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Improved Balanced Governor Valve.

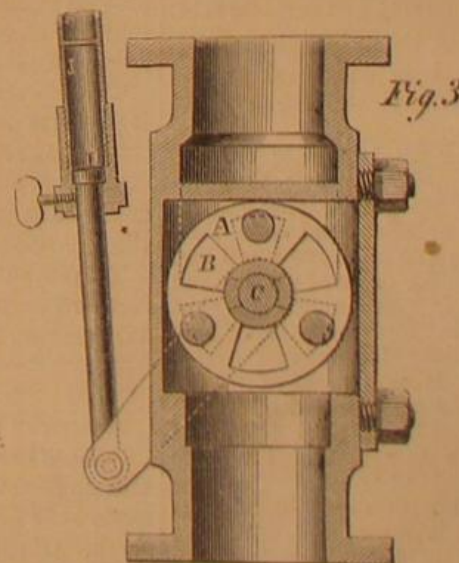
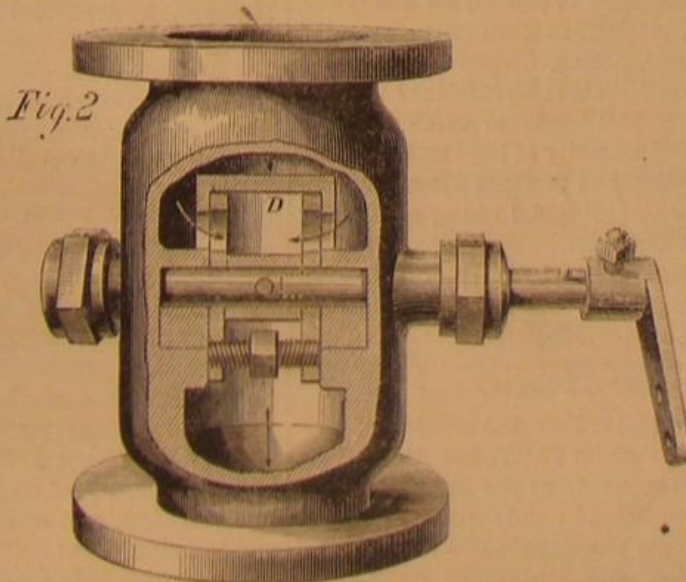
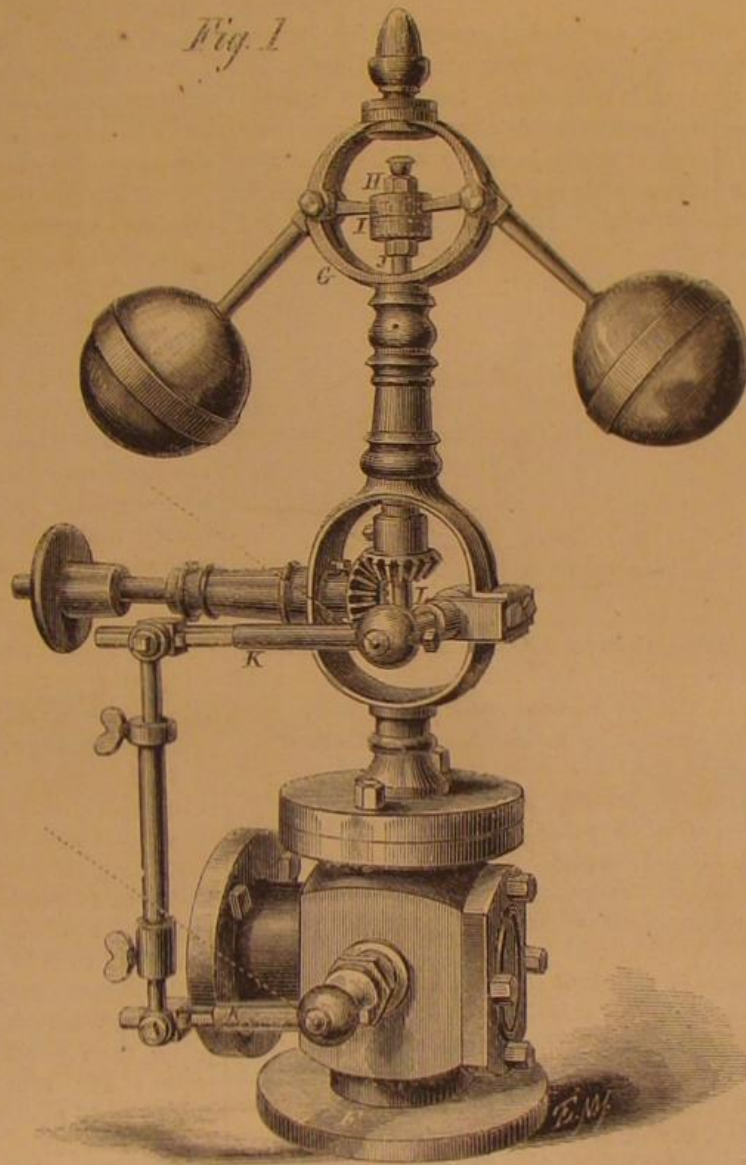
Any one familiar with the principles of a steam engine, the details, and their operation, must see at once that it is not in the nature of things that it should run properly at all times unless some device be applied to give it steam as it needs it. Of course, if the load is at one moment great, and at another reduced to little or nothing, the flow of steam must be regulated accordingly, to insure proper results. This the ordinary governor does not do, as we have remarked very many times before. In flour mills it is particularly necessary to have a continuous and steady velocity, and also in rolling mills, where, in one minute, when the bolt is passing through the rolls, the resistance on the engine is very much increased, and at another let off entirely.

The valve shown in this engraving is one that has been well tried and pronounced satisfactory by those who use it. It is, as may be seen, two disks, A (see Fig. 4), having ports, B, in the side for the admission of steam. These disks are quite independent of each other, but are, at the same time, connected by screw bolts, C, having right and left threads, so that they can be set up to their seats in the chamber, D; these bolts do not transmit the strain of working the valve or disks from the shaft, there being a coupling, E, formed on the bosses of the disks for the purpose indicated. The valve thus formed works between walls in the body of the chamber, D, and the steam enters from the inside and passes in through the openings down to the engine through the nozzle, F—a passage being cored out for it in the body of the exterior chamber, as shown in Fig. 2. It is thus perfectly balanced, there being as much pressure from within as without, so that it may be said to float in an atmosphere of steam.

The method of operating this valve is ingenious. The ordinary form of governor ball and arm is used, but the arrangement of it is altered. The balls and arms are attached to a frame, G, which revolves by the action of the miter gearing below. The working ends of the arms, or those which operate the valve, are fitted to a coupling, H, at the top, so that they work easily up and down therein. This coupling is made in halves, which are screwed together like a box cover, and the bottom one, I, is chambered out so as to receive the button head of the rod, J,

which works the valve through the intervention of the levers, K—a short one being fitted to the shaft, L, and a long one on the end of the same shaft, so that a slight movement of the rod, J, will be multiplied on the valve as the lengths of the levers are to each other.

These are the main details, if we except a method



WHITE'S BALANCED GOVERNOR VALVE.

of driving the gearing by a disk, M, on the shaft, the particulars of which the inventor has not furnished us. It is claimed, justly, that this valve will operate well if properly cared for, and that it is sensitive and durable to a high degree. It can be adjusted to close entirely, or in part, and is, in all respects, a useful invention. This invention was patented July 30, 1861. For further information address the White's Governor Valve Co., Galesburg, Ill.

CROOKES ON DISINFECTANTS.

William Crookes, F.R.S., editor of the London *Chemical News*, is a man of world-wide fame from his valuable contributions to chemical science, including the discovery of a new element. Since the appearance of the cattle plague in England he has devoted a great deal of attention to the study of disinfectants, and was finally appointed by the Royal Commissioners to make an elaborate investigation of the subject. His report is published in the *Chemical News*, and it is certainly the most valuable document in relation to disinfectants that has ever appeared. It revolutionizes the practice. It shows that the substances now principally relied on, and employed, have little or no effect in destroying infection, and it points out materials that are really efficacious. Could its conclusions be generally known and acted on, it might save thousands of animals from the rinderpest, and thousands of human lives from destruction by cholera. We regret that our want of space prevents us from laying it in full before our readers.

Mr. Crookes devotes the first portion of his report to the discussion of the nature of the infection, and he comes to a conclusion that it is *virus*, which he defines as the seed or germ of an organism, either animal or vegetable, having the power to grow and propagate its kind. Among the arguments in support of this view, perhaps the strongest is the extremely minute quantity of the matter that is sufficient to destroy a herd of cattle.

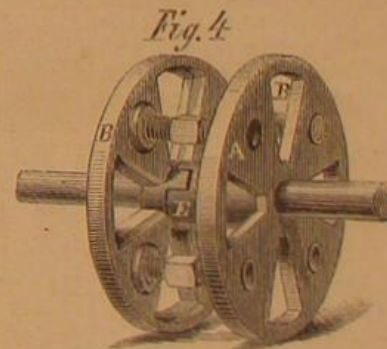
As a result of this theory, the distinction is clearly drawn between *deodorizers* and *antiseptics*—deodorizers

merely removing the harmless smell, while antiseptics kill the germ. We extract some of the paragraphs in relation to this part of the subject:

I am bound to admit that the conclusion to which I have been forced to come, is quite opposed to my preconceived ideas on the subject. I started with a strong bias in favor of chlorine and ozone, but the irresistible force of the arguments derived from my experiments, has caused me to alter my opinion.

At first sight nothing appears more perfect than the action of a powerfully oxidizing disinfectant, like chlorine or ozone, upon noxious vapor and septic germs. In presence of an excess of either of these agents, all organic impurity is at once burnt up, and reduced to its simplest combinations; and could we always rely upon the presence of a sufficient amount of either of these bodies, no other purifier would be needed. But in practical work on a farm these disinfectants were always very inad-

equate, except perhaps for half an hour or so during the day; at other times, the oxidizing agent has presented to it far more noxious material than it can by possibility conquer, and being governed in its combinations by definite laws of chemical affinity, the sulphureted and carburated hydrogen, the nitrogen and phosphorus bases, etc., would all have to be burnt up before the oxidizing agent could touch the germs of infection; while the continued renewal of the gases of putrefaction would be perpetually shielding the infectious matter from destruction.



It is here that the great objection lies to disinfectants which act by oxidation. If we arrange in a series (as set forth in par. 12) the possible substances which may be met with in an infected shed, and gradually mix with them chlorine or ozonized air, we find that those vapors having strong and fetid odors, and which stand at the commencement of the list, are the first to go; while the actual virus of the disease—the organized particles which have no odor whatever—are the last to be attacked. But in using disinfectants of this class, the only test of efficiency which a workman would employ is the sense of smell, and I have on several occasions known it happen that a deodorized shed, to all outward appearances disinfected, was still in reality saturated with infection. It so happens that the stinking gases of decomposition are of little or no danger in the atmosphere, while the deadly virus cells of infectious diseases are inappreciable to the sense of smell. Mere deodorization is therefore no protection whatever.

The following experiment tends to illustrate, if not to prove this:—Cheese mites were put into water mixed with strongly smelling cheese and sulphureted hydrogen. Aqueous solution of chlorine was gradually dropped into the mixture from a burette. The smell of sulphureted hydrogen was the first to go, then some smell of cheese, but it required a considerable quantity of chlorine to kill the mites. Exactly the same experiment was now repeated, only leaving out the sulphureted hydrogen and cheese. The chlorine now had nothing to divert its energy from the cheese mites, which were consequently killed before one-fourth the quantity of chlorine used in the first instance had been added.

Again, oxidizing disinfectants possess little if any continuous action. What they attack is destroyed perfectly, but what they leave has no special resistance to decomposition conferred upon it. They remove the products of decomposition, but they do not take away the power of further putrefaction.

Oxidizing disinfectants produce their effect by actually destroying infecting substances. Antiseptics act simply by destroying their activity. The former act more energetically upon dead than living organic matter. Antiseptics attack first the opposite end of the scale, and destroy vitality; they exert little or no action on the foul smelling and comparatively harmless gases of decomposition, but they act with intense energy on the inodorous germs of infection which these gases may carry into the atmosphere along with them.

If, therefore, the theory which I started be correct; if the matter which conveys infection from one animal to another be of the nature of an organized germ; if it owes its tremendous powers of destruction to the presence in it of vitality, then antiseptics are the only agents fitted to deal with this special case; for they leave almost untouched the crowd of simply odorous gases, and seek out and destroy the one thing to be feared. When I treat of carbolic acid, ample proof of the correctness of this view will be given.

The results of a long series of experiments are given, and the conclusion seems to be that chlorine, chloride of lime, ozone and other substances which have been recommended on very high authority, and almost universally employed, are of little if any value in arresting the spread of the disease, and that the two most efficient substances for this purpose at present known are sulphurous acid and carbolic acid. Among the experiments were the following:—

Other experiments were then instituted in the endeavor to understand more clearly the mode of action of carbolic acid.

IX. Some meat was hung up in the air till the odor of putrefaction was strong. It was then divided into two pieces; one was soaked for half an hour in chloride of lime solution, and was then washed and hung up again; the offensive smell had entirely gone. The other piece of meat was soaked in a solution of carbolic acid containing 1 per cent of the acid; it was then dried and hung up. The surface of the meat was whitened, its offensive odor was not removed, though it was masked by the carbolic acid. In two days' time the bad odor had quite gone, and was replaced by a pure but faint smell of carbolic acid. In a few weeks' time the pieces of meat were examined again. The one which had been deodorized with chloride of lime now smelt as offensively as it did at first, while the piece treated with carbolic acid had simply dried up, and had no offensive odor whatever. It was then hung up for another month and examined; no change had taken place.

X. A piece of fresh meat was soaked in a 1-per cent aqueous solution of carbolic acid for one hour; it was then wrapped in paper and hung up in a sitting room in which there was a fire almost daily; at the end of ten weeks it was examined. It had dried up to about one-fourth of its original size, but looked and smelt perfectly good and fresh, a very faint odor of carbolic acid being all that was perceptible. It was soaked for twenty-four hours in water, and then stewed with appropriate condi-

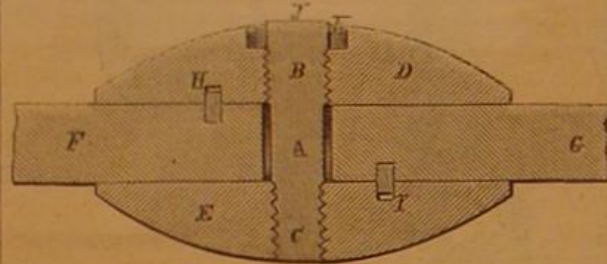
ments and eaten; it was perfectly sweet, and scarcely distinguishable from fresh meat, except by possessing a very faint flavor of carbolic acid, not strong enough to be unpleasant.

These are important experiments. They point out in a striking manner the difference between mere deodorizers and antiseptics. Hitherto attention has been almost entirely confined to the deodorization of gases arising from putrescence. The effect has been combated, while the removal of the cause has received scarcely any attention. Chloride of lime, one of the strongest of the class of deodorizers, acts, as has been shown, only on the gases of existing putrefaction, but it has no influence over the future. Carbolic acid on the other hand, has scarcely any action on fetid gases; but it attacks the cause which produces them, and, at the same time, puts the organic matter in such a state that it never re-acquires its tendency to putrefy.

The same substances that would kill the germs of the rinderpest, would doubtless destroy those of the cholera.

RUGGLES'S SHAFT COUPLING.

There are some mechanical powers which, because of not being of universal or general application, are seldom used and recognized, but which are of a most important and valuable character. Such is the differential screw, which is rarely used, but which, in certain instances, is the strongest grip known in mechanics. This has been applied in the above improvement very effectively. A brief description will easily explain this device.



A is a differential screw bolt having two threads, that on the upper portion, B, being ten to the inch, and that on the lower part, C, nine to the inch. The head, J, of the bolt is six-sided, and is flush with the surface of the box. It is seated in the circular recess, K, which is large enough to receive on the end a cylindrical or socket wrench. D is the upper half, and E the lower half of a box made to fit the shafts, F and G. Threads corresponding with those on the two portions of the bolt are tapped in the boxes.

The above is sufficient to explain to any practical man the operation of this device. It will readily be seen that a few turns of the screw will be sufficient to clamp the shaft ends in a grip the power of which is limited only by the strength of the material. Two steady pins, H and I, are inserted in the shaft and project into holes drilled into the coupling boxes to provide against negligence in setting up the screw, thereby allowing the shaft to turn. The annexed engraving is a vertical section.

This is evidently a valuable and efficient coupling. It presents no nuts or bolt heads to catch belts or clothing, obviates the necessity of keys and splining, cannot get out of order, and presents a neat appearance, when turned and polished, looking nearly like the enlargement of the shaft.

This invention was patented April 24, 1866. For further information address S. P. Ruggles, No. 152 Washington street, Boston, Mass.

Useful Plants.

A German author states that the number of useful plants has risen to about 12,000, but that others will no doubt be discovered, as the researches yet made have been completed in only portions of the earth. Of these plants there are 1,350 varieties of edible fruits, berries, and seeds; 103 cereals; 37 onions; 460 vegetables and salads; 40 species of palms; 32 varieties of arrowroot, and 31 different kinds of sugars. Vinous drinks are obtained from 200 plants, and aromatics from 266. There are 50 substitutes for coffee, and 129 for tea. Tannin is present in 140 plants, caoutchouc in 96, gutta-percha in 7, rosin and balsamic gums in 389, wax in 10, and grease and essential oils in 330; 88 plants contain potash, soda, and iodine; 650 contain dyes, 47 soap, 250 weaving fibers; 44 fibers used in paper making;

48 give roofing materials, and 100 are employed for hurdles and cosses. In building, 740 plants are used, and there are 615 known poisonous plants. One of the most gratifying developments, is that out of 278 known natural families of plants, there are but 18 species for which no use has yet been discovered.

Gun-Paper.

Mr. G. S. Melland, of Lime street, London, who has distinguished himself among British makers of fire-arms, has recently invented a "gun-paper" to supersede the old gunpowder. The invention consists in impregnating paper with a composition formed of chlorate of potash, nine parts; nitrate of potash, $4\frac{1}{2}$; prussiate of potash, $3\frac{1}{4}$; powdered charcoal, $3\frac{1}{4}$; starch $\frac{1}{2}$ th part; chromate of potash, $\frac{1}{6}$ th part; and water 79 parts. These are mixed and boiled during one hour. The solution is then ready for use, and the paper passed in sheets through the solution. The saturated paper is now ready for manufacturing into the form of a cartridge, and is rolled into compact lengths of any required diameter. These rolls may also be made of required lengths, and cut up afterward to suit the charge. After rolling, the gun-paper is dried at 212 deg. Fah., and has the appearance of a compact grayish mass. Experiments have been made with it, and it has been reported favorably of, as a perfect substitute for gunpowder, superseding gun-cotton and all other explosives. It is said to be safe alike in manufacture and in use. The paper is dried at a very low temperature. It may be freely handled without fear of explosion, which is not produced even by percussion. It is, in fact, only exploded by contact with fire, or at equivalent temperatures. In its action it is quick and powerful, having, in this respect, a decided advantage over gunpowder. Its use is unaccompanied by the greasy residuum always observable in gun barrels that have been fired with gunpowder. Its explosion produces less smoke than from gunpowder; it is said to give less recoil, and it is less liable to deterioration from dampness. It is readily protected from all chance of damp by a solution of xyloidin in acetic acid. The xyloidin is prepared by acting on paper with nitric acid, one part thereof being dissolved in three parts of acetic acid of specific gravity of 1.040.

In experimenting with this new explosive substance, six rounds were first fired with cartridges containing 15 grains of gunpowder, and a conical bullet, at 15 yards range, which gave an average penetration of $1\frac{1}{8}$ into deal. Six rounds were then fired with 10 grains of gun-paper and a conical bullet at same range, and gave an average penetration of $1\frac{3}{4}$ into deal. Here was 33 per cent less of paper than powder, and greater penetration with paper. Six rounds followed with an increased charge of 15 grains of gun-paper and a conical bullet, at the same range, and at each shot the bullet passed through a 3-inch deal. At 19 yards range, 12 grains of the paper, fired from a pistol of 54 gage (44-inch), sent a heavier bullet through a 3-inch deal. A fouled revolver was preserved four days, but betrayed no symptoms of corrosion after using gun-paper. It is expected that gun-paper will be manufactured cheaper than gunpowder.—*London Artizan*.

Growth of Our Navy.

In 1783 our navy consisted of four vessels; in 1815 of 276, carrying 1,636 guns; in March, 1865, we had 684 vessels with 4,477 guns. These comparisons of numbers of ships and guns, however, do not fairly represent our progress in naval power. What comparison can be made between a frigate or line-of-battle ship of fifty years ago, with its wooden sides, heavy spars, dependence upon wind for maneuver, ing, and battery of eighteen, thirty-two, and forty-two pounders, and a monitor of impenetrable iron, moved independent of wind or tide, and armed with a battery of four fifteen-inch guns!

DEPTH OF MILK FOR CREAM.—A correspondent of the Boston Cultivator says that the form of the vessel containing milk, from which it is intended to collect the cream, does not affect the quantity of cream raised. He says: "desiring to test this matter, I took glass cream jars, in which were graduated scales, and set milk at different depths, from 2 to 18 inches. The depth of cream was always in proportion to the quantity of milk."

Improved Portable Steam Engine.

Within a few years the steam engine, in portable form, has become a favorite motor, being used even for purposes requiring fifty horse-power. The unusual demand for these handy and easily-managed engines has greatly stimulated the builders to add improvement after improvement, until they may be considered as near perfection as any machine in general use.

The illustration gives a perspective view of a very excellent engine, manufactured by Bellows & Whit-

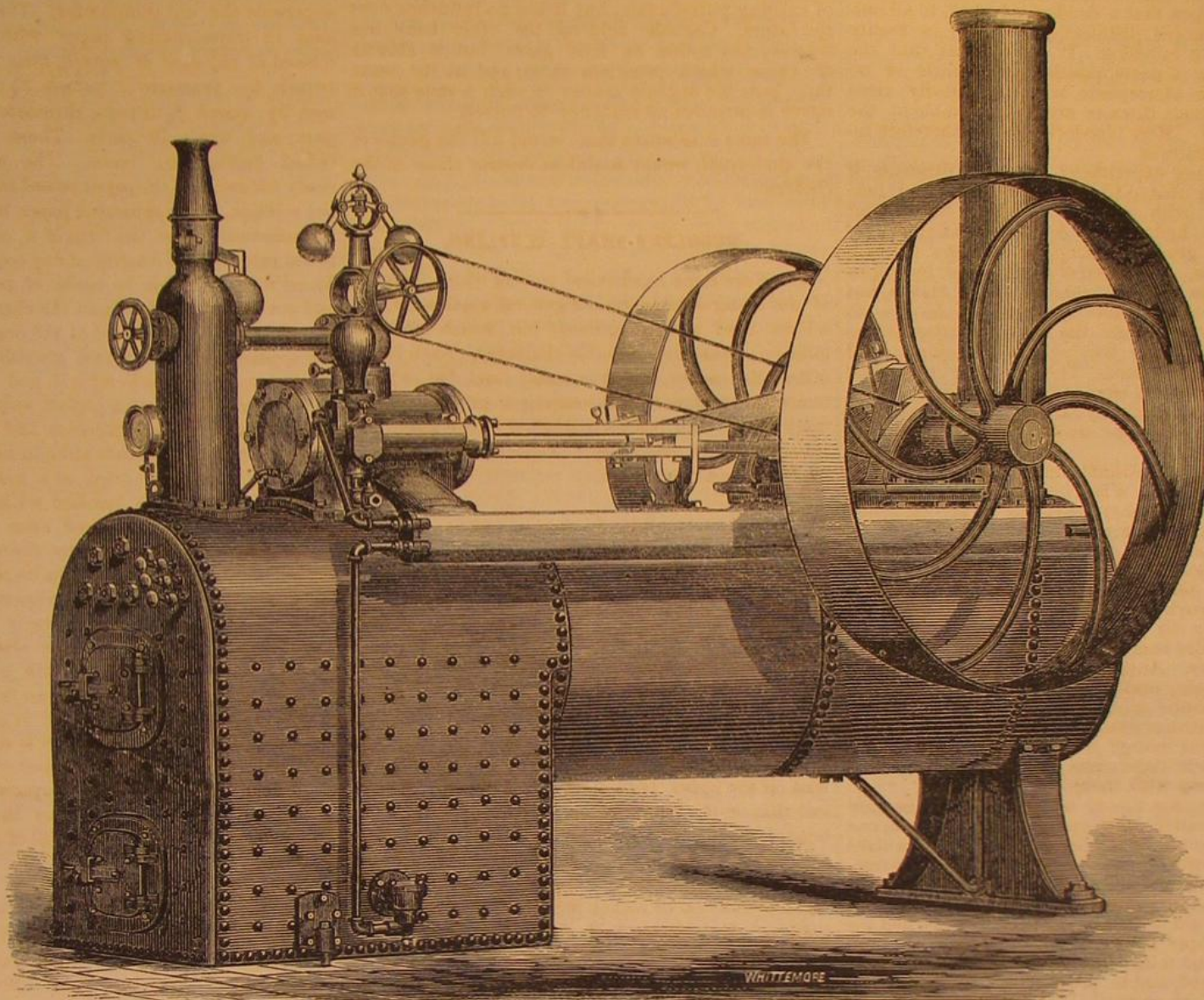
comb, Worcester, Mass. must be supplied with food, clothing, military munitions, and appliances. During the first months of a war these may come from the accumulations in the granaries and warehouses, but for the maintenance of armies through repeated campaigns, there must be a continued surplus production of them beyond the needs of that portion of the population which continues in peaceful pursuits.

The war in this country for the suppression of the rebellion cost the nation 3,500 millions of dollars, and a portion of this was drawn from the personal prop-

erty that we had on hand when the war broke out. The merchandise in our warehouses, the grain in our cribs, and the cattle in our fields, were probably less in quantity at the close than they were at the beginning of the war, but the quantity was not diminished to the extent of 3,500 millions of dollars. According to the census returns, we were accumulating wealth immediately before the war at the rate of more than 900 millions of dollars per year. This rapid accumulation was checked by the withdrawal of a million of men from productive labor to unproductive consumption, but it was not stopped. Indeed, it may be an open question whether the general introduction of the reaping machine, the sewing machine, coastwise propellers, and other agencies for facilitating the production of wealth, did not fully counterbalance the withdrawal of the soldiers from peaceful industry. There are many farmers, manufacturers, and traders, who have as large stocks as they had before the war, and who have besides some Government bonds—these bonds having been bought with the profits of their business during the war; in other words, their surplus products have been furnished for the support of the armies.

Now, the production of wealth in proportion to the population is two, or three, or four-fold greater in this country than it is in either of the European countries that are now going to war. The Prussian manufacturer of scissors has the iron and steel of his articles carried from fifteen to twenty miles on the heads of his workmen, during the process of manufacture, and the labor is unaided by water or steam. The consequence of this unwise direction of industry is, that the skilled mechanic produces but forty to fifty cents per day of value when measured in the markets of the world. The American mechanic, by calling to his aid the forces of nature and innumerable ingenious appliances, is able to produce value to the amount of three or four dollars every day that he works.

This great ability to produce wealth gives the people of this country the power to maintain armies, and thus endues them with military strength in proportion to their numbers—probably not less than three-fold that of any other nation, with the excep-



BELLOWS & WHITCOMB'S PORTABLE STEAM ENGINE.

comb, Worcester, Mass. The builders claim that these engines furnish the maximum of power with the minimum of fuel. The cranks and connecting rods are of the best forged iron, the workmanship is of first-class quality, and every plate used in the boiler is thoroughly tested before being used. A patent steam piston packing and an improved governor, of their own invention, is believed to give better results than any others in use. Each machine is tested by actual working before it leaves the manufactory, and is guaranteed to work to the full power at which it is rated. The engines are furnished complete, ready for operation, with the exception of pipes and belting, which will be provided if desired. For further information address as above.

THE WAR POWERS OF EUROPE AND AMERICA.

The strength of the three European countries now arming for strife is thus stated:—Austria, square miles, 236,311; population, 36,795,000; army, 800,000. Prussia, square miles, 108,212; population, 19,304,000; army, 700,000. Italy, square miles, 98,784; population, 21,703,710; army, 400,000.

The Northern States of this Union contain about 20,000,000 of inhabitants, and at the close of the war our army numbered 1,000,500 men.

The military power of nations, however, is by no means in proportion to their population, or to the size of their armies at the opening of the contest. When numbers so large are enlisted, the element that mainly determines the victory is the continued ability to support the armies, and this depends upon the nation's capacity for producing wealth. Soldiers

erty that we had on hand when the war broke out. The merchandise in our warehouses, the grain in our cribs, and the cattle in our fields, were probably less in quantity at the close than they were at the beginning of the war, but the quantity was not diminished to the extent of 3,500 millions of dollars. According to the census returns, we were accumulating wealth immediately before the war at the rate of more than 900 millions of dollars per year. This rapid accumulation was checked by the withdrawal of a million of men from productive labor to unproductive consumption, but it was not stopped. Indeed, it may be an open question whether the general introduction of the reaping machine, the sewing machine, coastwise propellers, and other agencies for facilitating the production of wealth, did not fully counterbalance the withdrawal of the soldiers from peaceful industry. There are many farmers, manufacturers, and traders, who have as large stocks as they had before the war, and who have besides some Government bonds—these bonds having been bought with the profits of their business during the war; in other words, their surplus products have been furnished for the support of the armies.

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tion of Great Britain. This power we owe to the intelligent use of productive machinery, and for the extent of this use we are indebted to our free institutions, our common schools, and our patent laws.

INTERESTING TO OIL MEN AND MINERS.

In Vol. XII., No. 23, we gave an illustration and description of an apparatus for pumping oil wells and mines, patented by F. S. Pease of Buffalo. Last week we had an opportunity of witnessing its operation by working models on a large scale, and we are satisfied, after a lengthy investigation, that the improvement is one of great importance.

Its negative advantages are, that it dispenses with all pump rods; has no apparatus in the bottom of a deep well which can get out of order, can pump and lift gas, atmospheric air, water, oil, or paraffine, and can act in any position, the pipe turning corners at all angles. Its positive advantages are certainty of action, using the pipes already down in oil wells, the creation of an efficient vacuum, and the ease and economy of its application.

