a life time. It takes two days to get well started, but after that there is a daily routine. To begin, I take rather more than the usual amount of coffee, and pour on it hot water when it is ready to be used; in other words, I make

French coffee. The grounds from this operation I leave to soak in the pot till the next day, when I begin coffee making by pouring hot water on these grounds, which hot water I use according to the French plan in making coffee from fresh ground coffee. The process is now in full operation, and every time coffee is wanted the manipulations of the second morning are repeated. I thus extract all the soluble and useful matter of roasted coffee, and waste nothing.

To put the art in the most practical form, I have found it necessary to modify the coffee pot. Perhaps the simplest apparatus is the most ordinary pot provided with two strainers. The strainers are of cup form, and fit into each other and into the top of the pot. For use I set a strainer on the top of the pot, and into the strainer I place fresh ground coffee; over this I use the second strainer, containing the grounds of the last operation. Now hot water is poured into the upper strainer, and percolates down into the pot, carrying with it all the goodness remaining in the grounds, and the aroma and much of the extractive of the fresh ground coffee. When the water has passed down, I throw away the now useless contents of the upper strainer, and upset the contents of the lower strainer into the pot. Delicious coffee is now ready to be served to the appreciative household.

I have now unwittingly made this article so long that I am obliged to omit the scientific considerations and arguments, pro and con, which I have thought over for the occasion, and a discussion of the question from an economical point of view, wherein I was prepared to show the millions of dollars per annum that an adoption of my process might save to the world. I dismiss the subject with reluctance.

Note.—The above is the first of a series of articles which I propose to write for the *SCIENTIFIC AMERICAN*. The subjects of these will cover a very wide range, and in the end, perhaps, I shall have been in rapport with all classes of readers.

Preparing Casts for Electrotyping.

An excellent method has been published by Dr. Heeren, of Hanover, for preparing the conducting surfaces of casts, whether of gutta-percha, wax, or gypsum, from which electrotypes are to be taken. The surface is well moistened with a nearly concentrated solution of nitrate of silver in alcohol by means of a soft brush. An aqueous solution cannot be employed, because it does not readily moisten fine lines or narrow interstices, and easily runs together into little drops. When the entire surface has been wetted, the excess of the alcoholic solution is wiped away with a drier brush. The cast is now at once, before the silver liquid dries, exposed to the action of sulphureted hydrogen; if the object be small, it need merely be suspended for a few moments in a vessel filled with gas. If its dimensions, however, be so great that it cannot be readily moved, a stream of this gas should be made to play upon it from an India-rubber tube. The surface becomes covered with a thin film of sulphide of silver, the alcohol quickly evaporates, and in a few minutes the cast is dry and ready for immersion in the electrotyping bath. The sulphide of silver is an excellent conductor of electricity, being not inferior to graphite, and is therefore admirably fitted for this purpose; an alcoholic solution of acetate of copper can also be used, but the resulting sulphide does not conduct as well as that of silver. Various kinds of fruit, and the bodies of soft and delicate animals, can be easily electrotyped by this process.

A GREAT METEOR.—The most remarkable addition that has ever been made to the collection of meteorites in the British Museum accrued to it in the past year by the arrival from Melbourne of the great mass of meteoric iron found at Cranbourne, near that city, and known in the colony as the "Bruce Meteorite." It was purchased by Mr. Bruce, with a view to his presenting it to the British Museum. Through a misunderstanding the museum at Melbourne had a promise of half of it; the trustees of the British Museum, therefore, acquired and sent to the Melbourne Museum the mass of the meteorite iron, weighing 3,000 lbs., that was sent to the exhibition of 1862, and which had been found close to the great meteorite, and the latter was then forwarded entire to London. Its weight is rather more than 3½ tons. It is, consequently, by far the largest meteoric mass of any collection in the world.

Improved Slide Valve.

These engravings represent a new method of working the slide valve, as also a different plan of constructing it, whereby the ordinary steam chest is dispensed with, the steam being taken through a separate casting connected to the valve aforesaid.

Fig. 1 is a perspective and Fig. 2 a section through the valve. The valve is shown at A, and has hollow rods, B, at each end which enter stuffing boxes in the frame or casing, C. The valve is worked from the rods, D, which have a crosshead, E, on the front end. In the top of it there is a plug, F, Fig. 2, which works freely in its place, but is kept steam tight by packing. This plug bears against two steel segments which, in turn, are received by the plate, G,

A Reform Needed in the Patent Office.

The efficiency of that valuable branch of the Government, the Patent Office, is much lessened by the long delays which often intervene between the filing of an application and the final decision. We hope that if any amendment is made to the Patent Laws by this Congress, it will be aimed to cure this defect in the administration of the office, a defect which arises from an inadequate force, or else from a wrong classification of that force. There are now three classes of Examiners, called "Examiners," "First Assistants," and "Second Assistants." If there was but one class, and each had equal pay and an equal share of work, the accumulations would soon be got rid of, without the necessity of increasing the

the chlorine and form water, it is clear that the oxygen of the binoxide barium cannot do the same, at all events under ordinary circumstances. No chemist who has prepared binoxide of hydrogen by Thenard's process has obtained chlorine. It must be admitted, then, that chlorine has more affinity for hydrogen than for the oxygen which peroxidizes the barium, while the contrary is the case with the oxygen which peroxidizes the manganese. This is demonstrated by the following experiments:—

If we fill with chlorine gas a bottle into which a little water and some very finely powdered binoxide of barium has been introduced, a lively effervescence is seen when the mixture is shaken, the color of the chlorine disappears, and in the end the bottle is

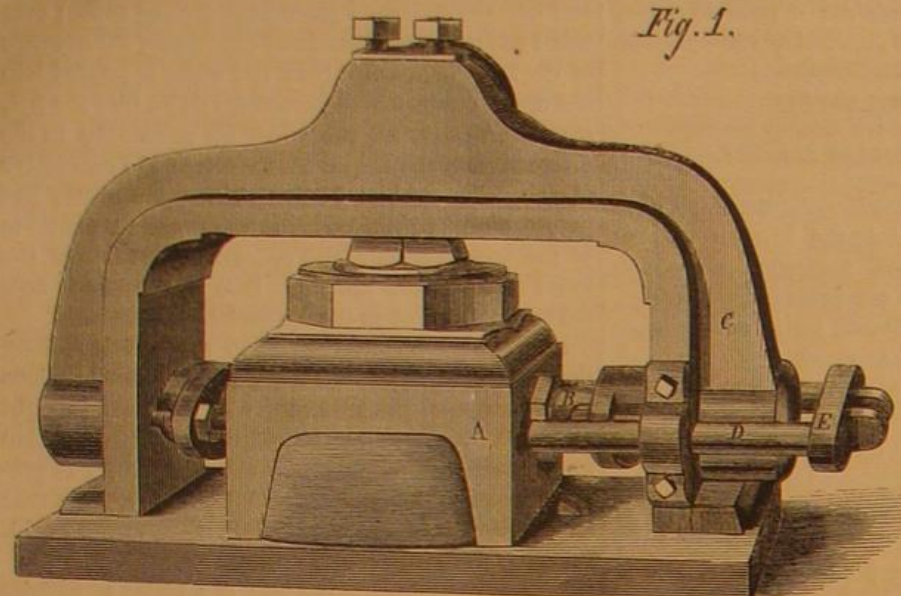


Fig. 1.

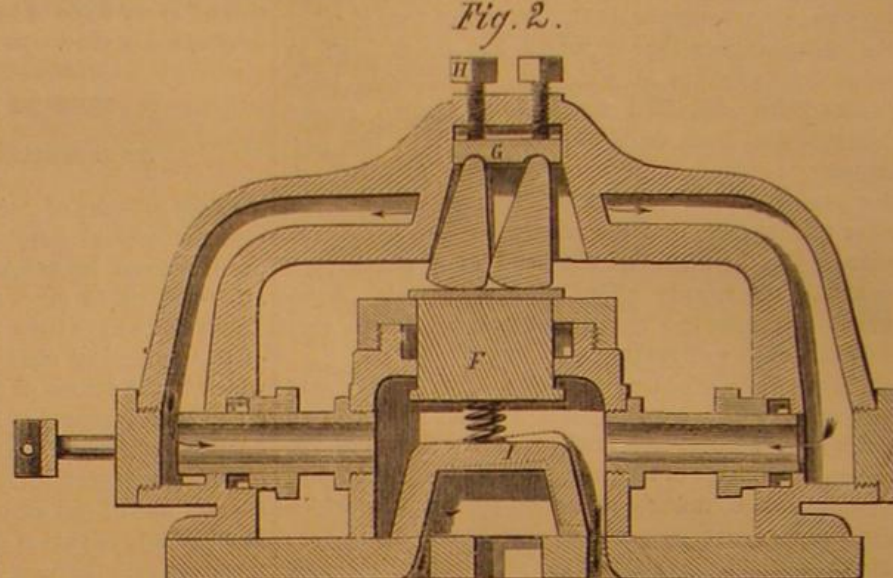


Fig. 2.

GREEN'S SLIDE VALVE.

in the top of the casing, C. The set screws, H, are merely to adjust the parts as they wear.

When the steam enters the chest through the casing, C, it presses against the plug, F, and forces it up, which has the effect of equalizing the pressure on the valve, I, inside, so that the friction on the face is greatly reduced.

The central or inner valve, I, is capable of rising when the pressure in the cylinder is greater than that in the chest, which is the case when locomotives are reversed suddenly with the train going ahead. It can be seen at a glance whether this valve is working steam tight or not. It is easily adjusted and is not liable to get out of order. It is adapted to engines of all kinds.

For further information address the patentee, V. D. Green, of Watertown, Wis., by whom it was patented on Jan. 30, 1866.

Strikes.

The following is an account of the strikes that have been successful, according to report:—House carpenters, for \$3 50 a day; bolt workers, against a reduction; plumbers, for \$4 a day; fresco painters, for an increase of 50 cents a day; horseshoers, higher wages on various scales; pencil-case makers, higher wages; dock builders, for \$3 and \$4 a day.

There have been unsuccessful strikes, as follows: Painters, for eight hours; longshore ship painters for eight hours; horse collar makers, for higher wages; also harness makers, musicians, lightermen of Brooklyn; longshoremen of Brooklyn; Brooklyn house painters; carpenters and plasterers of Brooklyn; Brooklyn masons; Brooklyn quarrymen as laborers; Jersey City plasterers and bricklayers—all for higher wages; laborers in shipyards and ship painters, for eight hours; city railroad car drivers, for fifty cents a day; and hod carriers for higher wages. Some of the strikes were compromised or were partly successful, a few of the men receiving higher wages. Among them were the stone cutters, flaggers, tin and slate workers, stone masons, sash and blind makers, Brooklyn bricklayers and plumbers; quarrymen of New York, and mason laborers of Jersey City.

The unsettled strikes, beside those of the ship carpenters, caulkers, etc., are very few. Reductions in rates for labor have been made by a number of large establishments and companies. Among those are the Neptune Steamship Company and the Erie Railway Company.

force. The present system compels an Examiner who has one or even two assistants, to go over the work again before a case is finally disposed of, and it seems to us, that if the assistants were made principals, and each had his separate and independent portfolio, the work would soon be brought up, and the examining corps might even be reduced in number, instead of being enlarged. While we are upon Patent Office matters, we owe it to the public and to inventors, to add our protest against the imposition of the ten dollars appeal tax. The patent fund is overflowing now, having about \$150,000 surplus, and this comes wholly from the fees of inventors. What good will it do any one to make the inventors who have to appeal, pay an additional tax? Will that secure a more intelligent examination of their cases by the Examiners? This proposed tax is odious, and we hope Congress will refuse to pass it. On the other hand, we hope they will grant to those of the few Assistant Examiners who have, by the direction of the Commissioners, ever since the time of Judge Mason, been doing the work of full Examiners, the compensation allowed by law to Examiners who have independent charge of different classes of invention. Congress directed the Commissioner in 1856 and 1860 to pay such the legal compensation, and we believe that inventors would no longer have to wait six months or nine months for their turns, if Congress will break up the grades of Examiners altogether, and let each Examiner have his proper share of work and equal pay, and be able to dispose of applications with more promptness.—*New York Times*.

Experiments and Observations on Oxygen and Bin oxide of Hydrogen.

Barium and manganese, which chemists agree in classing among the bodies improperly called *diatomic*, and which the author proposes to call *diptyotic*, present remarkable differences in their bin oxides. Bin oxide of manganese, for example, when treated with hydrochloric acid, gives chlorine, while bin oxide of barium under the same circumstances gives bin oxide of hydrogen.

Bin oxide of hydrogen remains intact in the presence of bin oxide of barium which served to produce it; but in the presence of bin oxide of manganese it decomposes into oxygen and water, the bin oxide of manganese undergoing no change.

The oxygen which peroxidizes the manganese decomposing the hydrochloric acid to take the place of

found to be full of oxygen, which does not act on ozone paper.

The following experiments show still further differences between the bin oxide of barium and that of manganese. We know that sulphovinic acid gives aldehyde when heated with bin oxide of manganese. In the presence of bin oxide of barium, however, sulphovinic acid gives ether and bicarbonated hydrogen mixed with oxygen and sulphurous acid, the reaction commencing at 103° and ending at 150°.

Pushing the analogies still further, the author has succeeded in preparing oxygenated water by means of peroxide of manganese. This water is destroyed by the simple presence of bin oxide of barium, just as that obtained by the latter body is destroyed by bin oxide of manganese, an experiment which clearly demonstrates the difference that exists between these two products. But the difference is rendered still more evident by the following fact: The oxygenated water obtained by means of bin oxide of barium and that obtained by means of bin oxide of manganese destroy each other; the effervescence produced when they are mixed is not violent, but it is continuous, certain, and indubitable.

After referring to the physical investigations which the author intends to make, he states that oxygenated water prepared by means of bin oxide of barium, when submitted to the action of four large Bunsen's elements, gives equal volumes of hydrogen and oxygen, even when far from being saturated, showing that the bin oxide of hydrogen is decomposed in preference to the water.

Lastly, the author remarks that if oxygen presents two allotropic states it is eminently probable that the bodies with which it unites may do the same; and hydrogen giving birth to two distinct bin oxides, it is probable that it also may present itself in two distinct states, complimentary one to the other, in the two bin oxides. Further, it seems probable that barium may present itself in one of these states and manganese in the other, which will account for the differences observed in their bin oxides, and that the two bodies may be found in the opposite state to that in which we know them, and, indeed, that all elements may exhibit this sort of allotropy.

MR. SCOTT RUSSELL, the eminent iron ship builder, of Cardiff, through untoward circumstances, has been compelled to hand over his extensive iron ship building establishment to his creditors, who intend carrying the works on under inspection.

PRODUCTION OF ODORIFEROUS OILS.

[For the Scientific American.]

The production of odoriferous or essential oils from plants has been accomplished in a great variety of ways, more or less adapted to the especial kinds of oils which were to be obtained. The oldest known method is that of "pressure," which is appropriate, when the odoriferous oils are very abundant, as, for instance, in the peels of oranges, lemons, etc., the materials are placed in strong cloth, usually linen, and subjected to powerful pressure. For small quantities a common tincture press, used by druggists, is sufficient, while a large screw press is used for greater quantities. The expressed juice is allowed to rest, and afterward filter in order to separate the aqueous and slimy particles from the oil.

Another mode frequently employed is that of distillation, the most appropriate for the greater part of essential oils, although some blossoms, containing the most subtle and precious odor, cannot be treated in this manner.

Formerly flowers were distilled with alcohol, but this having a low boiling point, extracted but little of the valuable principles and was therefore properly replaced by water, while the former method is still in use for the production of liquors.

The plants are placed into glass or copper stills, upon a false perforated bottom placed a few inches above the real bottom, exposed to the fire. The vapors pass through a condenser into a florentine flask where the oils separate from the water.

This water always contains a small quantity of the oil in solution, beside some organic acids, as cinnamic, propionic, angelic, are sometimes used in perfumery, but most generally for medicinal purposes, as for instance, aqua foeniculi, aqua menthae piperitæ, aqua sambuci, etc.

The great amount of water used in this method causes considerable loss of essential oil, which is dissolved, and it was found necessary to remedy this evil. Among the many attempts to that effect those of Drew, Heywood and Barron deserve credit, who procured Letters Patent for their methods in England. They surround the still with a steam jacket, which is the source of heat, while by means of a stirring apparatus, they keep the material to be extracted in constant motion. They then place a quantity of water into the still sufficient to cover the plant used and the distillate passes through a condensing worm and collects in a vessel, where the oil separates from the water.

The latter runs into the funnel of a siphon tube, which carries it back into the still. As a matter of course, in the distillation of oil heavier than water, like that of cloves, the water is discharged from the top of the vessel, while in the case of the lighter essential oils it collects in the florentine flask.

The same water is used in this manner until the completion of the process, and being then a saturated aqueous solution of the oil it is more useful than otherwise, its small bulk not rendering its waste necessary.

In consequence of weight of water in the fresh plants, drying the materials before distillation produces a better qualitative result. Aromatic seeds, such as annis, etc., are best when soaked in warm water for a few hours before they are exposed to distillation. But they should never be pounded or bruised, as by so doing the oil globules are surrounded by the albumen of the seed, which, on coagulating by heat, prevents the evaporation of the oil. The oil being mainly in the crown hull of the seed is not affected by the albumen in its interior, when the seed was left entire. The same may be said of spearmint, peppermint, etc. The distilled oils are purified by re-distillation and separated from adhering water by means of a glass funnel with stop-cock.

A third method used for the production of odoriferous oils is that of maceration. For this process the so-called simple pomade is prepared by mixing purified tallow and lard. This pomade is melted in a metal or porcelain pot, heated by a water or steam bath, and kept in this liquid condition for a period of 12 to 48 hours, during which time the flowers to be extracted are immersed in the molten fat which deprives them entirely of their odor. As soon as this is accomplished, the pomade is strained

off from the extracted flowers and a new portion is macerated in the same pomade. This operation is repeated ten to fifteen times, until the pomade is strong enough. The so-called "huiles antiques" or ancient oils, are prepared in the same manner, pure olive oil being substituted for the fat. This method is chiefly used for the blossoms of roses, of oranges, and of the acacia, and sometimes for violets and reseda, although the latter are more generally treated by absorption. This method is chiefly used in France, the perfumery of which country has a very superior reputation. It preserves the natural aroma of the flower unchanged and in full strength, which cannot be done by the methods already described, where heat is made use of. For the purpose of absorption glass plates, from two to three feet square, are laid into appropriate frames about three inches high. They are then covered with an even layer of purified pomade, a quarter of an inch thick, into which the blossoms are planted, open portion turned upward as if growing in the natural state. They then remain from one to three days, the frames being set one above the other, and the flowers are removed and replaced by a fresh one. This process is repeated for two or three months. When oil is to be saturated with the aroma instead of the pomade, the latter is replaced by a linen cloth saturated with olive oil. This is spread upon similar frames, having a wire gauze bottom in place of the glass, the rest of the process being the same as that used for the pomade. The linen cloths saturated with the perfumed oils are then subjected to a screw press, where they are freed from the oil. All the methods described are more or less effective, but slow and tedious, and the endeavors to supplant them by others conforming more with the present state of chemistry, were crowned with success. Dr. Millon was the first who produced oil from the cereals, having their specific odors by treatment with ether. He afterward experimented in Africa upon tropical flowers with sulphide of carbon, chloroform, ether and methylic spirit, all of which readily dissolved the perfume of flowers, the ether and sulphide of carbon working most satisfactorily. The flowers are placed in a percolator and exposed to the ethereal solvent for about fifteen minutes. The liquid is then withdrawn and displaced by a new quantity of the same used for washing. This is left no longer in contact with the flowers than the first portion. The ether, charged with the entire perfume of the flower, leaves it behind after evaporation, in the shape of a slightly colored residue, which is generally oily, but soon becomes hard and waxy. This residue, exposed to the sun for some time, and occasionally moved about, loses the flavor of the solvent entirely, preserving the pure perfume of the flower. The greater part of the ethereal liquid is regained by distillation, and serves an endless number of extractions, it being always advisable to use the solvent of any perfume after regeneration to obtain the same perfume again. The regeneration of the ethereal liquid is accomplished a great deal quicker than the distillation referred to in the older processes. This method even reproduces in the oil the slight differences caused by the timely or untimely harvest of the flowers, the time for which varies with different kinds of flowers, and is generally best learned by practice.

Roses should be collected during the morning and while entirely opened, jessamine should be gathered before sunrise, while cassia flowers always give an agreeable perfume, although differing decidedly with the time of the day when harvested. This method, although first described by Millon, was practiced some twenty years ago by Robiquet and by Buchner in the extraction of a few especial perfumes. But what renders it most valuable for this country, is the fact that all the ethereal solutions mentioned can be effectively replaced by purified petroleum naphtha, or gasoline. Its volatility renders its regeneration by evaporation at a low heat practicable, which does not injure the perfume, and some experiments, made with reseda, May flowers, white lilies, cinnamon, vanilla and cloves, were very satisfactory, as the extract produced in this manner is easily transferable to alcohol, which leaves fat and coloring matter undissolved. The last traces of petroleum adhere rather tenaciously to the perfume, but are removed by a slight heat, a current of air playing at the same time over the extract. The perfume of the

flowers is a fixed oil, seldom a volatile principle, and is therefore retained, when the naphtha is removed in the manner described. It remains unchanged in the atmosphere, unless its temperature is raised above its normal degree. It dissolves apparently without decomposition in alcohol, ether, fats, sulphide of carbon, chloroform, benzine, etc. It is capable of infinitesimal division, spreading rapidly in the air, where its pleasant odor betrays its agreeable presence. It is equally divisible in water to which a small quantity imparts a strong flavor, but it is so susceptible to chemical action, that an alcoholic extract of a perfume mixed with common water is rendered odorless, unless its quantity is exceedingly great, while pure distilled water preserves the full energy of the original aroma.

The extraction of the perfume of flowers is of immense value to commerce, as a small bulk represents the aroma of an exceedingly large amount of flowers, and can be carried in this manner with great convenience to all parts of the world. It has been proved repeatedly, that the aroma of flowers is the same in intensity in all climates, and there is no reason why we should not produce as good extracts more abundantly, than is done now by France, where this branch of industry is one of the most important.

A NOVEL MODE OF TREATING COFFEE.

A somewhat novel case, involving a patent for treating coffee, was recently tried in the Superior Court of this city. One of the features of the process consisted in running it through black lead which gave the coffee a shiny metallic appearance. It appeared in the trial that William Newell sold to Ezra Wheeler & Co., in March, 1858, the exclusive right to use such patent in the State of New York and other territory for the sum of \$5,000, and the further sum of six cents for every bag of skimmings, and ten cents for every bag of merchantable coffee passed by the defendants through the process of the plaintiff, and that the defendants should keep an accurate account of every bag of coffee that passed under said process, and to render monthly returns of the same verified under oath, and to pay over in cash on the first of each month the plaintiff's share of such earnings so stipulated for, the defendants having also the privilege of commuting the tolls aforesaid by the payment of the further sum of \$15,000 within three years; and that the defendants took the interest aforesaid, paid to the plaintiff the \$5,000, and used the patent; and the plaintiff alleges as breaches of the said contract:—First—That the defendants neglected to furnish the plaintiff with monthly returns of the number of bags of coffee they had passed through said process, and to pay the tolls due for the same. Second—And that the defendants have neglected to keep the plaintiff's interest in said agreement inviolate, by keeping in active operation the machinery in said agreement contemplated and used by the defendants, and have neglected to make the same available and productive, etc., and demands judgment for damages for such neglect. The defendants admit the contract, as set forth in the complaint, but allege that the plaintiff, to induce them to enter into the same, represented to them that by its use large sums of money could be made; that great improvement could be made in the appearance of coffee; that its value would be materially increased, and its merchantable quality improved, and its price enhanced; and that it would be made much more saleable; which representations the defendants allege are untrue, and that the process to them was valueless, and claim to recover the five thousand dollars paid, and to have the contract annulled; that running the coffee through black lead gave the coffee a metallic lustre, detrimental to its sale; that by reason of its effect upon the coffee—the loss in weight, the peculiar appearance it imparted to the coffee, the expense of operating and cost of renovation, and the depreciation in value arising therefrom—it became impossible to obtain any considerable employment for it, and none was obtained for which a true account has not been rendered.

The case was not disposed of, but the lovers of good coffee will be slow to believe that the beverage can be improved by the application of black lead.

As many as 26,000 vehicles often cross London Bridge in a day.



Information for Running Circular Saws.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN, on page 319, written by Mr. J. W. Churchill, I notice an article on sawing lumber. Some of his directions are correct, but I think he has committed some errors which I take the liberty of correcting. He says "the saw should range into the carriage half an inch in twenty feet," which I am sure is altogether too much. Suppose a sixty-inch saw is ranged one-half inch to twenty feet, it would range into the carriage one eighth of an inch in the diameter of the saw, which is altogether too much. He says that "the mandrel should have nearly one-eighth of an inch end play." End play is not only useless, but detrimental to the working of a circular saw. He says "the end play is to make the saw self-adjusting, as the governor in a steam engine, as to speed and motion."

Are we to understand by this that the end play regulates the speed (or motion) of the saw? He goes on to show, that if the saw is running out at the log, the latter will crowd against the center and change the range of the saw and cause it to run in again, and *vice versa*, if it is running into the log. Thus the saw is continually running in and out just in proportion as he gives it endwise motion. Endwise motion is just what will cause his saw to run in and out, and saw lumber like washboards.

I have taken the endwise play off of more than fifty mills; wherever I have been called to straighten and hang a large circular saw, having followed that business for more than fifteen years, seven of which were in California, where I straightened and put in operation more than one hundred and fifty large circular saws to saw the mammoth timber of that country, where saws as large as seventy-two inches are used.

The only advantage possible in lateral motion is where the carriage runs crooked, which is too often the case, lateral motion will permit the saw to go with the log; in such case the saw should have as much end play as the carriage runs out of true, and the saw guide should move with the saw. But, I ask, what mechanic would run a saw in that condition? Were the carriage ran out of true, lumber could not be sawed of uniform thickness in that way. The carriage should run as true as the bed of an iron planer.

He also says "the underside of the tooth should range eight inches from the center for hard wood, and ten inches for soft, and that twelve inches is not too much for a large saw." Now, if we take a thirty-six inch saw and range the angle of the underside of the teeth ten inches from the center, we have a very hooking tooth. Also, if we take a seventy-two inch saw, and range the teeth twelve inches from the center, we have a very blunt tooth. Thus it will be seen that the angle of the teeth will depend wholly on the diameter of the saw. He also says "the tops of the teeth should range one-fourth of an inch below the point of the next tooth back of it." I am surprised that a practical man should give such a rule. In that case the angle of the teeth will be determined by the distances the teeth are apart. He further says "he files the teeth a trifle shorter on the log or carriage side, to contract the range of the saw into the carriage."

This is the first time I have ever heard of a saw running (or inclining) toward the short corners of the teeth, as all saws will incline toward the long corners.

RULES FOR HANGING AND USING A CIRCULAR SAW.—First, the saw should be hammered flat on the log or carriage side, and all difference in thickness between the center and rim should be on the board side of the saw. The first and most important of all, is to know that you have a saw that is properly made. To test a saw, try the teeth with a set or wrench. If they bend readily and do not show a good spring temper they are too soft for use. Gage the saw, and see that it is equal in thickness. The most important of all is, the manner in which the saw is HAMMERED. Stand the saw up perpen-

dicular, try a straight edge over the log or face side of the saw, and see that it is true, then lay the saw down flat, and raise one side, holding it up with one hand, allowing it to rest on the teeth at the opposite side—lay a straight edge from the mandrel hole to the rim at right angles with the part held up and the part resting on the floor. The saw should drop just so you could see daylight under the center of the straight edge—this is called a little open. Should it rise up, it is called fast. A saw that is fast between the center and rim will always work bad if it gets the least warm on the rim or at the teeth. Go all around the saw in this way, then try the straight edge across the center of the saw with the center of the straight edge over the mandrel hole. The center of the saw should rise a little, just so you can see daylight under each end. This indicates the saw a little fast in the center. In this position the saw will bear a little warmth on the rim from friction of guide, also in the center from warmth of the box. Should the saw show too open or drop, say one-sixteenth of an inch, in appearance below the straight edge, it will be too limber to run stiff.

Nine hundred feet per minute is the proper speed to run the rim of a saw, it is then traveling nearly two miles per minute. Shingle or other saws, made very thin on the rim and thick in the center, or attached to large collars, may travel twelve hundred feet per minute with safety. Such saws running at greater speed than nine hundred feet per minute, should be hammered open in the center so they will fall a little below the straight edge, as the centrifugal force of the saw, when at great velocity, will expand the rim. The saw should line into the log just as little as possible, and have the log pass without bearing against the center of the saw, or so that the teeth will rise without cutting the log or timber.

There should be no lateral motion as it is sure to guide the saw from a direct line. The carriage must run true. The pitch of the tops of the teeth should be regulated by the amount of feed that the saw is to carry. For example, an edging saw should have more pitch to the tops of the teeth than a siding saw. So if a log is fed into a saw four inches to each revolution, the teeth must have more pitch than if it is only fed one-half inch. The pitch must be sufficient to clear the tops of the saw teeth when in the cut. Draw a circular line to the points of the teeth, then file the angle so that the back of the tooth will be below the circular line one-eighth of an inch. One inch from the point of the tooth is a very good rule for one-inch feed, but is subject to variation according to the feed required. The teeth of circular saws should be filed as hooking as they will possibly stand to cut; of course lathe saws where the stuff is fed by the saw under the arbor, and side cutting shingle saws, where hooking teeth will draw the timber into the saw too fast, are an exception. The pitch of teeth of large circular saws for pine, spruce, hemlock, etc., may be obtained in the following manner: A line of sixty degrees from the horizontal, will form an equilateral triangle, and may be formed by striking a line or circle whose diameter is one-half the diameter of the saw, and drawing a straight line from the points of the teeth to the outside of the circle. The throats under the teeth must be sufficiently large to retain all the saw dust, carry it through the log, and discharge it below. A large saw is often cutting, say, through thirty-two inches of timber, and one-sixteenth of an inch to each tooth. Thus, each tooth will cut a shaving, one-sixteenth by thirty-two inches, which would fill a space one inch by two inches, or equal to two square inches of solid timber, as thick as the saw cuts. If there is not two square inches of space under each tooth, the dust cannot act free, but must crowd somewhere. It is often the case, however, that the teeth cut one-eighth of an inch each, the saw dust of which would fill four square inches. If the space under the tooth does not contain that amount, where does the surplus dust go to? It must be crowded, between the saw and lumber and packs against the latter, heating the saw on the rim by the friction, and will often be seen caked on the side of the timber. The saw teeth should be filed square across both top and bottom, the points should be kept well spread, gradually tapering back from the point, and the saw must, to do good work, be kept round, so all the teeth will cut the same amount.

It is also very essential that the saw should be kept balanced. Sixteen thousand feet of lumber was sawed from clean hemlock logs in Messrs. Grant & Vansant's mill, in this city a few days ago, at once putting the saw in order, and without making a bad run.

JAMES E. EMERSON.

Trenton, May 16, 1866.

Taxing Inventors.

MESSRS. EDITORS:—For twenty years I have been a constant reader of your most excellent journal, and have always admired your fearless opposition to all unjust legislation affecting the rights of inventors. Other journals seem indifferent to the claims and interests of this most useful class of our citizens, and yet deprive those journals of patented improvements, and what, I ask, would now be the condition of the "art preservative of all art?" For one, I heartily thank you for opposing Mr. Jenckes's scheme of placing an extra load upon inventors.

As a class they are willing to bear their share of the burden of taxation now needed to maintain the honor of the nation; besides, they are willing to pay to the Patent Office all that is just and proper. I ask in all justice ought anything more to be required of them? I think not. Therefore, I protest against this new bill and call upon the Hon. Mr. Cowan, our U. S. Senator, who is also Chairman of the Committee on Patents, to kill the measure. He has the power and influence to do it, and represents among his constituents thousands of inventors who naturally look to him for protection. The money of inventors has been squandered to daub over a large hall in the Patent Office somewhat after the style of Indian art out in Idaho, and not content with having got this barbarous daub out of our pockets and some \$130,000 beside, Jenckes wants us to pay more for having our cases carefully examined and decided. The whole thing is wrong.

AN INVENTOR.

Harrisburg, May 19, 1866.

The Reviewer Reviewed.

MESSRS. EDITORS:—Your correspondent on "The Gear Question Reviewed," in your issue of May 5th, seems to labor under a material misapprehension of the case and of facts connected with it.

He virtually admits that it is correct to measure the given pitch of a gear on the arc, instead of on the chord. Now this is all that has been contended for, by one or two others and myself, in former communications. But he proceeds to say, that since it is impracticable to form the teeth properly, it becomes necessary to measure the given pitch upon the chord. That is to say, we will remedy a difficulty in the practice, by introducing an absurdity into the theory.

Now let us see how far beyond the facilities of the present day it is to produce teeth practically correct; and what the difficulty in that respect has to do with the doctrine, that a spur gear should be considered as a polygonal prism instead of a cylinder.

In the first place he asserts that "if the contour of the teeth is formed of the proper epicycloidal curves, the teeth of each wheel must be formed with special reference to the size of the wheel with which it runs;" and that "correctly adapted epicycloidal teeth are almost wholly unknown in ordinary machinery." Both these statements are erroneous.

Epicycloidal teeth, adapted with practical correctness, are well known and extensively used; and in forming them, it is not necessary that each wheel should be especially adapted to the particular one with which it is to work.

Professor Willis, who is entitled to the thanks of all mechanics for his thorough investigation of these matters, has shown that if the teeth of all the gears in a set be bounded by epicycloids formed by one common describing circle, rolled in each case on the pitch circle for which a tooth is to be formed, any two of such a set will work correctly together. And he has shown that the proper diameter for such a describing circle, is one half the diameter of the smallest pinion to be included in the set (in most cases 12 teeth).

Now, after describing any one of these curves, it will be found that a center and radius can be taken, with which an arc of a circle can be described, which will not perceptibly vary from the short portion of an epicycloid required. And Professor Willis has constructed an instrument which, when properly applied

to the radius and pitch circle of a wheel, gives two centers from which to describe those arcs; one, which always falls within the pitch circle, from which to describe that part of the tooth lying within it; and another which always falls without the pitch circle, from which to describe that part of the tooth within it.

And the teeth thus described are to all intents and purposes epicycloidal teeth.

This instrument Professor Willis has very properly named the "Odontograph" or "tooth describer." And by its use, or by other methods producing the same substantial result (the odontograph is not "the only simple means of determining the center and radii"), large quantities of racks, gears and pinions, coarse and fine, cut and cast, are made. And when all the steps are carefully taken, including that of recognizing the pitch as a distance to be measured on an arc, the work is good, and worked handsomely.

But the odontograph above mentioned, your correspondent of May 5th, has entirely ignored, and only drawn attention to another and quite distinct one (see fig. 1. of his communication), which gives a curve approximating to an involute. This form of tooth is much in use for fine gearing, say to one-half inch pitch, for which it is very well adapted. It is not, however, so desirable a form, where much power is to be transmitted.

To the statement that "Scribner, Haswell, and Nystrom, all recognize this fact in their valuable pocket-books" (i. e. the fact that "it is essential that the pitch be measured on the chord, rather than on the arc"), I have two things to say. First, that however we may respect those authorities, their recognizing an absurdity as a fact would not make it so. And second, the formula which they all give for finding the diameter of a gear, is utterly inconsistent with the recognition of any such "fact." Here it is: $\text{Pitch} \times \text{No. of teeth} \div 3.1416 = \text{Diameter}$.

Further argument on that statement is not needed, as this formula can apply only to a circle, and not to its inscribed polygon.

Now, as to why it is sometimes best to increase the diameter of a pinion beyond what is correctly required by its pitch and number of teeth. This is called by millwrights "giving the pinion a little lead;" its effect may be seen by a moment's consideration.

When a small pinion is working with a rack—we will take such a case as an example—each tooth of the pinion approaching the line of centers, exerts a lifting or crowding pressure on the rack. After passing that point, its tendency to draw the rack down is about as great as that to lift it, depending on the form of the teeth, their smoothness, etc. But in any case, the action of the teeth after passing the line of centers, is far more easy than before passing that point. If then, our teeth are formed by "rule of thumb," or our gearing is roughly cast, it will be an advantage in its working to have most of the work done by those teeth which have passed the line of centers—and increasing the pitch of the pinion is evidently a very simple means of causing it to be so done. In very unfavorable cases, it may be best to increase the pitch of the pinion to the extent which would measure the pitch on the chord; with well formed teeth and good castings, a good deal less is quite sufficient; and with well formed and well adjusted cut gearing, no such increase is necessary or desirable. And if guessing means using judgment in proceeding according to circumstances, then guessing is eminently proper in cases like the above.

Now, if circumstances sometimes render it necessary, as a mechanical expedient, to increase the pitch of our pinions, let us own up that it is a mechanical expedient, and not try to elevate it into scientific correctness by the aid of trigonometry.

I may mention that your correspondent of May 5, can obtain more particular information as to the two kinds of odontograph by consulting "Appleton's Mech. Dictionary," article "Gearing."

CALLIPERS.

Worcester, May 10, 1866.

A Slight Mistake.

MESSRS. EDITORS:—Some time ago you described a small steam boiler which had 50 tubes, 4 inches long and 1 inch diameter, the same being vertical

It is not necessary to describe this boiler at length, but in reckoning up the fire surface, I find that in the tubes there are 300 inches area, and in the fire box 144, exclusive of the crown sheet, which would doubtless make about 6 inches more; call it all 150 inches. This would make the total heating surface 450 square inches, perhaps a little more or less. Dividing this by 12 square inches, in one square foot, gives 37 square feet, or nearly three horse-power in a boiler only about 16 inches high, which is far too much for a small thing.

J. W. M.

Philadelphia, Pa., May 9, 1866.

[Our figures do not come out quite the same as this correspondent's. We find 144 square inches in one square foot, and but 3 square feet and 18 square inches in 450 square inches, which is sufficient for a small engine 2 1/2 inches diameter and 4 inches stroke.—Eds.]

Cipher Writing.

MESSRS. EDITORS:—I send you herewith a communication inclosing two cipher dispatches, with their translation. These documents came into my possession, at the close of the war, while I was an officer in the Union army. I send you the translations, but would suggest that the cipher be published (if agreeable to you) alone, in order to give your readers an opportunity to try their skill at translation.

I have read several articles in magazines, etc., in regard to Systems of Cipher, but have seen none that could not be translated. I have a very simple system, practical and easily used, which cannot be translated without the key, and which I will send you, if you think it of interest to your readers.

Norfolk, Va., May 10, 1866.

Confederate States of America,
Military Telegraph.

Dated Hd. Qrs., Feb. 25, 1865.

Received at Richmond 12 o'clock 25 mins. A. M.

To HON. J. C. BRECKENRIDGE, Sec'y of War:—I recommend that the TSYSMEE—FN—QOUTWP—RFAT—VUMP—UBWAQBRTM—EXFVXI— and ISWAQJRU—KTMTL—are not of immediate necessity, UV—KPGF—UBPGR—MPC—THULFL—should be—LMQHTSP.

R. E. LEE.

TRANSLATION:

I recommend that the removal of public property, machinery, stores, and archives, which are not of immediate necessity, be commenced. All powder should be secured.

Hd. Qrs. C. S. Armies,
March 24th, 1865.

Gen. E. KIRBY SMITH, Com'd'g Trans-Miss. Dept.:

GEN.:—Vvg—ecilmympm—rvcog—wi—lhomnides—kfeh—kdf—wasptf—us—tfcsto—abxc—bjx—azjkhmgj—silimvboeq—qb—ndel—neisu—ht—kfg—auhd—egh—opcm—mfs—uvajwh—xrymcoci—yu—dddxtmpt—iu—icjqkpxt—es—vvlau—mvr—twhtc—abxc—iu—eoleg—o—rdcgx—en—uer—pv—ntptxex—rqvariyyb—rgzq—rspz—rksjeph—ptax—rsp—ekex—raedstrzpt—mzmseb—acgg—nsfqvvt—mc—kfg—smhe—ftr—wh—mrv—kkge—pyh—fem—ckfrlisytyxl—xj—jtbbx—rq—htxd—wbhz—awvv—fd—acgg—ayxwzv—yclag—oe—nzy—fet—lgxa—scuh.

I am, most respectfully, your obdt serv't,

R. E. LEE.

[It would give us great pleasure to receive the cipher, and in accordance with our correspondent's suggestion, we retain the translation, so that our readers can try their skill.—Eds.]

Blue Vision.

MESSRS. EDITORS:—I take the liberty of reporting a curious phenomenon which I experienced a few days ago, a similar case of which I do not remember of having noticed in scientific records.

When opening my eyes in bed early one morning (about 5 o'clock, in full light), I was surprised at seeing all the dark objects in the room, the dark furniture, frames, cast shadows, etc., in a most beautiful, intense, velvety blue.

Being afraid, lest the magic vision should vanish by a mere winking of the eyes, I kept as still as a fossil, and only turned my eyes quietly around to observe other things in the room; everything of color except the dark brown or black, appeared in the natural color; white, green; red, etc., were not affected at all. Calling my sons to rise (who sleep on the other side of the room, a little forward), I saw, at

their rising, their hair—but nothing else on them—delightfully blue! Having enjoyed the sight long enough, I closed my eyelids, and on opening, everything appeared as usual.

I know the effect of taking santonine by experiment, long ago, when everything appeared greenish, yellowish or bluish. But here, nothing but the dark objects changed blue. The only thing which might possibly have "a cause" in the matter, is that I had manipulated considerably with cyanuret of potassium the day before. My sleeping room is well aired and spacious, at least 60 by 30 feet, and with windows only on one side, some thirty feet to the west behind the head of the bedstead.

Have any of your readers experienced anything like it?

C. M.

[The seeing things which do not exist is always indicative of disease. The disorder is often of the imagination only. The case of our correspondent is certainly an interesting one, and we are unable to explain it.—Eds.]

A Difficulty in the Way of Perpetual Motion.

MESSRS. EDITORS:—I see occasional references by your correspondents to the invention or discovery of perpetual motion. There is one point about this I have never seen referred to, which it seems to me an individual contemplating trying his hand on such invention, would do well to consider—that is, if an individual who seriously contemplates such an effort is sane enough to consider anything. Suppose a machine were invented which generated its own power, and consequently started and moved itself, by what process or possibility could its motion be restrained or regulated? It must do one of two things—stop, or run itself to death; as it seems to me the laws which govern machines moved by agencies or forces, such as steam, water or horse-power, applied externally, as it were, to the machine, are not applicable to a machine which is expected to develop from its own levers, cranks, wheels, etc., the power which moves it. Were it possible to develop such a power, it occurs to me clearly, its force must go on increasing and its motion accelerating from the moment of starting until a separation of the parts would necessarily follow. A governor or regulator, or resistance of any kind, would either stop it entirely, or, failing in that, would prove useless, for any such appliance would only develop a new point of resistance to starting, which, overcome by the inherent power of the machine, the results would ultimately be the same as if the resistance were not there. Of course this objection, if well founded, is only one phase of the law which makes any such invention impossible; but it may be that some who cannot see the difficulties or impossibilities in the way of starting a machine, may see the force of this suggestion in case they should get it started. If they cannot be reasoned out of the delusion, they may possibly be terrified from the creation of a monster, which like "Frankenstein," will be exceedingly apt to crash or devour its creator.