It has been subjected to severe tests and never yet has failed. Indeed, its performance exceeds the promise of the inventor. The lowest estimates made by practical and scientific men, who have examined its operation, is that it is equal to at least 2,200 barrels per day through a two-inch pipe, 4,090 from a two-and-a-half-inch pipe, and 8,200 barrels through a three-inch pipe. The depth of the well or mine does not prevent its efficient action.

The principle of its operation is that of forcing compressed air down a tube, exhausting the air

chamber, and thus forcing the contents of the well into the vacuum, whence it is discharged by the combined action of the compressed air and the pressure of the atmosphere acting on a vacuum. The same apparatus can be used for separate wells, or mines, there being always a surplus of power for contingencies. It has been applied to house pumps and works admirably, the pump never fouling nor freezing.

Those interested are referred to the description in No. 23 of Vol. XII., SCIENTIFIC AMERICAN, or to F. S. Pease, Buffalo.

New Steamboat Fuel.

The Cleveland (Ohio) *Herald* says:—"The other day, at the Islands, we noticed a novel kind of steamboat fuel. When the *Philo Parsons* was wooding at North Bass Island, she took on board a large number of sturgeon which had been landed from the fish ponds in that vicinity. As these fish had been lying a day or more in the sun they were, like the exploded dog, not good for much as fish. Curiosity as to the design of such freight was soon satisfied on seeing a huge sixty-pound sturgeon go head foremost into the furnace. Inquiring into this novel species of steamboat fuel, we were told that the oil from the fish assists the combustion of the wood very much, and that the boatmen are glad to clear the docks of sturgeon, which would otherwise be deemed worthless, unless to enrich the soil.

"It is said twenty sturgeon make as much steam as a cord of wood, though we do not know that the wood-measure tables have been 'reconstructed' so as to read, 'a score of sturgeons make one cord.'"

Low's Shingle Machine.

In the description of Low's shingle and barrel head machine, which was illustrated in No. 25, Vol. XIV., SCIENTIFIC AMERICAN, an error occurred in regard to its capacity. Instead of sawing from 1,700 to 2,500 shingles per day of eleven hours, we have seen certificates from concerns using the machines which state that they cut from 15,000 to 22,000 per day of ten hours, and that they are capable of doing even more. These machines are in use in all the Western States, in California, and in New Brunswick. They seem to give excellent satisfaction. For the convenience of our readers interested in the lumber manufacture we give the prices: with 36-inch saw and jointer, complete, \$275; with 40-inch saw, \$300. S. J. Ahern, 88 Wall street, is the agent in this city.

The Non-Recoil Gun.

It will be recollected that in our last number we stated the facts, in brief, in regard to experiments with an open tube as an instrument for propelling projectiles. The *Engineering* states that "Mr. Harding, the inventor, has brought it under the notice of the French and Belgian Governments, who have each appointed a commission to examine and report upon its merits. Mr. Harding is drawing, at the Hydraulic Tube Company's Works, a gun of 4-inch bore with 2-inch thickness of steel around the chamber, and we hope soon to be able to give the practical results of a conclusive trial of the most extraordinary system of ordnance known to modern times." The result of experiments on a scale that promises useful and practical effects will be awaited on this side the water with a degree of interest noways inferior to that of our cousins on the other side.

The Ames Gun.

Mr. Horatio Ames, the patentee and manufacturer of the gun which bears his name, and which has been repeatedly tried with extraordinary results by the ordnance officers of the American Government, has lately brought it under the notice of the Emperor of Russia. The resources of the Russian gun factories were at once placed at Mr. Ames's disposal, together with a liberal appropriation of money to establish the manufacture in that country; but, we believe, the offer has been declined, and indeed no experienced iron-master would think of commencing such an undertaking in a country so lacking in skilled labor and in general facilities for special manufactures of iron as Russia.—*Engineering*.

DURING the war over one thousand ships of our mercantile marine were transferred to foreign flags.

MISCELLANEOUS SUMMARY.

THE Hamilton Manufacturing Company, of Lowell, has entered upon a new department of business, that of manufacturing delaines. The machinery for this purpose was mainly imported from England at a cost of \$400,000, and the company is now able to turn out delaines that will not suffer from comparison with the products of older concerns. The manufacturing companies of Lowell have introduced into their mills Francis's apparatus for extinguishing fires—by which the entire building can be flooded in a very brief period of time, and which can be effectually operated when it would be impossible to affect the flames by efforts from the outside.

THE people of St. Louis are again bestirring themselves to an extension of the North Missouri Railroad through Iowa via Cedar Rapids and into Minnesota, so as to tap the seven east and west lines in those States, and afford an easy and effectual cut-off for the benefit of St. Louis. They have hitherto relied upon the Mississippi as a cut-off, but are abandoning that idea with the multiplication of railroad bridges over the stream, and now propose a subscription of a million dollars in aid of a railroad extension to Cedar Rapids.

OLD MINES RE-DISCOVERED.—In Brazil, in the town of Rio Grand de Sul, old silver mines worked by the Jesuits have been re-discovered. There are said to be in the southern part of California, also, silver mines of the greatest richness which were worked before the formation of the Mexican Republic with great results, all traces of which were carefully concealed when the priests, who had taken the profits of them, were compelled to leave the country. The Indians were put under oaths, with fearful penalties, not to disclose the locations of them.

A VEIN of tripoli, twenty feet in thickness, fifty rods wide, and a mile in length, has been discovered near the town of Stillwater, Minn. It is said to be free from acids, mica, or calcareous earths, and equal to the Mount Eagle tripoli, so celebrated in this country and Europe. Nothing has ever yet been discovered equal to the pure tripoli for cleansing and burnishing all metallic and glass surfaces. Tripoli is composed of the exuviae of infusoria, and is entirely an animal production, although found in the earth.

CRYPTOGRAPHY.—C. B. S., of Conn., sends a table intended to be used in cipher writing, which is precisely like one sent us by an Ohio correspondent, and which we referred to in No. 25, Vol. XIV. Like that, its value depends upon key words agreed upon by the parties in communication, and it is one of the most ancient forms of the art. An arbitrary transposition of the letters, guided entirely by the key words, constitutes its value.

THE city of Hartford, Conn., has produced no less than 821,000 volumes of books relating to the civil war, whose aggregate value is about \$2,500,000; turned out more fire-arms than any other city, and built \$1,500,000 worth of steam engines during the war.

MR. HUGHES gets for his telegraph 200,000 francs from France, 120,000 francs from Italy, and something from Russia, besides the Order of St. Anne. He can afford to frank a few dispatches for his friends—he can if any man can.

It is stated that New Haven is the only place in the United States where fishhooks, needles, and steel-bowed spectacles are manufactured. Needles, however, are now made in Bridgeport and other places.

A NEW HAVEN company has begun the manufacture of a compressed stone for building purposes. It is made of sand, pulverized quartz, and silicate of soda, and hardens within 24 hours from the consistency of putty to the solidity of stone.

LEWISTON, Me., has eight cotton factories, with eighty thousand spindles and five thousand operatives. The mills are now all running on full time. The Androscoggin Mill there is one of the largest in the world.

THE first bushel of wheat ever grown in Minnesota was raised in 1829; last year the yield was 10,000,000 bushels; and this year, with a good harvest, the crop is put down at 16,000,000 bushels.

THE Jewish synagogue just completed at Berlin, but not yet consecrated, is one of the most gorgeous buildings in Europe. The entire cost of the structure is estimated at \$750,000 in gold. It is surmounted by a huge dome of the Oriental type, which can be seen from every house-top in Berlin. It is not less conspicuous for its Eastern form, than for the heavy gilding which covers it in every part. Besides, there is also a minor dome, also richly gilded. The interior is broken up into the great central hall of worship, not far from a hundred feet in length, and provided with 3,000 chairs for the worshippers. These are of oak and richly carved. To occupy one of these chairs costs about \$500 yearly.

ODORS OF DISEASE.—The odor of small pox has been compared to the smell of a he-goat; that of measles to a fresh-plucked goose; scarlatina to cheese. The smell of plague has been compared with the odor of May flowers, and that of typhus with a Cosack. That the typhus odor resembles ammonia, I have often observed, and the best and most recent investigators agree that it is a compound of ammonia. Probably the more intense the smell, the more operative the poison; hence the necessity on the part of the attendant to avoid inhaling this concentrated poison.—*Prof. Banks, Medical Press and Circular*.

THE origin of the earth's heat is the subject of a communication from H. L. of N. Y. He assumes it is caused by the impact of the earth upon whatever resisting medium in the line of its orbit tends to retard its motion. The idea is not new, and the subject is not really of practical importance. Until the existence or nature of a resisting medium is established and understood, all discussion of the question must partake more or less of conjecture.

A NEW PRESIDENTIAL MANSION.—It is proposed in Washington to erect a new dwelling for the President on the elevated plateau at the east of the Capitol, the present White House being deemed unhealthy and inconvenient. Probably the cost of building a roomy and permanent structure in the locality proposed would be hardly more than the expense of the continual repairs which seem to be required on the present edifice.

MEASURING GRAIN.—The variation between weight and measure of grain in different States has induced the Albany Board of Trade to recommend to the Boards represented in the Detroit Commercial Convention of 1865, the measurement of grain by the cental of one hundred pounds, with the object of uniformity.

THE grounds of the Portland Rolling Mills Corporation comprise eighty-five acres. This tract is divided by avenues into lots, and with a multitude of neat and substantial houses constitutes a pleasant little village. The mill has a capacity of 10,000 tons per year, has an engine of 400-horse power, seven heating and three puddling furnaces.

IN speaking of city reforms, some weeks ago, we alluded to the fact that the new Excise Board intended to get enough from licensed liquor dealers to nearly pay the police expenses of the city. This Board went into operation on the 1st of May, and the Treasurer now reports over one million dollars on hand.

THE new bridge over the Schuylkill at Chestnut street, Philadelphia, is rapidly approaching completion. It is a splendid structure of cast iron, the total weight of the material being seventeen hundred and fifty tons. It will be opened for travel July 4th, and will be entirely finished in the ensuing September.

AN exchange says that a sure sign of rain is the rising of moisture to the surface of the ground where it has before been dry, and accounts for it by the fact that as a storm approaches, the density of the atmosphere decreases, and the pressure upon the surface of the earth is lessened.

STEEL RAILS.—In consequence of being made too hard, several steel rails have broken lately. It is imprudent to attempt to obtain great durability by making over-hard steel. In the cases to which we refer, the engine weights were very heavy.

WATER in which indigo has been dissolved is recommended to remove smoke stains from walls before whitewashing, but common lye made from wood ashes is believed to be equally as efficacious.

THE SCIENTIFIC AMERICAN--COMMENCEMENT OF VOLUME XV.

This is the initiatory number of Vol. XV., new series, and with it we send greeting to our numerous subscribers. What the SCIENTIFIC AMERICAN has been in the past is our readers' assurance of what it will be in the future. We might fill columns with the favorable notices we receive, not only from our exchanges, but by private correspondence, but we prefer that our works speak for themselves.

We design to sustain the character of this journal as a means of instruction and improvement, and a medium through which the student of practical science, and the mechanic, can reach those devoted to kindred pursuits.

The results of experiments in science as applied to the useful arts; the details of mechanical improvements; the successive triumphs of mind over matter; the discussion of questions involving valuable principles and their useful application; the furnishing of practical information desired by correspondents; illustrations and descriptions of new inventions, and a general *résumé* of the progress of science and art, are among the objects of the SCIENTIFIC AMERICAN.

We remind our subscribers that now is the time for renewing their subscriptions, as, after the lapse of a few weeks, it is often difficult to furnish the back numbers. The same remark applies equally to those designing to become subscribers.

Iron-clad Ships.

In reply to a question put by Mr. Laird, in the House of Commons, the other evening, Mr. T. G. Baring said: "Her Majesty's Government are 'aware that there are several ironclads belonging to foreign Governments on the Pacific and North American stations,' and that some of those vessels carry cast-iron guns which throw very heavy shot. With respect to the future movement of her Majesty's armor-plated ships, I must beg to be allowed to say that they must be determined from time to time by the Executive Government. I may mention, however, that the *Favourite* has been sent on an experimental trip to the North American station. Twelve-gun guns have not yet been placed on board any armor-plated ships. They have been found to work as well as broadside guns, have been adopted into the service, and will be supplied to our armor-plated ships as soon as carriages are ready. The alterations of the *Scorpion* are being carried on precisely as all work is carried on which is not urgently required. They have only been interrupted by pressing demands on account of ships wanted for service, but I am afraid they are not likely to be completed for some considerable time.—*Engineering*."

Honors to Mechanical Engineering.

At the commencement of the University of the City of New York, held on the 21st at Niblo's Garden, the degree of Doctor of Physical Science (*Doctor Physicis Artibus*), was conferred upon Mr. Erastus W. Smith, the well-known engineer of Harlem Bridge and of various corporations. Mr. Smith is also superintending the construction of the *Dunderberg* for the Government contractor, Mr. W. H. Webb. This is the first instance of the conferring of this degree in this country.

A NOTEWORTHY fact in connection with the present difficulties on the Continent is, that all countries likely to be engaged in the war have increased their supply of coal to an enormous extent. Italy has been importing coal lately in such large quantities that the freights on the east coast have greatly advanced, and vessels can scarcely take the coal with sufficient rapidity. This supply is for the Italian navy. Austria has also increased her supply of coal very largely, although it would appear that her navy is not to be actively engaged in acts of aggression upon Italian merchantmen. Prussia has also largely increased her supply, and the same remark will apply to Russia and France.

VESUVIUS GETTING LIVELY.—People who live in the neighborhood of Mount Vesuvius say that the volcano is again exhibiting signs of internal commotion. The small cone recently threw quantities of stones into the air, and on the large cone two new

craters have been formed. A considerable body of lava has also flowed from the small cone.

NEW INVENTIONS.

REGISTERING APPARATUS FOR PRINTING PRESSES.—JAMES KIRK, Dover, Del.—In printing upon both sides of a sheet, whether for newspapers, books, or other work, it is essential that the impressions on the two sides of the sheet register; in order to effect this, pins or points are generally used in giving the second impression, to fit into holes made in the sheet at the time the first impression is given it. Several plans have been devised for facilitating the adjustment of the sheet upon the pins or points, and the withdrawal of the latter from the former, in feeding the sheets to the press for the second impression, and this invention relates to an improved means for accomplishing that object.

GAGE COCK.—C. L. FRINK, Rockville, Conn.—This invention consists in the arrangement of an elastic and flexible perforated valve, in combination with the hollow screw spindle of a gage cock and with a tapering seat, so that by forcing the valve down in its seat, the channel in it is closed and the escape of water or steam from the interior of the boiler is prevented; and by moving the valve back from its seat the central channel or passage in the same is opened and the steam or water from the boiler is free to discharge.

SOCKET FOR WATER GAGES.—C. L. FRINK, Rockville, Conn.—This invention consists in the arrangement of a safety cock in line with the channel leading from the lowest socket of a water gage to the water space of a steam boiler, in combination with the ordinary blow-off cock at the bottom end of the socket, in such a manner that by opening the safety cock before the blow-off cock is opened a jet of solid water is forced through the socket at right angles with the bore of the glass tube, and thereby the steam is prevented from blowing through the gage when the blow-off cock is opened, and the danger of breaking the glass tube is avoided.

STREET RAILWAY CAR.—F. W. JENKINS, Brooklyn, N. Y.—The object of this invention is to prevent the occurrence of accidents to persons, who, by carelessness or mischance, happen to fall under the cars, across the rails, and in front of the car wheels, while the cars are in motion.

LANCING IMPLEMENT.—GEORGE J. CAPEWELL, West Cheshire, Conn.—This invention consists principally in a peculiar formed cap for the casing of the instrument in which the knife blade is arranged, whereby the instrument when placed upon the animal with such cap over the vein which is to be lanced, the vein will be firmly and tightly held in the proper position for the knife to act upon it.

WATCHES.—ARTHUR WADSWORTH, Newark, N. J.—This invention relates to that class of watches, for the winding and setting of which no key is required, and in which both operations are performed by simply turning a part of the pendant of the watch case.

WASHING MACHINE.—JOHN C. FELLOWS, South Adams, Mass.—The object of this invention is to produce a washing machine which will be economical in construction and easy to repair, and which is easily operated without requiring the expenditure of much power or much skill.

GANG PLOW.—JAMES B. HUNTER, Ashley, Ill.—This gang plow consists in an improved means for adjusting the plows, higher or lower, as may be desired, and also for adjusting them laterally, whereby furrows of greater or less depth and width may be made, in an improved means for raising the plows out of the ground, as is necessary in drawing the machine from place to place, turning at the ends of a field, etc., and in an improved means for adjusting the points of the shares more or less obliquely in a downward direction, and in an improved manner of attaching the plow beams to the machine in order to lighten the draft.

SNAP-HOOK.—A. HAGNY, Keokuk, Iowa.—This invention consists in a snap-hook which is cast with an eye of considerable size through its shank, and with points in its under side, which points are to be turned down to secure the spring to the hook, the spring passing through the eye and springing in a recess cut for it in the extreme end of the hook, by which construction it is believed that much is saved in material and expense of casting and fitting the parts.

SHOVEL PLOW.—PAUL DENNIS, Schuylerville, N. Y.—This invention consists in the employment of adjustable wings of twisted or curved form, applied to the plow in such a manner as to be capable of being reversed or changed in position from one side of the plow to the other, in order to cast the earth outward from the plow, or inward to fill the furrow.

BOLT-HEADING MACHINE.—A. B. GLOYER, Derby, Conn.—This is a machine for forming heads on bolts and consists in a novel arrangement of forming dies in connection with two upsetting dies, whereby the heads of bolts may be perfectly formed, and by an automatic movement of the several parts throughout the whole operation. The heading dies are so operated as to be brought consecutively over the bolt and forced down consecutively on the bolt, and the finishing heading die made to operate twice upon the bolt in order to finish the head. Means are employed for actuating the heading dies so that the bolt and screw may be firmly held during the heading operation, and instantly released after such operation is performed. It also has a clutch-operating mechanism for automatically disconnecting from the driving shaft as soon as the heading operation is completed.

BOOT AND SHOE STRETCHER.—WILLIAM FREDERICK, Ashland, Pa.—By means of this instrument boots and shoes may be stretched either at the toe or instep, or in both places at the same time. It consists of a stretching last, formed in two parts, hinged together at the toe by a treble-jointed hinge, and operated by a rod, pinion wheel, rack and pulley, or pulleys, for the purpose of stretching the toe of the boot or shoe.

FAUCET OR STEAM VALVE.—RUSSEL BURTON, South Adams, Mass.—The object of this invention is to furnish a faucet for restraining or permitting the passage of liquids or steam through a pipe; and consists of a conical chamber formed on said pipe and extending both above and below it, having a conical plug fitting

into it, being pushed up against the cover by the action of a spring making it steam-tight, and the wear being compensated by forcing down the plug by means of a screw cover.

RAILROAD SPITTOON.—W. G. SMITH, Carlisle, Pa.—This invention consists of a self-cleaning spittoon, which is let into the floor of the car, and the bottom and cover of which are so connected that closing the cover opens the bottom and discharges its contents, and opening the cover closes the bottom and leaves the spittoon ready for use.

CUTTING GREEN CORN.—JONATHAN BURT AND LEONARD F. DUNNE, Oneida, N. Y.—This invention relates to a device for cutting green corn from the cob, whereby the work may be quickly performed, and in a perfect manner. It consists of a series of cutters, scrapers, and guides, attached to a tube, and used in connection with a sliding frame provided with an adjustable center rod.

STRAW CUTTER.—CLARK POLLEY, Sinking Springs, Ohio.—This straw cutter is so constructed that the knife is forced up against the bed plate while making the cut, by direct pressure, thus compelling it to make a clean cut.

SMUT MILL.—R. C. SWANN, Brownsville, Ind.—This smut mill or scouring device is for the purpose of cleaning grain, and can be applied to an ordinary farming mill, thrashing machine, or fitted up in a flouring mill. It consists of a perforated bed or screen, having a reciprocating motion imparted to it, and a series of fixed pressure rollers having the bearings of their journals in springs, which cause the rollers to press upon the screen, the roughness of the latter in connection with the surfaces of the rollers, which are also rough, subjecting the grain as it passes over the screen to a sufficient scouring action, which loosens or detaches the smut and dirt.

FERRY BRIDGE GATE.—LEWIS P. DECKER, Brooklyn, N. Y.—This ferry bridge gate is so constructed as to be operated simultaneously and from any convenient position. It consists in the construction and arrangement of the gates, and the combination of a ratchet bar and gear wheels with each other, and with the shafts to which the gates are attached.

MACHINE TO MAKE HINGES.—JEAN BAPTISTE EVRAUD AND JEAN PIERRE BOYER, Paris, France. (A. Berthoud, 248 Canal street, New York, is the assignee).—This machine is for manufacturing butt hinges, made of two halves, each half being made of a piece of sheet metal cut out and doubled up, so as to form loops through which the wire can be passed that serves to unite the two halves of the hinge. The two strips of metal required for the two halves of the hinges are fed automatically to the punches, to the cutters, and to the devices for doubling up the pieces forming the loops, pushing the two halves together, inserting the wire and cutting off the same; and, furthermore, a carriage is applied which forms the bearings for a series of countersinks placed in such a position that by their action all the holes in each hinge are countersunk simultaneously, and the hinges on being delivered from the machine are complete and ready for immediate use.

APPARATUS FOR KNEADING DOUGH.—GEO. W. SANDERS, Springfield, Vt.—This invention consists in combining a kneading board and roller in such manner that the roller may have a universal motion, whereby a convenient and easily operated device for kneading dough is produced.

GAVEL-DISCHARGING DEVICE FOR HARVESTERS.—WILLIAM ZIMMERMAN, Oskaloosa, Iowa.—This invention relates to a new gavel-discharging device for harvesters, whereby gavels of greater or less size may be discharged, as desired, and the device made to operate with certainty and in a perfect manner. It is designed to operate in connection with an endless apron, a means used on some harvesters for discharging the cut grain from the machine.

SILL STRIP FOR DOORS.—JEREMY E. LINDSLEY, Goshen, Ind.—The object of this metallic strip is not only to protect the sill from becoming worn, but also to prevent rain or moisture or the wind from passing under the door, thus also acting as a weather strip; it being so formed that it can be applied to the sill of the door and there retained in place without the use of screws or other fastening devices.

IRRITATION INSTRUMENT.—FRED. KLEE, Williamsburgh, N. Y.—This invention consists in the application to an irritation instrument of a regulating screw, whereby the points can be so adjusted as to penetrate the skin of the patient to a greater or less depth as may be desirable; and in the arrangement of a diaphragm of leather or other suitable material at the bottom end of the cylinder containing the pricks so that when said diaphragm is saturated with the liquid to be introduced in the skin, the whole operation is effected by causing the pricks to pass through the diaphragm just before they enter the skin of the patient.

COATING BRICKS.—FRANK JONES, Boston, Mass.—This is a process of coating evenly any necessary portion of bricks with mastic or cement so that it will be of a uniform thickness, thereby greatly lessening the tendency of the mastic to peel off after being exposed to the action of the atmosphere as when applied in the usual manner.

CLOTHES POLE.—F. W. TILTON, New Bedford, Mass.—This invention consists in constructing a clothes pole with a double-hooked end so that the line can be readily inserted between the hooks and withdrawn at pleasure, and when placed therein it will be firmly supported; and also in whatever direction the wind may blow, or how often it may change, the line will always be in a position in the double hooks, which will prevent it from becoming detached from the pole.

CLEANER FOR RING TRAVELERS.—WELCH JENCKS, Manchester, N. H.—The object of this invention is to prevent the waste from lodging in the traveler and breaking the thread, as it will do if not removed during the operation of spinning.

SAFETY VALVE.—C. L. FRINK, Rockville, Conn.—This is an arrangement of a swinging supporter so combined with the stem and lever of a safety valve that the supporter will accommodate itself to the position of the lever, and the lateral strain on the valve stem will be diminished or avoided.

CIDER MILL.—S. J. ROMANS patentee, patent issued June 5th. The inventor may be addressed at Newburgh, N. Y., not at Walden.

Improved Steam Boiler.

The increased and increasing cost of fuel, and the continual demand for it as a generator of steam power, has stimulated the inventive faculty to a remarkable degree to find means to reduce its consumption or to utilize a larger percentage of the caloric. The old-fashioned cylindrical boiler, having only a single or double flue to distribute the heat generated in the fire-box, is fast giving place to more complicated, scientific, and effective forms. The improvement under consideration is one among the many intended to economize the use of fuel and to make available a larger portion of the caloric generated by combustion. The illustration annexed represents a longitudinal vertical section of a boiler, A, similar in form to that of the locomotive. From the top rises the steam dome, B, provided with a cap, C, from which the steam is conducted to the engine. E is a pipe extending through the top or side of the boiler and communicating with a serpentine pipe, F, situated directly under the crown sheet of the fire-box D. From this serpentine pipe extends another, G, down in the space between the outside of the fire-box and the inside of the boiler. This is connected with the horizontal pipe, H, which is shown by the openings and dotted lines, and surrounds the bottom of the fire-box.

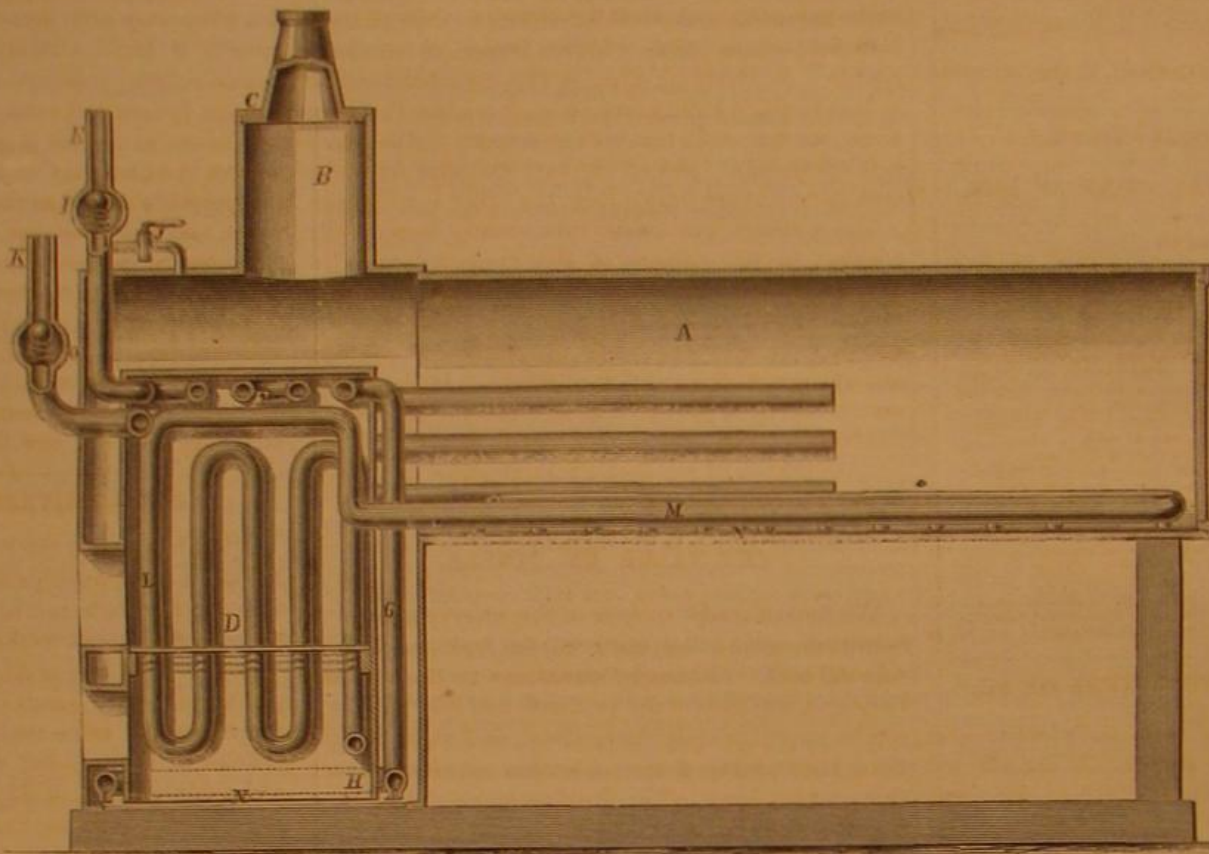
This pipe is provided with a set of nipples N, opening downward. Now, through the pipe, E, is forced gas or common atmospheric air, which, by traversing the serpentine pipe, is heated and discharges through the nipples, imparting additional heat to the water, and aiding in the circulation of the water and the disengaging of the steam. The air or gas is forced into the boiler by a pump or other similar device, and its return is checked by the valve, I. When the pump is not in operation the connection, J, is opened between the steam space and the pipe, E, to produce an equilibrium and allow the water to rise in the pipe to prevent burning. K is a similar pipe for a similar purpose, which enters the boiler from the front or side and connects with another serpentine-formed pipe, L, which surrounds three sides of the fire-box close to the sides. This also has a check valve, O, and connects with a return pipe, M, running along the bottom of the boiler and provided with downward opening nipples, N. Its operation and design are precisely similar to the first-described pipe. The object is to introduce to the water in the boiler highly-heated air or gas, which shall utilize the heat in the fire-box, aid in the circulation of the water, and thus indirectly in the production of steam, and directly by imparting additional heat.

Patent pending through the Scientific American Patent Agency by D. B. Tanger, whom address for further information, Bellefontaine, Ohio.

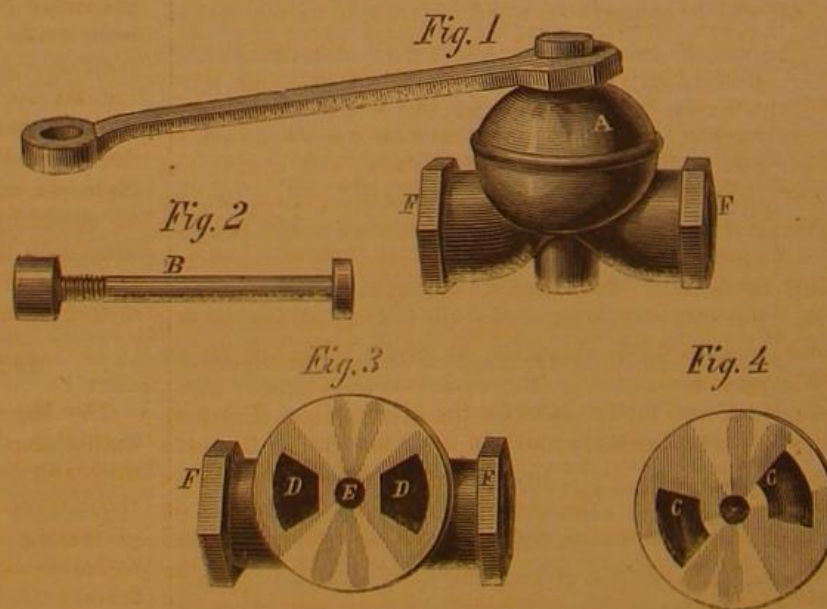
Allen's Improved Valve.