G.

Milwaukee, Wis., May 16, 1866.

Boilers Rusting.

MESSRS. EDITORS:—I have an upright tubular boiler in my dwelling house, for steam heating; now, may I trouble you to answer the question, shall I, to save my boiler, draw off the water and leave it empty until next fall, or shall I leave it as at present, half full? Which is the best method? The boiler is in my cellar.

A SUBSCRIBER.

New York City, May 10, 1866.

[This is a very common trouble with steam boilers laid by. Iron does not rust so rapidly under water as out of water, and it is therefore better to keep the boiler full of water, but even that would not stop rusting entirely. Since the boiler is in the cellar it would sweat if the water was drawn off entirely, and the boiler would then dry and rust very fast. There is, doubtless, a slight coating of sediment or scale on the tubes and sheet, which will protect it somewhat.—Eds.]

An enormous bronze cannon cast at Metz, in 1857, is about to be brought to Paris. Its length exceeds 13 feet, its calibre 1 foot, and its weight twelve tons. It will be consigned to the Museum of Artillery.

New Method of Ventilating Mill Stones.

This engraving represents a new method of ventilating mill stones by passing currents of air between them, so that the heating which usually occurs is obviated, and more flour, of a better quality, is obtained.

In the engraving A represents the upper stone, and B the bed stone. A chamber, C, is formed in the upper stone, through which the air passes into the eye of the lower one. Beneath this there is an air chamber, D, into which the ends of the tubes, E, open. These tubes are fixed in the bed stone and extend quite through it from top to bottom. At the face of the stone they communicate with the grooves of the same. The air is forced in by an air pump or other similar agent through a short pipe, F, and passing between the stones and into the tubes, E, of the lower stone creates a thorough circulation. The result is easily seen in the quantity and quality of the flour as the stones do not get clogged or the grain heated in grinding.

Patented through the Scientific American Patent Agency, Dec. 19, 1865. For further information address John Kemp, Corn Exchange Mills, 272 East 23d street New York.

Australian Intercolonial Exhibition.

Mr. J. G. Knight, Secretary of the above institution, sends us a letter and pamphlets announcing that an exhibition of the products of Australian skill and ingenuity will take place at Melbourne in 1866.

The year is now so far gone that goods would probably arrive too late to benefit American manufacturers, and for this reason we regret that the notice given was so short. Mr. Knight informs us that there is a great want of improved mining machinery of all kinds, both for metals and coal, for boring and tunneling the earth, as also for drilling through rock. The commissioners desire to exhibit all mechanical improvements of this kind that can be gathered together, believing that by so doing the interests of the colonies, as well as those of the home manufacturers, will be materially promoted. Full-sized machinery or working models would be equally acceptable, and as the building in which the exhibition will be held, is to become hereafter a public museum and department of industrial art, such mechanical illustrations could remain permanently acceptable to the public, thus securing a publicity far beyond that of the few months during which the exhibition will be open. According to the wish of the exhibitors the goods would be thus kept for permanent exhibition or handed over to any authorized agent at the close.

The Game of Croquet.

Out-door amusement for ladies and children is an object very much to be sought for and encouraged; especially for those who are penned up in our large cities and towns. The want in this respect can only be met by some game that will afford exercise and amusement at the same time. The recent introduction of the game called "croquet" fully meets all the conditions named, and it is rapidly becoming a popular exercise. The patent croquetries manufactured by Milton Bradley & Co., Springfield, Mass., combine several useful improvements and are superior to any that we have seen.

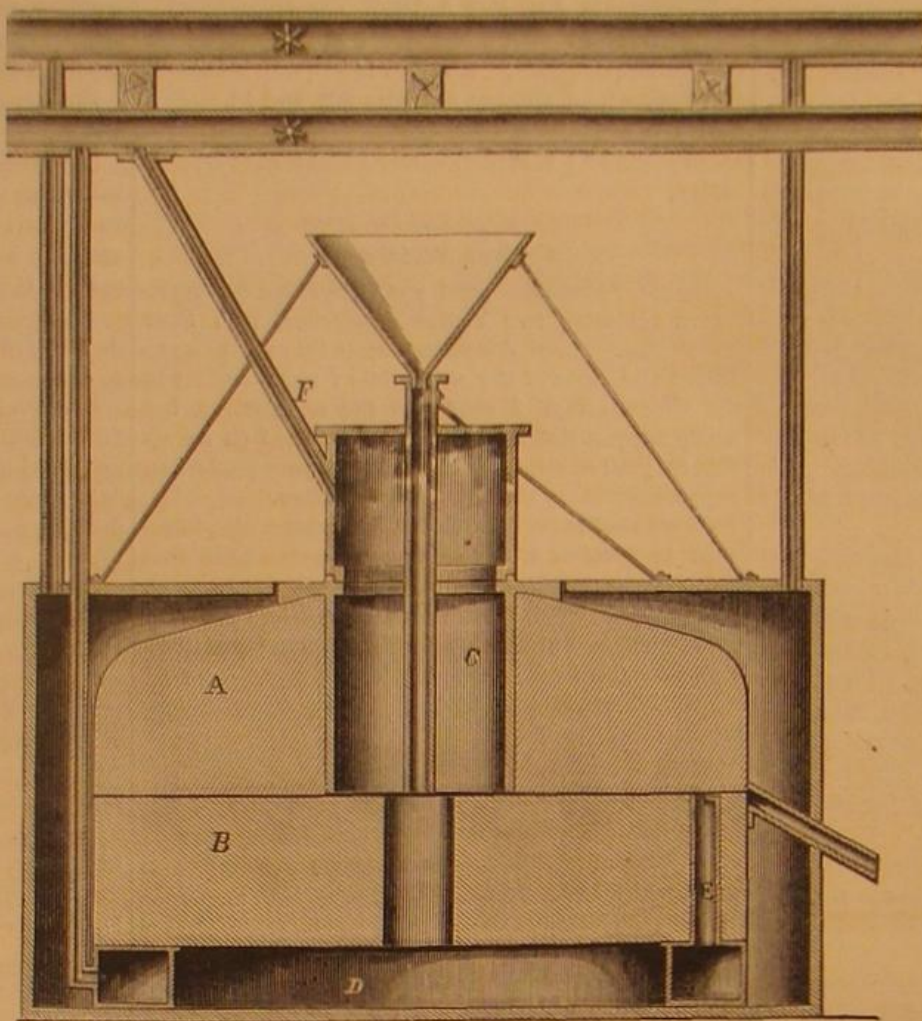
SHAW'S CLAMP FOR STRETCHING SHOE UPPERS.

All shoemakers will appreciate this invention, as it is intended to save a great deal of hard work.

It is intended as a device for holding firmly and straining the upper leather or fabric of shoes during the process of rubbing down the seams. In using it the seam is placed lengthwise with and over an iron

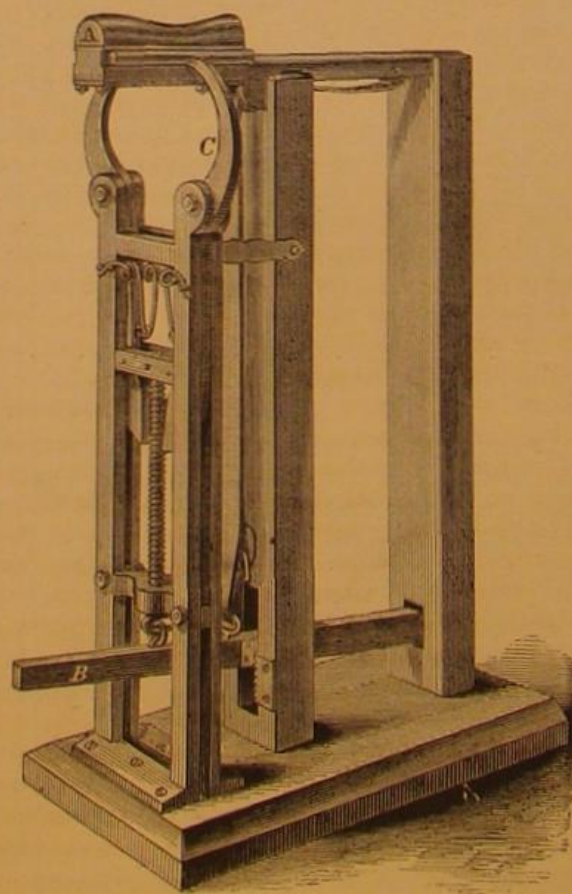
form, A, corresponding in shape to the seam. The lever, B, moved by the foot, and held fast by a ratchet, operates the jaws, C C, while the form is lifted sufficiently to produce the required strain. The seam is then rubbed down, both hands of the operative being at liberty for the purpose. The form is lifted by means of an inclined plane operated by a strap attached to the lever, B. The inclined plane is returned to its place by means of a spiral spring.

Heretofore the rubbing down of seams in the uppers of shoes has usually been done on a rounded stick



KEMP'S METHOD OF VENTILATING MILL STONES.

of wood, held on the lap, one hand straining the seam apart while it is being imperfectly rubbed down by the other. In the case of covered seams the work is still more clumsily performed.



The saving of time and labor, to say nothing of the more perfect work, and the facility it affords for trimming the welt, amounts to more than would at first be supposed. "In our own factory," say the proprietors, "after a few days' use, one boy accomplished, easily, the work of five men, thus making a

saving of over \$40 per week, besides doing the work much better."

A patent is now pending on this machine through the Scientific American Patent Agency; for further information address the assignees and proprietors, Bradley & Metcalf, Milwaukee, Wis.

How Ropemakers Work.

The Brooklyn Times gives the following facts in relation to the hours that ropemakers work:—

"There is a popular misapprehension as to the internal economy of a ropewalk. Everybody who toils in a ropewalk is not dignified by the title of ropemaker. It is only those who spin and lay that are considered ropemakers. The ropemaker is paid by the piece, and invariably commences to labor with the break of day, even if he is likely to have but an hour's employment. Their day's toil is generally over at noon, or, at the latest, 3 o'clock. There is another class—composed of men, women, and boys—who do the rude labor, and attend upon the machinery, etc. These go to work with the ropemakers, but, unlike them, are expected to toil until six o'clock. This is the class that unsuccessfully struck the other day, and we are inclined to sympathize with them. Ten hours per day is quite as much as should be expected of them or any other operatives.

"Our 'boss ropemakers' will probably smile at the estimate which is placed upon their incomes by a Boston cotemporary. Let him quadruple the sum he has given as annual income, and then double that, and he will begin to approximate toward the profits of ropemaking during the past few years."

The estimate given was, that one had an income of \$25,000 per annum, and another ropemaker was classed among the millionaires.

A Novelty.

There was recently exhibited at the Manchester Literary and Scientific Society a singular mineral that was found in a nodule of clay ironstone from the North Staffordshire coal field. On careful examination it appears to be a mineral mass in a semi-crystalline state. The form of the mineral appears to have been spheroidal, with crystals radiating from the center. It consists chiefly of carbonate of lime, carbonate of iron, and phosphate of lime, with traces of magnesia, alumina, and organic matter, and 10 per cent of silica. He also exhibited a beautiful white specimen of carbonate of strontia, obtained from a vein of carbonate of lime. It occurred among the lime in radiated masses, similar to those of carbonate of barytes, as sometimes found in veins of sulphate of barytes. This mineral has been obtained in considerable abundance, but up to this time it is believed that no use has been found for it on a large scale.

THE Chicago and North Western Railroad Company recently executed a mortgage to secure the payment of \$2,500,000, which covers 603 miles of railroad, and all the depot grounds and other lands and rolling stock belonging to the same. The lines of road covered by the mortgage are the following: The road from Chicago to Green Bay, Wisconsin, 242 miles; from Chicago to Fulton, Illinois, 136 miles; from Chicago to Freeport, 121 miles; from Kenosha, Wisconsin, to Rockford, 73 miles, and from Belvidere to Beloit, 21 miles. The United States revenue stamp affixed to the mortgage is for \$2,500.

TINMEN'S TOOLS.—We have letters from the South inquiring where the above tools can be purchased. Manufacturers will find it for their interest to advertise in the SCIENTIFIC AMERICAN.

THE Scientific American.

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SUPPLEMENT.

With the last five issues of the SCIENTIFIC AMERICAN, we have published a four-page supplement, which has been regularly sent to all our mail subscribers, and sufficient copies have been delivered to the American News Company to supply all those who receive their papers through agents. A supplement is also issued with the present number.

LEGISLATION ABOUT PATENTS IN CONGRESS.

Considerable attention is being given to patents in the House of Representatives. On the 16th inst. the Committee on Patents reported a bill for the relief of Delia A. Jacobs, which authorizes the Commissioner of Patents to extend the patent for an improved method of dressing treenails—the original term having expired August 28, 1862. Mr. Myers, who supported the petition, stated that no other persons have been using this patent since its expiration, and that there was a general desire that the widow of the patentee should have the benefit of the extension. A provision was incorporated in the bill that no parties shall be held to account for damages for any use of the invention since the patent expired.

Mr. Myers declared that the widow was now almost entirely supported by the little pittance given her by Wm. H. Webb and James Udall, of New York City. The bill passed by 57 majority—64 members not voting.

Mr. Myers, from the same Committee, reported a bill for the relief of William Mann and Jacob Senneff. It appears that Mann obtained a patent July 11, 1852, for improvements in the manufacture of copying paper made of equal parts of manilla and cotton, which will expire July 11, 1866. Being absent in Europe, he was not aware that ninety days' notice must be given of the application for extension. Mr. Washburne opposed the bill, and intimated that if a party "was swelling through Europe it was his own fault," and objected to the way the thing was being done.

Jacob Senneff obtained a patent Jan. 13, 1852, for a metallic heddle, used in looms for passing the

warp. This patent expired the 13th of last January, and being in the military service—employed in the hospital and in the volunteer refreshment saloon at Philadelphia, Mr. Senneff thus lost his chance to obtain his extension and only discovered his loss when it was too late to apply to the Commissioner under the general law.

The bills in these cases were simply to authorize the Commissioner of Patents to hear and decide them upon testimony, as in all other extension cases. Considerable debate ensued, and Mr. Washburne hit a vital point when he declared that these parties were only in the same condition with hundreds of others. The bills were passed.

Mr. Bromwell, of Illinois, from the Committee on Patents, reported a bill authorizing the Commissioner of Patents to grant an extension for seven years of the patent issued December 6, 1845, to Thomas D. Burrall, for a corn sheller, and extended for seven years from Dec. 6, 1859, by the Commissioner of Patents. The proposition now is to allow another extension for seven years, which, if obtained under the provisions of this bill would make three terms or twenty-eight years.

Mr. Harding, of Illinois, who opposed the bill, stated that the patentee "has been receiving large rewards for his invention during twenty-one years, and now he wants to continue the same business." Mr. Bromwell declared that the patentee was an exceedingly old man and exceedingly poor, the question being simply whether Congress was willing that the Commissioner of Patents should hear such cases, and decide as he deems right in view of the rights of the public and the inventor. The bill was passed.

We have carefully read the discussion upon these various bills, and while it seems to be very plausible and very just in its general features, we warn our readers that it has a much deeper significance. These comparatively minor bills are brought forward and passed to establish precedents and try the temper of the House; that the larger extension cases will soon come, we have not a doubt.

EXPERIMENTS IN AERIAL NAVIGATION.

Aerial navigation is by no means a subject of modern speculation. Many fabulous accounts of the doings of the ancients in this department of science, have reached us through the traditions of the elders. We are told that they constructed artificial wings, and by attaching them to the body, undertook by muscular exertion to rival the birds of the air.

In the fourth century one Archytas constructed a wooden pigeon that could fly by means of an inclosed spirit; but the author fails to tell us what that spirit was. At a much later period the famous Bishop Wilkins was so confident of success in this art, that he intimates that in future ages it would be as usual to hear a man call for his wings, when going a journey, as to call for his boots. Experimenters in aerial navigation, however, when they came to better understand the elastic properties of the air and the gases, dropped the wing theory, and turned their attention to balloons as the more feasible scheme. The first air balloon was constructed in 1782, by Dr. Black, of Edinburgh, and since that period many ingenious enthusiasts have followed the subject with patient hope and confidence, but as yet without great practical results.

In a lot on the corner of Houston and Greene streets, Dr. Solomon Andrews, of Perth Amboy, N. J., has on exhibition an aerial ship of peculiar construction, which is now nearly completed, and the inventor proposes soon to remove the doubts of all skeptics by an experimental trial.

Many of our readers will remember that in the early part of the war efforts were made to adapt ballooning for the purpose of reconnoitering the position of the enemy. These efforts were but partially successful, no valuable results having been secured, and at the close of the war, among other rubbish, were two army balloons, which found in Dr. Andrews a ready purchaser. These he has used to form the buoyant portions of the Aereon, which resembles in shape a long lemon, and which is covered with a net work, and connected by ropes, cords, and pulleys to a car suspended some twenty feet below the balloon. This balloon, when inflated, will contain 40,000 cubic feet of gas, capable of supporting a depending weight of two tons.

The car or basket is of wicker-work, and cradle-shaped, about fifteen feet long by two feet wide. Another car, about three feet long, placed on runners, is put inside the basket, and secured by tackle, so that it may be held in any desired position and made to serve for purposes of ballasting.

The inventor's theory is, that as the motion of the balloon will be in that direction in which least atmospheric resistance is offered, it is claimed that it will move, not vertically, as other balloons do in a still atmosphere, but upward and onward in the direction pointed to by its bow on an ascending plane. When sufficient height has been attained, the aeronaut will open the valve and discharge gas, at the same time stepping forward to the bow end of the basket, which will depress the bow of the Aereon, before elevated, thus guiding her direction on the descending plane. Having gone sufficiently low, still in the same direction, he will throw out ballast and again ascend, and so on, thus progressing to his journey's end in the zig-zag mode in which a ship tacks against a head wind. On a near approach to the earth, Mr. Andrews says, he has only to step to the middle or rear end of his basket, and thus elevate the bow and check the momentum; then sail horizontally for a short distance, or throw out more ballast, and move on the ascending plane. He further claims that his rudder will turn his vessel as readily, or more so—the medium being less resistant—as a ship is turned in the water.

Dr. Andrews claims, and with justice, that he is at least entitled to the indulgence of the public till he has shown them that the time and the man have come to control the wind and navigate the air, or fail in the attempt to do so.

WHEN STRIKES WILL SUCCEED.

A great many strikes have recently been made among the workmen of this city, and on another page will be found a summary from the *New York Tribune* of the results. It will be seen that in about one-third of the cases the strikers carried their points, and in about two-thirds they failed. It would have been easy in every case for an intelligent observer to decide beforehand whether the strike would succeed or fail.

Wages in the city of New York at the present time range from less than one dollar per week to more than one thousand dollars per week, and throughout the whole range, from the youngest sewing girl or errand boy to the most eminent lawyer, all would like to get more for their services, while the employers would like to obtain the same services for less pay. The employer always offers the lowest rate that he finds will command the special service that he requires, and the employed is always ready to work for some other person at the smallest increase in his wages. The rate is, therefore, adjusted at the money value of each one's labor in the market.

But labor, like other values, is constantly fluctuating. The multiplication of labor-saving machinery, the accumulation of capital, the increased intelligence and thrift of workmen, and many other influences, tend to raise the rate of wages; while the destruction of machinery, manufactories and other kinds of active capital by fire, wars, enforced idleness, and other influences, tend to reduce it. Generally the causes operating to raise wages are more powerful than those tending to lower them, and during the present century wages of common laborers have advanced from seven dollars a month to twenty.

Now, wages are less sensitive to changes in the market rates than most other values. Workmen with families dependent upon them will frequently plod along at the old rates, when there is actually a demand for their labor at higher wages. We are told by the proprietor of a job printing establishment that it is very difficult at the present time to get good journeymen printers—that there is a great scarcity in the market of this kind of labor. If this is true, it shows that the wages paid to journeymen printers is below the market. The phrase, "the demands exceeds the supply," has no meaning except in connection with a specified price or rate. The "market rate" means the rate at which the demand just equals the supply. If the proprietors of job printing establishments would make the proper advance in the pay, the scarcity of journeymen would quickly disappear, and if it is true that print-

ers are working below the market, a strike by them would be certain of success.

The reason why the fifteen hundred car drivers of this city lost their situations by their strike, instead of getting increased wages, was, that there were plenty of other men able and willing to fill their places at the old wages—in other words, they were getting the market rates for their particular kind of service.

We may denounce the natural laws of supply and demand, if we have a fancy for employing our tongues or pens in that way, but the power of these laws is irresistible—like death, they are something that we must all yield to. Whether a strike for higher wages will succeed or not, depends wholly upon the fact whether the wages being paid at the time are or are not below the market.

THE DECIMAL SYSTEM OF WEIGHTS AND MEASURES.

On the 17th inst., the House of Representatives passed laws which legalize the use of the metrical or decimal system of weights and measures in the United States. The important movement met with no opposition, and it is probable that within a few days the action of the House will be confirmed by the Senate, when the metrical system will become the law of the land. In the beginning the use of the system is not to be compulsory but optional with the people. As soon, however, as it becomes well enough understood, it will entirely supersede the present system. In order to make the system familiar to the people it is proposed to issue one or more new coins which shall represent some weight in grams and measure in a simple fraction of the meter. The post offices are also to be supplied with gram weights, and mailable matter is to be estimated in grams, and a set of standards of the new weights and measures are to be supplied to each of the State capitals. It will be remembered that in the new system all weights and measures are deduced from a single unit, the meter, which is nearly equivalent to the ordinary yard.

WAGES IN PITTSBURG.

The matter of wages is an interesting one. The merchant turns quickly to the markets in the morning paper to see how he stands, and to know what the ruling prices are, and we are sure that our readers will be glad to know the state of the market that regulates their affairs. According to the *Mining and Manufacturing Journal*, published in Pittsburg, the following rates are those now paid to some trades:—Puddlers, \$8 per ton; bar rollers, \$3 25; bar heaters, \$1 25; plate rollers, per day, \$7 50; plate heaters, \$6; guide rollers, \$4 75 per day; sheet rollers, \$11; laborers, \$2—an average increase of 10.54 per cent over the rates of 1865. Glass blowers are paid highly, it would seem. Vial blowers receive \$55 per week, and window-glass blowers \$63 per week—their wages have increased 33.23 per cent in one year. At that time the average rate of good workmen (of all trades, we presume) was \$2 50 per day—it is now \$3 50. Apprentices receive \$5 per week. The wages of first-class machinists have advanced 10 per cent in one year.

NEW PUBLICATIONS.

BRASS AND IRON FOUNDING.—D. Van Nostrand, 192 Broadway, New York.

Every person whose interests are in any way connected with the manufacturing arts, must have felt the want of such a work as this. One man cannot carry all the minute details of a trade in his head, and if he does not have recourse to books for the information he needs he will obtain it from friends. We have had many and frequent inquiries from our readers for recipes like those contained in this book, and we hope they will avail themselves of it. Many who are experimenters, with a view to improve certain parts of machines, others who are merely amateurs, and dabble in metallurgy from a pure love of it, will find in this work full details as to the method of procedure in all cases.

Besides the usual formulæ for the compositions of zinc, tin and copper, and other metals used in common work, the author introduces some instructions and recipes, not generally known, as to molling,

facings, and similar processes. We extract one recipe which will be useful to many:—

TO CAST IN BREAD PASTE.—Take the inside of fresh bread, and work it up well with vermillion—the longer the better, until it becomes viscid and tough. It is then to be worked well into the mold. After having obtained the mold, it must be fastened down upon a piece of wood, by wetting it so as to prevent it from warping as it dries. After it has been thoroughly dried you may oil it, and then obtain as many casts as you please from it, in plaster, wax or sulphur.

By means of bread paste a traveler may always take a model of any small object of interest he meets with on his journey; and thus a proper knowledge of its mode of use becomes invaluable. Scrolls, rules of tombs and temples, etc., have often thus been copied and brought home at a trifling cost.

The author is Mr. Jas. Lakin, at one time foreman of the brass foundry in Messrs. Rean & Neale's works, Philadelphia, Pa., which is a guarantee for the practical value of the book.

NOVELTIES IN INVENTION.

One day, two years ago, we walked through the outer office of our premises, adjoining the editorial rooms, and saw an interested group about a novel affair. On closer inspection this novelty proved to be a doll that walked. In its body was a train of gearing that through the intervention of eccentrics lifted the feet and propelled the little mockery across the floor. This proved a great success as an invention, and thousands of them were sold.

Soon after this a man brought in a figure of a Sambo suspended by a wire proceeding from his back, and put together, as to his limbs, with great freedom. The feet of Sambo rested on a spring board. When this was played upon by nimble fingers the image danced in a most natural and life-like manner; the heels and toes kept time and raked down "Ole Virginny" in the most approved manner.

This also was a good thing from a pecuniary point of view. Wherever one went the face of Sambo met the eye, with his everlasting grin, and hat like a wash basin crowning the summit of his uninteresting countenance.

Again our attention is requested to another novelty. This time to no black dancing dervish; to no handfull of flowers and lace, but to a cock that crows in the morning, or at eve, when you blow in his tail. The streets resound with the noise of Chanicleer, and one is constantly reminded of that mighty feathered warrior—the bantam—who almost splits his throat in attempts to out do the Shanghai.

This new toy is a little affair, made out of tin, not larger than half a dollar. By a little practice one is able to imitate the crowing of a cock very accurately, and if we may judge by the quantity in the hands of the juveniles, the invention is likely to prove a success.

And all this introduction brings us to the point: There are no inventions which are more successful than those which afford amusement. People like to be tickled, and they flock by thousands to the circus, the theater and the comic lectures, where hundreds go to hear "the weightier matters of the law" expounded. So it is with novelties in the way of invention. A new toy for children sells quickly, and turns into money as rapidly as anything we know of. As the holidays approach we find great activity prevailing in this branch of the Patent Office.

BAIRD'S SIMPLIFICATION OF THE SCREW ENGINE.

In a report to the Secretary of the Navy, dated Nov. 28, 1864, Mr. Isherwood stated that in the machinery designed by him for the navy, "the governing principles have been fairness of parts; strict connections without articulations; simplicity of combination, with such arrangement of the essential organs as to admit of easy access and constant observations; great extent of wearing surfaces in guides, journals, etc., and a strength of parts insuring against fracture from bad materials, workmanship, bad management, and the greatest possible abnormal strains." If we add to these "governing principles" the Isherwood point of cut-off, viz., seven-tenths of the stroke of the piston, we have reduced to a short and convenient rule, for practical men, the results of six years of continued coal-burning experiments. It is very remarkable that the contents of two quarto volumes (compiled at an expense of thousands of dollars of the public money) can be thus clearly condensed into practical shape. Notwithstanding the

fact that Mr. Isherwood's "governing principles" are so plain, and have been so completely demonstrated by the extraordinary economy (in some of the screw engines, a horse-power is actually attained with five lbs. per hour per horse-power) and the wonderful speed of screw steamers fitted with his engines, marine engineers refuse to be convinced, and still plod along in the beaten track. No doubt this is caused by that absurd professional jealousy which, unfortunately, exists more or less in all professions; but we are happy to be enabled to chronicle one exception at least to this rule. The eminent engineer, Mr. John Baird, the constructor of the machinery of the U. S. S. *Quinsigamond* and class, appears to have been guided, in planning this machinery, by Mr. Isherwood's teachings in relation to screw-engine construction. In the *Quinsigamond* engines, the bold conceptions of our steam Galileo have been carried into practice by Mr. Baird, the most celebrated constructing engineer of the time, who, on account of the tastefulness of his planning, has been appropriately called the Michael Angelo of steam engineering. Having shown why it is that these engines are regarded with so much interest by the profession, no apology is necessary for what follows.

The *Quinsigamond* is fitted with two independent propellers, each actuated by a pair of engines attached to a right-angled crank shaft, the cylinders of the port propeller are placed on the starboard side, and *vice versa*. They are spread apart sufficiently fore and aft to allow the cast-iron framing, which carries the main bearings of one engine, to be placed between them. This frame for the other engines is, of course, placed on one side, forward, and on the other, abaft, of the two cylinders. Bolted directly to the head of each cylinder are two condensers, with openings cast in them, through which passes the main shaft of the next engine on the opposite side; they also support the main cross-head guide. As the two cross heads are placed between the two condensers, with the ample space of some 20 inches of space between them, the upper guide bar partially covering the opening, they are of course very easy of access.

As there are four cylinders, there are of course eight condensers. This arrangement not only simplifies the machine, but at the same time it adds to its economic performance; for if a good vacuum can be obtained with one condenser, a better one can be obtained with two. Further, if one is fractured by a shot, or otherwise injured, another remains, which, no doubt, has sufficient capacity to perform double duty. If each condenser has, as usual, a bilge, as well as a sea injection, there will be no less than sixteen injection cocks or valves; this is of no importance, for by suitably arranged levers and bell-cranks, three or four men can work the whole of them.

The condensers are of the ordinary jet variety. Surface condensers were not adopted, probably, because the cylinders are so proportioned relatively with the boilers that between 40 and 50 lbs. pressure must be carried in order to work off the steam. Surface condensation would no doubt add to the formation of scale; which experience has shown increases in a far higher ratio than the pressure.

In order to add as much as possible to the simplicity, durability, and reliability of the engines, as well as to insure a perfect vacuum, each condenser is fitted with two air pumps, or sixteen in all. Every one will perceive that these sixteen air pumps add greatly to the reliability of the engines, for if one is disabled, there will be fifteen left; if two, there will be fourteen, and so on. Some "uncanny" person may urge as an objection to such a number of air pumps, that it involves additional cost in the construction, and an unnecessary complication of parts, but even a cursory examination will refute this absurd idea. These pumps are operated by means of horizontal rock shafts, which obtain their motion from the main cross heads. By this arrangement, only sixteen pump levers and eight levers for the cross-head links, with their necessary connecting links, are required; thus there will be but 32 links, with 64 journals, for connecting the pump cross heads with their rock-shaft levers, and for connecting the main cross heads with the horizontal rock-shaft levers, but 16 links more, with 32 other journals, are necessary. The journals of the horizontal rock shafts (which are supported by a post and a sliding bearing

work of wrought iron) are obviously not worth mentioning. The whole of this single air pump gear is so arranged as to admit of "easy access and constant observations," and the "simplicity of combination" is apparent. Each engine is fitted with 3 feed or bilge pumps, or only 12 in all, which are actuated by suitable rock shafts. These, through a dozen or more links, receive motion from the air-pump rock shafts. The pumps are arranged with greater simplicity than the air pumps, as all their "articulations" require but 64 journals.

As before mentioned, the main shaft bearings are fixed in cast-iron frames, which are placed opposite the respective cylinders, to the two condensers of which they are attached by 4 long bolts. The bearings are not made in the usual complicated and unhandy way, with binders and bolts, but consist of large rectangular openings cast in the frames, in which the brasses are placed, and the shafts inserted; and the cranks are then keyed on the shafts; this forms "a strict connection without articulations." If it becomes at any time necessary to remove the shafts, on account of fracture, or to bore out and line up the bearings, instead of going through the troublesome process of unscrewing bolts and removing binders, it is simply necessary to remove the cranks from the shafts (or if they stick, to cut them off) and hoist out the whole fix.

The valve gear of these engines merits particular attention. It is well known that such engineering enthusiasts as Maudslay & Sons, Penn & Sons, Randolph, Elder & Co., R. Napier, Humphreys & Tennant, and hosts of others, both in America and Europe, have wasted much time and ingenuity in so arranging their engines that they can be easily handled. These gentlemen, whose ingenuity appears to have run away with their judgment, did not reflect on the absurdity of providing means by which one man can start, stop, and reverse them, while there are thirty or forty men standing looking on in the fire-room. It is Mr. Baird who utilizes the wasted force by making them seize upon that part of the valve gear necessary to be moved. Then they can operate it without the intervention of such wretched contrivances as either steam or hydraulic cylinders.

We are happy also to see that Mr. Baird has thrown such new-fangled traps as link-motion reversing cylinders, etc., to the winds, and used the old and reliable device known as the "gab." In fact, this engineer employs it almost exclusively on his screw engines, and has always expressed a decided preference for it. Each engine is fitted with three eccentrics, one for going ahead, one for backing, and one for working the cut-off valve. The two former are provided with "gabs" which, by properly arranged levers and bell cranks, can be thrown in and out of gear. If the engines are stationary, and it is required to start them, all "gabs" being out of gear, long iron levers, called starting bars, are inserted in the valve rock shaft. Three or four men seizing the end of each of these bars, work the valves until the "gab" falls into gear, and away she goes. Of course the starting bars (4 in all) must be quickly removed, or the men must stand one side, or be hoisted by their own petard. It is thought that with 12 men, stationed at the starting bars, and 4 or 5 more to operate the "gabs" and injection valves, the engines can be promptly started, stopped, and reversed. Should the valves at any time stick fast, nothing is easier than to attach a tackle to the ends of the starting bars and lead the rope along the fire-room or the berth deck, which ever may be the most convenient.

The main cylinders are 46½ inches in diameter, by 60 inches stroke, and the boilers, which are of the ordinary English horizontal tubular variety, contain some 23,755 square feet of heating surface, and 893 square feet of grate surface. Hence it will be seen that although the engines cut off at seven-tenths, some 50 lbs. pressure must be carried in the boilers in order that the engines can begin to work off the great quantity of steam they will generate, particularly as they have a large area through the tubes for draft and are provided with enormous blowers.

The *Warrior* and *Black Prince*, English ironclads, have the same sort of boilers as the *Quinsigamond*, their boilers have 23,197 square feet of heating surface and 868 square feet grate, and the area for draft is nearly the same, but although the boilers of the

English vessels are smaller, they have about 60 per cent more capacity of cylinders. These are two in number, with a diameter of 112 inches (effective 104 inches) by 48 inches stroke. The sad mistake of putting in cylinders so absurdly large has been abundantly demonstrated by the performance of these vessels. They have never been able to develop, even in service, but little over 6,000 horse-power. It is expected that owing to the cylinders being proportioned in accordance with the full-stroke theory, the *Quinsigamond* will develop at least 3,000 horse-power.

Hence it is seen that although Mr. Baird has fitted these engines with an independent cut-off valve, the cylinders are so proportioned that it can be dispensed with without detriment to the economical performance of the machine—this is quite important in case of derangement of the cut-off.

There are many other points which mark the "simplicity of the combination" of these engines, but we will mention but two more. The main cranks, which, we are sorry to say, many screw-engine constructors have of late made mere chunks of wrought iron, devoid of symmetry, are in this case charming to look at—there is no superfluous metal.

It is said that in one set of these engines, a stationary five-inch steel rod is to be introduced, passing through the center of the piston and secured to both heads of the cylinder. This simple and elegant device, it is expected, will keep the piston from jostling the sides of the cylinder; the spring of this rod by the weight of the piston when it is in the center of it, it is thought, will add to its proper action.

It will be only necessary to add, that for symmetry of proportions and "maximum maximorum" strength (as Mr. Isherwood would say), with minimum weight of materials, the *Quinsigamond* engines are surpassed by none and equaled by few. Their constructor has, in this case, surpassed himself; in a word, they are characterized in a marked degree by that stern Calvinistic simplicity, taste, and grace, for which Mr. Baird has long been celebrated.

We have thus seen what can be accomplished, when, on the one hand, one of the most distinguished constructors in the world makes his plans in accordance with the views of the chief of the Steam Bureau, and consults him freely in relation to them; and, on the other, the chief of the Steam Bureau, without any of that petty professional jealousy which is, alas, but too common among engineers, gives in return the benefit of his great learning, experience and constructive skill. That Mr. Baird has submitted to be guided by the demonstrations of Mr. Isherwood in proportioning the principal and "essential organs" of these engines, shows him at once to be a man of liberal views and sound understanding.

STARLING BAR.

Boston, May 10, 1866.

MISCELLANEOUS SUMMARY.

WATER METERS.—A premium has been offered by the Industrial Society of Amiens, in the following terms:—The proprietors of steam engines are in want of a water meter which will indicate exactly the quantity of water injected into the boiler, whatever be the pressure. This apparatus must be one easily set up, not subject to get out of order, and capable of registering the quantity of water to within two per cent of the actual volume. It is not a memoir that the society wishes for, but an apparatus in working order on which experiments can be made; and if a water meter be presented appearing to be of practical utility, the society will use every effort in its power to promulgate the use of the contrivance. The meters to be experimented on should be sent to the office of the society before March 1, 1867.

SINCE 1862 the boot manufacturing business of Chicago has increased from one small establishment to fifteen, which turns out nine hundred cases per week, consuming three hundred dozen sides of upper leather, sixteen hundred sides of sole leather, and fifty dozen calf skins. About twelve hundred hands are employed in the business.

THE *New York Times* opposes the proposition to increase the tax on inventions, in an intelligent article which we republish in another column. It takes the same view of the subject that we have urged.

THE VOLTAIC PILE.—The Corps Legislatif of France has adopted the following projected law:—Art. 1. A prize of 50,000 francs to be awarded to the author of the discovery which will render the voltaic pile applicable, with economy, to the following purposes: To industry as a source of heat, to illuminating purposes, to chemistry, to mechanics, and to practical medicine. The rules to be adopted for the conditions and the judgment of the said competition will be determined by a decree. Art. 2. In case that no prize shall have been awarded at the period fixed by the above article, the competition can be prorogued, by a decree of the Emperor, for a new period of five years.

AN INVENTOR WHO LACKED FAITH.—At a recent meeting of the stockholders of the Atlantic cable project, Mr. Cyrus W. Field amused the assembly by several anecdotes of suggestions which had been made to him. One gentleman had gravely proposed to him to sink a hollow tube in which to go down and seek after the cable, and he was so annoyed by the continued calls at his hotel that one morning he told his visitor that it should be done, and that the author of the idea should make the first attempt. He had not seen him since.

A BUSINESS firm in Memphis detected a thief quite adroitly recently. They missed money from the till for some days, amounting to \$250, but could not detect the guilty party. The cashier, as an experiment, emptied into the drawer some nitrate of silver. The thief went to the till to make his evening capital, and in abstracting the money covered his hands with the nitrate, which he was unable to get off. An examination of his paws in the morning proved the fact, and the guilty party was arrested.

A PRACTICAL and thorough agriculturist, backed by manufacturing skill and capital, has sent to this country from France a shipment of six tons of the finest Silesian beet root. Illinois is the State chosen for his experiment, and upon the property devoted to the culture a large sugar refinery is to be immediately erected.

THE difficulty of making sound and valuable castings from old—and often remelted—alloys of copper and tin or zinc arises from the oxidation of the tin and copper, which Dussausoy has shown to take place in such proportions in gun metal that for one part by weight of the tin oxidized, from three to four of copper are so.

OF the total power developed by the engines of the *Warrior* 77½ per cent are applied to the screw and 22½ per cent expended in overcoming the friction of the machinery, while of the total power imparted to the screw rather more than 77½ per cent is expended directly on the propulsion of the ship; showing only 6 for the resultant efficiency of engines and propeller combined.

AN extensive series of experiments, conducted by Mr. Mallet, upon the effects of additions, in minute but atomic proportions, of porous hard metals to the binary alloy of copper and zinc known as Muntz metal, embracing antimony, lead, iron, bismuth, arsenic, and silver, proved that, in every instance, the ductility, tenacity, flexibility, and resistance to torsion were seriously impaired by proportions under even 1 per cent.

THERE are in all, including steamboat piers and railway stations, fifty-two inlets to the city of London, through which in the course of each twenty-four hours no fewer than 706,621 persons enter, a number equal to one-fourth of the entire metropolitan population, or, added to the sleeping population, to more than the entire population of Dublin, Edinburgh, and Glasgow put together.

A MAMMOTH still covered with its skin and hair, and in an excellent state of preservation, has been recently discovered in the neighborhood of Taz Bay Gulf of Obi, enveloped in ice. The Russian government has sent M. Schmidt to examine the animal.

RECENTLY a torpedo, which was sunk in Charleston harbor over three years ago, exploded in eight fathoms of water. It is said to have lifted an immense volume of water, and presented a grand appearance.

Ship Launching.

The difficulties which attended the launching of H. M. S. the *Northumberland*, coupled with the fact that the tendency of the age is materially to increase the tonnage of ships, whether destined for mercantile or defensive purposes, seem to point to the speedy abandonment of the practice of launching ships, which never was entirely devoid of risk and danger. It has been said that no engineering enterprise must now be deemed impossible, provided only that ample funds are forthcoming for its execution. We are willing to give ample credit to the ability of our engineers, but we are by no means inclined, unnecessarily, to put that ability to the test. It is by far too costly a proceeding to rely upon, the utmost stretch of their skill to effect results are daily called for; neither is this a course which engineers would recommend; for the President of the Institution of Civil Engineers, in his address delivered January last, laid it down as a maxim for young engineers that, "they must be prepared, if necessary, to advise their employers that the objects which are sought are not commercially worth the cost of the means which would secure them."

The launching of ships of the largest class, although it has hitherto proved practicable, has certainly, in two memorable instances, been attended with most important drawbacks. To the anxieties attending the launch of the *Great Eastern* has been attributed, and not without some reason, the early death of its gifted designer; and the outlay attendant on the protracted operations, which ultimately forced the reluctant ship into her native element, must have been very large. The more recent instance of the *Northumberland* is commonly reported to have occasioned an outlay of thirty thousand pounds, in the efforts made to get her afloat. If, now, time had been an object in preparing this formidable ship for sea, and circumstances might very well have transpired to call for her immediate equipment, the hitch in launching this ship might have proved a national misfortune.

The authorities are pretty well agreed that the untoward arrest of the ship on the launching-ways, after moving down some 170 feet, was due to the departure from the usual inclination in the construction of the ways; but this again is generally considered to have been dictated by no undue caution. Our cotemporary, the *Engineer*, who is no mean authority on the point, in speaking of the launch, says:—"The immense mass of the vessel renders her practically uncontrollable; and if she had been launched a little too fast, she might easily have run right across the river, and injured herself seriously on the opposite shore before she could have been brought up." Again, in *Engineering*, a similar opinion is expressed. The writer says: "The general incline of the ways is less than that usually adopted: and when we consider the difficulty of controlling the motion of such an immense mass as the *Northumberland*, there certainly seems to be a good reason why this should be the case." He then cites an instance of a vessel launched from the Millwall yard breaking away and running down a vessel moored on the other side of the river. The naval architect, therefore, in adhering to the practice of launching, has to steer between his Scylla and Charybdis—a dead lock on the ways, and a destructive run.