The accompanying engraving represents a disk or diaphragm valve, designed to supersede the common globe valve, which requires packing, and is difficult to keep in order after it is worn. Fig. 1 represents perspective view of the valve; Fig. 3 a face view

of the valve seat, showing the ports, and Fig. 4 the valve face. The valve proper, A, forms the upper portion of the apparatus and is a cup-shaped casting of metal having an outer shell, and an inner shell surrounding the bolt, B, Fig. 2. The face of this hemisphere is finished smooth and has ports, C, opening into the annular chamber between the inner and outer shells, and corresponding with similar ports, D, in the seat, E. The pipes F, have free passages into this annular chamber by means of these ports. The upper and under portions of the valve are se-

**TANGER'S STEAM BOILER.**

cured and held in close contact by the bolt, B, the head of which is on the top, and the nut underneath the valve. Between the nut and the bottom of the valve is a flat steel spring, having a tongue or spur fitting into a groove on the bolt, to allow the upper portion of the valve to turn without permitting the bolt to rotate. The spring holds the two faces of the valve together, while it permits a slight yielding to prevent unnecessary friction.

**ALLEN'S DIAPHRAGM VALVE.**

It is easy to see that the grinding and reseating of this valve could be easily accomplished in case of wear. It seems to be a very simple and efficient device for the purpose designed. Patented through the Scientific American Patent Agency, July 25, 1865, by D. D. Allen. All letters for information should be addressed to the Allen Valve Co., South Adams, Mass.

The Patent Office Reports for 1863 are issued and in answer to numerous inquiries for them we would state that the reports can only be had through Members of Congress.

THE ADAPTATION OF IMPLEMENTS TO LABOR AND THE LABORER.

The continual improvements in labor-saving machinery, to which the attention of our inventors is directed, aims mainly at the release of the human body from immediate contact with the work to be performed, and the substitution of mechanical appliances for the direct power of muscle. The grand object is to contrive machines, which, managed by one or two men, will do the labor of dozens and hundreds. This is well, and we see on all hands the triumphs of genius in this substitution of the forces of steam, and the strength of metals for the powers of the human organism. But is there not another field of labor-saving invention, which, although by no means neglected, is yet imperfectly wrought? The improvement in the common implements of hand labor ought to keep pace with the inventions that replace the efforts of the laborer. Take a few familiar examples. Some blacksmiths persist in the use of a four-pound hammer for ordinary work, while another for the same work uses a much lighter one, producing as great an effect within the same time at a much less waste of muscular force. Carpenters sometimes select a hand-saw for the thickness of its plate and its width, rather than for

its temper and perfect straightness. In the one case the workman moves back and forth a useless weight, and in the other the implement is as light as is possible for the result designed. The saw blade should be only thick enough to prevent "buckling," and should be set so as to cut a "kerf" only wide enough to allow its free movement.

We might cite many illustrations of the waste of human power by the use of unadapted implements.

We copy the following judicious remarks on this subject from the *New England Farmer*. Speaking of the common hoe, it says:—

"To be the most efficient, the handle of this tool should be just long enough to enable the holder to stand as erect as possible, and at the same time apply sufficient power to effect his purpose. It should be strong enough to resist the force applied to strike the hoe into the ground, and not have anything added to its bulk beyond that. The blade should be steel, thin, light, polished, and kept so by the workman, and should not have the tenth of an ounce in weight more than is necessary to give it the strength to perform the work required of it. Such a hoe should weigh two pounds, and no more, as the labor required to lift any more would be entirely thrown away. By observing the number of strokes struck by a man in hoeing during a day of ten hours, it will be found that he will lose a force each day equal to raising a ton-and-a-half weight several feet from the ground, if his hoe weighs one ounce too much. The labor required to raise such a weight, if multiplied by the number of days devoted to hoeing, would probably be found sufficient to hoe one or two acres of corn."

The *Omaha Republican* of June 7th gives cheering bulletins of the progress on the Union Pacific Railroad. There are on the levee at that place fifty miles of iron, and ties for seventy miles, with 60,000 ties up the river, in the transportation of which five steamers are constantly employed. From one to two miles are finished daily, and at the above date the track had reached eight miles beyond Columbus

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THE CULTURE AND MANUFACTURE OF SILK.

The war has done more than to unsettle and change the state of political parties. It has affected seriously the raising and manufacture of our great staple, cotton. The days of large plantations and aggregated settlements of farm laborers is past. Cotton will still continue to be an important staple of home manufacture and foreign export, but never again shall we see a whole section of country, comprising entire States, devoted almost exclusively to its cultivation.

For the benefit of the South—for the advantage of the country at large, and through the country, for the advancement of the world—we are not sorry. There is a meaning in all this, a meaning not altogether comprehended by our political leaders and statesmen. We believe that a subdivision of labor and pursuits not only insures the best results in itself, but produces the best effects on the world at large. There are exceptional cases where a particular locality is better adapted to the production of a particular material or its manufacture than to anything else, but those instances are only exceptional. There is hardly any fertile region but will produce equally well the raw material for several important manufactures, and, in many cases, will afford equal facilities for its manufacture.

Such, we believe, to be the South. The Gulf States appear to be the home of cotton. Some of the Atlantic States have endeavored to rival their sister States in its production, and, in some instances, with flattering results. But while the people have been engrossed with the production of the raw staple they have neglected its manufacture, purchasing, from those whose ingenuity has turned the product of their plantations into useful fabrics, the crops of their acres at a largely advanced cost. The manufacture of cotton at the South will undoubtedly hereafter become an important part of Southern wealth and importance.

But the business of silk raising and manufacture which, as early as the times of James I., was introduced into Virginia, ought to engage the attention of practical men. Owing to the demand for Virginia tobacco, it did not flourish, the planters preferring to cultivate the Indian weed to the production of the web of the Chinese worm. In 1732, artisans and others skilled in the silk business, were sent to Georgia, and succeeded in producing as fine a quality of silk as could be made in Italy, which commanded the highest prices in London. Before the close of the 18th century the last lot of Georgia silk was exported, owing to the revolutionary war and the want of interest in the business. About the middle

of the century, or in 1747, its cultivation was undertaken in Connecticut, and some excellent qualities of silk, raw and manufactured, were produced.

For some reason, however, the silk business has never been a favorite one in this country. One reason has been undoubtedly the necessity of careful attention to the worms and the treatment of the cocoons, with the necessity of skilled labor in the manufacture of the raw material. It is, however, now becoming an important business. In Hartford and Manchester, Conn., the Cheney Brothers have the most important silk establishments in the country. They manufacture ribbons and dress silks, in no way inferior to those imported, and often far superior. But all their material comes from China, Japan, or southern Europe. In Hartford, also, is the establishment of Tobias Kohn, a Hungarian, who furnishes the New York market with the best specimens of silk braids and trimmings. But all the raw material for these manufactories are drawn from the other hemisphere.

The southern portion of this country is especially adapted to the culture of the mulberry and the raising of the silk worm. There is no adequate reason why it should not furnish all the material necessary to keep our home manufactories running and encourage the erection of others. At the North, also, it has been proved that silk can be successfully cultivated. We believe this could be made an important branch of our manufactures and a large item in our material wealth.

THE VALUE OF TIMBER.

We have already spoken of the attempts made to substitute some other material for fuel in place of mineral coal. Although, according to English statisticians, the limit of the production of coal in Britain can be approximately determined, and their calculations have engaged the attention of Government, this country leads off in the first successful attempt to provide for the possible contingency of an exhaustion of the coal beds, or, rather, here, to meet the demand for cheap fuel. Our coal mines will last us for an indefinite period, but owing to local or temporary causes, it has become an object to find a rival to the black diamonds which underlie our soil.

But while the attention of our people is drawn to the necessity of introducing a cheaper material than coal, as a fuel, our forests are rapidly wasting away. In localities not possessing good facilities for transportation, the trees in the forests are ruthlessly sacrificed, and, if the waste continues in the same ratio for the next half-century as it has for fifty years past, there must be portions of our country which will be changed from fertile farms to barren wastes. This is no fancy or sensational statement. The grand reservoirs of our springs, brooks, and rivers are our forests, except on the slopes of mountain ranges. They conserve the moisture deposited by rain and dew, by frost and snow, and deal it out through the arid and thirsty months, giving fertility and verdure to land that otherwise would not feed a goat. Forests serve a grand object in the economy of nature. They should be valued and protected. For this utilitarian reason, as well as for others of a more æsthetic character, we desire to see our forests preserved.

A trial lately made on the New Haven, Hartford, and Springfield Railroad, established, so far as a single trial could, the value of peat as a fuel above that of coal. The report of the run of twenty-six miles and return, demonstrated the fact that peat gave a greater heat, weight for weight, than the best coal, either bituminous or anthracite, at a cost of not more than sixteen per cent of that of coal. Here, then, is at least a partial substitute for coal as a fuel, and we do not despair yet of the economical use of petroleum for that purpose. The gas from wells has been used economically and with excellent results in places where wells have been bored which yield gas rather than oil. Of course this material must, from its nature, be restricted in its application. But all these help to preserve our woods from the waste of burning.

The alarming inroads made of late years upon our forests, the continually exacting demands for lumber, and its adaptation for thousands of purposes, make wood an absolute necessity. Yet although a very large portion of our territorial area, less than a hundred years ago, was covered by forests, it is a fact

that large bodies of timber are now the exception rather than the rule. The forests of Maine, deemed at one time inexhaustible, the woody regions of Pennsylvania and Western New York, and even the forests of Canada, are yearly decreasing in extent. The pine is found now in larger quantities in the lower peninsula of Michigan than anywhere on this northern continent. How long can it remain? This is a question for those who have calculated on the forests of Maine as inexhaustible.

To be sure, the prairie dwellers of the West, with a foresight and enterprise that does them infinite credit, have gone to planting trees; but the object is a temporary and present one. The nature of the growth is rapid, attaining quick maturity, and intended only to subserve a present interest. No permanent forests will arise on our prairies. The wood will be cut as fast as it grows. Under these circumstances the discovery of a material which will fulfill the purposes of fuel as readily and cheaply as coal or wood, and the cessation of the wasteful destruction of timber by burning, in order to remove it from the soil, has become a necessity. We look to the inventive talent of the country—never yet appealed to in vain—to save to us and coming generations, those great storehouses of moisture—those equalizers of contingencies of the seasons—and depots for manufacturing material, our forests.

PARIS UNIVERSAL EXHIBITION.

A bill has passed the Senate—which will no doubt become a law—appropriating \$48,000 in coin to provide the furniture and fixtures for the proper exhibition of articles sent to the Paris Exhibition from this country. The sum of \$2,000 a year is appropriated to pay the principal agent. The sum of \$33,700 is appropriated for office rent in New York, freights on articles to France, and other contingent expenses; and a further sum of \$35,703 for railway transportation from Havre to Paris and returning, storage, clerk hire, etc. And, in addition to the above sums, \$10,000 are appropriated to pay the traveling expenses of ten professional and scientific Commissioners—to be appointed by the President—and ten additional Commissioners are to be appointed, who are to pay their own expenses. The total appropriation amounts to \$129,403, which include \$48,000 in coin.

Senator Grimes offered an amendment, that no money be paid under the resolution until the French Government gave ample assurance of the withdrawal of French troops from Mexico, and urged that the whole exposition was got up on purpose to glorify the infant Napoleon, now ten years of age, who had been made President of the Exposition. This proposition was gravely debated at considerable length, but did not find much favor.

We hope the French troops will be speedily withdrawn from Mexico, and that hereafter the Emperor Napoleon will mind his own business; but it would be unworthy a great Government like ours to exhibit such a spirit in reference to an exhibition of industry, which so many of our countrymen regard with deep interest.

PATENTS IN CONGRESS AGAIN.

The House has had under consideration a bill authorizing the Commissioner of Patents to determine and decide an application of Jonathan Ball for the extension of his patent "for an improved mode of coating the interior side of water pipes with hydraulic cement." This patent was duly extended seven years by the Commissioner, and having, under operation of law, run twenty-one years, expired some time last year. Mr. Dawes, of Massachusetts, opposed the bill chiefly on the ground that it was against public policy for Congress to legislate to extend expired patents. He insisted with great justice that, after the patent had been opened to the public, by operation of law, for any one to enter fully upon its manufacture, it was not right for Congress to undertake to revive the right. The position taken by Mr. Dawes is impregnable and, we are happy to say, resulted in the defeat of the bill. Such legislation, if insisted upon, would soon make our whole patent system odious. We therefore, speaking in the interest of the great body of inventors and patentees, protest against all attempts to revive dead patents.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JUNE 17, 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.

55,595.—EAVES-TROUGH.—J. P. Abbott, Cleveland, Ohio:

I claim the adjustable arm, A, notched standard, B, slotted lips, C, D, and key, F, in combination with the cross-tree, E, strap, G, and gutter, H, as and for the purpose set forth.

55,596.—HEATING AND SOLDERING GUN-BARRELS.—Ethan Allen, Worcester, Mass.:

I claim, 1st, The mechanism, substantially as described, for heating and soldering gun-barrels by blowing the heating blast through them.

2d, The clamps, J, composed of set-screws and springs, substantially as described, for holding gun-barrels while being soldered.

55,597.—BOLT-HEADING MACHINE.—Henry E. Anthony, Providence, R. I.:

I claim, 1st, The combination of a swivel-punch, F, with the die or collar which confines the bolt at a point above the heading chamber, substantially as described.

2d, Removing the thimble, R, and pin, T, or any other equivalent device which may be used to support or confine the lower end of the bolt, after such bolt has been partially headed, in order to allow any surplus stock to be forced from the upper chamber down through the head of the bolt, substantially as described.

3d, The sliding die-holder, G, operating substantially in the manner described.

4th, The combination of screw, E, and swivel-punch, F, operating substantially as described.

5th, I also claim the manner of securing the hand-tool by the cap, N, substantially as described.

55,598.—MODE OF COVERING STEAM BOILERS.—John Ashcroft, New York City:

I claim covering a steam boiler pipe, or other heater, with felt or other non-conducting material, when the latter is supported on a frame-work removed from and surrounding the former, not being in direct contact, but having an air-space intervening between said felt and boiler pipe, or other heater, constructed and operated substantially in the manner described and for the purpose set forth.

55,599.—SPOKE-SHAVE.—Leonard Bailey, Boston, Mass.:

I claim the combination of the screws, f, f, and nuts, g, g, or their equivalents, with the clamp-bar, c, and with the stock divided lengthwise into two parts or portions, constructed substantially in manner and so as to operate as described.

I also claim the arrangement of the clamp-bar, c, with the screws, f, f, and nuts, g, g, and with the stock divided lengthwise into two parts or portions, constructed substantially in manner and so as to operate with the said screws and nuts, substantially as set forth.

I also claim the combination and arrangement of the shoulders, i, i, with the screws, f, f, the clamp-bar, c, the cutter, d, and bed, b, or the stock, substantially as set forth.

55,600.—MANUFACTURE OF CARBONATE OF SODA.—Haydn M. Baker, Rochester, N. Y.:

I claim the application of the combined processes as herein described for the formation of carbonate and bicarbonate of soda, muriatic acid, and caustic lime, using for the said purposes the aforesaid carbonate of lime, carbonate of magnesia, and chloride of sodium, in the manner herein set forth, or any other processes substantially the same and which will produce the same intended effects.

I also claim the construction and application of the boiler and lime-retort in combination, as herein described and represented by the accompanying drawings, for the purposes duly set forth.

I also claim the application of heat and pressure without limitation in the process of forming bicarbonate of magnesia and subsequent double decomposition of chloride of sodium and bicarbonate of magnesia, forming chloride of magnesia and bicarbonate of soda.

55,601.—HOT-AIR ENGINE.—Cyrus W. Baldwin, Boston, Mass.:

I claim a vessel or reservoir placed between the furnace and the working cylinder into which jets of water are introduced at certain intervals and in regulated quantities, for the purpose specified.

I also claim the combination of the vaporizing trough, or its equivalent, with the hot-air duct, essentially as above set forth.

I also claim the peculiar construction of the trough, a, as made pyramidal or pointed at one or both its ends, and with the partitions, C, C, C, in manner and to operate as before set forth and explained.

55,602.—MACHINE FOR MAKING HORSE-SHOES.—Hazen J. Batchelder, Boston, Mass.:

I claim the mode of constructing each of the rolls, viz., not only with each of its dies made in sections and with lips to each, as described, but with rings to encompass the lips, the said sections and rings being held in place by a shoulder, I, and a channel, l, and clamps, N, N, or their equivalents, the whole being substantially as and for the purpose specified.

I also claim the separate creasing-die, O, made as described, in combination with two of the rings, H, H, and a sectional die, R, arranged between them, the whole being as set forth.

I also claim the combination of the lateral die, P, for obtaining variation of width of the blank with the two ring-dies, H, H, the dies, E, O, and R, and the mechanism for moving the roll-shaft, C, vertically, for the purpose of effecting the variations of thickness of the blank, as described.

55,603.—GRATE-BAR.—Horatio K. Bates, North La Crosse, Wis.:

I claim the off-set or dropper grate-bar herein set forth and shown.

55,604.—ORNAMENTING WOOD.—Alexander Beckers, New York City:

I claim producing mosaics, etc., of different woods, etc., in the manner herein specified.

55,605.—CHAIR-SEAT.—Alanson Bingham, Surrey, N. H.:

I claim attaching a seat composed of a single thickness of strips of oak, ash, or other suitable wooden material to a frame by means of slits, or slits and grooves, substantially as described.

55,606.—SLIDE FOR EXTENSION TABLES.—J. F. Birchard, Milwaukee, Wis.:

I claim adding thereto or combining therewith the additional slide-bar for supporting the leaves of the table, substantially as herein set forth.

55,607.—COTTON CULTIVATOR.—W. W. Blair, Lebanon, Tenn.:

I claim, 1st, The arrangement of the adjustable revolving harrow, H, with the revolving and adjustable chopping knives, J, J, upon the shaft, I, substantially as and for the purpose herein specified.

2d, The scrapers, M, M, pivoted near their inner ends, as represented and adjusted by means of the rods, d, d, levers, e, e, and rack-bars, g, g, substantially as and for the purpose herein fully set forth.

3d, The arrangement of the adjustable scraper-feet, D, D, with the scrapers, M, M, and the cutters or colters, L, L, substantially as and for the purpose described.

55,608.—CORSET AND SKIRT SUPPORTER.—Erastus Blakeslee, Plymouth, Conn.:

I claim, 1st, The stay, C, when arranged upon the body of the corset, so as to secure and support the skirt, substantially as described.

2d, In combination with a corset, buttons constructed and arranged so as to be self-adjusting on the stay, C, as and for the purpose specified.

3d, A corset supporter, constructed substantially as described, and attached to the corset in the manner herein set forth.

55,609.—ORDNANCE.—L. W. Broadwell, New Orleans, La.:

I claim the exterior reinforce, B, with a depression on its interior periphery, corresponding to the enlargement on the gun, with shoulders, b, b', substantially as and for the purpose described.

55,610.—WASHING MACHINE.—H. Bucknall, Darien, Wis.:

I claim, 1st, The combination of the rubbing concave, B, hung loosely in the machine by journals or pivots, with the uprights, G, cam, H, and rubbing bar, C, substantially as shown and described.

2d, The cam, H, in combination with the uprights, G, G, and pin, q, when constructed and operating substantially as and for the purpose specified.

3d, The thumb-screw, f, for raising and lowering the rubbing-board, C, in combination with the rock-shaft, F, and rod, E, as shown and described.

4th, In a washing machine constructed substantially as described, I claim the employment of a joint, e, at the connection of the rod, E, and the cross-rod, d, substantially as and for the purpose specified.

55,611.—GAP BUCKET HOOK.—James Bullock, Readsboro', Vt.:

I claim the form of three hooks combined in one piece of wire in the circle.

55,612.—HOE AND CORN-PLANTER.—John A. Burckard, Beloit, Wis.:

I claim the rod, D, hoe, C, spring, E, and roller, B, in combination with the stirrer, I, gauge-plate, K, and cylinder, A, as and for the purpose set forth.

55,613.—BRECH-LOADING FIRE-ARM.—John Burke, Syracuse, Ill.:

I claim, 1st, The combination of the tipping-barrel with the front part of the hinge and stock, and of the rear part of the stock and hinge with the breech-piece or plug, when the parts are arranged for joint operation, substantially as described.

2d, The jointed retractor, constructed substantially as described, to expel the cartridge by a positive motion.

3d, Moving the retractor in one direction by a cam, and closing it by grazing the breech, as described, whereby I draw in the retractor without using a spring, and am also able to prevent friction on the flange of the cartridge.

4th, The combination of the tipping barrel, the steady-pin, I, the locking bolt, L, the cone-plug, L, the cone-plug, K, and the shoulder, K', substantially as described, to hold the barrel firmly while firing.

5th, Constructing the locking-bolt so that it shall slide in a groove partly in the lock and partly in the breech, as described, to prevent strain on the lock, as set forth.

55,614.—DEVICE FOR CUTTING GREEN CORN FROM THE COB.—Jonathan Burt and Leonard F. Dunn, Oneida, N. Y.:

We claim, 1st, The sliding-frame, D, in connection with the springs, f, cutters, e', scrapers, h, any or all of them, and the tube, C, or its equivalent, all arranged to operate in the manner substantially as and for the purpose set forth.

We further claim the oblique rods, b, of the frame, D, connected with the plates or springs, d', for the purpose of expanding the cutters, e', and springs, f', substantially as and for the purpose specified.

55,615.—STEAM PLUG VALVE.—Russel Burton, South Adams, Mass.:

I claim, 1st, The arrangement in connection with the pipe, A, of the conical enlargement, B, conical plug, E, spring, H, and screw-cover, D, when the parts are constructed and combined as described and represented.

2d, The combination of the reservoir, J, one or more, with the conical plug, E, substantially as described and for the purpose set forth.

55,616.—LOCK.—Ira D. Bush, Detroit, Mich.:

I claim, 1st, The sliding and swinging tumblers, G, hung upon the bolt of the lock, and arranged and operating substantially in the manner and for the purpose specified.

2d, The collar, R, of the knob, spindle, or shaft, Q, in combination with the opening, S, T, in the lock-plate, the yoke, U, placed over such shaft and interlocking with the said collar, substantially as and for the purpose described.

55,617.—MACHINE FOR SHARPENING HORSE-SHOE CALKS.—Ensign A. Bushnell, Dodge county, Wis.:

I claim the arrangement of all the parts as herein set forth, as and for the purpose described.

55,618.—LIFTING-BAR.—D. P. Butler, Boston, Mass.:

I claim, 1st, The construction of the lifting-bar with the surfaces, c, in line with the center of the bar, a, substantially as set forth.

2d, The socket or socket-piece on the bar, and the pivot on the ring, substantially as shown.

3d, The elastic cushion placed between the ring and bar.

4th, The construction of the bar with the sockets or socket pieces on opposite surfaces thereof, substantially as and for the purpose set forth.

5th, Making the ring detachable from the weight-rod, substantially as set forth.

6th, Combining with the ring the spring, l, by which the ring and bar are held together, substantially as described.

55,619.—MACHINE FOR PRESSING CIGARS.—Jeremiah Campbell, Lancaster, Pa.:

I claim a press provided with a vertical screw, I, and horizontal or side screws, H, H, when the top and bottom cross-pieces, C, D, are provided with grooves, d, on one end in combination with a vertical press-board, E, arranged, constructed, and operating in the manner and for the purpose specified.

I also claim the loose slats, J, provided with blocks, K, on one or both sides at the ends, and when of double or triple length, intermediate blocks, all half the thickness desired to form the chamber, when employed in the manner and for the purpose set forth.

I also claim the partition boards, G, I, with the extended arms and followers, F, in combination with the vertical press-board, E, constructed and operating in the manner and for the purpose specified.

55,620.—SPRING LANCE.—George J. Capewell, West Cheshire, Conn.:

I claim the slotted cap-piece, K, for the casing, A, having outward bent lips or flanges, h, upon each side of its slot or opening, substantially as and for the purpose described.

55,621.—MILK-PAIL.—J. Carton and Wm. Ralph, Utica, N. Y.:

We claim as an article of manufacture a wooden milk-pail with a tin lining, constructed as described.

55,622.—ATMOSPHERIC CHURN-DASHER.—S. Case and A. W. Pratt, Putneyville, N. Y.:

We claim the combination of the adjustable and removable valve, D, with the rod, A, and tube, G, substantially as and for the purpose described, the rod being provided with the bulb, B, having the seat, a, for the reception of different-sized wings, as set forth.

55,623.—PRUNING INSTRUMENT.—Richard Collier, Springfield, Ohio:

I claim a pruning tool the blade of which is sharpened upon the chisel-formed point and also upon both the edges, the same being attached to a handle, substantially as set forth.

55,624.—PORTABLE DOOR-FASTENING.—Dennis Conlon, Portland, Maine:

I claim the combination of the plate, B, having the spurs, b, and shoulders, a, with the pivot, n, and tuiton, A, constructed as described all as and for the purposes set forth.

55,625.—EGG-BEATER.—Moses G. Crane, Boston, Mass.:

I claim the combination of the segment gears and pinions with the spindle, beating-wires, and standard, when said segment gears are constructed and arranged to rotate horizontally, substantially as set forth.

I also claim, in combination with the standard, b, spindle, a, and wires, c, arranged and operating as described, the plate, g, with its fingers, f, arranged to hold the standard, b, substantially as described.

55,626.—PUMP FOR DEEP WELLS.—Joseph H. Davis, Alleghany City, Pa.:

I claim the enlargement, B, of the valve-chamber, A, when constructed and operating for the removal of the foot-valve, D, substantially as herein described and for the purposes set forth.

55,627.—SOUNDER MAGNET.—Samuel F. Day, Ballston, N. Y.:

I claim, 1st, The combination of the posts, d, d, with the raised plate or bridge, C, in the manner and for the purpose set forth.

2d, The combination of the metallic frame, A, sounding-board or insulator, B, and metallic bridge or arched plate, C, for the purpose set forth.

55,628.—FERRY-BRIDGE GATE.—Lewis P. Decker, Brooklyn, N. Y.:

I claim, 1st, The combination of the gates, C and D, constructed and arranged as herein described, with the shafts, E and F, and with the bridge arches or other suitable supports, substantially as described and for the purpose set forth.

2d, The combination of the ratchet-bar, I, with the gear-wheels, G and H, and with the shaft, E and F, substantially as described and for the purpose set forth.

55,629.—MAKING SIRUP FROM CORN.—H. J. Deissner, Waukesha, Wis.:

I claim the within-described process of making sirup from corn, by following the various manipulations which are specified.

55,630.—SHOVEL PLOW.—Paul Dennis, Schuylerville, N. Y.:

I claim, 1st, Sharpening or providing the wings, D, D, with double cutting edges, as and for the purpose described.

2d, The wings, D, D, constructed in such a manner as to be capable of being reversed in position, so as to throw the earth outward to a greater or less distance, and also to be capable of being expanded or contracted, as occasion may require, as and for the purpose set forth.

55,631.—FRUIT BOX.—T. B. Doolittle, Ansonia, Conn.:

I claim a fruit box formed of two end pieces, in combination with a single piece bent around said blocks or end pieces, and overlapped, the whole constructed and arranged substantially as set forth.

55,632.—TABLE FORK.—John Edmond and William H. Wirt, Washington, D. C.:

We claim providing a table fork with a file edge or surface, substantially as specified, for the purpose of sharpening a knife.

55,633.—AUTOMATIC GATE.—J. G. Elkins and J. T. Green, Marquette, Wis.:

We claim, 1st, The method of hanging the gate to the bars, F, F, by which they are kept in contact by positive force while closed, without the use of latches or catches of any kind, substantially as shown and described.

2d, The combination of the timbers, H, H, levers, I, I, and links, J, J, rods, I, I, bell-cranks, K, K, and links, M, M, all arranged and operating substantially as shown and described.

55,634.—WASHING MACHINE.—John C. Fellows, South Adams, Mass.:

I claim, 1st, The combination of the vibrating frame, E, with the frame, B, the slots of frame, E, rising between the slots of frame, B, substantially as described.

2d, The vibrating roller whose frame has vertical motion, as described, with the fixed and vibrating frames, B and E, substantially as described.

55,635.—FISHING NET.—Edward A. Field, Sidney, Maine:

I claim the improved manufacture of fishing net or apparatus made substantially as described, with the sinker, the ground-guard, and the mouth-hoop, the lip hoops, or the same and the bait-line and float, all combined together and with netting, and so as to operate substantially as specified.

55,636.—POSTAL LETTER-BOX.—D. D. Foley, Washington, D. C.:

I claim a postal letter-box having an ante-chamber in which packages are deposited, when said ante-chamber has a sliding bottom, which is withdrawn when the entrance-port is closed, and vice versa, said sliding bottom being connected to and operated by the valve which covers the entrance-port by a lever or tilting-bar, and so adjusted that entrance to the receptacle below the ante-chamber will always be barred either by the valve over the entrance-port or by the sliding bottom, substantially as described.

55,637.—BOOT AND SHOE STRETCHER.—William Frederick, Ashland, Pa.:

I claim, 1st, An improved boot and shoe stretcher formed in two parts, A and B, hinged together at their forward ends by a treble-jointed hinge, E, substantially as described and for the purpose set forth.

2d, The combination of the rod, J, pinion-wheel, I, rack, B and roller or rollers, C, with each other and with the parts, A and D, of the last, substantially as described and for the purpose set forth.

55,638.—GAUGE FOR BOILERS.—C. L. Frink, Rockville, Conn.:

I claim the arrangements of the cocks, C, D, in combination with the socket, B, and tube, A, and operating in the manner and for the purpose herein specified.

55,639.—SAFETY VALVE FOR BOILERS.—C. L. Frink, Rockville, Conn.:

I claim, 1st, The hinged supporter, D, in combination with the valve-stem, C, and lever, F, of a safety valve, substantially as and for the purpose described.