But, it will be asked, what is to form an efficient and reliable substitute for the launching ways now in use? In reply to that question we may cite the following words of the President's address already referred to, viz:—"That hitherto the inventive genius, the patient perseverance, and the indomitable energy of the members of our profession, have not been found unequal to the tasks they have been called upon to perform." We are not however sure that any fresh efforts of inventive power are required to insure this desired result. Resort may be had to dry docks. But then it will be said that the expense of dry docks is enormous, and that in many localities they are impracticable. This may be so, but there are plans for meeting these difficulties which deserve the serious attention of naval architects. Let us take, for example, one designed and patented in the year 1857 by Mr. Lungley, the general manager of the Millwall Company, by whom the *Northumberland* was built. He proposed to construct dry docks and basins for stowing away vessels, which might enter at all tides, and be left high and dry above the level of the sea or river. To this end he made use of the natural level of the land, and built up his dry docks and basins thereon, connecting the dry dock with the basin, but so that they might be cut off therefrom by gates when required. The basin he connected with the sea or river by means of an outer dock or

channel, provided with double gates, and the water level of the basin be maintained at an artificial height. If, now, this plan was feasible for repairing and stowing away vessels, there is no reason why it should not be equally applicable for floating newly-built vessels. The natural level of the ground being used, will insure the docks from the influx of land springs, and any leakage into the docks from the basin is readily disposed of by gravitation.

There is, however, another plan and one that has the advantage of being in practical operation at the Victoria docks, that might, with a little modification, be adapted to the use of shipbuilders. We allude to Mr. Edwin Clark's hydraulic lift and saucer or pontoon. The vessel to be docked is floated over the sunken saucer or pontoon, and the latter is then raised by the simultaneous action thereon of a series of hydraulic lifts, until the ship is raised out of the water. The buoyancy of the pontoon or saucer is then restored, and it is floated off with the ship upon it to a shallow dock, for inspection and repairs.

Here again are the main requirements for insuring the safe and easy transfer of a vessel of any tonnage from the stocks to its native element. We trust, therefore, that the time may not be far distant when—by a judicious and timely outlay of money by the Government and our large shipbuilders—the transit of our ships from land to water may be effected without risk, and at an insignificant cost; and the public, which never fails to become the ultimate sufferer wherever risks are incurred, will be relieved from the recurrence of those seasons of anxiety which were notably created by the launch of the *Great Eastern* and H. M. S. the *Northumberland*.—*Newton's London Journal*.

New Patent Process in Wire Drawing.

The application of a new principle in the manufacturing process of wire drawing has just been made by a Birmingham firm—Messrs. Hibel and Colbourn, of the Long Acre Mills, Nethells—and its superiority certainly seems to claim for it a foremost place in the history of modern inventions. The improved process, which has been patented by Mr. John Hibel, consists of an entire alteration of the method of annealing. Under the old system annealing pots consisted of hollow cylinders of cast iron, closed at the bottom, and furnished with a lid or cover at the top, which was closed nearly air-tight during the annealing process. These pots were built in a furnace, and charged with the articles required to be annealed. When the pots were filled, the furnace was heated to the required degree, and allowed to cool, together with the pots. By this process, however, the surface of the wire became more or less covered with scales, which had to be removed by pickling before the wire could be drawn to the required thickness. By the new process the annealing pots are constructed of two hollow cylinders of cast iron, of different diameters, the smaller one being placed within the larger; a ring-like space is thus left between the two cylinders, which constitutes the chamber in which the articles to be annealed are placed. The bottom of this chamber is closed, and the top is also closed and made air-tight during the annealing process. When these pots are placed on the furnace, the flames not only encircle them, but come up through the hollow center, and the wire is thus more thoroughly and uniformly heated. They are made air-tight by a simple process, and when the wire is taken out is as smooth as possible; there is no scale about it, and therefore does not require pickling, as under the old system. The quality of the wire is also much improved; it is considerably more ductile, and a considerable saving is effected in weight, as the process of pickling reduces the wire considerably. Under the old system a No. 4 rod, before it could be drawn to No. 18, would require pickling six times, and annealing five times; under the new system the same rod requires pickling once, and annealing once. By the old process it would take eleven days to draw the wire to the required thickness; but by the new plan it is done in five days. It will therefore be seen at once that the saving of time, fuel, and vitriol (for pickling) must be very great, while the quality of the wire must be much improved.—*Ironmonger*.

A PATENT has been brought out by Messrs. Bond, Russell, and Fisher, of Newport and Tredegar, Monmouthshire, Eng., by which the refuse material from ironworks can be turned to profitable account in substituting it for emery. The inventors have found that slag possesses all the properties of emery, and by their process they make it even superior to emery for polishing steel, iron, brass, copper, and other metals.



ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING MAY 15, 1866.

Reported Officially for the Scientific American

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.

54,658.—Bed Bottom.—John Randolph Abbe, Providence, R. I. Antedated May 7, 1866:

I claim the springs, B, applied to the head and foot rails, a, a, of the bedstead in combination with the springs, B, rods, C, provided with knobs, d, and the slats, D, having concave surfaces to receive the knobs, all being arranged substantially as and for the purpose set forth.

54,659.—Corn Sheller.—Augustus Adams, Sandwich, Ill.:

I claim in combination with a series of feeding throats in the hopper of a corn-shelling machine, the use or employment of a rotating bar or shaft, M, provided with one or more suitable projections or angles, or a series of projections or angles corresponding with said series of feeding throats, arranged and operating substantially as herein specified and shown, and for the purposes set forth.

54,660.—Water Wheel.—I. J. W. Adams, Galestown, Md.:

I claim the arrangement of the penstock, E, scroll, C, frame, d, wheel, B, with its sides, a, a', and brackets, c, as described, shaft, A, crank, G, and box, H, operating in the manner and for the purpose herein specified.

54,661.—Harness Motion for Looms.—A. L. Anderson, Ware, Mass.:

First, I claim the combination of mechanism for moving loom harnesses consisting of the treadle, E, arm, G, pieces, a, a, wheel, H, levers, d, d, and cords or similar connections, e, e, when arranged and operating substantially in the manner herein set forth.

Second, Connecting the arm, G, both to the lathe, D, and to the harness operating devices as shown, so that it may actuate both simultaneously, substantially as herein described.

54,662.—Railway Car.—Edward H. Ashcroft, Lynn, Mass.:

I claim a safety car constructed with a water space, one or more showering pipes, and a fusible plug apparatus, arranged substantially in manner and so as to operate with respect to the car chamber, as specified.

And in combination with a car so made, I claim a heating apparatus and a circulation coil, or the equivalent or equivalents thereof applied to the water heating space, substantially as and for the purpose, and to operate as explained.

54,663.—Apparatus for Molding and Drying Peat.—Edward H. Ashcroft, Lynn, Mass.:

I claim the herein-described mode of preparing peat for fuel, namely, filling the molds, compacting the same, drying, and discharging at one operative, in the manner substantially as set forth.

54,664.—Skiving Machine.—William S. Atchley, Williamsburg, Ohio:

First, I claim the combination of the adjustable bed plate, A2, with the knife blade, B, when the two are arranged together so as to operate, substantially in the manner described and for the purposes specified.

Second, In combination with the above, the pressure roller, S, of the knife-carrying frame, K, arranged just in front of the knife blade, as and for the purpose specified.

Third, Hanging the roller, Y, in the bed plate, A, as and for the purpose described.

[This invention relates to certain new and useful improvements in machines, especially intended for the skiving of leather, although with slight additions it can be applied to the splitting of leather, whereby many important advantages are secured.]

54,665.—Applying Labels to Bottles.—James S. and Thomas B. Atterbury, Pittsburgh, Pa.:

We claim the bottle, having a label applied to a recess formed in it, and secured in such recess and covered by means of a soluble glass cement, as a new and improved article of manufacture.

54,666.—Axle Box Cover.—William S. Auchincloss, New York City:

I claim the arrangement of the square or polygonal-sided bolt, b, attached to the cover, B, and capable of manipulation by means of the bridge, C, substantially in the manner described and represented.

54,667.—Meat Chopper.—Daniel W. Baker, Harwich, Mass.:

I claim the combination of the bent arm, L, the post, D, or its equivalent, the knife and its slide rod, and the mechanism for imparting to the knife-rod its reciprocating movements, such mechanism being the lever, G, the connecting rods, I, K, and the gears on the shafts, the whole being substantially as specified.

I also claim the arrangement of the lever, R, its pawl, P, and spring, J, with the post, D, and lever, G, applied thereto, and to the knife shaft as described.

I also claim the combination and arrangement of the guard, O, with the bent arm, L, and the knife and its rod, as applied to such arm, and to operate in the tub, as specified.

I also claim the combination of the spring latch, M, or its equivalent, with the post, D, the bent arm and the knife combined together, and with machinery for operating the knife, as specified.

54,668.—Machine for Opening Tin Cans.—W. K. Baldwin, Chicago, Ill.:

First, I claim the arrangement and combination of the standard, B, clamp, P, and guides, V, when constructed and operated substantially as described.

Second, The combination of the parts, H, G and E, in combination with the bar, K, and lever, O, substantially as described, and for the purpose set forth.

54,669.—Cultivator.—Orlando Barr and Franklin F. Cox, Beloit, Wis.:

We claim the rod, B B, as shown in Fig. 1. The head blocks, "B B", sliding upon the said rod, B B, connected with the gear, b, b, and foot-lever and section pinion, D, the sliding rods, A A, attached to the beams, "A A", and the device and arrangement of the draft rods, g, g, and chains, e, e, when constructed substantially as and for the purpose herein set forth and described.

54,670.—Sewing Machine for Stitching Cord to the Edge of Fabrics.—Wm. B. Bartram, Norwalk, Conn.:

First, I claim, in combination with automatic mechanism capable of producing both a forward movement and a lateral reciprocation of the material to be stitched, a cloth-holding device, which par-

takes of the said lateral reciprocation, and between the upper and lower pairs of which the said material and cord pass in their forward movement, for the purpose described.

Second, in combination with the laterally reciprocating table, A, the clamp or holding device, B, substantially as and for the purpose set forth.

54,671.—Sewing Machine for Stitching Eyelet Holes.—W. B. Bartram, Norwalk, Conn.:

I claim the combination of the cylindrical guide, A, and a presser-foot, D, with a rectilinear forward feed movement, and a horizontally-reciprocating mechanism, to effect a lateral feed of the cloth, for the purpose set forth.

54,672.—Raking and Binding Attachments to Harvesters.—Joseph Barta, La Crosse, Wis.:

First, I claim the wheel, E, provided with pins, I, arranged in concentric circles, and the ratchet, F, connected with said wheel, and both placed loosely on shaft, D, in combination with the notched wheel, G, on shaft, D, the pawl, H, provided with lever, H', and the plate, I, all arranged substantially as shown and described, for the purpose of rotating the shaft, D, and consequently the raking and binding device intermittently, at longer or shorter intervals, as may be desired.

Second, The endless chain, S, arranged to operate first in one direction, and then in the other, in combination with the plate, P, having the rake-head, Q, attached, the levers, O, Q, plate, R, and the staple, X, all arranged substantially as shown, to give the reciprocating movement to the rake, and also the rising and falling movement, substantially as described.

Third, The adjustable frame, O, on which the plate, P, works, for the purpose of adjusting the rake in such a relative position with the cradle as to cause the sheaves to be bound centrally, whatever the height or length of the grain may be, substantially as set forth.

Fourth, The pawls, N, N', applied to the plate, P, and arranged so as to be operated therein, in and out of gear, with rack, O', through the medium of the bent lever, O', at the time of raising and lowering of the rake, substantially as described.

Fifth, The cradle, O', and bar, E', are arranged and combined as shown, so that the bar, as it is raised by the rotation of shaft, D, will raise the cradle with it, the cradle holding the gavel in position, and the bar, E, drawing the cord, R, around it, substantially as set forth.

Sixth, The twister, J, provided with jaws, W, W', one of which is furnished with a hollow square, A', in combination with the hook, B', and the clamps, V, V', all arranged to operate substantially as shown, for the purpose of tying the knot.

Seventh, The pivoted plate, L, operated from the shaft, D, and provided with slots, segment rack, etc., for the purpose of operating the hook, B', and twister, J, as set forth.

Eighth, The apron, L, operated by the lever or arm, P', cam, Q, on shaft, D, in combination with cradle, O', and bar, E', all arranged to operate in the manner substantially as, and for the purpose specified.

Ninth, The shears, M', placed on the bar, E', and operated from the shaft, D, to cut the cord, substantially as herein set forth.

[This invention relates to a new and improved raking and binding attachment for reapers, designed to be operated automatically throughout, from the driving wheel of the reaper, to which it may be applied. The object of the invention is to obtain a device for the purpose specified, which will be capable of being put in motion at longer or shorter intervals, as occasion may require, and be also capable of being adapted for binding long or short grain.]

54,673.—Saw Mill.—Marshall M. Bishop, Le Roy, N. Y.:

I claim adjusting the saw by means of the pivoted frame, D, racks, d, d', pulleys, E, and ratchet device, S, arranged to operate as herein described.

54,674.—Mosquito Canopy.—Marshall Bliss, Grinnell, Iowa:

I claim the combination of the frame, A, so connected to the wall of a room that it can be elevated or lowered as desired, with the cord, B, or its equivalent, and the netting or canopy, B, substantially as specified.

[This invention consists in a canopy or mosquito bar for enveloping the whole or a portion of a bed, so arranged that it can be brought into a position to surround the bed, or thrown entirely away from the same, at the will of the person lying in the bed, without the necessity of a change in the position of his body.]

54,675.—Cotton Bale Tie.—Jas. Booth, St. Louis, Mo.:

I claim an improved cotton bale tie, A, constructed with three hooks, at 12, 13, and combined with the ends, B and C, of the hoop, substantially in the manner described, and for the purpose set forth.

[This invention consists of a cast-iron bale tie, which is riveted fast to one end of the hoop, and which is provided with three hooks locking into notches in the other end of the hoop, the notches and hooks being so arranged that the strain of the hoop would be distributed among the three points of support, enabling the tie to withstand an immense pressure.]

54,676.—Paper Tin.—Edward H. Boswell, Philadelphia, Pa.:

I claim the arrangement of the calendar holders, A, elastic band, D, and pen-holding block E, in combination with a paper tin, of which one side is graduated, and the other raised, by projections, to act as a ruling guide, in the manner and for the purpose herein specified.

[This invention consists in certain improvements in the common paper tin, by which it is made to serve several purposes, in addition to its primitive use as a paper tin, viz: that of a letter clasp, a ruler, a ruler—by which to draw ink or pencil lines—a receptacle for pen-holders and pencils, and a calendar, for any of which purposes it can be used without injuring its qualities for any one particular purpose.]

54,677.—Stair Rod and Fastening.—Edward H. Boswell, Philadelphia, Pa.:

I claim the combination of the slotted rod, B, and the shouldered fastening, D, which, in one position, will admit the passage over it of the rod, retaining the latter by a partial revolution, substantially as described.

54,678.—Key.—Thomas S. Bowman, St. Louis, Mo.:

I claim the application to a key having a hole drilled in its shank or arbor, of a spring and stopper, substantially in the manner as and for the purpose herein set forth.

54,679.—Scoop, Sifter, Grater and Holder.—Frederick Bucknam, Portland, Me.:

I claim the combination with a scoop of the described form and kind of the roller, R, sieve, B, handle, H, having the grater and holder, G, made as specified, all constructed, arranged, and operated as set forth.

54,680.—Breech-loading Fire-arm.—John Burke, Courtland, Ill.:

First, I claim the combination of a telescopic joint in the barrel, with a hinged joint in the stock, when the barrel slides in the forward portion of the stock, substantially as and for the purpose set forth.

Second, The combination of the sliding barrel with the dovetailed bar and front portion of the hinge, substantially as and for the purpose set forth.

Third, The combination of the barrel with the front and rear portions of the hinge, substantially as and for the purposes set forth.

Fourth, The combination of the projection, r, on the front part of the hinge in the slot, h, with the rear part of the hinge, to hold the barrel at an angle, when loading, substantially as described.

Fifth, The combination of the catch lever, s, thumb bolt, n, and bar, i, substantially as and for the purpose set forth.

54,681.—Machine for Cutting Cloth.—Victor H. Buschmann, Baltimore, Md.:

I claim the endless belt-knife, constructed and applied, and operating substantially as described, and for the purpose set forth.

54,682.—Lock-up Safety Valve.—A. S. Cameron, New York City:

First, I claim the closed case, A, constructed substantially as herein

described, in combination with a single disk safety valve, o, and lever, substantially as and for the purpose set forth.

Second, The notched standard, c, rising from the bottom of the case, A, and arranged relatively to the internal screw, k, applied substantially as and for the purpose described.

Third, The counter lever, C, in combination with the slotted bar, u, provided with a shoulder, p, and with the main lever, d, of the safety valve, constructed and operating substantially as and for the purpose set forth.

Fourth, I further claim a cap applied to the valve port or discharge port of a lock-up safety valve apparatus, for the purpose and in the manner explained.

[This invention consists in the arrangement of a closed case or box, which can not be opened except by the person authorized to do so, in combination with a single disk safety valve, with a single or compound lever, in such a manner, that while the openings are free for the ingress and egress of steam, the valve is protected, and cannot be tampered with. It consists, also, in the arrangement of a slotted counter lever, in combination with the closed case and main lever of the safety valve, in such a manner that the attendant is enabled to blow off without supplying the means of adding to the load of the valve.]

54,683.—Car Coupling.—Miles H. Card, Fulton, Ill., and John W. Stewart, Lyon, Iowa:

First, We claim the combination and arrangement of the guards, C, links, B, and cams, D, with the draw head, A, substantially as and for the purposes specified.

Second, We claim, in combination with the links, B, and cams, D, provided with the shoulders, m, the employment of the pin or stop, c, arranged and operating substantially as specified and shown.

Third, We claim providing the cam with the projection, n, operating as set forth.

54,684.—Fishing Tackle.—W. D. Chapman, Theresa, N. Y.:

I claim the combination of the fixed wire hook, E, spring hook, F, and snood, G, when arranged together, and so as to operate substantially in the manner described, and for the purpose specified.

[This invention relates particularly to trolling fish-hooks, so called, although it can be applied to other hooks, and it consists in a novel manner of hanging a hook containing the fly, or other bait, to one or more hooks, whereby, when so desired, it can be easily detached therefrom, and a hook, adapted for another and different kind of bait, as for instance, for minnows, used.]

54,685.—Sprinkler.—W. F. Class (assignor to Nathan Page), Cleveland, Ohio:

First, I claim the plunger, C, and nozzle, B, in combination with the cylinder, A, valves, H, L, and perforated case, A', when arranged in the manner and for the purpose set forth.

Second, The lips, I, wings, n, and plunger, B, in combination with the valves, H, L, m, pipe, F, and nozzle, C, when arranged in the manner and for the purpose described.

54,686.—Apparatus for Expelling Air from Cans.—Daniel Clavidge, Indianapolis, Indiana:

I claim an apparatus for expelling the air from cans by pressure upon their sides, arranged substantially as set forth.

54,687.—Machinery for Forging Screws.—John Cochran, Township of Wall, N. J.:

First, The method of forming screw-threads upon metal bolts by means of forging dies of proper shape, in combination with a guide screw and rotating wheel, all constructed and arranged substantially as described.

Second, The combination of the tons and guide screw with the forging dies and templates, constructed and operating substantially as described.

Third, The combination of the clevis with the sliding rods or templates, so as to sustain and move with the bolt or blank, while it is under the action of screw-forming dies, constructed and operating substantially as described.

Fourth, Controlling the space between dies, operating as described, as the operation progresses, by means of sliding templates, or their equivalent, so as to forge screws of uniform diameter or taper, or gimlet pointed, substantially as described.

Fifth, The combination of the sliding templates with the guide screw, by means of the slide rods and yoke, so as to be operated by it with an equal and simultaneous retractive movement, constructed and arranged substantially as described.

Sixth, The combination with screw-forming machinery, of the open bearing, r, clevis, in front of the dies, and the open-screwed bearing in the pedestal for the guide screw, so that a blank or bolt, and the detachable apparatus, y, which it is held and rotated, can be safely and expeditiously placed in, or removed from, the machine while in motion, and without interruption to the speed, substantially as described.

Seventh, The straight-threaded forging dies, in combination with the jumper, c, and anvil block, J, constructed and operating in the manner and for the purpose, substantially as described.

Eighth, The combination, in a screw-forming machine of a screw-forming die that has a positive and definite reciprocating movement, and a screw-forming die that has a positive movement to or from the other, as required in the production of screws of varying diameter, when such movement of the latter die is caused and controlled by means of sliding templates, or their equivalent, substantially as described.

Ninth, The method of forming or raking screws upon metal bolts, by operating upon and completing them from the neck or shank toward the point, by the means and in the manner, substantially as described.

54,688.—Device for Operating Ships' Windlasses.—Geo. Coffin, Boston, Mass.:

First, I claim the combination and arrangement of the windlass and its chain drums, operated by the toggle jointed levers, substantially as described.

Second, Regulating and checking the veerings of the cable by means of a lever, working in the top of the chain pipes, as in the manner described.

Third, The arrangement and construction, substantially as described, of the chain drums and brakes, by which they can be made to turn with, or be disengaged from the windlass.

54,689.—Ratchet Attachment for Harvesters.—William Cogswell, Ottawa, Ill.:

I claim the combination with the pinion A, and shaft, B, of the adjustable pawls, C, C', and ratchet, B2, substantially as described, to operate in the manner and for the purpose set forth.

I further claim the combination with the pawls, C, C', and ratchet, B2, of the screw bolts, E, E', and nuts, E, E3, as and for the purpose described.

54,690.—Neck Yoke.—A. C. Cooke, Ohio, Ill.:

First, I claim the combination with a neck yoke of friction spools, C, substantially as and for the purpose specified.

Second, The manner of connecting the friction spool, C, to the bar, A, as shown and described.

[This invention consists in the employment, in combination with a neck yoke, of friction spools, fitted to slide upon the breast straps of the horses, in such manner that the jerking of the pole, when the vehicle is passing over uneven ground, will not affect the horses or wear out the breast strap in so great a degree as occurs in the usual mode of attachment.]

54,691.—Shoemaker's Jack.—Lewis L. Coon, Nunica, Mich.:

First, I claim the combination of the working shaft, C, and the standards, H, H', H'', revolving at right angles to it, substantially in the manner and for the purpose set forth.

Second, So arranging the standard, H, by means of a bevelled base and eccentrically placed screw that by using the nut, K, the last will be held firmly in place, substantially in the manner set forth.

Third, The combination of spring, D, sliding cone, E, and detents, F, F' for the purpose of fixing the position of the shaft, C, substantially as set forth.

54,692.—Machine for Cutting Pegs out of Boots and Shoes.—Thomas Corey, Marlboro', Mass. Antedated Nov. 15, 1865:

First, I claim the arrangement in a machine for removing pegs from the inside of boots and shoes of cutters in combination with

suitable mechanism for imparting rotary movement thereto, substantially as shown and described.

Second, In combination with cutters and machinery for imparting rotary movement thereto, I claim the frame provided with vertical and oblique arms or horns, substantially as and for the purpose set forth.

Third, So constructing the arms or horns of the frame, as to inclose and surround the cutters and mechanism in rotating the same, leaving only the cutting edges of the former to project, as shown and described.

Fourth, The arrangement of the rotary cutters in relation to their respective driving machinery and horns or arms so that they shall revolve on vertical axes, substantially as set forth.

54,693.—Gang Plow.—Thomas J. Cornell, Decatur, Ill.:

First, The combination of the lever, M, and bent arm, O, for raising the beams from beneath at a point in the rear of their forward point of attachment, so as to be vibrated upon the said lifting device, by a weight applied to the forward end, substantially as described.

Second, The combination of the link, H, attached to the forward end of the beams and to the carriage, and operating substantially as described.

Third, The combination of the beam and the curved arm, or its equivalent, which in its backward motion operates to keep the beam down under the circumstances described.

Fourth, The mode of attaching the tongue to the carriage consisting of the laterally sliding socket and the guides, arranged and operating as described.

Fifth, The combination of the links, H, and standards, G, whose holes admit of the vertical adjustment of the links therein.

Sixth, The arrangement of the foot lever, R, the links, H, and beams, A, operating as described.

[This invention consists in devices for raising the fore and hind ends of beams for regulating their action and position, and in the mode of attaching the beams to the carriage, and in the mode of attaching the tongue.]

54,694.—Pipe Tongs.—Richard Cox, Philadelphia, Pa.:

I claim the jaw, c, serrated and shaped as described, swivelling upon the screwed handle, A, in the manner and for the purpose specified.

54,695.—Folding Hair Brush.—Charles Crosman, Tompkinsville, N. Y.:

I claim a hair brush, the handle of which may be folded over upon the brush head, the said handle being hinged or pivoted and having suitable catches for holding the two parts in an extended position, substantially as described.

[This invention consists in hinging or jointing the handle of a brush to the brush head in such a manner that the handle may be thrown back upon the said head piece, and thus be folded into a small compass when not needed for use.]

54,696.—Fruit Gatherer.—John A. Daum, Canton, Ohio:

I claim the adjustable bar, D, with set screw, F, screwed to the frame, A, when used as and for the purposes herein set forth.

The frame, A, receiver, E, pipe, H, wheels, B, B' secured by lever, c, c', and bar, D, arranged and used substantially as and for the purpose herein set forth.

54,697.—Ore Separator or Jigging Machine.—Thomas Davey, Houghton, Mich.:

I claim the combination of a double acting plunger pump with two sieves of a jigging machine so that each motion of the plunger shall force water through one or the other of the said sieves, substantially in the manner and for the purposes set forth.

Arranging the jigging sieves of an ore washer and separator, one above the other, substantially as and for the purpose described.

In combination with the sieve of a jigging machine, I claim the receiving hopper, B, provided with the perforated bottom, c, as and for the purpose set forth.

In combination with the sieves of a jigging machine, I claim the ore discharging chamber, L, provided with a gate or gates, as described.

In combination with the sieve and pump of a jigging machine, the partition, a, as and for the purposes set forth.

The adjustable pressure board, I, in combination with the pump and sieve of a jigging machine.

In combination with the sieves, D and J, of a jigging machine the passage, H, and shoot board, I, substantially as and for the purpose set forth.

54,698.—Sextant.—George Davidson, Philadelphia, Pa.:

I claim the combination of the spirit level, cross-wire reflector and double convex lens, or their equivalents, with the sextant, quadrant, octant, reflecting circle, or their equivalents, substantially as above described.

54,699.—Spinning Mules.—William C. Davol, Fall River, Mass.:

I claim the escape wheel or plate, p', on the clutch, P, constructed and operated substantially as described for the purpose of engaging and disengaging the clutch, P, at stated intervals, in combination with the fixed stud with the escape plate, W, and helper spring, 2, as above set forth.

Second, I also claim the fixed latch or stud, t, in combination with the escapements of the escape wheel, p', substantially as described for the purpose of moving and holding the escape plate, P, out of gear at intervals.

Third, I also claim the combination of the escape wheel, p' and the clutch box, P, with the stop finger, 14, and stop plate, 15, for turning the cam shaft, E, at intervals, substantially as described.

Fourth, I also claim the combination of the escape wheel, p', and the clutch box, P, with the escape plate, W, escape lever, y, and helper spring 2, substantially as described.

Fifth, I also claim in combination with the escape plate, W, the helper spring, 2, the escape lever, y, the stop finger, 14, the stop plate 15, and the catch or clutch box, P, with its escapement, p', arranged substantially as above shown.

[This invention consists in an improved mode of turning and operating the cam shaft of the mule. This is accomplished in a positive manner by a new combination in the arrangement of geared wheels and clutch box, and escape plate, with a fixed latch or stop for moving the clutch box out of and into gear at intervals, all of which operate in combination with another escape plate and escape lever with a helper spring for putting the clutch box into and out of gear. These operate together for turning the cam shaft one quarter of a revolution at intervals, in order to change the different parts of the mule in and out of gear.]

54,700.—Harness Snap.—George W. Devine, Ottumwa, Iowa:

I claim the within described snap as an article of manufacture, said snap made of wire with a loop at one end, and hooks at the other, the two parts of the wire being twisted together or around each other, between the loop and the hook, for the purpose of making a firmer loop, and for binding the hooks together more securely, and thus throwing the tension upon both parts of the wire in whatever line the strain may be directed, substantially as herein specified.

54,701.—Plug for Washing Machine.—Ellis Doty, Janesville, Wis.:

I claim the inside plug valve for closing the discharge opening of the tub or chest actuated by a spring or lever and maintained in open position by the engagement of a shoulder or pin with the edge or outer portion of the chest, substantially as described.

[This improvement consists in a long pointed plug, held in place by a coil spring. It closes an orifice in the bottom of the tub through which the water is discharged.]

54,702.—Manufacture of Guard Finger for Harvesters.—Rufus Dutton, New York City:

I claim forming a guard finger of one uniform metal, as steel cutting, sawing or milling a slot therein, and tempering such slot on its under surface or edges, substantially as and for the purpose set forth.

Forging a solid guard finger, cutting the slot therein and tempering such slot on its under surface or edges, substantially as and for the purpose set forth.

Forging the guard finger from a single piece of metal without a weld and cutting a slot for the knife to work through, substantially as and for the purposes set forth.

are situated on the outside of the building and each of which communicates with a distinct series of pipes in such a manner that in case of fire in the building, a hose can be readily attached to the proper nipple, and the floor on which the fire originated can be flooded with water, and the fire extinguished before it is allowed to make much headway.]

54,749.—Tenoning Machine.—Lawrence Mason, Turin, N. Y.:

I claim the arrangement of the vertically moving frame, B* B*, adjustable bars, D* D*, and springs, E* E*, saws, F* F*, cutters, G* G*, engaged by means of the tappets, I* I*, and arms, N*, operating substantially as described and represented.

54,750.—Machine for Boring Wagon Hubs.—Lawrence Mason, Turin, N. Y.:

First, I claim the arrangement in the hub-boring machine of the adjustable cutter mandrel, B, with its plate, S, and set screw, T, and the clamping and entering plates, D D', with their triangular openings, F F', constructed and operated as described.

Second, I claim the combination and arrangement of the frame, M, arbor, K, slotted dog, N, arm, P, collar, Q, disk, R, shafts, B, and adjustable plates, D D', substantially as and for the purpose described.

54,751.—Cultivator.—William McCormick, Muscatine, Iowa:

First I claim the cast iron standards, Z, provided at their upper ends with lips, I, to fit over the upper and lower edges of the plow beams, I, in order to avoid the use of the braces to retain the standards in position, substantially as set forth.

Second, The arrangement of the plow beams, I, as shown, to wit, the rear ends being provided with rods, J, to fit into staples or guides, K, at the lower parts of uprights, G, at the rear of the frame A, and their front ends connected by chains, R, to uprights, G, which are attached by universal joints, g, to the front part of the frame, A, the uprights, G, passing down between rollers, M, and the front bent parts, a*, of one of the clevis, L, of each beam, substantially as and for the purpose specified.

Third, The attaching of the doubletree, Q, to the front end of the beams, I, when said beams are connected to the bar, I*, through the medium of the uprights, O, in said beams, in the manner substantially as set forth.

Fourth, The arrangement of the treadles, T T, with the beams, I I, and lever, W, substantially as and for the purpose specified.

54,752.—Brick Machine.—A. R. McNair, New York City:

First, I claim feeding the molds to a brick machine in a pile from the front side, substantially as specified.

Second, The eccentric wheels, K and L L, in combination with shaft, D, levers and linkages, O, presser, I, sliding boards, E and F, as described, constructed, and arranged, substantially as and for the purpose set forth.

54,753.—Axle Box.—Joseph Montgomery, Harrisburg, Penn.:

First, I claim the journal box, C, arranged and constructed, substantially as described and for the purpose set forth.

Second, The lid, A, hinged low and secured by handle, B, and jamming cam, b, constructed and operating substantially as described and for the purpose set forth.

Third, The loose or hinged rack frame, C', inside of box, constructed and operating, substantially as described and for the purpose set forth.

54,754.—Portable Fence.—E. D. Montrose, Nashua, Iowa:

I claim a portable fence constructed of two or more parallel chains, A A, composed of links, a, bent in the form and around the pickets, B, in the manner substantially as herein set forth.

54,755.—Carriage Seat.—F. B. Morse, Milwaukee, Wis.: I claim the lever, fastenings, G, when used in combination with the seat rail posts, F, for the purpose specified and arranged, and operating substantially as described.

[The object of this invention is to so attach the lazy-back and buggy tops to the seats of carriages, that when desired they can be readily and easily detached therefrom or secured thereon, and thus either one or the other used at pleasure, the mode of attachment being simple, light, but strong, and costing but little to manufacture.]

54,756.—Plow.—John Mott, Danville, California:

I claim First, As a new invention, the use of a double plow revolving upon a horizontal axis, L, the two plows being placed one over the other in an inverted position, substantially as described and for the purpose set forth.

Second, I claim the clamps, M and N, for hinging the main rod, L, to the standards, C and I, and the adjustment with washers (or their equivalents) of the clamps, N, for turning the plow more or less to land, substantially as described.

Third, I claim the set screws, s, placed in the upper end of the standard of the plows for steadying them and keeping off the land side from the standard, J', substantially as described.

54,757.—Superheating Apparatus.—Isaac Newton, New York City:

I claim, First, The arrangement of a superheating apparatus composed of a system of tubes and a circulating chamber within an enlarged casing or box, N O P Q, in relation to the outlet of the boiler and the base of the chimney, substantially as and for the purpose specified.

Second, Bracing the circulating chambers, A B C D, by securing one or more of the inner tubes to their corresponding outer ones at their ends, H F, and their reverse ends, respectively, to the side, C D, and dividing plate, I K, of the circulating chamber, substantially as described.

Third, The arrangement of the superheating tubes within the casing, N O P Q, in relation to the circulating chamber and to a door, A B', in the said casing, substantially as herein specified, to provide for the removal and replacement of any of the said tubes.

54,758.—Machine for Making Eaves Troughs.—O. W. Noble, Darlington, Wis.:

I claim, First, The slide, E, in combination with the roller, B, arranged and operating substantially as specified.

Second, The forming board, F, in combination with the treadle, G, and roller, B, substantially as and for the purpose specified.

Third, The combination and arrangement of the roller, provided with a permanent rib, D, and slide, E, with the forming board, F, and treadle, G, substantially as specified.

[This invention relates to a machine for forming sheet metal eaves troughs whereon the roller is provided with a slide used to a permanent rib therein for clamping the sheet of metal while being formed, which is used in combination with a forming board operated by a treadle, all being suitably arranged so that the operator can put in the sheets of metal, operate the machine and remove the formed trough without a change of position.]

54,759.—Pentagraphic Machine.—Edmund Oldham, Brooklyn, N. Y.:

I claim in pentagraphic machines the use of an eye glass with a speck or dot on its surface for the purpose of tracing outlines of plane or other surfaces, substantially as above set forth.

Second, I also claim the means above described for giving independent movements to the diamond pointer, to wit: the bar, E, the fusee pinion, F, and its shaft, G, and the toothed wheel, H, on which the carriage H, runs substantially as above set forth.

Third, I also claim the ruling devices, I S T, constructed and operated substantially as set forth.

54,760.—Chuck.—L. H. Olmsted, Stamford, Conn.:

I claim making a chuck, substantially as shown and described.

54,761.—Egg Beater.—S. B. Pangborn and G. H. Griffin, Boston, Mass.:

We claim the improved egg beater, as composed of the vessel or pot, A, the shaft, v, and its winch or casters, g g g, and the arms or projections, e, and the weight, f, fixed to such arm the whole being arranged in manner and as to operate substantially as and for the purposes as hereinbefore specified.

We also claim the combination of the centrifugal guard, h, with the vessel, A, with its cover, and with the shaft, its bearers and the arm and weight applied to such vessel, they being substantially as specified.

54,762.—Chair.—V. P. Parkhurst, Templeton, Mass.:

I claim the combination of the plate, E, pivots, a, ferrules, F, caps, G, and pins, g, arranged relatively with the back, D, and posts, C, of the chair, A, and operating in the manner and for the purpose herein specified.

[This invention consists in so attaching or hanging the backs of chairs and other similar seats to the posts that they will adjust themselves to the person sitting in the chair, supporting both the shoulders and lower part of the back, whatever position the sitter may assume; and, also, in so hanging the said back that when the person rises from the chair, the back will resume its original or vertical position between its posts or supports, without the aid of springs or any other additional devices.]

54,763.—Cultivator.—Edward Parmele and R. N. Patterson, Davenport, Iowa:

First, We claim applying shovel standards to a carriage in such manner that they are allowed to rise or fall bodily or independently of each other and also of being moved laterally together by the feet of the attendant, substantially as described.

Second, The slotted shovel standards, D D, in combination with the treadles, r r, and the driver's seat, substantially as described.

Third, Connecting the standards, D D, to the roller, e, in such manner that their lower ends can be swung forward and upward in combination with contrivances for allowing said shovel standards to be adjusted laterally, and also moved up and down in a direction with their length, substantially as described.

Fourth, So constructing the two treadles, r r, that each one serves as a lever, and also as a means by which both standards can be moved simultaneously to the right or to the left, substantially as described.

54,764.—Clothes Wringer.—James N. Pease, Panama, N. Y.:

I claim the improved method of gearing wringer rolls by doubling or multiplying the toothed wheels in the manner hereinbefore described, that is to say, by the employment upon each of the shafts geared together of two or more sets of teeth of like number, configuration or construction, each set being situated in different planes but in such a fixed relation in respect to the other set or sets, that the spaces between the teeth of either set shall be equally divided by the teeth of the other.

54,765.—Broom Head.—Daniel Peters, Eaton, Ohio:

I claim the tube, E, which forms a guide and socket for the bolt, D, in its described combination with and relation to the said bolt, the wrapper, B, the handle, A, and bars, F F.

54,766.—Water Closet.—Oliver S. Pettit, Brooklyn, N. Y.:

I claim the combination of the valve, H, rod, I, and lever, J, with the discharge pipe, G, and cover, B, of a water closet, substantially as described and for the purpose set forth.

[This invention has for its object to so improve the construction of water closets, that the unpleasant effluvia may not ascend through the discharge pipe and be disseminated through the building; and it consists in combining with the discharge pipe and with the seat or cover of the pan, a valve, opening automatically to permit the escape of the contents of the pan, and closing when the pressure upon the cover is removed.]

54,767.—Ladder.—Barton Pickering, Dayton, Ohio:

I claim the platform, C, provided with catches, u, the rollers o, and bent rod, P, in combination with the ladder, A B, having projections on the part, A, substantially as described and for the purpose set forth.

54,768.—Safety Valve.—Alexander Pollock, New York City:

First, I claim the valve chest, C, and its two valve seats, e f, the double puppet valve, E F, and the outlet, D, arranged in relation with each other and with the steam box, A, communicating with the steam space of the boiler, substantially as and for the purpose herein specified.

Second, The arrangement of the safety valve, the weight, H, or its equivalent, and the lever, J, through which the weight or spring acts upon the valve all within a steam box A, which is always in communication with the boiler, substantially as herein described.

Third, The tripping lever, M, outside of the steam box A, and the rod, L, applied in combination with loaded rod, I, connected with the valve lever, J, within the steam box, A, substantially as herein described, whereby the lifting or tripping of the inclosed valve for blowing off steam is provided for, without permitting the load on the said valve to be increased, or the said valve to be secured in a closed condition.

Fourth, The arrangement of the valve chest, C, attached to steam box, A, by the removable plate, D', whereby the removal of the pin, n, the valves and valve chest lever, J, may be removed from the steam box A with the said plate, D.

Fifth, The bar, Q, staple or staples, R, pin or pins, t, and seal or seals, j, applied as arranged in relation with each other and with the steam box, A, and door, P, substantially as and for the purpose herein set forth.

Sixth, The double puppet valve provided between its heads with a chamber, g, which is open to the steam space in which the valve chest is situated, substantially as and for the purpose herein specified.

54,769.—Churn Dasher.—G. H. Poole, New York City:

First, I claim the dasher, B, constructed substantially as described and for the purpose set forth.

Second, The combination with the dasher of the disk or fan, D, substantially as described and for the purpose set forth.

Third, The combination of the double cover, E F, constructed as described with the dasher and with the churn, substantially as and for the purpose set forth.

Fourth, The combination of the crank wheel, I, arm, H, and guides, N, with each other, with the dasher B, cover, G E F, and frame, J, substantially as described and for the purpose set forth.

[The object of this invention is to furnish a churn by means of which the globules in the cream which contain the butter may be gradually and quietly broken in contact with the air, thereby improving the quality and increasing the quantity of the butter produced. And it consists, principally, in the novel construction of the dasher, which is made by attaching three or more whorls of radial arms to the lower part of the dasher shaft. To the upper and under sides of each of these arms is attached half-cone shaped cups or scoops, which, as the dasher rises, carry up and project through the air quantities of the cream, and as the dasher descends, carry down with them air to be distributed through the cream.]

54,770.—Railroad Switch.—Thomas B. Purves, Green Bush, N. Y.:

I claim the construction of a portable switch, for the purpose of placing cars upon a railroad track by the combination of the bar, a b, secured as described to the rail, with a movable limb, c f g, formed as shown and hinged or pivoted to it over the center of the rail, substantially as described and for the purpose set forth in this specification.

54,771.—Purifying Bone Black.—Thomas H. Quick, New York City:

First, I claim the flue, G, for receiving the descending currents of animal coal or bone black, constructed substantially as and for the purpose above described, with the aspirator, B, and shaft, C, in combination with the feed pipe, A.

Second, I claim the combination of the flue, G, with a Hancock steam blower, arranged substantially as and for the purpose above described.

54,772.—Portable Fence.—Jacob Reedy, Toledo, Iowa:

I claim constructing the posts, A, with a double riveted mortise and the boards, B, with corresponding notches in their lower sides, the fence being secured by such notches and by keys driven above the boards, substantially in the manner set forth.

54,773.—Ladies' Paper Undersleeves.—Helen M. Remington, Springfield, Mass.:

First, I claim as a new article of manufacture, a paper undersleeve, substantially as described.

Second, I claim the material composed of two thicknesses of paper with an oily substance to render it water proof and a suitable pre-

paration to prevent this oil from striking through to the outside, substantially as described.

54,774.—Mode of Attaching Circular Saws to their Arbors.—Albert L. Rice, Worcester, Mass.:

First, I claim the improved mode of attaching and adjusting circular saws to their arbors by the combination with the stationary and movable rods and collars as herein described, of a conical bush, sliding on the saw arbor, and fitting in the recess formed in the movable collar under such an arrangement that the saw may be simultaneously adjusted, and secured on its arbor, as shown and set forth.

Second, In combination with the stationary and movable collar and conical bush fitting in a recess in the movable collar as described, I claim the employment of a rubber or other elastic packing or washer, as and for the purpose herein set forth.

54,775.—Axle Box.—William F. Rippon, Providence, R. I.:

I claim the independent oil reservoir, A, provided with a filter, e, as described in combination with the journal bearing, D, substantially as described.

54,776.—Egg Beater.—Alexander M. Robinson, Boston, Mass.:

I claim the funnel-shaped ends in combination with the ribs soldered to the sides of the case.

54,777.—Head Block for Saw Mills.—George W. Rodebaugh, Toledo, Ohio:

First, I claim setting the log to the saw at either end or at both, simultaneously, by means of the independent shafts, E E, when operated by compound cog wheel, I, and a justable pinions, K K, substantially in the manner and for the purposes herein specified.

Second, I claim the construction of the dog, consisting of the bit, a, attached to a shank, u, which fits and slides with a vertical groove of the knee, substantially as described and represented.