2d, The central screw, F, and clamping-plate, E, in combination with the packing-piece, D, and valve, B, constructed and operating substantially as and for the purpose described.

55,640.—GAUGE COCK.—C. L. Frink, Rockville, Conn.:

I claim the flexible and elastic valve, D, with a central passage, C, in combination with the conical seat, E, spindle, C, adjustable gate, G, and body, A, of a gauge cock, constructed and operating substantially as and for the purpose set forth.

55,641.—LIGHTING GAS BY ELECTRICITY.—Samuel Gardiner, Jr., New York City:

I claim, 1st, The combination with a gas-burner of an electrical conducting cord and tassel, D, D', connected with the poles of a battery, substantially as described.

2d, The combination with the above, of the stiff wire, G, igniting-finger, J, lever, L, and spring, M, substantially as described.

3d, In combination with the electrical lighting devices herein described, I claim the non-conducting or insulating stud, R, employed in the manner described.

55,642.—TURNING GAS-COCKS BY ELECTRO-MAGNETISM.—Samuel Gardiner, Jr., New York City:

I claim, 1st, Turning a gas-cock by means of a sliding-rod, E, and click, G, acting directly upon the toothed-wheel, H, on the axis of said gas-cock and employed in combination with an armature, B, and magnet, A, A, substantially as described.

2d, The combination with the armature, B, of the guides, C, C, and springs, K, substantially as and for the objects specified.

3d, The stop or stud, E, attached to the sliding-rod, E, and employed to limit the motion of the wheel, H, as set forth.

4th, The combination with the wheel, H and E, and click, G, of the retaining spring, J, applied and operating in the manner and for the purpose substantially as described.

5th, In combination with the apparatus herein described, I claim the helical spring, D, adjustable collar, M, and thumb-screw, N, arranged as described and employed for the purpose specified.

55,643.—BUTT FOR BLINDS.—O. S. Garretson, Buffalo, N. Y.:

I claim, 1st, The loose pin, C, provided with the cam, e, and notch, f, in combination with the wings, A, B, provided respectively with the flange, f, and stop, g, arranged and operating substantially in the manner and for the purpose set forth.

2d, In combination with the loose pin, C, I claim the conical seat and corresponding bearing of the parts, A, B, or their equivalents, arranged and operating as shown and described.

3d, The free axial pin or bolt, C, operated by its own weight, in connection with suitable stops on the wings of the butt for forming a self-fastening hinge, substantially as set forth.

55,644.—SHUTTER HINGE.—O. S. Garretson, Buffalo, N. Y.:

I claim the locking-bar, H, in combination with the parts, B and D, of a hinge, constructed and operating substantially as shown and described.

I also claim forming the wings, B, D, with concave faces in combination with the pendant bar, H, when said bar moves on a plane with the wings, substantially as and for the purposes set forth.

55,645.—ARTIFICIAL LEG.—David Gilson, Nashua, N. H.:

I claim an adjustable socket or pad supported upon springs or their equivalent, for the purposes as herein set forth; I do not limit my claim to the particular form as herein shown, but extend it to any other substantially the same.

55,646.—BOLT-HEADING MACHINE.—A. B. Glover, Derby, Conn.:

I claim, 1st, The two pairs of levers, Y, Y', Y'', with the forming dies, X, X', X'', arranged so that one pair will operate at right angles to the other pair, in combination with the two heading dies, O, O', all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The attaching of the heading dies, O, O', to a transverse or laterally moving slide, I, fitted to the vertically moving slide, H, and operated through the medium of the arm, J, rock-shaft, K, arm, L, and the cam, M, or their equivalents, for the purpose of bringing the dies, O, O', over the bolt-rod at the proper time, substantially as shown and described.

3d, The holding dies, S, S', in combination with the lever, V, operated by the notched wheel, W, for the purpose of holding the bolt-rod during the heading operation, and releasing the same after said operation is performed, constructed and arranged substantially as described.

4th, The lever, E', in combination with the pawl, V, in the driving shaft notches, U, in the driving pulley, A2, rod, D', spring, A*, and cam, E*, all arranged substantially as shown to automatically stop the machine at the completion of the heading of the bolt, substantially as shown and described.

55,647.—HANGING MIRROR.—J. S. and H. F. Gray, Chelsea, Mass.:

We claim the friction plates, d, f, having irregular contact surfaces, constructed and operating together as and for the purpose substantially as set forth.

55,648.—SNAP HOOK.—Adam Haggy, Keokuk, Iowa:

I claim a snap hook, a, having an eye, b, in its shank, through which passes the spring, B, which is attached by projections, c, c, on the side, and the projection, e, at the end, which holds the said spring by being flattened down upon it, constructed and arranged as described.

55,649.—CHEESE VAT.—L. C. Hains, Bedford, Ohio:

I claim, 1st, The detachable hinges, E, in combination with the pan, C, and vat, B, when arranged as and for the purpose set forth.

2d, The brace-rib, J, pins, n, in combination with the pan, C, and vat, arranged as and for the purpose set forth.

55,650.—RAILWAY CHAIR.—Alexander Hamill, Baltimore, Md.:

I claim the construction of the chair with its hinge, L, at the outside end, when arranged and fastened to the cross-tie, B, by a bolt, F, with a flat bar head, G, below, and a forked key, H, above, substantially as herein described and for the purposes set forth.

55,651.—SKIRT-SUPPORTER.—Prescott V. Harrington, Attleborough, Mass.:

I claim a skirt-supporter consisting of a loop and pin tongue and catch combined, the article being substantially as specified.

55,652.—GAS STOVE FOR HEATING.—David Greene Haskins, Cambridge, Mass.:

I claim, 1st, The combination of the air-heating chamber, B, with the chamber, D, the concentric casing, a, and interposed radiating material, substantially as and for the purpose specified.

2d, The combination of the tapering chamber, G, with the chamber, D, substantially as and for the purpose specified.

3d, The combination of the air-heating chamber, B, the escape

pipe, o, and the partitioned mantel or radiating chamber, F, as and for the purpose set forth.

4th, The arrangement of the upper burners, g, with the chamber, D, in combination with the chamber, B, and space, H, as and for the purpose specified.

55,653.—FISHING REEL.—Anson Hatch, New Haven, Conn.:

I claim the skeleton spool in combination with the band, A, A, when the whole is constructed, arranged, and fitted for use, substantially as herein described.

55,654.—MOWING MACHINE.—Eleazer and David Hinckley, Worcester, Mass.:

We claim the combination and arrangement of the cam-wheel, F, rocker lever, E, connecting-rod, D, the shaft, G, and its beveled pinion, H, and annulus, I, with the driving wheel, K, and the knife, C, the said rocker-lever being provided with friction rollers or projections for the cam-wheel to operate against, and the whole being substantially as specified, and for the purpose of operating the knife, C, by the revolution of the wheel, K.

55,655.—REFRIGERATOR.—Aaron A. Hinkley, Boston, Mass.:

I claim the combination and arrangement of the chamber, d, and air-passage, e, of the cover, with the passages, f, f, and the ice-box or pan, C, arranged in the case, A, substantially as specified.

I also claim the combination and arrangement of the cold-water cooled pipe, D, and its discharging branches, with the case, A, and the ice-pan, the chambered cover and its air-passage, and the air-passages leading therefrom, the whole being substantially as described.

55,656.—BENCH VISE.—John S. Hoar, West Acton, Mass.:

I claim as a special improvement in bench vises, of the kind described or those to turn horizontally on a bed-plate, the combination of the long curved back slot, d, and its screw, f, and two side curved slots, e, e, and their set-screws in the stationary jaw-carrier, C, and with the jaws, C, D, all constructed and arranged to operate together substantially as specified.

55,657.—POTATO-PLANTER.—Lyman J. Holcomb, Nunda, Ill.:

I claim, 1st, The combination of the pole, E, frame, F, seat, G, hopper, H, tube, I, beam, M, and plow, L, arranged and operating as and for the purposes specified.

2d, In combination with the above and the wheels, A, and axle, B, of a wagon, the circular plate, R, pins, a, bell, S, lever, T, and spring, d, arranged and operating substantially as and for the purposes set forth.

55,658.—MACHINE FOR PRESSING AND MOLDING PLIABLE MATERIALS.—George C. Howard, Philadelphia, Pa.:

I claim, 1st, The form of the housings, A, A, combining all the necessary bearings in one piece with the table, B, constructed substantially as described.

2d, Providing the treads and housings with two or more fulcrum losses, substantially as and for the purpose specified.

3d, The slots in the stand, P, at right angles to those immediately under it in the table, K, substantially as and for the purpose described.

55,659.—WINDOW-SASH SUPPORTER.—H. C. Hunt, Amboy, Ill.:

I claim, 1st, The case, A, with its double inclines, b, b', and its corresponding slot, c, all operating as and for the purpose shown.

2d, The anchor, C, with its double inclines, f, f', and its knob or finger-piece, r, operating as and for the purpose shown.

3d, The friction-roller, E, operating as and for the purpose shown.

55,660.—GANG PLOW.—James B. Hunter, Ashley, Ill.:

I claim, 1st, The bolster, G, screws, H, H, I, and plow-beams, J, J, when used in combination with the rods, K, L, and all arranged substantially as and for the purpose set forth.

2d, The attaching of the plow-beams, J, J, to the bolster, G, through the medium of the rods, K, placed at the under sides of the beams, J, and fitted loosely at their front ends on a rod, L, at the rear of the bolster, substantially as and for the purpose specified.

3d, The raising of the plows, P, out of the ground by means of a rod, M, crank-shaft, N, and lever, O, all arranged substantially in the manner as and for the purpose set forth.

4th, The adjusting of the shares or points of the plows in a greater or less inclination downward, by means of the screw-rods, n, connected to the upper parts of the standards, Q, substantially as shown as described.

55,661.—CUTTER FOR DOVETAILING MACHINES.—John C. Hursell, Boston, Mass.:

I claim the construction of the cutters, as herein described, for polishing and condensing the surfaces of dovetail tenons or mortises.

I also providing the upper outer corners of a cutter, constructed as above claimed, with outward cutting lips, as and for the purpose specified.

I also constructing the conical cutter-head, a, with a slot to receive a solid cutter with opposite cutting edges, the cutter being inserted in said slot and confined to the head, as described.

55,662.—CLEANER FOR RING-TRAVELER SPINNING MACHINES.—Welcome Jenckes, Manchester, N. H.:

I claim an adjustable cleaner for ring-travelers, made substantially as above described.

55,663.—RAILWAY CAR FOR PREVENTING ACCIDENTS.—F. W. Jenkins, Brooklyn, N. Y.:

I claim a roller or rollers hung in a vertical plane in front of the wheels of a railway car, and so as to turn thereon, substantially as and for the purpose described.

I also claim so hanging the roller, C, to railway cars, that it can have a play in a vertical direction, substantially as described and for the purpose specified.

55,664.—MACHINE FOR FACING BOOT AND SHOE BOTTOMS.—N. B. Jewett and E. Everson, Haverhill, Mass.:

We claim, when combined and arranged as described and so as to operate in the manner and for the purpose specified, the shaft, d, grinding cylinder, b, (these being parallel with each other, and operated from wheel, h, by one belt, g), the cases, c and e, and the angular fan blades, f.

55,665.—CASTER FOR FURNITURE.—William Johnson, Milwaukee, Wis.:

I claim, 1st, The combination of the rose-plate, D, in one or more parts, the chamber, h, and the collar, G, for the purpose described.

2d, The shoulder, i, in combination with the rose-plate, D, thimble, l, collar, G, and chamber, h, substantially as shown and described and for the purpose set forth.

55,666.—SPINNING TOP.—Edward E. Jones and G. L. Kitson, Philadelphia, Pa.:

We claim the holes, A, A, with the hole, C, in the center of the top, in combination with a musical attachment, for the purpose herein described, an aeolian or musical top.

55,667.—MANUFACTURE OF BRICKS.—Frank Jones, Boston, Mass.:

I claim, 1st, The process substantially as above described of applying to bricks a preparation of mastic or cement.

2d, The apparatus constructed and operating substantially as above described for applying mastic to bricks separately before being laid.

3d, As an improved article of manufacture, I claim a mastic-covered brick prepared substantially as above described.

55,668.—CORN PLANTER.—Wm. H. Karicofe, Harrisonburg, Va.:

I claim the combination of the several parts above described, in the construction of a machine that will furrow two rows and drop therein at regular intervals corn and ashes or similar fertilizer, and will cover the same, removing clods and small stones, that by means of the adjustable screws in the cups the amount of corn or of the fertilizer may be fixed by the operator, that by means of the cross-bars on the right wheel the land will have the appearance of being checked, and by means of the driver the machine may be thrown out of gear and removed to any part of the field without the shaft turning.

55,669.—SPARK-ARRESTER.—Charles Bright Keyes, Washington, D. C.:

I claim, 1st, The revolving cover, d, d, constructed substantially as described in paragraph 2d, letters d, d and i, i.

2d, The combination of the revolving cover, d, d, with a shield or deflector, e, e, and an opened-mouthed trumpet, g, g, substantially as described in paragraph 2d, letters g, g.

3d, The combination of the revolving cover, d, d, and the shield or deflectors, e, e, and the opened-mouthed trumpet, g, g, the opening through, f, f, in connection with a pipe, b, b, and the water-tank, c, c, and the arrangement, j, j, for turning the cover, d, d, substantially as described in paragraphs 3 and 4.

55,670.—CAR BRAKE.—Washington H. Kilburn, Kennedy, N. Y.:

I claim, 1st, Bringing the brakes of a railroad train to bear against the wheels of the several cars, by the momentum and weight of the train itself, when the engine drawing such train or any car of its series of cars, is arrested in its motion in any possible manner, substantially as herein described and for the purpose specified.

2d, The draw-head, E, bar, F, and lever, G, when combined and arranged with regard to and connection with the brakes of a railroad car, substantially as described and so as to operate as and for the purpose specified.

55,671.—BOOT AND SHOE.—John Kimball, Boston, Mass.:

I claim the improved manufacture of shoe as made with a layer of cork, so arranged between its inner and outer soles that the leather of the outer sole may come in contact with the leather of the upper where it laps over the inner sole (the same being so as to hide the edges of the cork) and the soles, cork, and upper be united by sewing or nails, as specified.

I also claim the improved manufacture of water-proof sole for boots or shoes, it being composed of leather and cork arranged with a border or a piece of leather circumscribing the cork, as and for the purpose set forth.

55,672.—HORSE RAKE.—Jacob King, Omaha, Nebraska:

I claim the rake provided with sets of teeth on each side of the head and drawn by means of the reversible swinging frames, K, constructed and operating substantially as described and represented.

55,673.—WINCH CAPSTAN.—David Knowlton, Camden, Maine:

I claim the combination as well as the arrangement of the capstan, A, the capstan-head, D, and two or any other suitable number of winches applied to such head and provided with mechanism for revolving them separately from the capstan.

I also claim the arrangement of the head, D, with the capstan, A.

I also claim the combination as well as the arrangement of the internal ratchet, P, and its pawl, e, traveling pinion, O, the drawing pinion, R, the ratchet, K, and pawl, L, and also the combination of such additional power mechanism with each winch, F, the head, D, and the capstan, A, or the same and the holding ratchet, G, and pawl, H, of the winch.

I also claim the combination as well as the arrangement of the head, D, with the two winches and their operative mechanism, as specified.

I also claim the combination of the two holding ratchets, G, G, and their retaining pawls, H, H, with the two winches, their shaft and operative mechanism as applied to them, their shaft and the capstan head, substantially as specified.

55,674.—UPSETTING PRESS.—Andrew Kloman, Pittsburg, Pa.:

I claim, 1st, The top-piece, C, with its side projecting ledges, d, d, and inclined top when used in an upsetting press, as described and for the purpose specified.

2d, The combination of the two wedges, D, D', screws, S, S, frame, A, plate, E, and piece, C, arranged as specified and for the purpose already described.

3d, The combination of the two pieces, G, G, with the piece, C, and bed, B, as described and for the purpose specified.

4th, The mode of forcing down and holding stationary the piece, C, and of preventing the pieces, G, G', from spreading apart at one and the same time by use and means of the screws, S, S, wedges, D, D', inclined top-piece, C, plate, E, and ledges, d, d.

5th, The plunger, I, having two points or projecting angles, l, l, and notches, g', g', as described and for the purpose already mentioned.

6th, The combination of the fly-wheels, K, K, shaft, k, k, cam, L, box, b, yoke, M, wedge, W, and bolt, J, for obtaining from a motive power comparatively small an enormous pressure and long throw in a short space of time, variable in intensity to any desired degree of power or speed by the single motion of the wedge, W.

7th, The combination of the bars, g, g, piece, Q, pieces, R, R, plates, T and S, and pieces, r, r, and T', T', as described and for the purpose specified.

55,675.—PORTABLE BOAT.—R. Knudsen and W. S. Lassoe, Brooklyn, N. Y.:

We claim, 1st, A portable boat composed of two water-tight floats connected substantially as herein described, whereby they may be drawn apart to give the necessary stability for use, and closed together to afford facility for transportation.

2d, The combination with a double boat of the movable frame, B, constructed and applied substantially as herein set forth for the purpose specified.

3d, The seat, C, having row-locks, r, arranged over the space between the two hulls of the boat when the said hulls are extended and held apart, substantially as herein set forth.

55,676.—PRIMING METALLIC CARTRIDGES.—Theodore T. S. Laidley, Springfield, Mass.:

I claim the combination of the cartridge case with an anvil, A, which is of such shape that it holds the percussion cap in a central position within the case against the head, and is held firmly in its place by resting against a shoulder formed in the case below the head, after the anvil has been inserted, in the manner and for the purpose above described.

55,677.—SERVING TABLE.—William L. Lance, Plymouth, Pa.:

I claim, 1st, The moving table, b, combined with one or more stationary tables, a, a, for dining and other use, substantially as set forth.

2d, Moving tables, b, in combination with one or more pantry or furnishing or receiving rooms, P, in the manner described.

3d, The moving table, b, and stationary tables, a, a, so arranged having an open space, Q, forming a room on the inside or inner part of the tables, a, a, b, as described.

4th, In combination with the tables, I claim a passage-way, i, either under or over tables, a, a, b, by stairs or otherwise, substantially as set forth.

5th, Dividing the tables, a, a, b, into sections substantially as set forth.

6th, In combination with the tables, I claim the application of a flanged wheel, R, or its equivalent, to support, guide, and steady a moving table, b, for dining and other uses, substantially as set forth.

7th, In combination with the moving table, I claim the fixed shaft, x, to the leg, H, of the tables, a, a, supporting tables, a, a, upon which shaft, x, a wheel, R, to guide movable or moving table, b, substantially as and for the purpose set forth.

8th, The application of a belt, S, or its equivalent, to the driving of a movable or moving table, b, for dining and other uses, substantially as set forth.

55,678.—RED-BOTTOM.—S. E. Lamphear and H. H. Blair, Brunswick, Ohio :

We claim the elastic loop, B, pin, I, and collar, D, as arranged in combination with the slot, A, staple, F, and cleat, G, for the purpose and in the manner set forth.

55,679.—FORMING METALLIC CHARACTERS ON PAPER, ETC.—John Lanza, New York City :

I claim the above-described writing-fluid for the purpose of making metallic or other dust (or metallic or earthy mixtures) adhere to the writing, and thus give metallic letters, substantially in the manner and for the purposes set forth.

I also claim the above-described fluid as a new and useful improvement, when the above-described fluid is employed substantially as described.

55,680.—SPRING BEDSTEAD.—Rufus Lapham, New York City :

I claim the center-piece, a, or its equivalent, with the interstices, b, b, the springs, c, c, c, with their slots, the cross-pieces or springs, d, d, d, with their pins, e, e, fitting in the slots of c, c, c, in combination, operating substantially as described and for the purposes set forth.

55,681.—ADJUSTABLE MANDREL.—Charles W. Le Count, Norwalk, Conn. :

I claim the arrangement of the sliding keys, F, socket, B, and thimble, C, in combination with the mandrel, A, in the manner and for the purpose substantially as herein described.

55,682.—PHOTOGRAPHIC APPARATUS.—Charles A. Leech, Philadelphia, Pa. :

I claim, 1st, The combination and arrangement of the dark chamber, F, with the camera box by means of the sliding frame, G, substantially in the manner above described and for the purposes set forth.

2d, The combination of the dark chamber, F, with the bath-case, A, and baths, B, C, D, E, by means of the sliding frame, G, the said parts being constructed and arranged in relation to each other substantially as described, so that the said chamber may be brought successively into its vertical and horizontal positions with all the baths for the immersion of the plate into the same and its removal therefrom, without removing it from its fixed position in the dark chamber, as and for the purposes above specified.

3d, Constructing the baths, B, C, D, E, with the slots, b, and hinged lids, d, substantially as and for the purposes above described.

4th, The combination and arrangement of the opaque valve, M, with the dark chamber, F, for shutting out the light from beneath the latter when it is in its elevated position, substantially as described.

5th, The combination of the springs, I, I, with the sliding frame, G, for holding the latter in its vertical position with the baths by means of the recesses, l, in bath-case, A, substantially as described and for the purposes specified.

6th, The combination of the spring, H, having a pin or projection, J, with the sliding frame, G, for holding the dark chamber, F, in its elevated position, substantially as described.

55,683.—SILL AND WEATHER-STRIP.—Jeremy E. Lindsley, Goshen, Ind. :

I claim the metallic strip, D, having flanged edges, a, a, and i, when applied to the sill of a door, as and for the purpose specified.

55,684.—PLOW.—C. M. Lufkin, Claremont, N. H. :

I claim, 1st, A cutter, I, of any convenient form operated and connected by an eccentric, M, shaft, N, tube, H, and slide-rod, K, to the mold-board, F, in such a manner as to admit of the oscillation of the cutter by the adjustment of the mold-board, as herein set forth.

2d, A tube, H, slide-rod, K, latch, L, spring, e, and catches, g, g, operating and arranged substantially as and for the purpose herein set forth.

3d, The pivot, f, on the cutter, I, in connection with the eccentric, M, and socket, J, all constructed, arranged, and operating substantially as and for the purpose specified.

55,685.—WATER-WHEEL.—T. W. Mahler, Rome, N. Y. :

I claim, 1st, The buckets, E, hinged on axes, b, in such a manner that they may be turned or adjusted, substantially as shown and described and for the purpose specified.

2d, Connecting the axes, b, of the buckets, E, by means of arms, F, to a ring, c, adjusted through the medium of the plate or lever, G, shaft, h, and a bit, i, on said shaft working in a hole, g, in a projection, f, of ring, c, all arranged substantially as and for the purpose specified.

3d, The shaft, i, provided at its lower end with a crank, u, and pin, o, in combination with the plate or lever, G, substantially as and for the purpose set forth.

4th, The scroll, A, having greater depth than the wheel or with its top and bottom plates, p, p', respectively above and below the top and bottom rims, c, c', of the wheel, substantially as and for the purpose specified.

55,686.—STREET LAMP.—Thos. T. Markland, Jr., Philadelphia, Pa. :

I claim, 1st, The combination of the screen and reflector, H, with the burner, E, and reflector, H', substantially in the manner and for the purposes set forth.

2d, The combination of the globe, A, with the base, D, and roof, E, when said parts are constructed and arranged in relation to each other, substantially as described and for the purposes set forth.

3d, The combination of the reflector, H', with the roof, E, reflector, H, and burner, B, substantially as described and for the purposes set forth.

4th, Constructing the globe, A, with the annular projection, m, for turning the water from the lamp, substantially as specified.

5th, Constructing the base, D, with perforations, f, and the roof, E, with the slots or openings, K, for causing a current of cold air to flow over the interior surface of the globe, A, to counteract the heat from the burner, B, substantially as described and for the purpose set forth.

6th, The combination of the cap, L, with the central tube, K, and the burner, B, when constructed and arranged to operate in relation to the draft of said tube, substantially as described.

7th, The perforated names in the sides of the cap, L, in combination with the burner, B, substantially as described and for the purpose specified.

55,687.—BENDING FLANGES UPON BOILER-HEADS.—William W. Martin, Alleghany City, Pa. :

I claim the construction and arrangement of the revolving table, B, and rolls, C, said table and rolls operating substantially as herein described and for the purpose set forth.

55,688.—BUTTON-HOLE SEWING MACHINE.—John McClosky, New York City :

I claim the grooved cylinder, H, constructed substantially as described, for moving the needle forward and backward alternately, attached to or moved with the needle-arm of a reciprocating needle.

I also claim the grooved cylinder, H, in combination with the yielding finger, G, substantially as described.

I also claim the eccentric on the lower end of the grooved cylinder for alternately moving the needle forward and backward, substantially as described.

I also claim connecting the reciprocating needle, O, with the grooved cylinder by means of an arm, J, applied substantially as above described.

I also claim the hollow flange, j, on the under side of the presser foot in combination with the guide, Q, substantially as described.

I also claim the combination of the movable bed, S, with the loose guide, Q, operating in conjunction, substantially as described.

I also claim the combination of the supplementary hook, f, with the needle, O, and the devices which move it forward and backward, substantially as above described.

I also claim the horizontal lower needle, C, made and operated

substantially as described, in combination with the revolving hook, and a reciprocating needle, O, moved forward and backward alternately, substantially as described.

55,689.—TRAVELING TRUNK.—Alexander McDonald, Charlestown, Mass. :

I claim the combination of the leather covering, e, and the boards, c and d, arranged with respect to each other, and the bands, f and x, substantially as set forth.

Also, combining with the buckles upon the front side of the body and straps, which fasten the lid thereto, the auxiliary strain-loops substantially as described.

55,690.—SHIFTING BUGGY-TOP.—S. S. Meily, Lebanon, Pa. :

I claim the application of turn-buttons, g, g, which are constructed with screw-stems to the secondary seat, B, and main seat, A, these two seats being constructed and fitted together substantially as described.

55,691.—APPARATUS FOR WEIGHING GRAIN.—R. S. Morison, Bangor, Me. :

I claim, in combination with a scale-beam, the mechanism operated thereby to control the passage to the scale of material to be weighed, when constructed and arranged to operate in the manner shown and described.

Also, in combination with a scale-beam, a secondary lever or beam, as set forth, when arranged to suddenly release the scale-beam when the weight received by the scale equals the amount noted on its register, substantially as described.

Also, in combination with a scale-beam, as set forth, a slotted link to permit free motion of the beam to an extent sufficient to secure a momentum by which to actuate a controlling mechanism, as described.

Also, the arrangement of mechanism for changing the chute, substantially as described.

55,692.—RUB-IRON FOR CARRIAGES.—F. B. Morse, Milwaukee, Wis. :

I claim spring, D, in combination with shaft, C, and revolving rub-iron, A, substantially as and for the purpose described.

55,693.—DRILLING-MACHINE FOR WELLS.—Gorshom Mott, Big Run, Ohio :

I claim the tripping-beam, E, having its toe, E', shaped as shown in combination with the crank, D, substantially as and for the purpose set forth.

55,694.—METHOD OF PROTECTING PILES.—William J. L. Moulton, San Francisco, Cal. :

I claim the mode of protecting piles, by means of metallic covering and cement filling, as set forth and described.

55,695.—STAVE MACHINE.—Charles Murdock, Ellenville, N. Y. Ante-dated June 2, 1866 :

I claim, 1st, The block-carrying frame, Q, with its supplementary frame, W, arranged together substantially in the manner described, and operating with regard to the saw, as and for the purpose specified.

2d, The arrangement of the swinging-arm, b, with its spring-pawl, ratchet-wheel, Z, adjustable plate, C, and fixed arm, I, connected through a pinion and rock-gear, or its equivalent, with the block-carrying frame, Q, and operating together substantially in the manner described and for the purpose specified.

55,696.—DRILL AND BLACKSMITH'S TONGS.—F. Nevergold and G. Stackhouse, Pittsburg, Pa. :

We claim, 1st, The new and improved tool which we call a drill tong, constructed as described, or its equivalent.

2d, The combination of the tongs, A, B, with the frame, F, spindle, G, wheels, M, M, shaft, N, crank, O, and drill, K, as described, and for the purpose specified.

3d, The disk, D, on the tongs, A, in combination with the disk, E, the slots, g', g', and the bolts, H, H, for holding the frame, F, in different positions in relation to the tongs, A, B.

4th, The combination of the piece, R, with the jaw, B, of the tongs, A, B, constructed and applied one to the other as described and shown.

55,697.—COMPOSITION FOR CURING ROT IN SHEEP.—H. D. Niles and James C. Brooks, Bristolville, Ohio :

We claim the aforesaid compound formed of the above-named ingredients, in about the proportions and for the purpose herein set forth and described.

55,698.—BOOT OR SHOE.—Onesippe Pacalin, New York City :

I claim the combination of the inner and outer plates, A, B, heel-socket, E, plug, G, bolt, H, and fastenings, D, D, etc., constructed and arranged substantially as above described and represented.

55,699.—LIME-KILN.—Clark D. Page, Rochester, N. Y. :

I claim, 1st, The employment of water in coal-burning lime-kilns for the purpose of first steaming the coal, to produce a more perfect and economical combustion, and the absorption of all sulphurous acid gas of the coal by said steam and using the gases of the decomposed water in producing a greater degree of heat, substantially as described.

2d, The combination of the pans, c, c, and water-pipes, M, or equivalent, operating substantially as and for the purpose specified.

3d, The water-receptacles, f, f, in combination with the ash-pits, L, L, and grates, b, b, so arranged that the steam that is produced by the fire will pass upward around and through the grates to keep them cool, substantially as described.

4th, The partition, I, in combination with the particular form of the cupola at the base, the latter provided with the concaves, a, a, and having the chamber on each side of uniform thickness, substantially as described.

5th, The arrangement of the recesses, N, O, and cold-air flues, k, k, in combination with the grates, b, b, and the sides of the furnace, the same opening directly over the grates, and so constructed as to furnish cold air and prevent clinkering, substantially as described.

55,700.—STOP-COCK.—C. C. Parsons, Boston, Mass. :

I claim a stop-cock, constructed with one or more closed airtight chambers, d, operating in combination with the opening through the plug.

55,701.—COTTON-SEED HULLER.—John Perkins, Providence, R. I. :

I claim the combination and arrangement of the series of vertical ribs, d', with the shell, C, its series of horizontal ribs, e, the cylinder, A, and its case, B, the whole being to operate together substantially as specified.

55,702.—SHINGLE MACHINE.—Charles L. Pierce, Buffalo, N. Y. :

I claim, 1st, Reciprocating the block-carriage which feeds the block to the saw in an unequal progressive movement by means of the crank-pin, D, working in the slot of cross-head, D', substantially as described.

2d, Imparting an equal progressive movement of the block-carriage by means of the diamond slot, L, and crank, D, and thereby giving an equal and uniform feed of the shingle block to the saw, substantially as set forth.

3d, Operating the movable dog-bar, G1, of the dogging device by a weighted bell-crank, G2, working in combination with the hinged lever, G4, on the bed-frame, in the manner described.

4th, Operating the movable dog-bar, G2, of the dogging device by the bell-crank, J, and opening bar, J2, working in combination with the stop-piece, J3, on the bed-frame, in the manner described.

5th, The arrangement and combination of the segment lever, K1, K2, with the bell-crank, G2, carrying segment, K, and movable dog-bar, G', for the purpose of operating the dog-bar by hand-power.

6th, The double taper cams, I, in combination with the tilting block-tables when arranged in relation to the block-carriage, and operated thereby in the manner and for the purpose set forth.

55,703.—STRAW-CUTTER.—Clark Polley, Sinking Springs, Ohio :

I claim, 1st, The levers, A' and V, in combination with each other, with the knife, B, and ash-frame, J, K, and with the walking-beam, P, and driving-cam, O, the whole being constructed and arranged substantially as described and for the purpose set forth.

2d, The combination of the spring, X, with the shaft, T, and walking-beam, P, substantially as described and for the purpose set forth.

55,704.—TACK HAMMER.—Alvin Pond, Southington, Conn. :

I claim the hammer herein described, consisting of the head, c, constructed with a notched jaw, e, and having a corresponding jaw, d, attached thereto, provided with their respective handles and constructed to operate substantially in the manner herein set forth.

55,705.—SLEIGH.—T. W. Porter, Bangor, Maine :

I claim, 1st, The metallic coupling or bar-end, A, Fig. 1, substantially as and for the purposes specified.

2d, The metallic coupling or double T, marked B, Fig. 1, substantially as described and shown.

3d, Forming metallic sleigh standards with the socket, c', Figs. 1, 3, and 4, in manner substantially as described and for the purposes specified.

55,706.—PROCESS OF PREPARING PAPER-PULP FROM STRAW.—John Priestly, New York City, and Thomas C. Bradbury, Poughkeepsie, N. Y. :

We claim, 1st, The process effected by a crushing machine used for the purpose of opening, splitting, and flattening the straw with a rotary steam boiler, as described.

2d, The process effected by a crushing machine used for the purpose aforesaid with the rotary steam boiler containing the paper-stock, operated at about sixty pounds pressure, substantially as described.

3d, The process effected by a crushing machine used for the purpose aforesaid with the rotary steam boiler containing the paper-stock, and with a pulping engine (Kingsland or other), for the purpose of disintegrating the fibers, substantially as described.

4th, The combination of the rotary boiler containing the paper-stock operated at a pressure of about sixty pounds, for the period described, with a pulping engine (Kingsland or other), substantially as described.

5th, The combination of a crushing machine and boiler, containing the paper-stock operated at a pressure of about sixty pounds and with a corresponding temperature, for the period described, with a pulping engine (Kingsland or other), for the purpose of disintegrating the stock and producing a fiber suitable for the manufacture of paper without the addition of other stock, substantially as described.

55,707.—GRAIN DRILL.—A. Putman, Owego, N. Y. :

I claim, 1st, The changing of the machine from a grain-drill to a broadcast-sower and from a broadcast-sower to a grain-drill, by moving or adjusting the tooth-bars, K, to the feed-box, F, as above described, or its equivalent.

2d, Forming the teeth, G and H, from two different shaped patterns, which is to incline one forward and the other backward alternately, in the manner already set forth and described.

55,708.—STAVE MACHINE.—John J. Ralya, Alleghany, Pa. :

I claim, 1st, Setting the head-stock or knife-frame on journals, so that it may admit of a slight motion on its axis to accommodate its position to any twist or irregularity of shape of the stave which is forced between the knives in the operation of shaving.

2d, Placing the knives in a head-stock or frame susceptible of motion on its axis in such a way that the center of motion shall be and line between the inner face of the knives and between their back and edge.

3d, Limiting and regulating the range of motion of the knives by means of set screws, substantially as herein-before described.

4th, The use of the movable head-piece in the end of the ram so constructed and arranged as to be susceptible of a limited motion on its axis for the purpose of allowing the stave to turn in its passage through the knives to accommodate any twist or irregularity of shape of the stave.

5th, The use of a spring in connection with the movable head of the ram, so as to permit of its yielding slightly in the operation of forcing the staves through the knives, substantially as described.

6th, Crotching the end of the ram so as to hold the stave in place as it is being forced through the knives.

7th, The use, in combination with the cutters or knives and ram, of an upright pulley-post to carry the rope and weight for withdrawing the ram after the stave is pressed between the knives.

8th, So arranging the toothed rack of a ram as to be capable of adjustment towards or from the segmental gear-wheel for the purpose of regulating the length of stroke of the ram towards the knives, substantially as and for the purpose herein-before described.

9th, Giving to the knife-blades a concave curve from their outer edge, so as to form a ledge or shoulder for the purpose of turning the shaving or chip outwards at such an angle as to break it off just above the edge of the knife, substantially as herein-before described.

55,709.—FRUIT BOX.—Charles Reese, Baltimore, Md. :

I claim a box made of a single piece whose flaps are so bent up as to form sides which are secured together by eyelets, substantially as described.

55,710.—REDUCING METALLIC OXYDS.—Jacob Reese, Pittsburg, Pa. :

I claim, 1st, Deoxidizing metallic oxyds while in a molten or liquid condition, by means of hydrogen gas or a vapor of carbon or of hydro-carbon, or a mixture of such vapor or gas so that these oxyds or ores may be reduced to a metallic condition without the use of additional fuel, substantially in the manner herein-before described.

2d, The use of liquid petroleum or other liquid hydro-carbon in the manufacture of iron or steel and other metals, substantially in the manner and for the purposes herein-before described.

3d, The use of hydrogen gas for the purpose of deoxidizing metallic oxyds, substantially in the manner herein-before described.

4th, Making liquid wrought or malleable iron from the ore by subjecting the ore while in a melted condition to the action of hydrogen gas or hydro-carbonated vapor, or a vapor of carbon, or a liquid hydro-carbon, substantially as herein-before described.

5th, Making cast-steel by deoxidizing iron ore while in a molten condition, in the manner herein-before described, and subjecting the pure iron thus produced to a vapor of carbon or hydro-carbon, or adding thereto a liquid carburet or hydro-carbon, until the requisite amount of carbon is added, substantially as herein-before described.

6th, Making cast-iron by deoxidizing iron ore in a melted condition, in the manner described and supplying the requisite amount of carbon in a gaseous or liquid form, substantially as herein-before set forth.

7th, Refining iron and steel by means of a carbon in a gaseous or liquid form, to which, after the metal has been deoxidized thereby, a sufficient amount of air, water, or steam is added to support the combustion of the carbon thus added as fuel to the melted metal.

8th, Making a belly in the lower side of the deoxidizing chamber or reducer so as to hold the charge of melted ore away from the tuyere holes in the bottom of the reducer until the reducer is raised to admit the deoxidizing vapor or liquid, substantially as herein-before described.

9th, The use of a valve on one of the trunnions of the reducer, constructed substantially as herein-before described, so as to shut off the deoxidizing vapor or liquid from entering the reducer, when in position to receive its charge, and open the communication when the reducer is restored to its position for working.

10th, The use of gas-meters, in combination with the air-cylinder and vapor-generator and reducer, for the purpose of measuring the amount of deoxygenizing vapor or air admitted to the interior of the reducing chamber, substantially as herein-before described.

55,711.—HYDRANT.—Joshua Regester, Baltimore, Md.:

I claim, 1st, Constructing the base of the cylinder, B, in such manner that this cylinder will be held in a permanent position within a divided case, A, A, between and upon base-supports or collars, a, a, substantially as described.

2d, The combination of a divided case, A, A, with a cylinder, B, which is constructed with a contracted neck, B', and a pipe, D, leading to this neck below the base, a, a, all substantially as described.

3d, The construction of the hydrant case of two sections, A, A, two half base-pieces, a, a, and perforated portion, g, d, the said perforated portion being below the base, a, a, substantially as described.

55,712.—HYDRANT.—Joshua Regester, Baltimore, Md.:

I claim, 1st, The construction of the nut, D', with an external flange, and with an internal flaring passage, in combination with the tapering plug-valve, F, packing, f, internal cylinder, B, and plunger, B', all substantially in the manner and for the purpose described.

2d, Fitting the plug-valve, F, in a recess formed in conical seat, E, which is perforated near its circumference, all substantially in the manner and for the purpose herein described.

3d, The combination of the conical seat, E, plug-valve, F, packing, f, perforations in the seat, E, and the nut, D', all constructed and arranged substantially as described.

4th, Securing the packing, f, upon the seat, E, by means of a flange, c, and plug-valve, F, substantially as described.

5th, Applying the crank-rod, I, to a tubular bearing, J, having a flanged head, k, with stops, k', k', on its outer end, in combination with a crank-arm or handle, l, which has a stop, k2, formed on it all used in connection with the foregoing features of invention substantially as and for the purpose herein described.

55,713.—MOLD FOR CASTING PULLEYS.—William D. Rinehart, Pittsburg, Pa.:

I claim a flask made in two parts ("cope" and "drag"), each part being furnished with a chamber for heated air or steam, the whole being constructed, arranged, and operating substantially as herein described and for the purpose set forth.

55,714.—BUTTER-WORKER.—John Robinson, Calais, Vt.:

I claim the conical roller, B, b, and handle, C, fitted so that the handle may turn upon the roller, in combination with a sector-shaped tray A, A2, and cross-bar, d, substantially in the manner and for the purpose herein set forth.

55,715.—PREPARING HIDES, SKINS, FURS, ETC., FOR USE.—Julius A. Roth, Philadelphia, Pa.:

I claim the softening of leather, hides, furs, and the hair or wool thereon, by treating the same in a saponified solution, made in the manner as set forth and for the purpose as specified.

55,716.—GUN-STOCK.—Wm. Rudolph and A. Braun, San Francisco, Cal.:

We claim as our invention and improvement connecting the trigger to the sear by means of the hinged-arm, g, substantially as described.

And in combination with the trigger and hinged arm we claim the spring, i, substantially as described.

55,717.—BUCKLE.—Lomis W. Russell, Galesburg, Mich.:

I claim the ring or clasp, A, blocks, b and c, provided with a groove, and corrugated on their inner surface, being made of wood or metal, substantially in the manner and for the purpose herein set forth.

55,718.—DOUGH-KNEADER.—George W. Saunders, Springfield, Vt.:

I claim the combination of the roller, B, with its grooved end, a', the block, C, pin, b, staples, c, c, hook, d, and board, A, arranged and operating in the manner and for the purpose herein described.

55,719.—BREECH-LOADING FIRE-ARM.—Adolf Sayer, Naubuc, Conn.:

I claim in combination with swinging breech-block, the hook, W, the groove, a, in which it is placed, and the groove, e, substantially as and for the purpose described.

55,720.—TEA AND COFFEE POT.—P. G. H. Schaffer, West Meriden, Conn.:

I claim the combination of the flange, k, with the embossed body, substantially as described.

55,721.—BILLIARD TABLE.—Peter Schouller, Boston, Mass.:

I claim the arrangement and combination of the channel, a, with the rail, B, and the elastic or caoutchouc strip, A, of a billiard table, the same being substantially as specified.

55,722.—NAIL-PLATE FEEDER.—Thomas A. Searle, Providence, R. I.:

I claim the cam substantially such as described, for giving the turning motion to the nail-plate, in combination with the vibrating feeder-frame for drawing back and lifting the nail-plate, that it may be turned, and returning it to the required position on the bed knife, substantially as described.

55,723.—PLANING MACHINE.—William Sellers, Philadelphia, Pa.:

I claim, 1st, The use in planing machines for metal of traversing uprights to support the cross-head, and upon which the cross-head may be elevated and depressed to suit the varying heights of the material to be operated upon, in combination with a fixed platform, provided with ways, slides, or their equivalents, arranged so as to avoid the necessity of raising the material to be operated upon from the platform, so as to come within reach of the cutting tool, all constructed, arranged and operating substantially as described.

2d, Actuating the traversing uprights of the planing machines for metal herein described from a revolving shaft or shafts attached to and moving with the uprights, substantially as described.

3d, The use of an endless belt in combination with fast and loose pulleys, or their equivalents, when applied to the planing machines herein described, substantially in the manner and for the purposes specified.

4th, Reversing the direction of the movement of the cutting tool by means substantially as described and for the object specified.

55,724.—TRUSS.—Jacob A. Sherman, New York City:

I claim, 1st, The curved pressure-spring, a, introduced between the bars, b and c, and carrying the truss-pad, as specified.

2d, The clips, d, e, 3 and 4, to which the ends of the bars, b or c, are attached, in combination with the segmental slots and clamping screws for connecting the bars, b, c, to the respective springs, a, f, or g, and allowing for adjustment, as set forth.

3d, The inclined hinge, 11 or 12, for uniting the pad to the truss-spring, a, so as to allow the adjustment of the pad as specified.

4th, The lever, q, and screw 15, in combination with the lever, o, and diagonal hinges, 11 and 12, as and for the purposes set forth.

55,725.—FANNING MILL.—Levi Shultz, Upper Sandusky, Ohio:

I claim, 1st, Constructing a fanning mill with a suspended riddle-shoe, D, which in part extends above and below the fan-

case, B, and forms the closed sides of the mill, substantially as described.

2d, Suspending the shoe, D, by a pivot, c, and providing it with springs, g, g, for equalizing its movements substantially as described.

3d, Providing the blast opening through the fan-case with adjustable slides, a, a, for regulating the force and direction of the blast, substantially as described.

4th, The combination of a fan-case, B, and a shoe, D, having side-boards applied to it, with an open supporting-frame, A, substantially as described.

55,726.—FEED-BAG.—Felix John Simeon, Brooklyn, N. Y.:

I claim, 1st, Constructing both the sides and bottom of a feed-bag of perforated metal or wire-cloth, substantially as and for the purpose set forth.

2d, The combination, with an open or perforated feed-bag, of the springs, F, F, and strap, E, substantially as and for the purpose set forth.

55,727.—CATTLE-TIE.—Henry C. Small, Portland, Me.:

I claim the combination of the bows, d and e, the bow, d, having the ring, h, and hooks, f, f, on its ends, the bow, e, the two hooks, K, K, and spring, S, all constructed, arranged, and operating as set forth.

55,728.—HEATING-STOVE.—Samuel Smith, Philadelphia, Pa.:

I claim, 1st, The ring, B, secured to the cylinder, D, constructed and adapted for attachment to the base or cap plate of a stove, substantially as described.

2d, The combination with the above of the base plate, A, with its openings, x, arranged as set forth for the purpose specified.

55,729.—SPITTOON FOR CARS.—Willison G. Smith, Carlisle, Pa. Ante-dated May 26, 1866:

I claim, 1st, An improved self-cleaning spittoon, formed by combining the box or cup, B, the cover, H, the arm, G, and sliding bottom, D, with each other, the parts being constructed and arranged substantially as herein described and for the purpose set forth.

2d, The combination of the spring, F, with the lower part of the spittoon and the sliding bottom, D, substantially as described and for the purpose set forth.

55,730.—MEDICAL COMPOSITION.—Thos. W. Speisegger, Charleston, S. C.:

I claim a medical compound composed of the ingredients herein specified, and in about the proportions named.

55,731.—VALVE-GEAR FOR STEAM-ENGINES.—Edwin Sprague, Alleghany City, Pa.:

I claim, 1st, The hinged lifters, n, said lifters being operated by means of triggers, r, and inclines, l, or their equivalents, and one cam-rod made in one or more parts, said lifters, triggers, inclines, and cam-rod being dependent for their action upon the cam, 15, and adjustable point, 17, substantially as herein described and set forth.

2d, The adjustable point, 17, when used in combination with a cam and cam-yoke and a single cam-rod for working a full stroke, and used for operating the cut-off gear of steam-engines, as herein described and set forth.

3d, The inclines, l, on plate, y, said plate and inclines being operated by lever, o, through the medium of a governor or otherwise, substantially as herein described and for the purpose set forth.

55,732.—INDICATOR FOR STEAM-GENERATORS.—Joseph H. Springer and William M. Bartram, Philadelphia, Pa.:

We claim, 1st, A cup, I, open at the top and suspended within a steam-generator, or in a tube communicating with the said generator, in combination with devices constructed and arranged substantially as herein described, whereby the said cup is caused to discharge a volume of steam when the water becomes low, as set forth.

2d, The combination of the tube, A, its cup, I, steam-whistle, J, spring-valve, G, and lever, H, the whole being arranged substantially as and for the purpose described.

3d, The combination with the above of the glass tube, F.

55,733.—PESSEY.—Israel Stealy Crestline, Ohio:

I claim the application of a rubber globe under the womb, to be filled with air after inserting the same, in order that it may press upward against the womb to prevent falling, weakness, and pain, thereby give ease, comfort, and strength to the suffering patient.

55,734.—KNITTING-MACHINE.—Alden B. Stillings, Springfield, Mass.:

I claim, 1st, Constructing the crank in such a manner as to obtain a varying or adjustable thrust, substantially as described and for the purposes set forth.

2d, The use of the shaft, E, E', having screw-threads cut upon them as described, in combination with the cam-stops, when arranged and operating substantially as set forth.

3d, Imparting to the four cam-stops the same relative motion by means of the chain-carriers and endless chain, or by any equivalent means, substantially as described.

4th, The combination of a crank constructed as set forth, with the mechanism described for adjusting the position of the cam-stops, substantially as set forth.

55,735.—DEVICE FOR UPSETTING TIRES.—Alonzo Stow, Calais, Vt.:

I claim a tire upsetting-machine, with self-adjusting jaws or holders, and operated by an eccentric or cam-lever, substantially as set forth.

55,736.—RAILROAD SWITCH.—Wm. J. Stowell, Baltimore, Md.:

I claim, 1st, The construction of the movable guard, E, with a projecting tongue, f, in combination with the swelled head, e, of this guard, and the two rail sections, A, D, arranged to operate substantially as described.

2d, The combination of the rail section, D, which is constructed with an enlarged head, e, and inclined plane, e', with the guard, C, and the web or bridge, a, substantially as described.

3d, The movable switch-rails, D, E, when constructed substantially as described, and combined with stationary guide-rails on the opposite side of the track, substantially in the manner and for the purposes specified.

55,737.—BEVERAGE.—Christopher Sussegger, New York City:

I claim, 1st, The "American Sherbet" as a new article of manufacture.

2d, The manufacture of a beverage by a process substantially as herein-before set forth and described.

3d, The combination of water, sugar, tartaric acid, yeast, linden blossoms, and rose leaves or their equivalents, for the production of a beverage or "Sherbet," substantially as herein-before set forth and described.

55,738.—SAWING MACHINE.—Zurriel Swope, Lancaster, Pa.:

I claim operating a reciprocating saw by means of a treadle and the devices connected thereto, when they are constructed and arranged to operate in the manner and for the purposes substantially as specified.

55,739.—SCREW-WRENCH.—George C. Taft, assignor to T. H. Dodge, Worcester, Mass.:

I claim, 1st, The combination with nut, E, having a flange, e, of the jaw, D, and its stirrup, f, substantially as set forth.

2d, The combination with the front of nut, E, of the shoulder, c, on jaw, D, as and for the purposes set forth.

3d, Beveling off the front of flange, e, in combination with

beveling off the rear of stirrup, f, as seen at 3 in the accompanying drawings.

55,740.—MANUFACTURE OF FLEXIBLE TUBING.—Wm. B. S. Taylor, New York City:

I claim as my invention and improvement in flexible tubing for illuminating gas, the combination in a flexible gas-tube of a layer or layers of animal membrane coated with glue, or other suitable gelatinous cement, substantially as described, and for the purpose of resisting the penetrative action of the gas and its fluids.

55,741.—APPARATUS FOR CARBURETING AIR.—John B. Terry, Arburndale, Mass.:

I claim the improved air-forcing apparatus, made substantially as described, viz., not only of the two wheels, A, B, having their buckets arranged as explained, but of the case, E, provided with the chambers, I, K, L, the connecting tube, H, and the induction passage, G, as set forth.

55,742.—GRAIN DRILL.—J. H. Thomas and P. P. Mast, Springfield, Ohio:

We claim, 1st, The hopper, A, attached to the central or stationary bar, B, in combination with the adjustable bar, E, substantially as shown and described.

2d, The adjustable tubes, I and J, arranged to operate in combination with the stationary hopper, and adjustable bars, substantially as and for the purpose set forth.

3d, The slide, I, when arranged to operate in combination with the rod, f, and hopper, A, as herein described.

4th, The agitators, a, having a to-and-fro movement over the openings of the hopper, A, as shown and described.

5th, We claim the tube, I, having its upper end enlarged, and so connected to the hopper, A, as to cover the opening therein, and receive the seed therefrom, at all adjustments of which the bars, E, are capable.

6th, Pivoting the tube, I, to the hopper, A, and the tube, J, to the bar, E, and having the tubes, I and J, arranged to slide upon each other, substantially as shown and described.

55,743.—REVOLVING FIRE-ARM.—Wm. Tibbals, South Coventry, Conn.:

I claim constructing the chamber of fire-arms with the groove or slot in its side, for the reception of the pin-cartridge, substantially as herein shown and described.

55,744.—CLOTHES POLE.—Francis W. Tilton, New Bedford, Mass.:

I claim a clothes-pole having one of its ends provided with a double hook B constructed substantially as shown and described.

55,745.—LAMP WICK.—Cyrus L. Topliff, New York City:

I claim the application to a lamp wick of a solution of gum and alum, for the purpose described.

55,746.—APPARATUS FOR COOLING AND CONDENSING BEER, ALCOHOL, ETC.—John Trageser, New York City:

I claim the mode herein described of constructing volute condensers or coolers by the introduction of a strip of metal between the edges of the sheet-metal divisions, and soldered together in the manner specified.

55,747.—COIL FOR BREWERS' BOILERS.—J. Trageser and J. G. Schreiber, New York City:

We claim the steam-pipe, b, and condensation pipe, c, provided with the couplings, e, e and g, g, in combination with the coils, f, f, substantially as and for the purposes set forth.

55,748.—CLAY AND PEAT PRESS.—B. Van Vranken, Schenectady, N. Y.:

1st, In a machine for molding clay and peat, employing a vertical pug-mill, or mixing-box, B, and a press-box, D, I claim the adjustable pusher, F, applied to a table, E, for moving the mold boxes from the rear to the front end of said table, substantially as described.

2d, The combination with an upright pug-mill, B, press-box, D, and a table, E, I claim the rack-bars, G, G, oscillating sectors, H, H, and a pitman-rod, J, connecting with the main-shaft, C, substantially as described.

55,749.—LATHE-REST FOR TURNING BALLS.—William T. Vose, Newton, Mass.:

I claim the arrangement of the adjustable base, A, revolving-cap, B, with the hinged-stock, H, set-screw, E, cutter, F, and handle, H, substantially in the manner and for the purpose set forth.

55,750.—WATCH.—Arthur Wadsworth, Newark, N. J.:

I claim, 1st, The combination of the gear-wheels, O and Q, respectively hung to arms, T and T2, with the pendant spindle, H, main-spring axis, M, and arbor, N, of a watch-movement, when arranged together so as to operate substantially as and for the purpose described.

2d, The combination of the spindle, H, and pusher-sleeve, E, arranged together substantially in the manner described and for the purpose specified.

55,751.—STOVE DAMPER.—George W. Walker, Boston, Mass.:

I claim in combination with a foraminous plate or gauze, through which air is admitted at the front of the stove for the support of combustion, a provision for regulating or shutting off the admission of such air, substantially as set forth.

55,752.—BREECH-LOADING FIRE-ARM.—H. F. Wheeler, Boston, Mass.:

I claim, in combination with the breech-block and single hammer, the two breech-loading barrels of varied caliber when so hung upon the breech-pin as to permit either barrel at will to be brought into position with respect to the hammer, for firing, and to be slid longitudinally on said pin for expulsion of the cartridge-shell and insertion of a cartridge, substantially as set forth.

55,753.—BUTTON-HOLE FOR PAPER COLLARS.—Nathaniel T. Whiting, Lawrence, Mass.:

I claim the lateral slots, c, or cuts, d, d, combined with the button-holes, A, substantially as and for the purpose specified.

55,754.—BURGLAR ALARM.—Horace Wickham, Jr., Chicago, Ill.:

I claim the operating of the clock-alarm by means of the arm, H, support, U, standard, F, and screw, I, when constructed substantially as set forth and operated as described.

55,755.—NAIL-PLATE FEEDERS.—James L. Wiggin, South New Market, N. H., assignor to John W. Hoard, Bristol, R. I., and George B. Wiggin, South New Market, N. H.:

I claim, 1st, Combining in a movable frame with a nail-plate feed-bar the wheels and other means of transmission whereby the rotary and vibratory up-and-down and back-and-forth motions are directly imparted to the feed-bar, the whole being constructed and arranged for operation substantially as herein shown and set forth.

2d, The sleeve for holding the feed-bar in the movable frame, as described, in combination with gear-wheels, one of which is mounted on said sleeve under the arrangement herein shown and described, whereby an intermittent rotary movement is imparted to the feed-bar.

3d, In combination with the sleeve for holding the feed-bar as described, I claim the spring spline in combination with a slot or groove in said bar, substantially as set forth.

4th, Pressing the feed-bar against the gauge-plate of a cutting-apparatus by spring-power, mechanism, or the equivalent thereof, when applied through the intermediary of an arm mounted on a sleeve capable of a rotating and sliding movement on a rod parallel to the feed-bar, substantially as herein shown and described, so

that the feed-bar may be instantly disengaged at the pleasure of the operator.

5th, Effecting the movements of rotation, lifting up and drawing back of the feed-bar in the manner herein described, the various devices for this purpose used being actuated by a single disk provided with cams and pins, as herein shown and set forth.

6th, In combination with the movable frame which carries the feed-bar and the intermediate support, I claim the disk provided with cams, whereby the movable frame is actuated to cause the feed-bar to be lifted between each stroke of the cutting apparatus, as set forth.

7th, Pivoting the dogs or jaws for grasping and drawing back the feed-bar, as described, to a slide secured in the top of the vibratory frame, and constructed and arranged as set forth.

8th, In combination with the dogs or jaws pivoted to a slide in the top of the movable frame, I claim the vibrating yoke hinged or pivoted to the stationary frame, and actuated by the lever as described to cause the alternate opening and closing and drawing back of the dogs or jaws, as and for the purposes herein shown and set forth.

55,756.—GLOBE-COCK.—Joseph Worcester, Newport, Ky.:

I claim the valve, C, adapted to rotate in the manner substantially as described, on the stem, G, and provided with a rigid stem, D, operated from the outside, in the manner and for the purpose specified.

55,757.—FASTENING VENTILATORS.—Max Zabel, Milwaukee, Wis.:

I claim the springs, e, e, e, securing the ventilator in place, when arranged and applied as shown and set forth.

55,758.—HARVESTER.—William Zimmerman, Oskaloosa, Iowa:

I claim the combination of the door, B, screw-rod, b, counter-poise, C, spring catch, E, cord, d, bar, f, rake, D, and pivoted arm, g, arranged relatively to each other and with the endless carrying apron-roller, a, and operating in the manner and for the purpose herein specified.

55,759.—TOBACCO PRESS.—James W. Barber, assignor to himself and Elisha P. Strout, Cincinnati, Ohio:

1st, In the described combination with a reciprocating plunger, I claim the bottomless pressing-box or trunk, substantially as set forth.

2d, In combination with the elements of the clause next preceding, I claim the bands, H, and set-screws, i, or their equivalent.

3d, The arrangement of two or more shiftable pressing trunks adapted to be brought alternately or successively in connection with a single plunger.

55,760.—SAUSAGE STUFFER.—Purmort Bradford, assignor to Sargent & Co., New Haven, Conn.:

I claim the combination and arrangement of the outer case of the form described, constructed in two parts, A and B, hinged together as specified, having a hopper, H, on the one part, and an outlet, I, on the other part, with the cylinder, E, and piston, F, constructed and arranged to operate substantially in the manner and for the purpose herein set forth.

55,761.—PACKING PROJECTILES FOR RIFLED ORD-
NANCE.—Lewis Wells Broadwell, New Orleans, La., assignor to C. M. Clay, Kentucky:

I claim the described method of wrapping the projectile by belts of cord which occupy detached annular recesses around the ball.

I also claim the application of the said fibrous covering of pulverized graphite or plumbago to serve as a partial protection to the fiber, as and for the purpose described.

55,762.—BRECH-LOADING ORDNANCE.—Lewis Wells Broadwell, New Orleans, La., assignor to C. M. Clay, Kentucky:

I claim, 1st, The permanently located, self-acting, conical or curved gas-ring in combination with a wedge-shaped breech-block, which moves in a line at right angles to the axis of the gun to secure the gas-ring in position.

2d, The combination of a conical or curved gas-ring, as described, with an adjustable bearing-plate, D, in the face of the wedge-shaped breech-block.

3d, In combination with the adjustable bearing-plate, D, I claim an intervening softer material or cushion inserted between the block and the bearing-plate, for the purpose described.

55,763.—HARVESTER.—Francis C. Coppage, assignor to himself and Wm. Coppage, Terre Haute, Ind.:

I claim, 1st, The jointed lever, e, g, adjustable vertically at the end by means of the slot, set screw, and pivot, k', k', and as to working length by the sleeve and set screw, t, v, substantially as described.

2d, The jointed connecting-rod, S, 9, 10, in its relation to the winding devices at the inner and outer ends of the platform, substantially as and for the purpose described.

3d, The arrangement of the sliding-frame, S, guides, T, T, leg, R, castor-wheel, Q, shoe, P, in combination with the jointed shaft, S, arranged and operated in the manner and for the purpose set forth.

55,764.—BRUSH.—Alanson C. Estabrook, Florence, Mass., assignor to J. S. Parsons, of the same place, and Geo. A. Scott, Lansingburg, N. Y.:

I claim as a new article of manufacture the brush constructed and arranged as herein described, that is to say, a brush in which the bristles inserted through a perforated plate are imbedded and held firmly in a cement of any suitable substance as described, which cement shall at the same time, in combination with a strip of metal or other material, form the back and handle of the brush, as herein shown and set forth.