Third, I claim operating the pivot dog, a', by means of the lever, b, and pins, e, e, as and for the purposes set forth.

54,778.—Extension Fruit Ladder.—Artemas Rogers, Painesville, Ohio:

I claim the lever, I, brace, D, in combination with the ladder, A, and B, lugs, C', arranged and operated in the manner and for the purpose set forth.

54,779.—Bed Bottom.—Jonas Rouse, Dowagiac, Mich.:

I claim the combination of the slats, C', and secondary slat, D, arranged to operate substantially as specified.

[This invention consists in the combination, with the slats of a bedstead of a secondary slat, in such manner that the secondary slat acts as a spring, giving to the slats proper the desired springing motion, whereby a cheap and easy spring bed bottom is obtained.]

54,780.—Steam Generator.—Stephen P. Ruggles, Boston, Mass.:

I claim combining with an open boiler or reservoir of water, a steam generator within said boiler, and at or near the bottom of the column of water therein, substantially as and for the purpose herein described.

54,781.—Washing Machine.—William H. Sargent, Weymouth, Mass.:

I claim the combination and arrangement of the stationary rubber, f, the friction rollers, e e, and their carrying frame, A, being constructed with its two opposite sides, b b, inclined toward the handle, and made with openings through its ends to enable the water and saponaceous matter to flow freely through them into and out of the case while the machine may be in use.

54,782.—Attaching Props to Carriage Bows.—Leonard Sawyer, South Amesbury, Mass.:

I claim the plate, B, provided with the square tubular projection, C, and the prop or arm, D, provided with a screw to fit into an internal screw thread in the projection, c, in combination with the collar, F, having a square interior and fitted on a square portion on the prop or arm, and on the projection, c, substantially as and for the purpose specified.

54,783.—Device for Shooting Gravel at Cows upon Railroad Tracks.—Stephen Scolton, Richmond, Ind.:

I claim the construction and operation of the valve, c, in combination with the hopper, A, and tube, B, or their equivalents, for the purpose described.

54,784.—Harvester.—Jacob Seibel, Manlius, Ill. Antedated May 1, 1886:

First, I claim the arrangement of the jointed shaft, H, with the two shafts, J N, with their attachments, operating substantially as and for the purposes herein specified and shown.

Second, I claim suspending the platform upon the main frame by means of the bar, K, and the bent support, W, attached to the platform, all being arranged and operating as and for the purposes specified and shown.

54,785.—Hoop Skirt.—Permella E. Sheffield, Pontiac, Mich.:

I claim hoop skirts of steel wire, having an apron, A, extending down the front of the skirt covering the wires substantially as and for the purpose set forth.

54,786.—Ribbed Metallic Bar.—John Y. Smith, Alexandria, Va., assignor to himself and Herman Haupt, Philadelphia, Pa.:

I claim the manufacture of the metallic trip-ribbed bar, in the manner and by the means substantially as herein described.

54,787.—Mail Pouch or Box.—Marshall Smith, St. Louis, Mo.:

First, I claim the combination of the box, C D, with the toothed ways, e f, and sliding follower or compressor, A, or corrugated ways, h, and followers or compressor, B, or their equivalent devices, when employed as and for the purpose set forth.

Second, I claim attaching the reversible label, M, to the box, C, substantially as described.

Third, I claim interposing a rubber or any other suitable packing, x, between the different parts of wooden boxes, so as to make them waer-tight, for the conveyance of mails.

Fourth, I claim a box fitted with internal partitions and followers, arranged to separate parcels of mail matter, while being conveyed in the same box, the whole used as a package for inclosing mails for and in transportation, substantially as set forth.

54,788.—Flour Sifter.—Edward Spencer, Philadelphia, Pa.:

I claim the employment of the balls, E, in combination with the rotary cylindrical sieve, A B, suspended in a suitable case, C D, the whole being constructed and arranged together, so as to operate substantially as and for the purpose described.

54,789.—Harvester Rake.—Ara D. Sprague and Asbury Dockum, Caledonia, Minn.:

First, We claim the combination and arrangement of the elevated rake head, G F, and arm, H, with the sheave, J, constructed and operating substantially as and for the purposes herein delineated and shown.

Second, We claim in combination with a slotted rake head, F G, the employment of the slotted arc fingers, L, arranged and operating as and for the purposes set forth and shown.

Third, We claim the adjustable teeth, e, when constructed, arranged and operating as and for the purposes shown and described.

54,790.—Combined Harrow and Roller.—John Steiner and John P. Miller, Harrisburgh, Ohio:

First, We claim the drag bar, A, constructed and arranged with reference to the harrow, B, substantially as described and for the purposes specified.

Second, The combination of the harrow, B, drag bar, A, the wheel's D D E E and the roller, C, in the manner substantially as described, and for the purposes specified.

54,791.—Sorghum Stripper.—A. P. Stephenson, Equality, Ill.:

I claim a tool constructed substantially as described, for topping, stripping, and cutting sorghum, and other canes.

54,792.—Water Wheel.—Christopher C. Stillman, West-erly, R. I.:

First, For each of every one of the pitches of a turbine wheel with a separate gate operated substantially as and for the purposes herein specified.

Second, A combination with a series of gates applied one to each of the pitches of a turbine water wheel, I claim a cam so applied.

open and close the said gates in pairs, successively, all around the wheel one on each side of the center thereof, substantially as herein described.

Third, I claim the combination of the annular grooved cam, E, the circular actuating guide frame, B, and the arms of the gates, substantially as and for the purpose herein set forth.

Fourth, I claim the springs, I, applied in combination with the gates and their stems, substantially as and for the purpose herein described.

54,793.—Weather Strip for Doors.—A. E. Strobel, New York City.

I claim the plate, D, attached to the door and operating as a weather strip by projecting into and receding from the groove, C, with the movement of the door, in the act of opening or closing the door, in combination with the said plate, B, which is attached to the plate within the groove, substantially in the manner and for the purpose herein described.

54,794.—Portable Fence.—John Thompson, Williamsburgh, N. Y.

I claim the several rollers, B, and rails, C, D, E, in combination with the said rollers, G, and hooks, H, so arranged that the fence will be extended or retracted by means of the handle, I, and the posts will be retained in position, substantially in the manner herein represented and described.

54,795.—Hot-Air Furnace.—Thomas Wallace, Chicago, Ill.

I claim the arrangement of the zig-zag pipe, A, and the lateral plates or partitions, B, in a furnace, in such a manner that the heat from the fire in the furnace shall be made to follow the pipe, substantially as and for the purpose set forth.

54,796.—Gate.—H. M. Ward, Stone Church, N. Y.

I claim the self-actuating gate made up of the socket, D, and bearing, E, connected by the rods, G, and the guides, J, with two or more friction rollers, H, when used in combination with the gate, A, in such a manner as to cause it when closed to swing back and then swing it around automatically, substantially as set forth.

54,797.—Cherry-toner.—William Weaver, Phoenixville, Pa.

First, I claim the disk, A, having ribs on both sides, in combination with a double or with two hopper arranged at opposite sides of the disk, substantially as and for the purpose described.

Second, I claim the combination with the disk, A, of one or more inclined channels, B, for the purpose set forth.

Third, I claim the combination with the disk, A, of one or more hoppers with a revolving disk having blunt-edged projections or ribs, C, on one side and sharpened ribs, C', on the other, for the purpose set forth.

54,798.—Boiler Feeder.—W. S. Wells and S. B. Wells, Middlebury, N. Y.

We claim the combination with a steam boiler of an auxiliary steam and water chamber, provided with a float-valve connected with the valve through which steam is supplied to the feed pump, as to cause the starting up and stopping of the said pump, when the several parts are arranged as herein described.

54,799.—Fan and Parasol.—William H. White, West River, Md.

First, As a new article of manufacture, a fan sun shade, or canopy, composed of a hoop frame and wrapper, when the latter is provided with draw cases, and draw springs, and constructed and applied in the manner hereinbefore set forth.

Second, I claim, as a new article of manufacture, a combination fan and sun shade, constructed and operating substantially in the manner set forth.

54,800.—Corn Plow.—Daniel Wilde, Washington, Iowa.

First, I claim adjusting the shovel-ticks and shovels, by means of the slots, q, and bars, r, as and for the purposes herein recited.

Second, I claim a combination with the shackle bar, t, between the handles and connected thereto, the slotted or spaced plates, f, at the ends of the beams, m, affixed to the front bar, u, substantially as described, as and for the purposes herein set forth.

Third, I claim connecting the feeder to the plow frame, by means of the hinged straps, x, and bar, z, and pin y, as described.

54,801.—Propeller.—Aretus A. Wilder and William Gooding, Detroit, Mich.

I claim the combination of said double flanged buckets with paddles, crank shaft and rod arms, constructed substantially as shown and described, and for the purpose set forth.

54,802.—Whitewashing Apparatus.—Moses H. Wiley, Bucksport, Me.

I claim as my invention the said apparatus or combination of the reservoir, A, the rollers, b and d, and the towel, e, arranged substantially in the manner and so as to operate as and for the purpose or objects hereinbefore specified.

54,803.—Buckle.—Joseph J. Wilkins, Virdey, Ill.

First, I claim the buckle constructed and operating substantially as shown and described.

Second, I claim providing the buckle tongue with the cam, n, for the purpose of rendering it self-operating, as set forth.

54,804.—Adjustable Sandal.—Jane Maria Wilkinson, Urbana, Ill.

First, The plate, B, in combination with the heel, A, of the sandal, substantially as and for the purpose set forth.

Second, An adjusting device by which a sandal may be adapted to different sizes of shoes, substantially as and for the purpose set forth.

Third, The shoe, D, with the opening, E, in combination with the adjustable heel, A, and plate, B, substantially as and for the purposes set forth.

54,805.—Floor Clamp.—Seth C. and Samuel Winslow, Worcester, Mass.

We claim the combination of the dogs, G, G', with the floor clamps, substantially as and for the purpose herein specified.

54,806.—Billiard Register.—A. Wirsching and William Zoehe, Williamsburgh, N. Y.

First, We claim the use in a billiard indicator, of concave keys or buttons, C, C', substantially as herein described, so that the points of the cues are not liable to slip thereon, when the players wish to force the same in.

Second, The keys, C, C', in combination with rockers, m, levers, h, and stop pins, i, substantially as and for the purposes set forth.

Third, The keys, C, C', in combination with elbow levers, q, q', r', racks, w, w', and index hands, a, a', constructed and operating substantially as and for the purpose set forth.

Fourth, The serrated arms, i, i', in combination with stops, i, keys, C, C', racks, w, w', and index hands, a, a', constructed and operating substantially as and for the purpose set forth.

Fifth, The rack, w, w', and pinions, e, e', in combination with the radiating plates, f, f', arms, e, e', pawls, i, i', ratchet wheels, a, a', and index hands, a, a', constructed and operating substantially as and for the purpose set forth.

Sixth, The levers, m, m', and inclined plates, e, e', in combination with the stops, k, k', levers, p, p', and ratchet wheels, a, a', constructed and operating substantially as and for the purpose set forth.

Seventh, The additional hook catches, e, e', in combination with the ratchet wheels, a, a', and index hands, a, a', constructed and operating substantially as and for the purpose set forth.

Eighth, The pawls, a, a', and ratchet wheels, w, w', in combination with the ratchet wheels, a, a', and with the index hands, a, a' and b, b', as and for the purpose set forth.

Ninth, The inclined plates, e, e', in combination with the pawls, a, a', and index hands, a, a', constructed and operating substantially as and for the purpose set forth.

Tenth, The keys, C, C', in combination with the ratchet wheels, a, a', and index hands, a, a', constructed and operating substantially as and for the purpose set forth.

54,807.—Slinging Arm.—Oliver E. Wood, Philadelphia, Pa.

First, I claim slinging the gun by means of the strap, C', and one or more hooks, D, D', substantially as and for the purpose described.

Second, I claim a hook, O, attached to the cartridge box, P, to adapt the latter to be attached to and supported by any part of the equipment.

Third, I claim the method of holding open the flap of the cartridge box.

Fourth, I claim providing the bayonet with a hook, R, to enable it to be slung to the equipment, as and for the purpose specified.

Fifth, I claim slinging the cartridge box behind the knapsack, in any manner, substantially as described.

54,808.—Foot Stove.—M. B. Wright, West Meriden, Conn.

I claim the arrangement of the movable perforated plate, G, rim, B, lamp, C, movable hazing plate, H, and movable grate, D, in combination with the perforated vessel, A, constructed and operating in the manner and for the purpose herein described.

54,809.—Machine for Coiling Hoops of Wood.—Louis Zistel, Sandusky, Ohio.

First, I claim the combination of the belt, L, pulley, J, self-adjusting pulley, M, and U, carrying pulley, T, drum, K, weighted lever, N, relatively to each other, and operating in the manner and for the purpose herein set forth.

Second, The combination of the sawing cover, W, drum, K, pushing hook, E', shaft, D', arms, D', C', arranged and operating in the manner and for the purpose herein specified.

[The object of this invention is to furnish a machine for coiling hoops, stave and cheese-box sides, etc., for market. And it consists of a combination of pulleys, bands and levers, by means of which the hoops are led into a reel about a drum or pulley, the parts being so arranged as to adapt themselves automatically to the different positions required by the increasing size of the coil.]

54,810.—Machine for Tightening and Securing the Hoops of Compressed Bales.—Richard S. Adams (assignor to himself and George E. Parrott), Loyd, N. Y.

I claim an improved machine formed by combining a pair of grippers, B, constructed as described, with each other, with the cog wheel, C, ratchet wheel, E, pawl, F, and with the frame, A, in which they are placed.

Second, The combination of the punch, G, constructed and operated substantially as described, with the machine, for the purposes set forth.

[The object of this invention is to furnish a machine by means of which the hoops may be drawn tightly around the bales and their ends secured to each other easily, securely, and cheaply. And it consists of a pair of grippers, racks, cog wheel and punch, so arranged that the ends of the hoop may be grasped by the grippers and drawn so as to overlap each other. The punch is then operated, cutting and forcing out a strip in the hoops, so as to form a loop, into which a key is dropped, securely connecting the ends of the hoop together.]

54,811.—Clamp for Holding Cigars for Tying.—Matt All (assignor to himself and William Mayer), Philadelphia, Pa.

I claim the within described clamp, composed of the elastic band, B, and block, A, constructed substantially as and for the purpose herein set forth.

54,812.—Knitting Machine.—J. M. Armour, Craftsburg, Vt., assignor to National Knitting Machine Co.

I claim forming a stitch or loop by drawing the needle and a thread through an opening in the end of the frame, d, which supports the needle and stitch holder, substantially as described.

Second, The stitch holder, d, arranged to press the stitch against the face of the frame, u, and hold it there, while the needle with the new stitch is drawn in it, substantially as and for the purpose set forth.

Third, The carrier frame, d, constructed and operating as and for the purpose herein shown and described.

Fourth, I claim with drawing the needle, a, by means of the spring, i, or its equivalent for the purpose of imparting to the needle a quick backward movement, and thereby ensuring the drawing of the new stitch through the previously formed stitch before the latter is released by the stitch holder, d, as described.

Fifth, I claim providing the frame, d, within which the needles traverse with hooks and eyes, e, e', for the purpose of uniting more or less of them together, as and for the purpose set forth.

Sixth, The combination and arrangement of the cam, E, and the cams, o, and n, with the needle, a, and stitch holder, d, for the purpose of giving to said needle and stitch holder the required movement, substantially as herein set forth.

Seventh, I claim constructing the form or endless chain for holding the needles of lags or sections, so arranged or connected together as to prevent of enlarging or contracting the form or chain by adding more sections, or removing some of them at pleasure.

Eighth, I claim also the combination of a revolving endless chain or form, constructed as above described with one or more stationary cams for operating the needles.

54,813.—Saw Grinding Machine.—John G. Baker (assignor to Henry Disston), Philadelphia, Pa.

First, I claim as my invention the vertically adjustable frame, D, for holding the saw in combination with the grind stones, B and B', the whole being arranged and operating substantially as set forth for the purpose specified.

Second, The frame, D, its detachable packing pieces, e, e', and detachable strips, i, the whole being arranged for supporting and grinding the saw blade, substantially as described for the purpose specified.

Third, The combination of the adjustable frame, D, with the adjustable cross head, I, its spindles, J, and the friction pulleys, m.

54,814.—Heating Stove.—Albert N. Beach, Windsted, Conn., assignor to himself and Edward Hatch, Charlestown, Mass.

I claim my improved stove as constructed with the fuel supply opening, E, furnished with a door or cover, F, and the draft or air inducer or inducts provided with a valve or valves, a, arranged in the top of the stove and over the fuel chamber in the manner and for purpose set forth.

54,815.—Self-rocking Cradle.—Benjamin Brazelle (assignor to himself, W. P. Walker and J. Clark Brown), Nashville, Ill.

I claim the rocker wheel, K, the sliding verge, N, the lever, L, the decenter or lock lever, P, the stud, O, and the hinged foot, M, in combination with each other with the clock work, and with the frame of the cradle or crib, substantially as herein described and for the purpose set forth.

[This invention consists in combining with the frame of the cradle of a system of levers and clock work, so constructed and arranged as to impart to the cradle a constant and regular vibration, and which can be so adjusted that the motion may be slow or fast, and the movement long or short, as may be desired.]

54,816.—Feeding Mechanism for Sewing Machines.—George W. Goodspeed, Winchendon, Mass., assignor to T. S. Page, Toledo, Ohio.

I claim the arrangement and combination of the cams, f, g, the feeder, F, its arms, b, c, the regulating screw, d, and the vibratory arm, b.

And also the combination of the same and the friction apparatus, substantially as herein before described.

54,817.—Dinner Pail.—David Howarth (assignor to himself, W. R. Johnson, and Samuel C. Rundlett), Portland, Me.

I claim a dinner pail composed of several rings so arranged that they may be passed out when the pail is to be used, the rings connected with each other, when so pressed out, by forming hooks or shoulders on their edges to overlap each other, the lower or bottom ring having a compartment to contain liquid, all constructed and arranged in the manner and for the purposes herein set forth.

54,818.—Device for Operating Sashes of Ventilating Windows.—Edwin Lockwood, Bordentown, N. J., assignor to himself and to Wm. H. Carryl, Philadelphia, Pa.

I claim the combination of the rod, A, lever, D, spring, L, pawl, M, and ratchet or corrugated plate, B, in the manner and for the purpose substantially as shown and described.

54,819.—Clothes Sprinkler.—Matthew Moriarty, Bangor, Me., assignor to himself and William A. Ulmer, Ellsworth Falls, Me.

I claim as my invention and as a new article of manufacture for the special purpose for which it is designed, the clothes sprinkler composed of the elastic bulb, the jet pipe and the nose arranged, arranged and combined, substantially as specified.

54,820.—Pipe Tong.—Albert E. Page (assignor to Page, Wilson & Co.), Fitchburg, Mass.

I claim the arrangement of the arm, B, with respect to the arm, B', of the lever, B' B' is the manner substantially as described, and the application of the jaw, D, to such arm, B, by a screw, B, projecting from the jaw and screwed through the said arm in the manner and so that it may be revolved with and by means of the jaw, substantially as specified.

I also claim when the jaw, D, of the pipe tong is connected to its screw, B, so as to operate with it, the arrangement of one of the two teeth of the jaw in and the other aside from the axis of the screw produced, the whole being as explained.

54,821.—Machine for Boarding and Graining Leather.—James Parker, Woburn, Mass., assignor to himself, S. and S. B. and L. L. Holden.

I claim, First, The combination in a boarding machine of the top board, G, with the arm, F, and slide, C, D, substantially as described and for the purpose set forth.

Second, The combination of the top board, G, with the springs, K, and rubber board, H, substantially as described and for the purpose set forth.

Third, The combination of the rubber board, H, and bolster board, I, substantially as described and for the purpose set forth.

Fourth, The combination of the bolster board, I, with the springs, S, and trencher board, N, substantially as described and for the purpose set forth.

Fifth, The combination of the trencher board, N, with the springs, S, screws, M, and board or frame, L, substantially as described and for the purpose set forth.

Sixth, The combination of the arm, V, and lever, T, with the trencher board, N, and bolster board, I, substantially as described and for the purpose set forth.

[The object of this invention is to furnish a machine by which leather of different variety and of different thicknesses may be boarded, grained, or softened quickly and thoroughly. And it consists principally in the combination of a rubber and bolster with each other, both rubber and bolster being adjustable and so constructed and arranged, as to adapt themselves to the various thicknesses of the skin that may be operated upon.]

54,822.—Grain Elevator.—Joseph T. Parlour (assignor to himself and James Dean), Buffalo, N. Y.

I claim the adjustable hinge screw clamps, P, when used for the purpose of holding the endless bucket chain, constructed and arranged as herein described.

[This invention relates to a new arrangement of parts especially intended to be used on vessels, in which grain is transported, the object of which is to automatically convey or shovel the grain from all parts of the hold, to the hatching in which the elevator is arranged for hoisting and thus discharging the grain from the vessel.]

54,823.—Ditching Machine.—Jacob P. Rees and R. A. Graham (assignor to themselves and C. C. Burns), Greensburg, Ind.

I claim the digging wheel, F, or its equivalent, arranged in a suitable frame so hung in and to the body of the machine, as to be raised or lowered, substantially in the manner described and for the purpose specified.

[The principal object of this invention is to construct or arrange the ditching device of the machine, in such a manner that a ditch of any desired depth may be made.]

54,824.—Steering Apparatus.—Edward A. Turner, New York City, assignor to himself and John A. Leggett, Branford, Conn.

First, I claim the pawls, n, i, and the frames, K, arranged and operating with reference to each other and with the two ratchet wheels, g, h, on the drum of the apparatus, substantially as herein set forth for the purpose specified.