55,765.—HAY KNIFE.—Francis J. Fischer, Hamilton, Ohio, assignor to himself and John B. Berning, Cincinnati, Ohio:

I claim the hay knife constructed as described, with a shank, A, diverging blades, B, B', and a short middle blade, C, the whole adapted to cutting hay from the stack, substantially as described.

55,766.—WHIRLING-JACK FOR TOYS.—F. W. Flagg, assignor to himself and E. B. Manning, Middletown, Conn.:

I claim the combination of the spring, D, with the barrel and spindle of a whirling-jack, when constructed and arranged to operate in the manner herein described, so as to rewind the cord, as specified.

55,767.—CAPPING WOOD-SCREWS.—John Gardner, assignor to Chas. T. Grilley, New Haven, Conn.:

In the manufacture of capped screws, I claim for operation upon screws for this purpose specially provided with a notch in their shanks, the punching apparatus and spring-catch or equivalent mechanism, as described, so that the screw, when capped, may be adjusted in its proper relation to and its cap nicked by the punch, substantially as and for the purposes herein set forth.

55,768.—HOOP-SKIRT.—Thomas S. Gilbert, assignor to himself and Perkins, Cooke & Co., New Haven, Conn.:

I claim inclosing a cord upon the wire substantially in the manner described, so that the hoop and tape may be screwed as and for the purpose specified.

55,769.—BROOM-HEAD.—George W. Golay, assignor to himself and Eli T. Ogle, Vevay, Ind.:

I claim, 1st, The hinged clamp, B, composed of parts, B', B'',

loop, D, and pawl, E, constructed and operating substantially as and for the purpose specified.

2d, In combination with the above, I claim the sliding-clamp, C, composed of parts, C, C', and link, e, as set forth and for the purpose specified.

55,770.—PADDLE-WHEEL.—William H. Holland, assignor to himself and William Goodman, Boston, Mass.:

I claim the arrangement and combination of the series of auxiliary floats, D, D, with the wheels, A, A, and the series of main floats, C, C, C, formed and arranged substantially as described.

55,771.—LAMP.—David Howarth, assignor to himself and W. N. Gourley and S. C. Rundlett, Portland, Me.:

I claim inserting into a lamp, constructed of any opaque substance, a transparent ring, of the form, in the place, and manner, and for the purpose substantially as set forth.

55,772.—OPERATING HAMMERS AND STAMPS.—Christopher R. James, assignor to himself and N. W. Condict, Jr., Jersey City, N. J.:

I claim operating a stamp or hammer by means of a piston working in a cylinder, the upper end of which is opened at proper intervals to a steam-blower and to the atmosphere alternately, and the lower end of which is in constant communication with a reservoir of compressed air, substantially as herein specified.

And, in combination with two stamps or hammers so operated by pistons working in separate cylinders, I claim a valve and passages so opened as to bring each cylinder alternately in communication with the boiler, and so produce the action of the pistons and their attached hammers, substantially as herein specified.

55,773.—PROPELLER FOR STEAMSHIP.—Charles Kinkel and Martin Hubbe, New York City, assignor to Charles Wehle, Hoboken, N. J.:

We claim, 1st, The combination of a number of nozzle-pipes, with the hull of the vessel, when each one of said pipes is connected with a pump and engine, substantially as described.

2d, The mechanism for connecting and turning the nozzle-pipes, substantially as described and for the purpose set forth.

55,774.—REGISTERING APPARATUS FOR PRINTING PRESSES.—James Kirk, Dover, Del., assignor to R. Hoe & Co., New York City:

I claim a feed-board for printing presses composed of two parts connected by a joint, one part being fixed and the other part movable so as to work on the joint in connection with a fixed or stationary pin or point connected with the fixed part of the feed-board, and a pin or point connected with the movable part of the same, all arranged to operate in the manner substantially as and for the purpose set forth.

55,775.—INSTRUMENT FOR IMITATING THE SKIN.—Friedrich Klee assignor to Louis Klee, Williamsburg, N. Y.:

I claim the arrangement of the screw, f, piston, d, spring, a, nut, g, and handle, e, applied relatively to the cylinder, A, combined and operating in the manner and for the purpose herein specified.

2d, The diaphragm, h, in combination with the cylinder, A, and prieks, b, constructed and operating substantially as and for the purpose set forth.

55,776.—TREE-PROTECTOR.—William and David McCaine, assignors to themselves and Daniel McCaine, Groton, Mass.:

We claim as our improvement in the tree-protector, the arrangement of its plates of glass so that each two which are next adjacent shall make an angle with each other in a vertical direction at their junction.

We also claim the arrangement of two of such glass plates in a groove or rebate, and so as to meet together and make angles with each other in a vertical direction.

We also claim the arrangement and combination of the passage, h, and its holes, k, k, in the top-plates of glass, c, c, d, d, arranged as specified.

55,777.—METHOD OF BURNING GAS.—John C. McNulty, assignor to himself and Thomas Lee, San Francisco, Cal.:

I claim the burning of jets of inflammable gas in combination with clinkers, substantially as described.

55,778.—APPARATUS FOR CARBURETING AIR, GAS, ETC.—A. C. Messenger, assignor to himself and A. T. Smith, Syracuse, N. Y.:

1st, In an apparatus for carbureting gas for illuminating purposes, I claim the use of double perforated walls, d, d, having a suitable capillary substance confined between them, said walls being so arranged as to form a porous diffusion through which the gas is forced, substantially as described.

2d, The forming of two apartments in a vessel, A, by means of an upright double wall partition, which is rendered sufficiently porous to allow of the absorption of the fluid in said vessel, and the passage of gas through it, substantially as described.

3d, Subdividing the chamber, C, by means of a partition which is applied on one side of the induction passage, a, for the purpose and in the manner substantially as described.

55,779.—OPERATING BEATER OR POWER-PRESS.—Charles Nelson, assignor to himself, James W. Taylor, Wm. R. Brown, and Fred. W. Banks, Newburg, N. Y.:

I claim, 1st, Automatically throwing the clutch, d', out of gear from the wheel, d, by the descent of the follower during the operation of pressing, for the purpose of preventing said follower from descending too far, substantially as described.

2d, The combination of the follower, e, rope, q, drum, r, screws, b3, b3, shaft, b2, and a continuously revolving shaft, e, all arranged and operating substantially as described.

3d, The combination of the loose wheels, a, d, and clutches, a', d', with the shaft, e, and the two wheels, b, c, on the reversible shaft, b2, substantially as described.

4th, So constructing a baling-press that a rapid vertical movement can be communicated to the follower, or the follower brought down upon the bale or compressed mass with a dead pressure from a main driving-shaft which has a continuous movement in one direction, substantially as described.

55,780.—HARVESTER.—Daniel G. Norris, assignor to himself, John H. Paddock, and Rufus S. Merrill, St. Johnsbury, Vt.:

1st, In mowing machines constructed and operating substantially as herein described, I claim the combination with the recessed sliding-bar provided with friction rollers, as herein-before described, of the cam-wheel on the pinion-shaft, said sliding-bar communicating its movement to the cutter-bar through the medium of a connecting rod or pitman hinged to the sliding-bar, as set forth, the whole being arranged and operating substantially as shown and described.

2d, In combination with the recessed sliding-bar, as described, I claim the pinion-shaft revolving in bearing on the cutter-frame, when arranged relatively to the driving pinions, as set forth, and having the cam-wheel located within and the self-adjusting clutches without the cutter-frame, upon the said shaft, as and for the purposes herein shown and described.

3d, In mowing machines, arranged and operating as described, I claim attaching the whistle-tree directly to the metal cutter-frame and shafts to the wooden frame, as and for the purposes herein described.

55,781.—HARVESTER.—David M. Osborne, assignor to himself and Wm. A. Kirby, Auburn, N. Y.:

I claim connecting the pitman of a harvesting machine to the

head of the cutter-bar or cutters, or connecting bars to their supports by means of a single pin, and retaining said pin in place by means of a self-adjusting, perforated spring, substantially as above described.

55,782.—HYDRANT.—Agur Pixley and John Robertson, assignors to Robertson, Dow & Company, Brooklyn, N. Y.:

We claim the plug, I, formed with a hole or opening, n, and arranged upon the hollow valve-stem, D, with reference to the hole or opening, r, thereof, in combination with the valve-stem, D, and valve-box, C, substantially as herein set forth for the purpose specified.

55,783.—MACHINERY FOR FINISHING COFFIN NAIL AND SCREW-HEADS.—Augustus A. Randall, assignor to Sargent & Co., New Haven, Conn.:

I claim, 1st, The combination of the spindles, F and I, fingers, N, and channel E, constructed and arranged to operate substantially in the manner and for the purpose specified.

2d, In combination with the above, I claim the cutter, b, mill, f, and a burnisher, substantially as and for the purpose specified.

55,784.—STOP-COCK.—Francis Roach, assignor to himself and Joseph Zane, Boston, Mass.:

I claim the arrangement and combination of the socket, e, the guide, b, the valve, A, the spring, B, the valve-seat, I, the induction chamber, K, the education chamber, F, the pivot, a, the key, G, the neck, H, the screws, f, g, and the induction and education passages or pipes, l, m, the whole being as specified.

55,785.—STEAM GENERATOR.—M. M. Rounds, New Haven, Conn., assignor to himself and William Zellner, New York City, and J. E. Jerold, Jersey City, N. J.:

I claim the tubes, d, arranged in the crown-sheet, C, so as to open into the fire-box, substantially as and for the purpose, specified.

55,786.—SABOT.—F. W. Schroeder, assignor to himself and W. H. Hoskins, Philadelphia, Pa.:

I claim, 1st, The sabot composed of the sole-piece, A, and heel-piece, B, connected together by a metal strip, D, bent to conform, or nearly to conform, to the shape of the sole and heel of a boot or shoe, and having a shoulder, a, and turned-up end, b, all substantially as described.

2d, The combination of the strip, D, and its hooked end, e, with the transverse strip, E, and its hooked ends and sole-piece, A.

3d, The transverse strip, F, having hooked ends, and being arranged to slide on the strip, D, as set forth for the purpose specified.

55,787.—COTTON GIN.—Charles Spofford and C. H. Hersey, assignors to themselves, W. E. Hawes, and Francis C. Hersey, Boston, Mass.:

We claim the employment of the triangular-shaped bar, K, in combination with the rolls, G, H, and combs, N, operating substantially as and for the purpose set forth.

We also claim the triangular-shaped bar, K, with its projecting ledge, l, substantially as and for the purpose described.

55,788.—SMUT MACHINE.—R. C. Swann, assignor to himself, John L. Riter, and T. Jefferson West, Brownsville, Ind.:

I claim the reciprocating perforated bed or screen, A, in combination with the pressure-rollers, B, having a rough periphery, and their journals fitted in springs, C, all arranged to operate in the manner substantially as and for the purpose set forth.

55,789.—RIGGING-STOPPER.—Henry Thompson, assignor to himself, D. C. and C. H. Haskell, Rockland, Maine:

I claim the rigging-stopper made and for use substantially as herein-before described, that is to say, of the toothed sectional lever, the rack, and the movable supporting-arm, and the two jawed levers, arranged and applied together in manner and so as to operate as explained.

55,790.—SWAGING MACHINE.—James H. Tobey, assignor to himself and Alfred E. Tenney, Cranston, R. I.:

I claim the duplex plunger, composed of two independent plungers, D and E, having coincident axes operating relatively to each other, as described, in combination with the die, C, constructed and arranged substantially as and for the purpose specified.

55,791.—MILK-CAN.—Isaac F. Van Duzer, assignor to himself and R. M. Sayer, Middletown, N. Y.:

I claim, 1st, The manner herein set forth of attaching the breast to the body of the can, viz., by having the breast-piece confined between the body and hoop, as and for the purposes described.

2d, The manner of constructing the bottom part of the can, of the two hoops, and body and bottom, as herein recited.

3d, The manner of securing the body-piece and the hoops together, by first riveting them and then dipping them in the melted solder, as set forth.

55,792.—GRINDING MILL.—Jules Aubin, Paris, France:

I claim constructing mill-stones with metal boxes or compartments let into the stone, and covered with metallic or other cloth, substantially in the manner and for the purposes herein-before described.

55,793.—ARTIFICIAL EYE.—Auguste Boissonneau, Paris, France:

I claim the shaping or forming artificial eyes in enamel, with a hollow, c2, in the lower internal section, so that the lower section is symmetrical to the upper one, for the purpose, as herein-before set forth, of using the said eyes on either side, as substantially described.

55,794.—MACHINE FOR MAKING HINGES.—Jean Baptiste Errard and Jean Pierre Boyer, Paris, France:

We claim, 1st, The arrangement of the spring-dogs, b, reciprocating carriage, e, in combination with the slotted rod, c, with its cam-slot, d, the lever, e', dovetailed strips, h, operating in the manner and for the purpose herein specified.

2d, The punches, l, and knives, r, in combination with the cams, n, levers, o, and with the guide grooves through which the blanks are fed, constructed, and arranged substantially as and for the purpose set forth.

3d, The bending tools, s, and grooves, a', in combination with cams, v, and levers, w, constructed, arranged, and operating substantially as and for the purpose described.

4th, The arrangement of the dog, j, cam, l, lever, m', constructed and operating in the manner and for the purpose specified.

5th, The spring-clamp, a3, b3, in combination with the cam, d3, and lever, e3, substantially as and for the purpose set forth.

6th, The adjustable guide-tube, i, arranged in combination with the mechanism for feeding-in and bending the plates and feeding the wire, substantially as and for the purpose specified.

7th, The countersinks, o', o', applied in combination with the mechanism for feeding-in, bending, and cutting-off the plates, substantially as and for the purpose set forth.

55,795.—GUNPOWDER.—Louis H. G. Ehrhardt, Bayswater, England:

I claim the combination of mineral carbon with cutch, tannin, or gambier, substantially as herein described, to form a safety powder which may be rendered explosive at will by the addition of chlorate and nitrate of potash, in the proportions substantially as herein set forth.

I also claim the combination of tannin, or its equivalent, with

mineral carbon, chlorate of potash, and nitrate of potash, substantially in the manner and for the purpose herein set forth.

55,796.—PROJECTILE.—Samuel H. Haycock, Ottawa, C. W. :

I claim an elongated pointed projectile with a cylindrical portion to fit the lands of the bore, and a conical rear, the center of gravity being in advance of the cylindrical portion.

55,797.—PHOTOMETER.—S. G. Elliott, San Francisco, Cal. :

I claim the combination of the tube, A, with the sliding, graduating tube, B, reflector, F, and rod, E, when said tubes, reflector, and rod are constructed in the manner and for the purpose as substantially described.

RE-ISSUES.

2,288.—MACHINE FOR PRESSING BONNETS, BONNET-FRAMES, ETC.—W. E. Doubleday, Brooklyn, N. Y., and J. Stewart, New York City, assignees by mesne-assignments of Wm. Osborn. Patented August 19, 1856; re-issued Feb. 17, 1857; again re-issued March 27, 1860 :

We claim a pair of dies fitted to press the whole of a bonnet-frame, or similar article to be worn upon the head, at one operation substantially as specified, whether said bonnet-frame or similar article is formed of one or several pieces, and irrespective of the particular size or shape.

2,289.—EGG-PAN AND CAKE-BAKER.—The Russel & Erwin Manufacturing Company, New Britain, Conn., assignees of Nathaniel Waterman. Patented April 5, 1859 :

We claim, as a new or improved article of manufacture, the egg-pan or arrangement of cups and a handle at each end of the series, all connected together and cast or founded in one united piece of metal, with heat-passages between the cups, and longitudinal, transverse, or circuitous channels on the underside of the same, substantially as herein-before described and set forth.

2,290.—MACHINE FOR GRINDING SAWS.—Emanuel Andrews, Williamsport, Pa. Patented Dec. 16, 1856 :

I claim, 1st, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder roller bearing, and spring, substantially as set forth.

2d, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, and turning-frame for the grinder, substantially as set forth.

3d, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, traversing carriage for the same, bearing for the article, and mechanism to move the grinder along the surface of the article with varying speed, substantially as set forth.

4th, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, and pattern-holder, of varying thickness at different parts of its length, substantially as set forth.

5th, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, and pattern-holder, of varying thickness both lengthwise and crosswise, substantially as set forth.

6th, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, and pattern-holder, whose thickness at different parts of its length can be varied by adjustment, substantially as set forth.

7th, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, and the pattern-holder, whose thickness at different parts of its length and breadth can be varied by adjustment, substantially as set forth.

8th, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, pattern-holder, and spring to maintain a yielding pressure on the article during grinding, substantially as set forth.

9th, The combination in a grinding machine of the following instrumentalities, viz., the revolving grinder, bearing for the article, pattern-holder, spring to maintain a yielding pressure on the article during grinding, and mechanism to move the said pattern-holder past the grinder, substantially as set forth.

2,291.—COOKING STOVE.—Daniel E. Paris, Troy, N. Y., assignee by mesne-assignments of Samuel B. Spaulding, Brandon Vt. Letters-Patent No. 20,668 dated June 22, 1858; additional improvement May 17, 1859 :

I claim, 1st, The extending of one or more of the flues of a square-shaped or diving-flue cooking stove, so as to conduct the heat and products of combustion under the bottom of a reservoir or water-tank and against it before the same passes into the exit-pipe, when the said reservoir is placed wholly or partly below the top of the stove, and in rear of the back flue or flues thereof, substantially as herein described and set forth.

2d, A return-flue so constructed that the heat will be conducted under the bottom of a reservoir or water-tank, and thence back to the exit-flue or pipe, and when the whole or a part of the reservoir is placed below the surface of the stove, and in rear of the back flue or flues thereof, substantially as herein described and set forth.

3d, The damper, F, so arranged and operated as to throw the heat and products of combustion under the reservoir, E, and against it, or by a proper adjustment or change of position thereof to allow the same to pass directly into the exit-flue, I, substantially as herein described and set forth.

4th, Constructing the flues which pass under the oven of a cooking stove in such a manner that the heat and products of combustion will pass under the hearth in front of the stove, substantially in the manner and for the purpose herein described and set forth.

5th, The hot-air chamber projecting out from and situated immediately in the rear end of the stove and back of the flue or flues connected therewith by means of an aperture or opening in and through the rear end and vertical plate of the cooking stove, so as to permit or allow the heat or heated air, or escaping products of combustion to pass through the same into such chamber or its equivalent, and thereafter come in direct contact with the reservoir or water-tank, arranged for the purposes substantially as aforesaid.

6th, An open seat or outward projecting chamber which shall receive and contain said reservoir or water-tank, and formed on the back end of a cooking stove, so that such reservoir shall itself form the covering or a part of the outer casing of the rear flue or flues, and of the said hot-air chamber combined just below the same, in the manner substantially as herein described and set forth.

7th, The arrangement of an aperture, opening, or openings, constructed in and through the rear vertical end-plate of the stove so that the heat, hot-air, or escaping products of combustion may by the means thereof come in positive contact with the bottom or other exposed parts or portion of said reservoir or water-tank, and thereby heat or warm the water therein, substantially as herein described and set forth.

8th, The arrangement of a reservoir or water-tank, with the whole or part thereof sustained or supported substantially as herein described and set forth, in combination with an aperture or opening or openings in and through the rear vertical end-plate of said stove, for the purposes substantially as herein described and set forth.

9th, The arrangement of a hot-air or warming or drying chamber or closet directly underneath the bottom of the cooking stove, in combination with the downward projecting bottom, x, of the horizontal flue or flues of the stove into such chamber or closet, in the manner and for the purpose substantially as herein described and set forth.

10th, The suspending and supporting of a cooking stove, without the use of the ordinary legs, upon the surrounding casing or box, C, which forms the hot-air or drying chamber or closet, between the seam and the floor, substantially as herein described and set forth.

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Improved Saw Gummer.

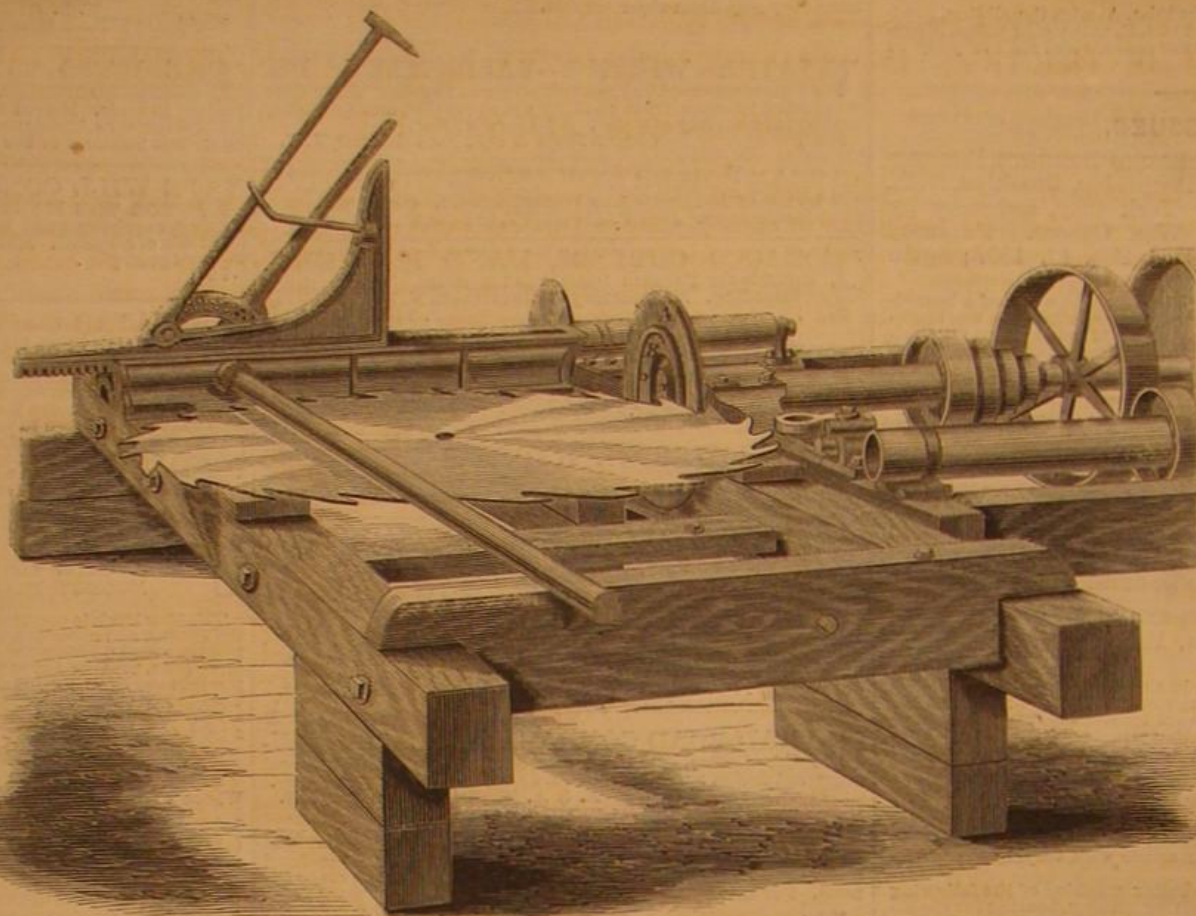
This engraving represents a new method of "gumming" circular saws, or, in other words, cutting out the throat of the tooth so that the dust will have a free opportunity to escape without clogging and binding the saw.

The tool is designed to be applied to the mandrel the saw itself works on, so that by merely removing it, and substituting the gummer, the operation can be performed without any other special fixtures.

The gummer itself consists of a grindstone or emery wheel, A, made of vulcanized rubber and emery, in the shape of a ring. This ring is clamped between two iron plates, B, and firmly held by screws, so that it cannot shift or change its position. Thus constructed it is applied to the saw mandrel and secured thereon, as the saw itself is, with a nut.

The saw, when operated on, is laid on the carriage or timbers of the mill—as shown in the engraving—which renders it easy of access during the job.

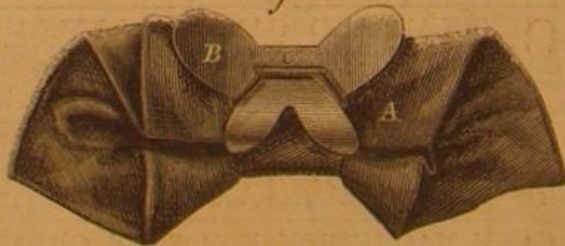
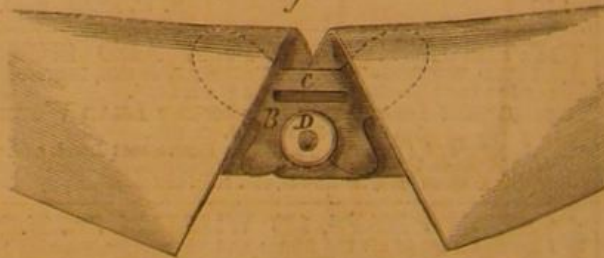
Many persons using this gummer speak highly of its qualities, and the proprietors are prepared to fill orders for them. It was patented on Nov. 15, 1864, by L. A. Dole. For further information address Dole, Silver & Deming, manufacturers, Salem, Ohio.

**DOLE'S SAW GUMMER.**

ous unless upon a scale large enough to employ modern agricultural machinery to advantage.—*Cor. Cin. Inquirer.*

HART'S CRAVAT HOLDER.

The starched lawn neckerchief, and the heavy Italian silk tie, which swathed the neck in voluminous folds, have given place to a simple bow worn in front of the collar, leaving the neck free and adding much to the convenience and natty appearance of this portion of the masculine costume. The trouble has been that the closing neck button of the shirt

Fig. 1.*Fig. 2.*

had to perform the treble office of securing the binding, the collar, and the cravat, producing too much strain on one button.

The device here illustrated is intended to relieve this dependence on the button and to keep the bow in shape. Fig. 1 shows a back or inside view of the knot and holder. A is the bow or knot, and B the holder. A slot, C, in the holder, which is of metal, silvered or enameled, receives the elastic loop, which then passes over the lower branches of the holder. These lower branches pass on either side of the button, D, and the upper branches pass under the collar. Fig. 2 shows the holder without the knot. By this device the knot or butterfly is held securely in place, but can be easily exchanged for another. The form and use of the holder can be readily understood by the two figures.

This very convenient invention was patented May 8, 1866, by Wm. H. Hart, Jr., and is manufactured by Hurlbut & Savery, sole agents and manufacturers, No. 21 Bank street, Philadelphia, to whom all orders should be addressed.

A Cheap Furnace for Chemical Experiments.

A correspondent who is an amateur chemist, sends a drawing and description of a cheap furnace, which he says he has used successfully for two years. He takes a piece of eight-inch stove funnel, twelve or fourteen inches high, and furnished with a cap at the top, which can be removed at pleasure. At the bottom a small hole is cut in the side to receive the pipe from a blower, and the whole funnel is lined inside with pipe clay mixed with sand.

Three inches from the bottom the lining is increased in thickness and receives some bits of wire, which form a grate. The blower is eight inches diameter and three wide, having four fans made of sheet iron, tin, or even pasteboard, as is also its case, and is driven by a small pulley belting from a larger one designed to be turned by hand. The whole arrangement can

be secured to a board, that portion under the furnace being protected by sheet-iron.

In such a furnace our correspondent says he has melted cast iron and manganese in a few minutes. He prefers coke to coal, as giving a more intense heat. His suggestions appear to be valuable to amateurs who do not wish to incur the expense of a complete apparatus.

**INVENTORS, MANUFACTURERS.**

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 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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FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN.

The Largest Farm in the World.

I observe a note in your last issue, of an 8,000-acre farm, in Bureau county, Ill., and of Mr. J. S. Alexander's farm in Morgan county, Ill., both of which will pass for fair-sized Illinois farms. But the farm which is, no doubt, the largest cultivated farm in the world, and, I believe, the best, is owned and cultivated by M. L. Sullevant, Esq., formerly from the vicinity of Columbus, Ohio, now of Champaign county, Ill. He owns and presides over 70,000 acres of the best land on this hemisphere, 23,000 acres of which are under fence, and in actual improvement and cultivation; the balance is used for herding.

I will venture the opinion that there cannot be found five acres of unserviceable land on Mr. S.'s entire 70,000 acres. Their productiveness is unsurpassed. Almost all of Mr. S.'s farming is conducted by labor-saving machinery, so that it is estimated that, throughout, one man will perform the average labor of four or five, as conducted on small farms. He drives his posts by horse-power; breaks his ground by Comstock's "spaders;" mows, rakes, loads, unloads, and stacks his hay by horse-power; cultivates his corn by improved machinery; ditches any low ground by machinery; sows and plants by machinery, so that all his laborers can ride and perform their tasks as easy as riding in a buggy.

I had the pleasure of being present when he harvested a thousand acres of his wheat; this was done with ———'s "Header's"—about eight or ten men and twenty horses cut and safely stacked away about 200 acres a day, and performed the work better than I ever saw it by the old modes. To give all the improved modes of farming employed by this king of agriculture, would require more space than you would like to spare. Notwithstanding all this labor-saving machinery, Mr. S. employs from one to two hundred laborers, some two hundred horses and mules, and a large herd of working oxen.

Not having the exact data before me, I will not venture to give the enormous returns, in bushels or tons, of the products of this great farm. Some estimate may be made from the magnitude of the farm, taken in connection with the fact that the quality of the soil is unequalled by the very best Sciota bottoms.

Scientific American.

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

Vol. XV.—No. 2.
(NEW SERIES.)

NEW YORK, JULY 7, 1866.

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(IN ADVANCE.)

Improved Steam Boiler.

The hindrance of the deposition of sediment and scale in a boiler, by a circulation of the water during the process of steam generation, and the utilization of a large amount of the heat, are objects worthy the attention of all who desire to render the use of steam power more general and effective than heretofore. Such is the design of this new boiler.

The accompanying illustration shows a vertical section of the boiler, and the explanation can be readily understood by reference to its several parts as designated by the letters.

This boiler consists of a cylindrical shell, with an internal fire-box, also cylindrical, the two being connected together by stay bolts in the ordinary manner. From the crown sheet of the fire-box is suspended a water leg, A, the exterior surface of which is armed with a series of bent pipes, B, opening into its interior at both top and bottom. The products of combustion are carried off by vertical tubes, C, passing from the crown sheet to the top of the boiler, where the stack is commenced, with an inverted funnel covering the whole; or, in the case of boilers of large size, a smoke box is formed of brick-work communicating with the chimney at the side.