Second, The levers, s, provided with treadles, u, or their equivalents, operating the pawls, n, i, in connection with the ratchet wheels, g, h, substantially as herein before set forth for the purpose specified.

54,825.—Tool for Making Spiles.—G. W. Wait (assignor to himself and A. J. Smith), Wayland, Mich.

I claim the combination of the shaping knife, B, with a wood boring tool, A, in such a manner as to bore and shape wooden spiles at one operation, substantially as specified.

[This invention consists in the combination with a bit or any suitable boring to I, of a knife or cutter so constructed and arranged that while the tool is boring the hole in the spile, the knife will bend or round off the end in the manner required.]

54,826.—Mold for Casting Curved Pipe. Seth Williams, (assignor to Henry C. and C. T. Williams), Foxboro, Mass.

I claim the arrangement and combination of the wings or extensions of the core stock, with the two openings, or the same, and the brackets applied to the two parts of the flask, substantially as specified.

54,827.—Saw.—Joseph Woodrough, Hamilton, Ohio, assignor to Woodrough & McFarlin, Cincinnati, Ohio.

I claim the counter sunk or imbedded ribs, E, employed in combination with the teeth, B, C', substantially as and for the purpose set forth.

54,828.—Seat and Back to Chairs.—Francis Carre, Paris, France.

First, I claim the radiating strips, a, of sheet steel, or of other suitable material in combination with the central disk, b, and frame, c, constructed and operating substantially as and for the purpose described.

Second, The secondary supporting strips, e, in combination with the radiating strips, a, and central disk, b, constructed and operating substantially as and for the purpose set forth.

Third, The back of a chair or other similar article composed of C-shaped strips, a', of sheet metal or of other suitable material, in combination with horizontal rods, h', and frame, b, constructed and operating substantially as and for the purpose described.

54,829.—Mode of Separating Gold and Silver from their Ores.—William Crookes, London, England.

I claim the employment of zinc, tin, and cadmium, and such other metals as were before mentioned, and also of such several processes for the extraction of gold and silver from the ores and substances containing them, and for the treatment of mercury, employed for such purposes as herein before substantially set forth and described.

54,830.—Ventilating Stove for Railroad Cars.—Richard Eaton, London, England.

First, I claim the arrangement of the air ducts, F, in the front corner of the stove and air passage, D, in the top thereof, in combination with the air pipe, C, in a manner and for the purpose herein specified.

Second, The arrangement of the chamber, A, air ducts, F, air passage, D, air pipe, C, spiral chamber, G, and chimney, B, constructed and operating in the manner and for the purpose herein specified.

[The object of this improvement is to produce a stove which shall give out a large amount of heat with a small amount of fuel in comparison with other stoves; which also can be used with coal, wood, or other fuel; and which will, when in operation, serve to ventilate the apartment or car in which it is used.]

54,831.—Watch.—F. A. Lange, Glashutte, Saxony.

First, I claim the removable key, E, inserted within the pendant of a watch and retained therein, substantially in the manner described in combination with the winding mechanism of the watch, when constructed and operating in the manner and for the purposes as set forth.

Second, I claim the concave contrate wheel, F, upon the arbor, D, and gearing with the crown wheel, z, said contrate wheel having its teeth constructed in the peculiar manner described.

Third, I claim providing the ratchet cylinder H, upon the arbor, D, and gearing with the contrate wheel, F, with a projection M, upon its lower surface, which enters a slot or recess upon the face of the pinion, O, and operates in the manner and for the purposes set forth.

Fourth, I claim the loose pinion, O, upon the shaft, D, in connection with the minute wheel when provided with a recess, N, upon its face, and constructed and operating in the manner and for the purposes set forth.

Fifth, I claim the combination of the removable key, B, arbor, D, concave, conical, wheel, F, crown wheel, Z, ratchet cylinder, H, with its pinion, K, and the pinion, O, when constructed and operating substantially in the manner and for the purpose set forth.

54,832.—Artificial Fuel.—Edmund Sharpe, Paris, France: I claim the herein-described artificial fuel consisting of peat, anthracite, and bituminous coal with a coal-tar cement, combined in the proportion and in the manner substantially as set forth.

54,833.—Method of Mining Coal Minerals, Etc.—William Locke, John Warrington, W. E. Carrett, W. E. Marshall, and J. Telford, Kippax, Eng.

First, We claim the system or mode of actuating the cutting tool or tools of machines for working coal and other minerals and earthy matter by the direct pressure of a flow of water or other practically non-elastic fluid medium, by the means and in the manner substantially as herein shown and set forth, so as to produce a steady even slotting action of the tool or tools at any angle with the substance to be cut.

Second, The application and use to and in machines for working coal and other minerals and earthy matters of a holding on head or feeler, which is pressed against the roof during the cutting action of the tool or tools and released therefrom to allow the machine to move forward during the return or back stroke of the tool or tools, the movements of this head or feeler being obtained from the pressure of water or other practically non-compressible fluid medium, substantially as herein shown and described.

53,834.—Manufacturing Bank Notes.—George T. Jones, Cincinnati, Ohio:

I claim the process substantially as herein described of manufacturing bank notes, bonds or analogous securities, by applying ink or coloring matter to un-sized or partially sized paper, so that it will penetrate or come into actual contact with the fiber thereof, and afterward applying a coating of size to permeate the paper, cement its fibers and prevent counterfeiting or alteration by the transfer or removal of the ink.

I claim as a new article of manufacture, a bank note bond or other evidence of value with the portion or signature protected by size for the purpose of preventing counterfeiting or alteration.

54,835.—Mode of Preparing Bank Notes to Prevent Counterfeiting.—Geo. T. Jones, Cincinnati, Ohio: I claim covering the impression with a transparent film of paper or other fibrous material, substantially as described.

REISSUES.

2,241.—Water Closet Valve.—T. H. Bartholomew, New York City. Patented Jan. 19, 1864:

First, I claim in combination with a water closet, a supply valve, valve stem, diaphragm, K, and regulating chamber, said parts being so arranged that the valve may be opened by the manual force applied to it, and closed by the pressure of the water and retarded in its closing, substantially in the manner as and for the purpose set forth.

Second, A flexible disk forming an obstruction in the water passage or way of the cock, to operate in the manner substantially as and for the purpose set forth.

2,242.—Preserve Jar.—R. A. Bunnell (assignee of Chas. F. Spencer), Rochester, N. Y. Patented Feb. 10, 1863:

I claim a cover or stopper, with a packing around its edge, or periphery, in combination with a jar, or can, whose mouth or neck has a cylindrical or slightly flaring inner surface, and an inwardly projecting shoulder or seat below.

I also claim a self-retained cover, or stopper with a packing which projects above and below its edge so as to be impressed between the jar and the mouth, or neck of the jar or can.

I also claim the combination of a jar, or can which has no inwardly projecting shoulder in the mouth or neck thereof, with a cover or stopper, whose packing packs both against the said shoulder, and against the inner periphery of the neck.

I also claim a packing ring, one edge of which is bent inward and held in a peripheral groove of the stopper or cover.

I also claim a cover, or stopper, which has an edge or flange below the packing nearly fitting within and in combination with a shoulder in the neck of the jar or can.

I also claim the combined arrangement and construction of the double flanged cover, B, packing, b, and jar-neck seat, a, one flange, f, of the cover compressing and tightening the packing ring and the other flange, g, nearly fitting and closing the circle within the seat, substantially as and for the purposes herein specified.

2,243.—Iron Ship.—Mary Jane Montgomery (assignee by mesne assignments of Richard Montgomery), New York City. Patented Dec. 6, 1859:

First, I claim the use of corrugated metallic beam, whether straight, curved, bent, or sheared, in the construction of ships, steamers, or other vessels.

Second, The use of corrugated metallic plates or sheets, in the construction of bulk heads or partitions for forming fire-proof or water proof compartments in the holds of ships, steamers and other vessels.

Third, The block or knee, C, when constructed substantially in the manner and for the purpose set forth.

Fourth, The metallic plate, E, when forming the plating of the sides, and if required, the flooring of the deck, in combination with the corrugated beams to which they are attached, substantially as shown and described.

2,244.—Iron Ship.—Mary Jane Montgomery (assignee by mesne assignments of Richard Montgomery), New York City. Patented Dec. 6, 1859:

I claim the above described curved, bent, or sheared corrugated beam, irrespective of any peculiar curve, bend, or shear, in the construction of ships or other vessels.

2,245.—Sewing Machine for Stitching Button Holes.—The Bartram & Fenton Manufacturing Company, Danbury, Conn., assignees by mesne assignments of W. B. Bartram, Reading, Conn. Patented Nov. 7, 1865:

First, We claim stitching a bar across the end of a button hole, for the purpose of strengthening the same, by means of devices which produce a lateral reciprocation of the material being stitched while it is also being fed forward, and permit the extent of the said lateral reciprocation to be increased at will by hand, while the machine continues in operation.

Second, Working and entirely completing a button hole without the use of a hand needle, by means of devices substantially as herein described.

Third, In combination with the arm, H, the wheel, I, and the eccentric of the driving shaft of a sewing machine or its equivalents, for the purpose set forth.

Fourth, In combination with the wheels, I, and P, the arm, H, and the stop, J, provided with the projection, a, substantially as and for the purpose set forth.

Fifth, In combination with the wheel, I, the stop, J, and the plate, A, substantially as and for the purpose set forth.

Sixth, In combination with the movable plate, A, of a sewing machine, the cloth holder, O, and the circular plate, N, as and for the purpose set forth.

Seventh, In combination with the cloth holder, O, the stationary guide, P, and circular plate, N, substantially as and for the purpose set forth.

Eighth, In combination with the springs, L, the stop, J, wheels, I, P, arm, H, and the eccentric of the driving shaft of a sewing machine, substantially as described for the purpose of producing a zig-zag stitch.

Ninth, In combination with the feed bar, b, and its eccentric regulating lever, R, for throwing the feed bar entirely out of action, substantially as and for the purpose herein set forth.

2,246.—Mode of Regulating the Temperature of Hot Water Apparatus.—Thomas T. Tasker, Philadelphia, Pa. Patented Dec. 5, 1864:

First, I claim the combination of a float actuated by the expansion of water with a draft or smoke damper, as the means of regulating the temperature of a hot water heating apparatus, substantially as and for the purposes described.

Second, The use of the damper, O, for admitting cold air over the fire, as a means of cooling the gases of combustion, or reducing the draft, and of cooling the water in the boiler, either alone or in combination with other dampers.

Third, The use of a simultaneous motion for the dampers, P and M, and the succeeding simultaneous motion for the dampers, P and O, as described.

Fourth, The combination of the three dampers, P O M, and the

float, A, together with rods, G K, and the link, R H, for the purpose and object herein described.

2,247.—Machine for Sawing and Edging Clapboards.—Averus A. Wilder, Detroit, Mich. Patented, Oct. 30, 1855. Reissued, Oct. 18, 1859.

First, I claim the flanged rollers, d, with the spring, e, or equivalents, in combination with the adjustable back rest, b, for the purpose herein before described.

Second, The combination of circular saw, k, and the rotary edging cutter, n, attached to its arbor with the upper rotary edging cutter, g, for the purpose herein described.

DESIGNS.

2,312.—Bracket.—Albert Bridges, New York City.

2,313.—Card Holder.—Joshua Brooks, Newton, Mass.

2,314.—Plates of a Cook Stove.—Samuel W. Gibbs (assignor to Samuel H. Ransom), Albany, N. Y.

2,315.—Plates of a Cook Stove.—Samuel W. Gibbs (assignor to Samuel H. Ransom), Albany, N. Y.

2,316.—Printer's Type.—Andrew Little, New York City.

2,317.—Knife Handle.—Solomon Oppenheimer, Peru, Ind.

2,318.—Plates of a Cook Stove.—Samuel H. Ransom, Albany, N. Y.

2,319.—Plates of a Cook Stove.—Samuel H. Ransom, Albany, N. Y.

2,320.—Plates of a Cook Stove.—Samuel H. Ransom, Albany, N. Y.

2,321.—Plates of a Parlor Stove.—Samuel H. Ransom, Albany, N. Y.

2,322.—Plates of a Parlor Stove.—Samuel H. Ransom, Albany, N. Y.



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Y. C. J., of Pa.—Paper rubbed with lampblack will make a tracing paper for common purposes.

C. E. W., of Mass.—It is impossible for us to say what will cure the itch.

W. R. B., of N. Y.—There is nothing in the diagram you send us "to turn a crank through more than one-half of its stroke by a single movement of a lever." If you have obtained such a result, it is due to the momentum of some of the parts, not to any arrangement of them.

T. L. B., of St. Louis.—You have hit the nail on the head.

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The buckets are not parallel to each other, but are arranged at right angles, so that as they emerge from the water edgewise they will present the bucket, which is just entering, in the most favorable position for propelling the boat. The upper part of the wheel, that which is not immersed, has the buckets edgewise or nearly so, thus avoiding the atmospheric resistance that is incident to the common wheel. The engraving shows the paddles disposed in a regular order at the bottom the same as any other. This is not the true position when at work, as the paddles assume all angles according to their position, in passing through the water, but owing to the impossibility of fixing these angles definitely in the model, and the confused appearance the wheel would have so drawn, we have depicted it as shown. It will be seen that the feathering action is obtained by the shape of the paddle, one side being wider than the other. The greater area will therefore act against the less, turning the paddle as before stated.

Patented on Jan. 10, 1865, by G. A. Keene, Newburyport, Mass. A company with a capital has been formed for the purpose of introducing this invention, and for further information the reader is referred to Charles C. Dame, President, No. 10 Barrister's Hall, Court Square, Boston, Mass.

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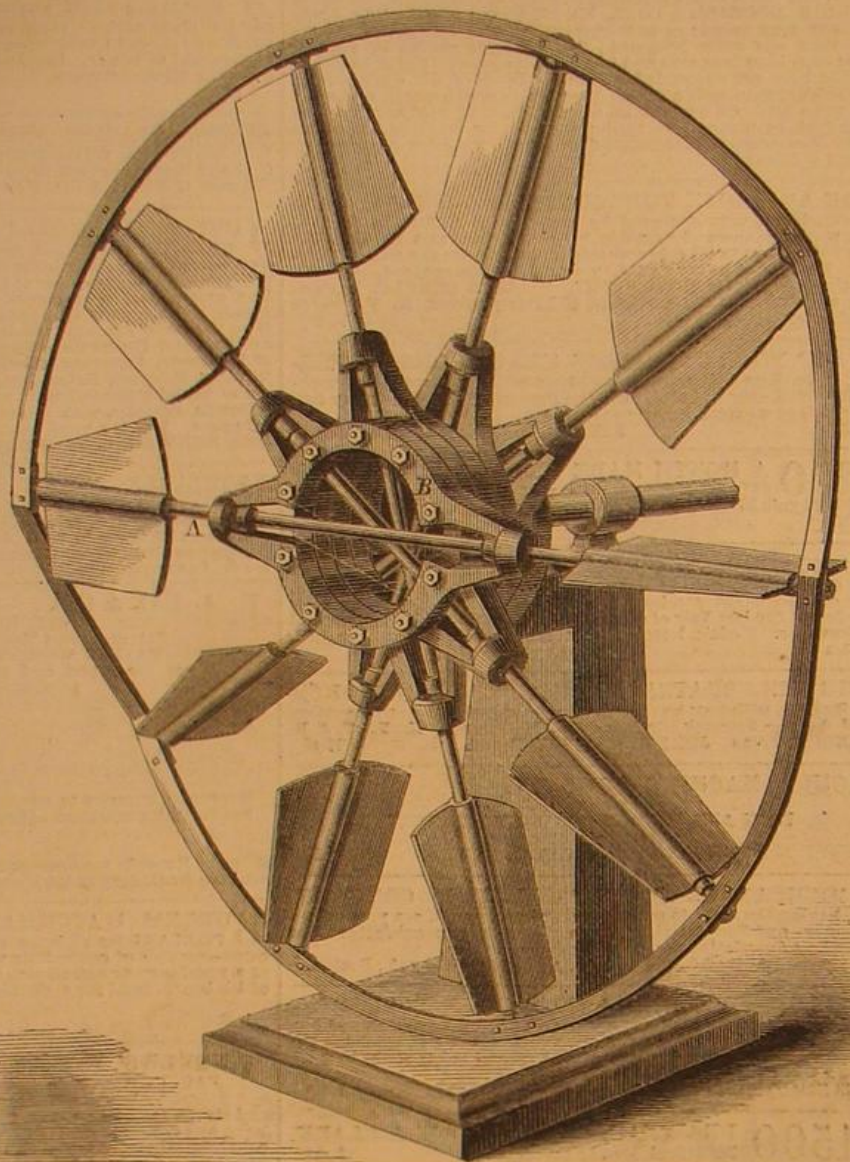
It is well known that for general purposes shingle roofs are the cheapest and most durable. They are quickly put on and easily repaired when leaky. One trouble with them, however, is, that they retain moisture for some time after rain storms, and therefore rot much more quickly than they would otherwise.

The roof here shown is composed of shingles on a new plan. Instead of having plain surfaces, fitting closely one to the other, the several shingles are ribbed, as shown, so that one laps over on the other.

A series of channels are thus formed underneath, which allows free ventilation or circulation, so that

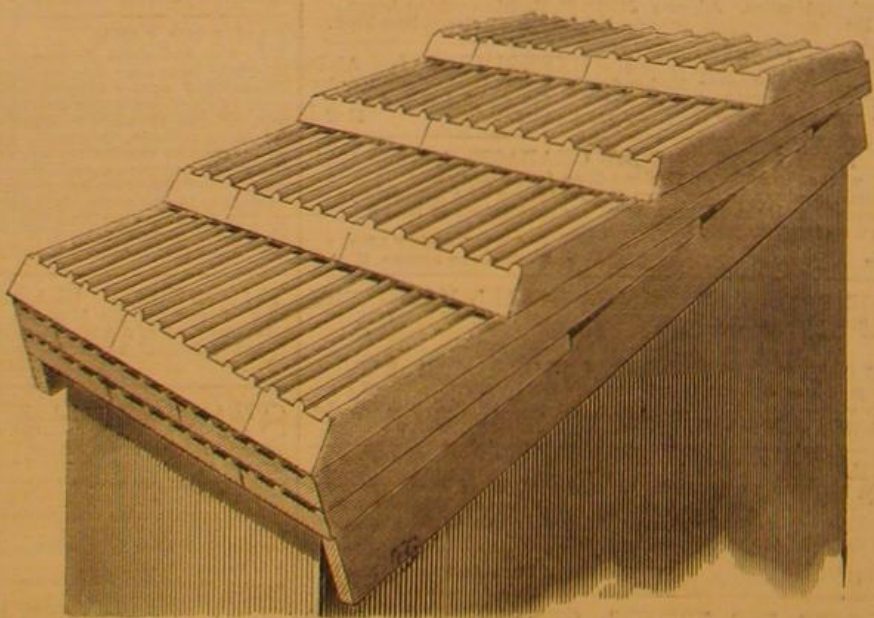
the humidity which causes rot and mildew is speedily dissipated.

It is claimed by the inventor that this roof will last three times as long as an ordinary shingle roof, while the expense of so forming them will not exceed thirty cents per thousand over common shingles.

**KEENE'S SELF-FEATHERING PADDLE WHEEL.**

Patented Jan. 9, 1866. For further information address John F. Lowden, Burlington, N. J., or Smith Brothers, 139 Broadway, New York.

ARTIFICIAL WANTS.—Bulwer says that poverty is only an idea in nine cases out of ten. Some men

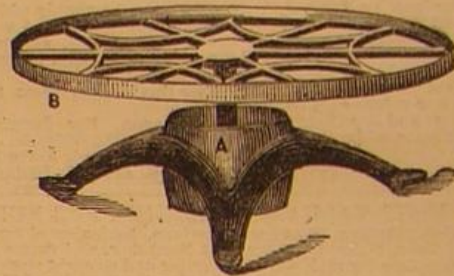
**THE BURLINGTON SHINGLE ROOFING.**

with ten thousand dollars a year suffer more for the want of means than others with three hundred. The reason is the richer man has artificial wants. His income is ten thousand, and he suffers enough from being dunned for unpaid debts to kill a sensitive man. A man who earns a dollar a day, and does not run in debt, is the happier of the two. Very few people who have been rich will believe this, but it is as true as God's word. There are thousands with princely incomes who never know a moment of

peace, because they live above their means. There is really more happiness among the working people than among those who are called rich.

LAMB'S DISH-STAND.

The season approaches when mice, flies, ants, and the plague of small lice, afflict the housekeeper. Dishes set aside for tea are covered with undesirable guests, and great is the vexation and loss thereby. It is well known that ants, beetles, and other creeping things, have an aversion for water. They will not touch it when they can avoid it, and many persons rid themselves of these pests by setting their dishes on supports which are immersed in water. As it is inconvenient to be continually improvising arrangements of this kind, an inventor has constructed a stand which has a cup formed at the base in which water is poured, thus completely surrounding the central stand and converting it into an invulnerable fortress. A is the cup and B the stand.



Besides this the utensil is handy for other purposes—for holding a flatiron or a coffee pot that has been on the stove and is liable to black the cloth, etc. They are made of cast iron, neatly japanned, and weigh about a pound; larger sizes are made for holding heavier articles.

It was patented Feb. 13, 1866, by I. W. Lamb. For further information address J. E. Johns, General Agent, Box 972, Rochester, N. Y., town, county and State rights for sale.

ENGLISH statesmen are becoming alarmed about the probable exhaustion of her coal fields; no coal, no steam. Chancellor Gladstone admits that the United States has about forty times more coal than England.

We are indebted to Hon. E. D. Morgan, Hon. James Guthrie and Hon. E. C. Ingersoll for valuable public documents.

**INVENTORS, MANUFACTURERS.**

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