The bottom of the water leg is connected with the exterior water space by means of horizontal tubes, D, which assist the circulation of the water. Opposite the end of each of these, in the external shell, is a hand-hole, E, which may be used to clean them, or to draw out any scale or dirt from the bottom of the leg. A steam drum, F, of any convenient form, is attached to the top or at the side of the boiler, as the case may require.

The principle of construction is equally applicable to large or small boilers, and it has been thoroughly tested, and with very satisfactory results, in both. It is readily repaired in case of the tubes giving way, by taking out the horizontal pipes which join the water spaces, and disconnecting the interior leg at the crown sheet. The connection at this point is made by means of a cast-iron ring with gasket and screw bolts, which, being in the water space, are protected from fire, and the joint can therefore be readily broken, and the whole leg, with its attached water pipes, dropped down into the pit below, where it can be worked upon on all sides. The horizontal pipes are easily replaced by means of the hand-holes in the shell.

The advantages of this arrangement are in the interior fire-box, in which no heat is lost by contact

with brick-work; in the thorough circulation of the water of the boiler, secured by the water tubes surrounding the water leg; and by the horizontal tubes connecting the exterior and interior water spaces; in the entire consumption of the fuel, and exhaust-

is such that, in those which have been for some time in use, it was found that although the water used was impure, the interior of the boiler was clean and free from scale.

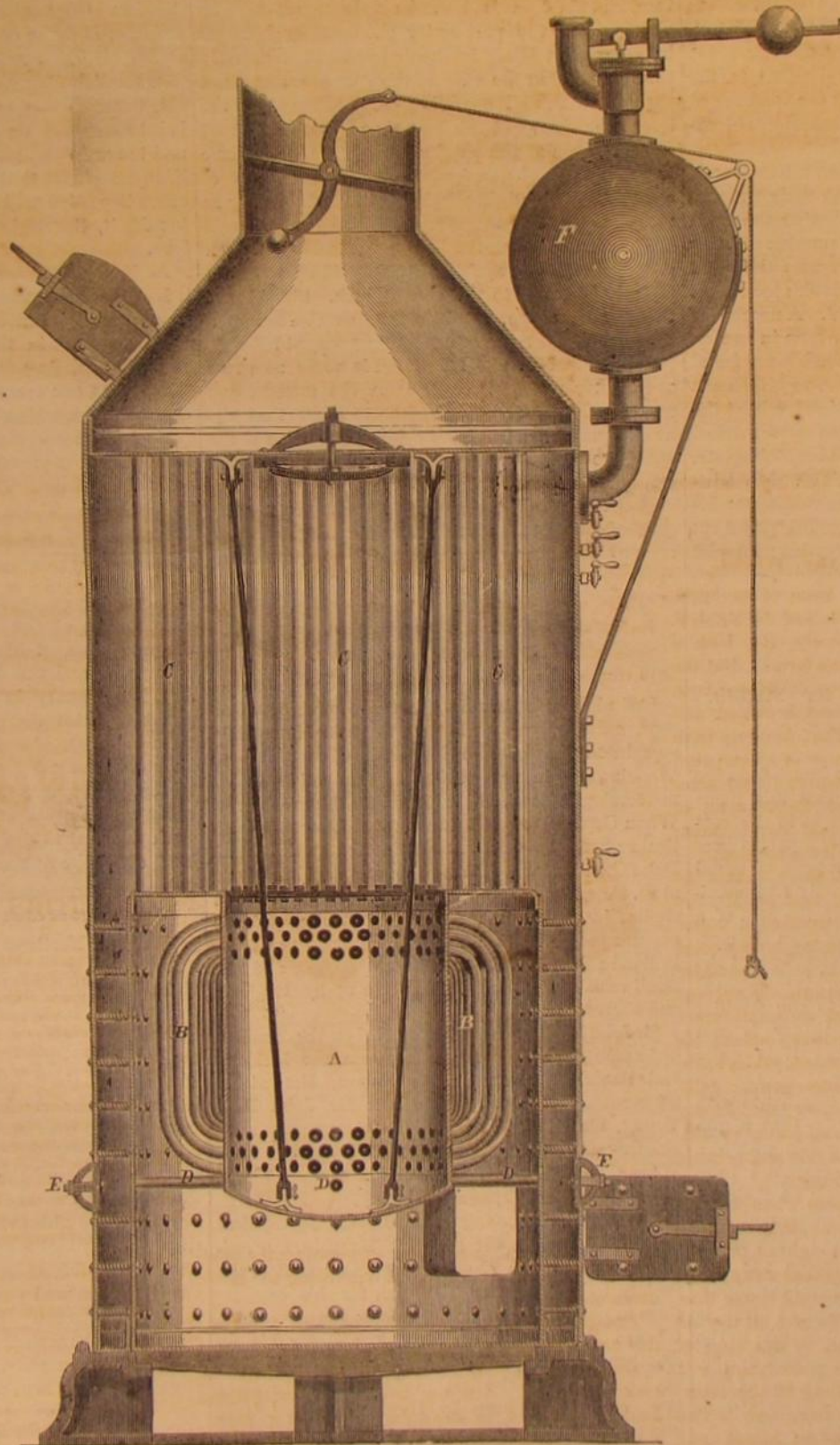
Those conversant with the subject will readily understand that the large fire surface and rapid circulation of water, secured in this contrivance, must produce great economy in the use of fuel, and this has, in fact, been found to be the result. In addition to this, the boiler has the great advantage of being compact and readily handled. It requires no brick-work to set it, and is therefore recommended for shipment to the South or to distant points, where brick and lime are difficult to procure.

It is also especially recommended for use in portable boilers for drilling, pumping, hoisting, etc. Address, for further information, James Connery, care Robt. H. Barr & Co., Wilmington, Del.

Locomotive Boilers.

At the meeting of the Mechanical Engineers, held at Birmingham on the 3d May, a paper was read by Mr. William Kirtley, of Derby, "On the Corrosion of Locomotive Boilers, and the Means of Prevention." Mr. Kirtley alluded to the corrosion which occurs in boilers made with lapped joints, and attributed the grooving action which takes place to the fact that neither the plates themselves nor their attachments to the fire box and smoke-box are in the direct line of the strain that is put upon them by the pressure of the steam. The furrowing action is most marked at the interior of the smoke-box end of the barrel, where it occurs most frequently opposite the edge of the outside angle-iron ring, when such a ring is used, and along the edge of the inside laps at the longitudinal and transverse joints. As stated the result of the strain produced by the pressure of the steam within a lap-jointed boiler is, that a slight springing or bending of the plates takes place at the edges of the joints each time that the pressure is applied, the continual variations in the pressure causing this bending action to be continually

going on when the boiler is at work. By this action the coating of scale, which is deposited upon the plates by the water, and which, to a certain extent, would protect the plates from corrosion, is detached at the points we have mentioned, and a fresh surface is thus continually exposed to the action of the water. To avoid the defects above mentioned, the boilers



CONNERY & PENNYPACKER'S STEAM BOILER.

tion of the heat, caused by the ample size of the combustion chamber, as shown by the fact that the gas, when leaving the boiler, is comparatively cold, and in the superheating of the steam by the tubes at the top, passing through it for a short distance after leaving the surface of the water.

The effect of the circulation of water in this boiler

of the locomotives on the Midland Railway are now made with welded longitudinal joints, and the three rings of which each barrel is composed have their abutting edge turned in a lathe, and are united by double-riveted butt-joints, the covering strips being hoops shrunk on, and all the rivet holes being drilled after the plates and hoops are put together. The plates forming the rings are rolled with thickened edges, a long gradual taper uniting the thick edges with the main body of the plates. At the smoke-box and fire-box end of the barrel, the rings are flanged outward, so that no angle-iron rings are required to join the barrel to the fire-box casing and smoke-box tube plate. Special machines are employed to bend and flange the thickened edge plates. The flanging is effected by laying the plate upon a flat bed, with the portion that is to be flanged over projecting; this part of the plate is then bent down by the descent of a roller. The rolls used for bending these plates have a deep groove formed in them at one end to receive the flange, the width of the groove being adjustable by a large screw and nut. Each ring is formed of two plates, and after these have been welded up, the ring is blocked to the proper diameter and the soundness of the weld tested by means of an ordinary hydraulic wheel-tire block-press.

A series of experiments which have been made upon these welded joints show that their average strength is within one-eighth of that of the solid plates; and in more than half the number of strips of plate which have been cut out across the weld and tested by a tensile strain, the fracture took place in the solid plate, and not in the weld. A number of boilers with welded seams have now been in use on the Midland Railway for some years; they are found to be in good condition, and they have, as yet, shown no sign of furrowing, even at the flanged ends, at the points where the grooving action was most marked in the boilers connected to the smoke-box, tube-plate, and fire-box casing by angle-iron rings. Mr. Kirtley exhibited, on the occasion of the reading of his paper, a number of specimens of corroded plates cut from boilers of the ordinary construction; samples of the thickened-edged plates, flanged and bent, and pieces of welded plate that had been broken in testing the strength of the welded joints, were also shown.—*Engineering*.

WHY A GUN BECOMES HOT ON FIRING.

BY PROFESSOR CHARLES A. SEELY.

When a gun is fired a fierce flame issues from the muzzle, and there is little doubt that this flame was preceded by one still more intense in the confined space of the barrel. As there is manifest here an abundance of heat to warm up a mass of metal like that of the gun, people have readily and unanimously come to the conclusion that the heat of a gun, on being fired, has come directly from the combustion of the powder—the heat is absorbed at the interior surface and from thence is conducted throughout the metal according to the familiar laws. Nevertheless, this popular theory is not altogether sound; I may show that it is quite fallacious.

It is a long time since I have had experience with guns, but I remember quite distinctly that a gun gets warm very quickly. As I have had within a few days no opportunities for experiments, I have consulted many of my military friends on their experience in firing large and small guns, and find that their testimony generally agreed with mine, that a gun becomes perceptibly warm on the outside instantly on firing. Can heat travel through a mass of iron or any other metal instantly? Iron is among metals a very poor, slow conductor; if the conducting power of silver be represented by 100, that of copper will be represented by 74, and of iron by 13. The popular theory fails, because metal cannot conduct heat fast enough to satisfy it.

But before being conducted the heat must first be secured? How difficult this is will be apparent when we realize the small surface exposed to the burning powder compared with the mass of metal, and how very short the exposure is. The contact of the inflamed powder with the metal is only for an instant. There is often no perceptible interval between the explosion of the cap of the

powder and the appearance of the flash at the muzzle. Can any great quantity of heat be communicated to a mass of metal in such a little space of time? I have plunged my hand for an instant into molten iron with perfect impunity. A bar of iron may be thrust through a flame many times without becoming perceptibly warm.

I think it quite manifest, from such considerations, that a gun does not receive all its heat from the heat of combustion; the combustion theory does not account for the rapid diffusion of the heat through the metal nor for its great amount.

Another source of heat, of which all know something, and which will relieve us of difficulty, has been overlooked by military men; I allude to the heat of percussion. If a piece of iron be laid on an anvil and struck a few smart blows with a hammer, it becomes hot; the rectilinear motion of the smith's arm is transferred to the cold iron and in it becomes an undulatory motion of the particles of iron, and the iron is hot. In this case it will be observed that the part under the hammer becomes hot instantly, and is heated almost uniformly throughout. In the case of the gun are there not the same essential conditions—the percussion, the instant heating, and the heat throughout the mass? In short, I am of the opinion that if we could have the expansion of gunpowder, without any heat of combustion, we might still have practically nearly as much heating of guns as now.

The expansive force of fired gunpowder has been estimated all the way from 15,000 (Robins) to 1,500,000 lbs. (Rumford) to the square inch. Should not this force produce as much heat as the fall of a colossal hammer of a corresponding weight?

The force of the recoil of a gun is never so great as the force which proceeds from the muzzle, and carrying the shot. Is it possible to show that the heat of percussion bears some definite relation to the difference of these? A unit of heat represents 772 foot-pounds.

The friction of the charge, in its passage from the gun, of course, contributes to the heating, but the amount of heat so produced must be quite small compared to the heat of percussion.

[From our own Correspondent].

Foreign Scientific News.

LONDON, Wednesday, June 6, 1866.

Last night a testimonial, in shape of three thousand guineas, was presented to Capt. Maury, late superintendent of the National Observatory at Washington, in recognition of the value of his meteorological researches to all maritime nations. When Capt. Maury left the United States for political reasons, he was warmly invited by the Grand Duke Constantine, of Russia, to take up his abode at St. Petersburg, and Prince Napoleon gave him a similar invitation in the name of France. Of the amount presented to him at the dinner last night, Holland subscribed £1,800, Russia £1,000, and the small remaining balance was made up by England and France.

Sir John Pakington, M. P., presided on the occasion, and among the guests present were the Mexican and Danish Ministers; Earls Nelson, Hardwicke, Grosvenor, and Powis; Admirals Sir John Hay, Young, Sir G. Back, Halsted, and Anson; Generals Beauregard and Walker; also Prof. Tyndall, Prof. Wheatstone, Commodore Jansen, Capt. Cowper Coles, and about a hundred others.

At the annual meeting of the Royal Geographical Society, last week, Sir Roderick Murchison, President, awarded the "Founder's" gold medal of the Society to Dr. Thomas Thomson, for his explorations in north-western India, among the mountains whence the Indus takes its rise, and for his researches in Thibet, and other parts of Central Asia. Dr. Thomson was the first to dispel the prevalent idea, entertained even by Humboldt, that Thibet was an elevated plain or plateau, and to trace the water systems, climate, and productions of that hitherto unknown region. For those researches Dr. Thomson, up to last week, never received any reward, and, in fact, in publishing his discoveries, was subjected to heavy pecuniary loss. The "Victoria" gold medal of the Society was then presented to Mr. William Chandless, for tracing, by his own unaided exertions, the river Purus, one

of the largest tributaries of the Amazon, from its mouth to its sources. M. Du Chaillu next received 100 guineas from the Society, in recognition of the value of his recent researches in equatorial Africa. M. Du Chaillu, since his last visit to Africa, no longer describes the gorilla as a beast terrible to meet, as an animal that rushes roaring through the woods, gnashing its teeth, and beating its breast with its fists to produce a noise like the roll of a drum. On the contrary he now states that a whole drove of gorillas ran away when they saw him. The strictures of the English press on his first book of adventures have induced more moderate statements, yet it is but fair to M. Du Chaillu to state, that many of his disputed assertions about Central Africa, have been since substantiated as facts.

The *Great Eastern*, with the Atlantic cable on board, will leave Sheerness on the last day of this month, and commence the laying operations about the 10th of July. She will be accompanied by the *William Cary*, steamship, 1,500 tons, the screw steamer, *Medway* of 1,900 tons, the *Albany* screw steamer 1,500 tons, and the *Terrible*, man-of-war. The English Government will lend only one ship this time. In the attempt to raise the old cable, it is intended that three ships will grapple it at once, and the westernmost of them put on the greatest lifting strain, so that should it break the cable the other two ships will have a comparatively easy task to raise it, the strain being taken off one end of the loop.

As for the last expedition, Dr. Russell's book about it is of the most unsatisfactory description, and has been severely handled in this country. It has oozed out that in the picking up operations, last year, the incoming line of cable was subjected to sharp jerks, one every three or four minutes. The drum of the machine being a cylindrical form, the cable had to be what sailors call "surged" every few minutes, to prevent it from coiling itself off the edge of the drum. These facts have been suppressed in the book. The contractor's electrician, also, who had charge of the operations, has been, for some reason unknown, replaced this time by one of his juniors. As the Atlantic Telegraph Company had an electrician on board to report what he saw, the shareholders at one of their meetings demanded the production of his account of the engineering operations, and the directors refused the request. As it is customary in England for telegraph companies to print their engineers' reports, and post them to the shareholders, the secrecy thrown by the directors over what might be a national undertaking, has brought down a great deal of unpopularity upon a noble enterprise, and it will be hard work this year to get up any enthusiasm in England, about the Atlantic cable.

An Extraordinary Railroad Disaster.

The great Northern Railway, of England, was the scene of an extraordinary casualty on June 14th, which is entirely unprecedented. It seems that a freight train broke down in a tunnel, and the precaution of flagging approaching trains having been neglected, one came along soon after and piled itself on the top of the freight train. Even this experience did not suffice, and a few minutes later still another train came in from the other end and dashed on top of the rest. This jammed the tunnel full to the very crown, and one of the engines having turned over, the coals fell out and set fire to the combustibles. For two days this fire burned unhindered, for the simple reason that it was impossible to check it. The noise of the fire, caused by the heated air rushing out of the confined place, is said to have been fearful. The immense traffic of the road was entirely stopped for the period mentioned. All this was caused by the simple neglect, in the first instance, of not flagging the coming trains. Only two lives were lost.

Ryerson's Churn.

In the matter which accompanied the engraving of this churn, published on page 406 of the last volume of the *SCIENTIFIC AMERICAN*, the address of the inventor was incorrectly given as at *Princeton*, Ind. The real name of the town is *Piercetown*, Kosciusko Co., Ind.—the similarity of the two names causing the mistake. This churn will be found to expedite the laborious process of churning very much.

[From the Galaxy.]

THE SPECTROSCOPE AND ITS REVELATIONS.

BY PROF. HENRY DRAPER.

Within the last few years a new form of chemical analysis has arisen, which ascertains substances by observation upon the color and properties which they impart to flames during combustion. It has been long known that the combustion of certain bodies gave certain colors to flames; strontia, for example, affording the beautiful crimson so well known in pyrotechny. But no sure method existed of using the facts of combustion for chemical investigations, until the invention of the spectroscope. Spectrum analysis enables us to detect the minutest trace of the constituents of substances burnt. It has already discovered several unsuspected new metals; has given us the power of analyzing bodies whose composition we had not the means of ascertaining, and has proved to us that many of the elements of the earth are present in the inaccessible sun, and even in those more remote stars whose distance the most refined researches of astronomy cannot determine.

The spectroscope is merely a prism to which light can be admitted through a slit $\frac{1}{32}$ of an inch wide, with apparatus for examining microscopically the spectrum or decomposed ray beyond the prism. When this is done, the spectrum is found to be crossed by an infinite number of lines perpendicular to its length, as shown in the upper part of Fig. 2. These lines are called, from the name of the distinguished optician who discovered them, Fraunhofer's lines.

When the light, coming from a white-hot mass of metal is examined by the spectroscope, its spectrum is found to be perfectly continuous and unbroken by any Fraunhofer lines. This fact was demonstrated by my father, Prof. J. W. Draper, in 1847. What is the cause of the lines in the solar light, and in what does that luminary differ from the incandescent mass?

In order to fathom this question, we must investigate for a few moments the case of artificial lights, such as ordinary flames, and those in which there are purposely introduced various elementary or compound bodies. The construction of the spectroscope must also be described.

The spectroscope is some times a very complicated instrument, but, for ordinary analysis, quite a simple form may be used. The one represented in Fig. 1 is commonly found in laboratories. It consists of a prism, P, supported on a stand, F. Two telescopes of low magnifying power, A and B, are attached by suitable supports. One of these, B, is furnished with an eye-piece like any common spy-glass, but the eye-piece of the other, A, is removed, and in its place is put a vertical slit, *c*. Opposite this slit the flame to be examined is placed. The light coming through the slit from the flame falls upon the object glass of the first telescope, and its rays are rendered parallel; it then passes through the prism, is refracted and decomposed, and enters the second telescope, whence it falls upon the eye. Any flame may be put opposite the slit, and its peculiarities examined, or, by the aid of a reflector, the sunlight may be cast on part of the slit so that we can see a solar spectrum alongside of the flame spectrum. Or we may have the spectra of the two flames, D and E, at once and compare them. The third telescope carries a scale.

The use of a spectroscope merely involves placing the substance to be examined in a spirit or gas flame, and then looking through the telescope to examine the spectrum. The number, position, and color of the transverse lines are always the same from the same substance. A person soon becomes experienced enough to state in a moment what bodies are present.

If, for example, a piece of soda be suspended in the flame, at once a double yellow line makes its appearance, as shown in Fig. 2, by the double line near the right-hand end of the third spectrum from the top. The wood cut shows also the lines characteristic of the elementary bodies, potassium, lithium, rubidium, cesium, strontium, calcium, barium, thallium. The spectrum at the top is that of the sun, and is inserted for the sake of comparison. By noticing where the lines in the lower spectra fall, and collating them with the solar spectrum, their color may be ascertained from this cut. Those at the right-hand end are red, those at the left violet, those in the intermediate parts of the intermediate colors.

Understanding, then, that various elementary bodies, when volatilized in a flame and examined by a spectroscope, give spectra distinguished by bright-colored lines, soda by yellow, strontia by red, etc., the reader is ready to grasp the next idea in the investigation.

If the light coming from such a source as a mass of white-hot iron, which is free from all Fraunhofer lines, be passed through a flame where soda is volatilizing, before it is analyzed by the prism, instead of seeing the bright yellow lines characteristic of the soda, we shall find in their place two dark lines. In other words, the soda flame has interfered with the continuity of the spectrum of the white-hot body, and produced therein two Fraunhofer lines. If a number of substances are burning in the flame at once, we shall get in the spectrum an increased number of lines. A flame refuses to permit the passage of rays of the same kind as it emits. White light passing through a soda flame has the yellow rays sifted out of it.

It is obvious at once, from such considerations, that we can ascertain the constitution of the sun, both as regards his physical character and chemical composition. From the fact that the lines in his spectrum are dark, we infer that he has an intensely hot solid or fluid nucleus, emitting light and surrounded by an atmosphere of flame in which there are many volatilized bodies. If he were solely an ignited gas or flame, the lines of his spectrum would be bright instead of dark.

As regards chemical composition, it is only necessary to ascertain what elementary substances can produce lines corresponding to those in the solar spectrum. We can then at once be sure that those bodies exist in their luminary. The presence of iron, sodium, and a variety of other materials familiar to us here, has thus been proved.

The reader will at once perceive what an important bearing these facts have on the construction and unity of the solar system. We have shown that on two members of it—the sun and the earth—the same substances are found, and may, therefore, infer that all the rest are similarly composed—for no other two, at first sight, seem more unlike. The sun, and all his attending planets, with their satellites, are composed of the self-same elements.

In this place, it is interesting to refer to a theory by which such facts may be accounted for, and the reason of the similarity shown. The nebular hypothesis assumes that our solar system was at one time a gaseous mass, extending beyond the orbit of the furthest planet, Neptune. Its composition was necessarily uniform throughout, for the tendency of gases to diffuse into one-another, or intermingle, would have free play. In this nebula the temperature was very high, for the elementary bodies were in a vaporous state in it, just as they are at present in the sun. But as soon as the mass commenced to lose its heat, there were established currents and a general movement of rotation, and on the exterior a shell, or, rather, equatorial band of condensed materials, began to form. The cooling and consequent contraction still continuing, the band was left behind, but it sooner or later broke, in one or more places, and aggregated into one or more globular masses, which continued their rotation as planets.

The same thing occurring several times in succession, and rings of molten matter being left behind by the contracting gaseous mass, as it lost its heat, eventually all the planets, as we now see them, were formed, and the remainder of the nebula is the sun, still preserving the form partly of ignited gas, and partly, probably, of a liquid or solid. It is, however, even now radiating its heat away and cooling, though slowly. After, perhaps, giving off a few more planets, whose orbits will not exceed in diameter his present size, the sun, according to the hypothesis, will be no longer visibly hot, and life on the planets will come to an end.

This celebrated hypothesis has been very freely discussed, and has received much adverse criticism. Many strong objections have been urged against it, but the spectroscope confirms it. The reader will not be able to appreciate the full value of this support until the constitution of the nebulae visible in the heavens has been spoken of. It will, therefore, be reserved for that place.

But let us not confine ourselves in these observa-

tions to our own solar system. Let us see whether this little instrument, which is scarcely any thing more than a small triangular piece of glass, will not enable us to establish a relationship with more distant bodies than the sun and planets—with other solar systems far away in the abysses of space.

To the naked eye, there appear scattered over the sky at night a multitude of stars of various colors. Even in our best telescopes they are only glittering points, and no glimpse of their chemical constitution could be presented before the spectroscope was applied to investigate them. We were satisfied that they shone by their own light, that they were suns, that they presented many analogies to our solar system, and also many dissimilarities.

How strange a sunlight, for instance, there must be in a world lighted by a pair of differently colored suns, for such must be the case if planets revolve around some of the binary stars. At one season of the year, a blue sunrise, followed by a yellow one, then a day of the intermingled lights—a yellow evening and dark night. At another season the reverse order of illumination; while at intermediate times there may be continuous day, first of one color, then of the other; a yellow day inciting the growth of plants, a blue one delighting the photographers. Can we establish a connection with such worlds?

The stars, both single and double, when examined by the spectroscope, are observed to contain substances well known to us. One of them, Arcturus, closely resembles our sun, as has been shown by Rutherford. At once we perceive a fellowship between them and our own earth, and are led to the noble idea that Nature constructs everywhere out of the same materials. Bodies, so distant that the astronomer fails to give us an idea of their remoteness, are brought, as it were, into our grasp, and are analyzed with certainty. We recognize the same elements in them, that compose the soil we tread, the water we drink, the air we breathe.

And what are these materials? Chemists enumerate to us sixty-eight elementary bodies, that is, substances not composed of anything else, and that cannot be further decomposed. Such are the gases: oxygen, nitrogen, hydrogen, etc.; the liquids: mercury, bromine, etc.; the solids: sulphur, iron, gold, etc. One is fifteen times lighter than the air, another twenty-one times as heavy as water. Truly, Nature has variety enough to choose from, for out of sixty-eight elements how many combinations may not be made? But this very variety creates at once a suspicion that the ultimate elementary bodies are not in fact so numerous.

Among the reasons for doubting the multiplicity of elementary bodies, it may be stated: 1st, That many of them are so nearly identical that it requires a good chemist to distinguish one from another. 2d, That in our own times a number of elements have been stricken from the list, having been found to be compound bodies. 3d, That by quite trivial means one elementary substance may be made to assume a form having properties totally distinct from those it originally possessed. 4th, That we can form, from two or more elements bodies, which have the attributes of elements, a case in point being cyanogen. 5th, That the infinite variety of organic substances, such as the various tissues of the bodies of animals and plants, diverse as they are, are all formed principally from four elementary bodies. A multitude more of such arguments might be advanced; but the general conclusion which they indicate can be summed up in a line. All the sixty-eight elements may be compounds, perhaps only two or three elements—may even be modifications of a single type of matter. But any further consideration of this part of the subject would lead us into an examination of the nature of matter, and its atomic constitution, and with that we have not room to deal.

But we will penetrate yet a step further into space. The stars, it has been stated, are exceedingly remote. Let us examine bodies so distant that the stars are near neighbors compared with them. Clusters, resolvable nebulae, true nebulae, shall carry us as far from the earth into space as the eye can see.

To the naked eye, or in a telescope of low magnifying power, there are visible in the sky certain patches of diffused light, differing in appearance from the glittering stars. Some, when examined with a higher power, are seen to be resolved into an

aggregation of stars; some, by the use of the highest attainable magnifying power, on the finest nights, are with difficulty resolved, while some resist every attempt. It is with the last that we are more particularly concerned.

The great reflecting telescope of Lord Ross is well known. It is six feet in aperture and fifty-four feet in focal length. By its aid, nebulae that had, up to his time, been unresolved, were separated into stars, and from this circumstance the argument was advanced that all nebulae would yield to a sufficient increase of power and be demonstrated to consist of stars, which, while in reality separated by immense distances, yet seem so closely packed together that their light is blended into one mass.

We have spoken of solar systems; there are, according to these statements, also stellar systems where, instead of a sun and planets, there are groups of suns. Our sun belongs to such a group of resolvable nebulae, the stars that we see individualized, and those of the milky way, being his companions.

Seen at a great enough distance, our nebular or stellar system would present a flattened or lima-bean-like shape, somewhat elliptical from one point of view, and like a narrow band from another. Is this group arrangement the only form in which luminous matter is found in the universe?

Here, again, the power of means apparently trivial, but rightly applied, is shown. Once more the prism of glass solves a question which hundreds of thousands of dollars expended in telescopes could not have settled. On applying the spectroscope to the investigation of the irresolvable nebulae, Huggins finds that some of them present the spectra characteristic of an ignited gas, that is, of a flame. The Fraunhofer lines in that case are, as we have said, bright instead of dark, as in the solar spectrum, and the evidence is of a very tangible and unmistakable kind.

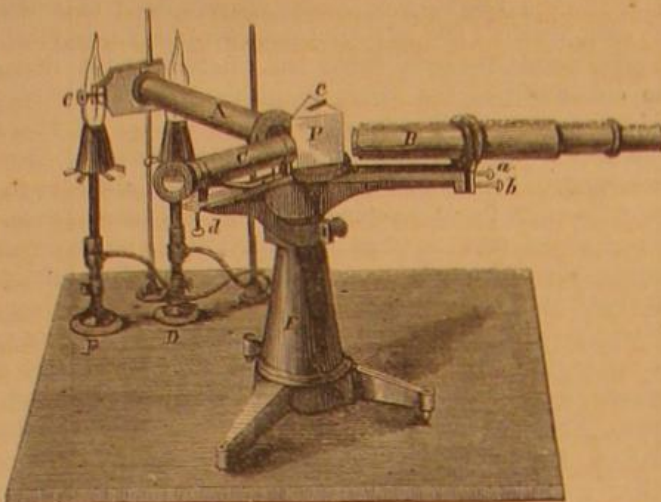
There are, then, in space, masses of ignited gaseous matter of prodigious extent, shining by their own light, containing no star and resembling the nebulae, which the nebular hypothesis declares to have been the original state of our solar system.

Now we can appreciate the assistance which the spectroscope has lent in establishing that noble conception of Herschel and Laplace. It has demonstrated the unity of the solar system by establishing the existence throughout it of the same elements; it has shown the same unity in the materials of the universe; and, lastly, it fortifies us in the belief that that theoretical conception is in process of realization before our eyes; that we may see worlds in the act of formation. The spectroscopic hypothesis: the former heated state of our globe. Geologists assert, from the presence in high latitudes of the fossil remains of tropical plants, that the earth was once in a molten condition; that it cooled gradually, and at one time reached such a temperature that the internal heat sufficed to maintain a warm climate on every part. The polar regions were not then dependent on the sun for their supply of heat, but needed that luminary only for light. Vegetation was somewhat like that of a hot-house in the north in winter, with plenty of heat, but lacking light for part of the year.

By this hypothesis, a great variety of facts, such as the formation of some mountain ranges, may be

satisfactorily explained. For example, when the heated mass of the earth was cooling it was also shrinking, but as soon as an inflexible crust had formed over the liquid ball, that exterior could no longer gradually diminish in circumference, but was forced to pucker into ridges, just as we see in the case of an apple drying up. The apple assumes a wizened appearance, so did the earth. The wrinkles

Fig. 1.

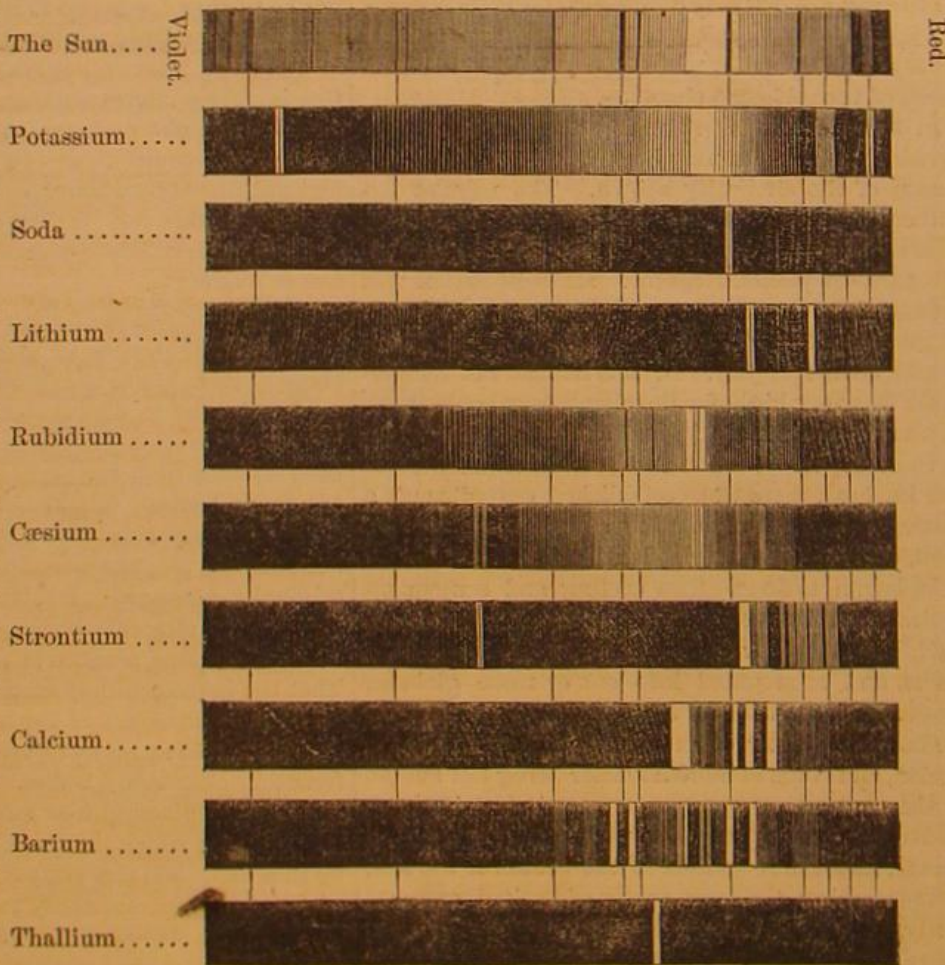


are mountain chains.

The spectroscopic confirmation of these ideas, though indirect, follows necessarily from the support which that instrument lends to the nebular hypothesis. If the earth was once an ignited gas, it is certain that it also presented subsequently a molten form. And its geometrical shape, that of an oblate spheroid, the figure naturally assumed by a rotating liquid mass, is an important link in the chain of evidence.

Another reflection naturally suggests itself to any one thinking about these matters. We know that heat was the force concerned in keeping the materials of our solar system in the gaseous state, for by its aid we can again bring most of them into that form.

Fig. 2.



The escape of heat was the cause of the solidification of the present crust of the earth. Where has all that immense amount of heat gone to?

It escaped altogether as radiant heat, moving in straight lines. Is it lost in the abysses of the universe, or is it somewhere collected together to melt worn-out worlds into nebulae again, and cause them to run again the course they have before pursued? Can we discover the scheme by which perishing systems are replaced by new ones, and the grand East Indian idea, of a multiplicity of worlds in an infinity of time, realized? How, when the light of our sun has faded out, shall our solar system be revived, and re-supplied with the force it has lost?

These are questions that remain to be solved. We are satisfied that matter and force are eternal, but what their laws of distribution and operation in space and time are, the intellect of man has yet to discover.

And if there has been a gradual formation of planets within our solar system, beginning at its confines, one after another losing its internal heat and becoming dependent on the sun for warmth, does not another thought occur to us? Has not life followed the inward march of heat? Is it not possible that there was a time when plants and animals, such as we have here, were able to exist on the exterior planets, favored by their genial heat? The last traces may not have disappeared from them. And may not the types of low forms of organized things, that inhabited this earth in early geological times, have passed inward toward the sun, where surrounding physical conditions favored them in a manner that has ceased here? Are there on Venus the radiata, mollusca, etc., belonging to our planet ages ago? Do types of life exist in the more distant planets, of some grade higher than our own? We see on the earth the migrating animals that cannot stand the vicissitudes of summer and winter, follow the sun southward in winter, and driven before him northward in the summer. Is there in the solar system a similar obedience to heat and its effects, and an ever inward flowing tide of life?

A Great Railway Enterprise.

The Imperial Mexican Railway, connecting the capital city with Vera Cruz, a distance of 350 miles, is one of the greatest railroad enterprises ever undertaken. In a distance of 55 miles an elevation of 7,000 feet is to be overcome, corresponding to 119 feet per mile, or 2 feet in every 44 feet throughout the whole distance. The most abrupt ascent ever before achieved was that on the Copiapa line in Chili, 196 feet per mile in 17 miles; but the chief incline of the Mexican Railway, at Maltrata, will overcome 211 feet per mile in a distance of 23 miles. In achieving this part of the work, the engineers have been called upon to construct over the river Metlac, midway between the cities of Orizaba and Cordova, a viaduct which, when completed, will surpass any structure of the kind now existing in the world, and will, of itself, be worth a trip to Mexico to see. This viaduct, to consist, of an iron bridge, now nearly completed in England, will carry the road over the Barranca de Metlac, at the enormous height of 380 English feet, being nearly 150 feet higher than any such work now extant. One hundred and sixty miles of this road will be opened this month, and the whole is under contract to be completed on the 30th of April, 1869. The road is built under the superintendence of Col. Andrew Talcott, an eminent American engineer.

Variable Star.

In a recent issue we noticed the discovery of a variable star in the Constellation of the North Crown. Rear-Admiral Davis, in a communication to the Secretary of the Navy, gives full credit to Mr. Farquhar, of the Patent Office, for the first discovery of this star. The *Compte Rendus* states that the same star was observed at Rochefort, France, on the night of the 13th of May—only one day later than its discovery by Mr. Farquhar.

A GLASS-MAKERS' convention was recently held at Philadelphia, all the leading concerns being represented. It is said that the glass-manufacturing business has been so much injured by the low rate of tariff put upon imported manufactured glass-ware, that many shops have been compelled to suspend operations entirely, and the others have so little encouragement to continue the business that but a small number of hands are employed. The ware can be imported, and after payment of duties, sold at a less price than our manufacturers can afford to make it. It is desired by them that Congress raise the tariff on this article of importation.

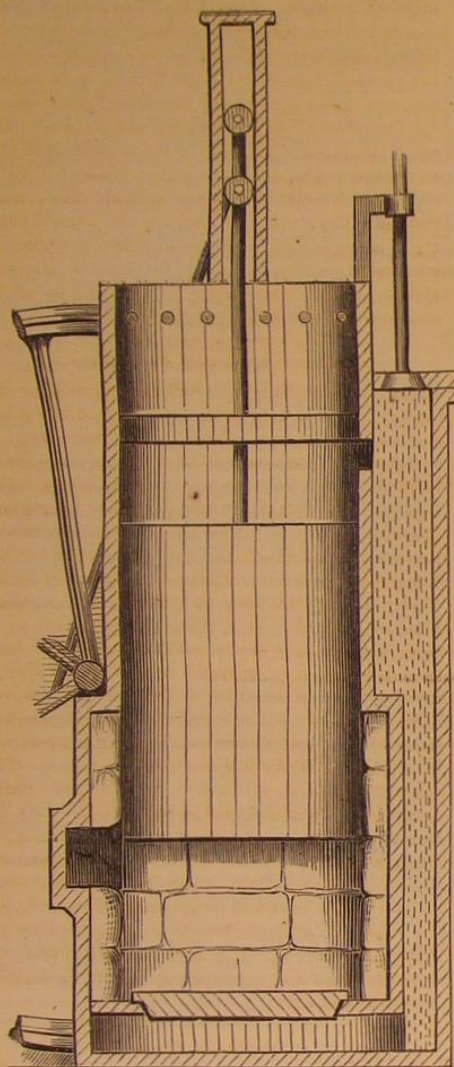
At the recent meeting of the American sharpshooters association, at Chicago, Gottlieb Fahlm, of Morgansfield, Ky., won the first prize, making twenty-five shots within a circle four inches in diameter at a distance of 700 feet.

McDONOUGH'S CALORIC ENGINE.

(Communicated.)

This machine consists of a cylinder, open at the top and closed at the bottom. The furnace is at the lower end of this; a plunger moves in it above the fire, and also a piston at the upper or open end. The air to feed the fire is drawn into the cylinder through holes in its periphery, which are uncovered when the piston is at the upper end of its stroke. The plunger moves the air through a side pipe and under the fire. It expands and does its work by forcing the piston upward, after which the plunger expels it through an exhaust valve near the top of the side pipe.

By this arrangement only cold air reaches the pis-



ton, and as all the parts affected by heat are covered with fire-clay, it forms a durable machine. The engine, which the engraving represents, has furnished a power of more than six pounds per inch to a fifteen-inch piston, of eight inches stroke, 150 revolutions per minute—the power only acting one way—and consuming fourteen pounds of coal in four hours. The heat is utilized at more than 600 degs., probably, and escapes at 100 degs., being a step toward the development of a machine superior to the steam engine in economy of fuel.

Patented Jan. 30, 1866. Detailed drawings and castings furnished to persons wishing to build engines; address T. McDonough, Newburgh, N. Y.

To Prevent Chafing.

During the "hot term" persons of a full habit, who walk much, are inclined to chafe. This can be cured or prevented by the use, once or twice a day—at retiring and rising—of a solution of common alum in water. The alum may be dissolved in warm or cold water, but should be used cold, applied with a soft linen or cotton cloth to the parts affected. The proportions are a lump of alum large as a walnut to half a pint of water. If too strong, where the flesh is excoriated, weaken with cold water. We know by personal trial this simple remedy is effectual.

An Ancient Stove.

The oldest stove, probably, in the United States,

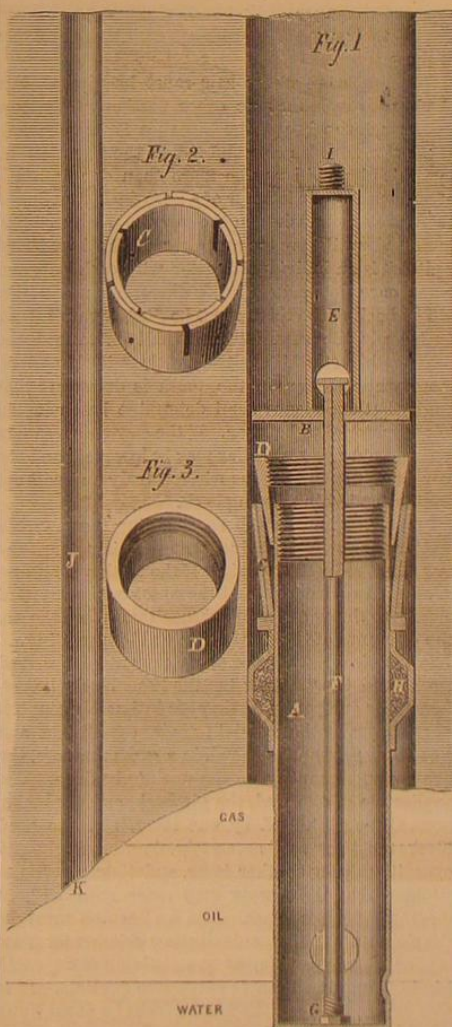
is one which warms the hall of Virginia's Capitol in Richmond. It was made in England, and sent to Virginia in 1770, and warmed the House of Burgesses for sixty years before it was removed to its present location, where it has been for thirty years. It has survived three British monarchs; has been contemporaneous with four kingly monarchies, two republics, and two imperial governments of France. The great Republic of America has been torn by internecine strife, the breaches partly healed, and still the old stove remains, unmoved in the midst of all.

CHRISTIAN'S DEVICE FOR OIL WELLS.

There are many who, having sunk wells for oil and lost all they possessed therein, would rejoice if the day of their mourning was changed to gladness by the sight of the coveted fluid welling up from the bowels of the earth, and the hollow bore, which seemed only a place to bury treasure, made to yield a thousand-fold for that which was lost in it.

The inventor of the apparatus here illustrated has a theory in regard to non-productive oil wells, and he claims that his arrangement will make a well that is now pumped, yield spontaneously, or flow of itself, without the labor and expense of raising the oil mechanically. The details are as follows:—

A is an iron pipe, or its equivalent, having flanges at B, and C is a slotted, double hollow cylinder, of copper or other suitable material. At D a hollow, wedge-shaped cylinder, of steel or iron, is shown; and E is a tube, having a flange at its base, connected by the rod, F, with the pipe, A, by a nut, G, at the bottom. The seed bag is shown at H.



The device is thus operated: the drill rod is screwed on at I, when the pipe, A, and its connections, are lowered to their place in the bottom of the well, and the weight of the drill rods allowed to rest for a moment on it; this secures the tube, A, firmly in the well. The drill rods are then turned several times round to detach the rod, F, from the tube, A, by unscrewing it at the nut, G; the tube, E, and the rod, F, are then drawn up out of the well with the drill

rods. In the engraving a cavity in the rock is shown at the bottom of an oil well. As the gas arising from the oil is lighter than water, it will occupy the upper space in the cavity, and since the oil is lighter than water, it will float on the surface and remain between the two, if undisturbed; therefore, if a well is bored into the upper or "gas strata" of a cavity, the well will not be a flowing one, but will require a pump, but if this apparatus and its accompaniments are inserted in the well, as shown, down through the gas, into the oil strata, then a flowing well will be the result. Again, if a well is sunk (as shown at J, by the side of the engraving of the machine), a flowing well will be the result, for it penetrates to the oil itself; but when the surface of the oil becomes lowered, or is on a level with the bore, as at K, the flow will cease; then, it is claimed, if this machine and its accompaniments are inserted, as before described, reaching down to the bottom of the oil, and shutting off the escaping gas, a flowing well will be the result. As the oil generates gas constantly, wells that have been pumped for some time could possibly be changed into flowing wells in a short time, and at a trifling expense, by using this device.

Figs. 2 and 3 represent the construction of the copper cylinder, C, and the steel cylinder, D.

A patent was issued on the 22d of May, 1866; for further particulars address the patentee, John B. Christian, Mount Carroll, Carroll Co., Ill.

Glass Brick Mold.

A new mold for bricks is in use in Baltimore which is said to turn out most elegant specimens of pressed brick. The mold of wood is lined with plate glass, which forms a perfectly smooth surface and naturally gives excellent results. The cost of the mold is but little, if any, more than the ordinary wooden mold, and it can be easily applied to brick machines already in use. The brick comes out smooth, with perfect sides and edges, the mold being raised from the palette or plate on which the bricks are made. It has, we understand, given perfect satisfaction wherever used. Rights can be obtained of P. Murguiondo, Baltimore, Md., who is the patentee's agent for the United States.

Our New Dress.

We are somewhat proud of our new typographical costume. Our readers must have noticed in our last number, as they see in this, the sharp, clearly-cut appearance of our new type. It is from the type foundry of Messrs. Farmer, Little & Co., 63 and 65 Beekman street (formerly White's), and the font is as fine as any we have seen. Handsome clear type, on good paper, is a commendation to the matter of any journal, and we think the character of our paper deserves a handsome dress.

A FRIGHTFUL accident recently happened at a foundry in Scotland. A heavy casting was being made, when some of the liquid escaped, and splashing on the hands and arms of the workmen, caused them to quit their hold of the ladle, which immediately capsized, and the whole of the contents, some three tons, was thrown on the workshop floor. All the men rushed for their lives to the door, but it could not be opened at once, and they turned in desperation, and actually ran through the molten metal. One fell as he ran, and was so disfigured that he was scarcely to be recognized, and his life, with that of one of the others, is despaired of.

MESSRS. ALPHEN, of Paris, are the most wealthy diamond merchants of the day. They lately presented a problem to the Academy of Science in the shape of a magnificent stone, worth \$30,000; the question to be solved was the changed color in the stone. It is naturally of a yellowish tinge but on being slightly heated changed to pink. As this metamorphosis decreases the value of the stone one-half, they were naturally anxious to know the cause. The Academy declined giving an answer until they had examined the subject more fully.

COMPILATION OF THE EIGHTH CENSUS.—From Senator Morgan we have received the statistics of the Eighth Census relating to mortality, banks, insurance, railroads, canals, real and personal estate, the fisheries, the press, educational and religious statistics, and other matters.



A Weak Steam Boiler.

MESSRS. EDITORS:—You will confer on us a favor, and, no doubt, do many of your numerous readers a kindness, by explaining through your columns why a boiler should fail under circumstances like the following:—

We made last month a boiler of charcoal No. 1 iron, 16 feet long, 60-inch shell, 60 four-inch flues, shell five-sixteenths, and heads three-eighths inches thick, of the same iron we usually make such boilers, hung on brick-work of arch by three cast-iron legs riveted to the boiler. It was tested with cold water at a pressure of 100 lbs., and was in all respects, so far as we could judge, an A No. 1 boiler. After running finely about 15 days, it began to leak in three joints over the fire, under pressure of about 60 pounds, the sheets gradually bagging, and in two or three days had settled down more than an inch, leaking so badly that the owners were compelled to stop its use. Our attention being called, we looked at it and declared it the result of firing up without water in the boiler, the owners as strongly asserting the contrary.

We took out all the sheets injured, replacing them with new ones of best fire-box iron, five-sixteenths thick, tested by 100 pounds cold-water pressure. Steam was again applied, and in a little more than one day the joints over the fire began leaking and the sheets bagging as before.

The grates in the first place were about thirteen inches below the boiler, and on the second trial about twenty inches below, the fuel used in both cases being Ohio coal screenings, and lake water to feed the boiler. The chimney is about 75 feet high and the draft strong, and the pressure on second trial at no time over 70 pounds.

We have been for 15 years largely engaged in making steam boilers of this and other sizes, and have never before known such a case. We have seen several of our leading boiler makers and find two or three of them have had similar cases, and have no satisfactory solution of the matter.

[We suppress names purposely, as we presume our correspondent does not wish his failures advertised to the world.]

The cause of the trouble is weakness of the boiler. It is not strong enough for its work. Bourne gives the following rule to ascertain the thickness of boiler plates to withstand a given pressure: "For a single riveted boiler, multiply the internal diameter of the boiler in inches by the pressure of steam in pounds above the atmosphere, and divide by the constant 8,900; the quotient is the proper thickness of the plate in inches."

From this rule, it will be seen that the plates of the boiler are too thin for their work and they fail accordingly. Fairbairn gives a table of the strength of steam boilers, and the pressures they may be worked at; and for a boiler of 5 feet diameter and three-eighths plates (not five-sixteenths) he allows 70½ pounds per square inch, but Bourne states that these figures are too high, and that a boiler so worked is not safe. He says that for double-riveted boilers the margin is large enough, but for single riveted the pressure is too near the ultimate strength of the iron. For a boiler 5 feet diameter the plates according to Bourne, should be 0.416 of an inch or about seven-sixteenths of an inch, and for this he allows 60 pounds per square inch.

These authorities are, we take it, sufficient. If the boiler in question is only one of many that have been made and worked successfully, it goes to show that good iron and good workmanship will permit the habitual use of a pressure far in excess of the safe load, or the duty that a plate is capable of bearing as ascertained from the strength of materials.

The Manchester Boiler Association, of England, a body composed of practical men who examine and insure steam boilers, recommends that in all such cases as the one here given, the shell should be strengthened by angle-iron flanges all the way round, at intervals of from two to three feet, according to circumstances.

It is not impossible that there may be deposits on the plates, and if this be so, then they must be burned or over-heated, and any practical man can tell whether this has taken place or not. It is also possible that the boiler is strained from the settling of the brick arch on which it is hung by three legs. As the front is the hottest, it may have given way at that point. These are mere surmises and conjectures, however, and of little value compared to the naked fact that the plates are thinner for a given strength than the best makers put in.—Eds.

Circular Saws.

MESSRS. EDITORS:—Having been engaged for the past fifteen years in building and running circular saw mills, permit me to make some statements in relation thereto. I have sawed lumber in the Granite State, among the sapling pines and second growth, and also among the giant poplars, oaks and walnuts of the West; I have been conversant with the entire series of saw mills from the original Page down to the present time. My experience has taught me that, as with all other machines, the more completely the saw mill is divested of complicated appliances, especially if designed to meet imaginary difficulties, the more complete will be its success. That lateral motion for the saw, and throwing the saw from the log, in gigging back, are fallacies, is daily proven by thousands of mills that are successfully operated without; if a necessity ever existed for lateral motion it has disappeared in the present perfection attained in the manufacture of the saws.

When the saw has been hung upon a true mandrel, supported in solid bearings, and restricted, as is usual in all shafting, from any end motion (lateral to the saw) the inventor and manufacturers have performed their parts, the residue is within the province of the sawyer.

The front edge of the saw must be pitched into the log so much that no other portion of the saw shall touch the face of the log that it has dressed. If the saw be quite true and flat on the side next the log, this pitch will not be more than one-sixteenth of an inch in the diameter of a sixty-inch saw, but if there are any bunches on the saw the pitch must be increased until they too are clear of the log. This "pitch" is an individual matter with each saw, and when once determined needs thereafter no change.

The back of the tooth must be filed square across, for it leads the saw, letting it fall off toward the next tooth, so that it shall fairly clear itself and no more, while the face of the tooth is dressed to that angle that experience shall determine best adapted to the material to be sawn. If the saw cuts a square kerf the nut and saw collar may be loosened, and the saw hanging on the pins will cut truly and will not scratch the log in gigging back.

I prefer setting as well as upsetting the saw, as a matter of economy, finding that the diameter of the saw is not reduced so rapidly if the teeth are sprung in alternate directions, and the upset used afterward merely to throw out a full corner than when the entire clearance of the saw is obtained by upsetting.

It is desirable that the management of the feed works and the "setting" of the head blocks be performed by one person, as they are intimately connected with each other, and in their expeditious and correct performance depend, in a great measure, the quality and quantity of the work to be done. The application of the feed, the gig-back, and the brake, must all be controlled by one lever, and the head blocks must be "set" accurately, simultaneously, and expeditiously by another lever, and they must be so situated that the sawyer may reach both without moving from his place. The feed works must be simple and effective, substituting friction for gearing, as far as possible, as permitting a more rapid gig-back motion than is otherwise possible. It is also necessary that the head blocks be at all times capable of a convenient, independent motion, for that is indispensable in the preliminary adjustment of the log and for other purposes. They must be of adequate strength to withstand the turning down of heavy logs in frosty weather, and yet not so heavy but that they can be readily lifted in adjusting them for logs of different lengths, and in which case they must be readily detachable from, and attachable to, the apparatus for communicating the simultaneous motion. The requisite strength and lightness can be

only attained by the use of wrought iron as a material for the base of the head block.

I have endeavored to condense, into as few words as possible, the facts and rules that I am in the habit of using in teaching the use of the circular saw to those purchasing mills of the establishment with which I am connected, and I seldom fail to make a good sawyer of any intelligent man.

SAMUEL R. SMITH,

Millwright and Engineer, with Lane & Bodley,
Cincinnati, Ohio.



C. H., of S. C.—We prefer not to publish communications in regard to the treatment of cholera, unless they have been well tested and approved by physicians. In the hands of unskilled persons injury might result. Sugar of lead is a powerful astringent but it is not considered so safe a remedy as some others.

L. B. T., of Md.—On pages 294, and 431, Vol. X, you will find the proportions of key seats.

W. A. B., of N. C.—The number you send for is out of print but you can purchase a treatise on the art of brewing from D. Van Nostrand, of this city.

F. J. L.—of —.—There was undoubtedly some moisture in the dish when you poured the molten zinc in. It is not a property of zinc to explode when melted. Your brother's vision was defective.

J. C. K., of Pa.—We are much obliged for your article upon cipher writing, but in view of what has already appeared on the subject, we think enough has been published.

O. S., of Va.—A gold ring that has lost color may be renewed, according to the "Practical Metal Worker," by the following process: Make a paste with 3 parts nitrate potash, 1½ alum, 1½ sulphate zinc, 1½ common salt, put this on the ring and set the latter on an iron plate over a fire until black hot, then plunge the ring into the cold water. After this it must be polished, which is easily done, with rouge or common chalk, on a woolen cloth. This gives a fine deep color.

D. S. B., of Wis.—The best recipe for hardening edge tools is to use hot fire and cold water. Fish glue is used by belt makers for joining the leather before riveting; possibly some use a different cement.

W. B. H., of Ohio.—The "Practical Draughtsman" will give you the desired information on isometrical drawing; to be had in all the large cities.

E. J. P., N. Y. City.—Wire springs, either coiled or spiral, can be expeditiously and evenly tempered by using a tub or tank of cold water, on which floats a stratum of whale or fish oil, of sufficient depth to immerse the spring before it reaches the water. If the heating is of the right temperature, or color, this will be found an effectual method.

O. C., of Boston.—Your improvement can, we think, be patented.

F. S., of Ill.—We are not aware that alcohol is irregular in its rates of expansion by heat. Its expansion is always the same for equal increments of heat at ordinary temperatures. If we could freeze it, there would probably be found, as, in the case of water, an expansion by cold near the freezing point.

S., of Pa.—Melted gutta-percha makes an excellent coating for the parts of metals to be protected from the plating bath.

S., of Conn.—Vulcanized rubber which has been softened by heat, is made useful again by grinding it with raw rubber and sulphur, and subjecting the compound to heat as in the ordinary process of vulcanizing.

S. U., of Conn.—If you design to take out a patent for your invention, you had better not delay the application—provided you have completed your experiments—nothing is gained by delay and much is often hazarded.

R. W. C., of Troy.—The "Practical Draughtsman," published by H. C. Baird, 406 Chestnut street, Philadelphia, is probably the work you need for mechanical drawing.

J. S. Barre, desires to be informed if soaking shingles in lime water increases their durability. We cannot say whether it does or not, but it will make them nearly imbu-
bustible.

E. C. H., of N. Y., says his well tastes strongly of kerosene at night and morning, a freak that has lasted for only three months, although the well has been used for forty years. If the well is, as stated, in limestone rock, this "freak" is not likely to be caused by the natural presence of petroleum, but is probably the result of surface drainage.

C. & Co., of Buffalo.—Sulphate of copper, commonly called blue vitriol, dissolved in water, will form a bath to copper iron castings. Immerse the articles for a short time, and then scour them in a tumbling barrel with sawdust and leather scraps.

O. C., of Mass.—It is well known that wood naphtha and concentrated alkaline solutions will cut gum shellac. You could not obtain a patent for the process.

Correspondents who write letters to us for information, are always required to sign their names to their letters. We insist upon the observance of this rule as an act of good faith.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

FRUIT BASKET.—ISAAC C. GLEASON, Middletown, Conn.—This invention consists of a polygonal fruit basket with a circular bottom, the tapering sides of which are formed of a single piece, partially cut, to form the angles of the sides, and its ends secured by eyelets, and the round bottom being held in place by its edge fitting into horizontal slots formed in the sides near their lower edge.

DISTILLING APPARATUS.—C. H. HALL, 633 Hudson Street, New York City.—This apparatus consists chiefly of a supply tank or still from which the oil or other liquid courses down in a slow current to a semicircular retort, the bottom of which it covers in a thin stratum so that its temperature can be regulated, and destructive distillation and colorization of the distillate can be avoided. While the liquid passes down over the inclined bottom it evaporates, and the vapors pass through a horizontal tube which is surrounded by a water jacket in which steam is generated, and this steam is conducted back through one branch of the tube where it is superheated and causes the light or condensable vapors of the oil to separate from the condensable gases, and to collect rapidly in a suitable receiver, where they are driven back into the supply tank or out in the open air, while the condensable vapors of the oil or other liquid also collect in the receiver, whence they are drawn off in the liquid state. A suitable scraper, which is carried over the bottom of the retort, prevents the formation of a sediment on the same, and the residuum, composed of the least volatile parts of the oil or other liquid, is carried into a tank by the suction of a jet of steam. The residuum in this tank is washed and cleaned and then returned to the supply tank to undergo a second distillation. The operation of distilling can thus be continued without interruption, and the largest possible percentage of useful material extracted from the liquid to be distilled with the least possible expenditure of fuel.

BUCKLE.—G. F. J. GUNNING, New York City.—This invention relates to a buckle made of one piece of metal wire which is bent so as to form two jaws and a shank, in such a manner that when the end of a belt or strap is secured to the shank and the other end drawn through both jaws and then back between the same, a strain exerted on the strap will cause the jaws to close up and to clasp the strap tightly, and if the strain ceases, the jaws spring open by their inherent elasticity, and the belt or strap can be readily adjusted to any desired length.

ROLLER AND CORN PLANTER.—W. E. RICH, New Providence, Iowa.—This invention consists in a novel manner of operating the seed-distributing device, and in the means for covering the seed, the above parts being used in connection with a roller, whereby a field, after being properly furrowed in one direction, may be planted with corn, in check rows, by the passage of the machine at right angles over the furrows.

EGG BEATER.—FREDERICK ASHLEY, New York City.—In this invention the beater for the eggs is at one end of a shaft upon which is arranged a hollow sleeve or nut, in such a manner that by sliding it up and down upon such shaft a reciprocating rotary movement will be imparted thereto, and consequently to the beater.

WRITING STAND.—DAVID I. STAGG, New York City.—This is a combination of a stand, writing desk, and book holder, whereby the device may, with the greatest facility, be adjusted so as to be used for any of the purposes above specified, and still be simple in construction and economical to construct.

WOOD-MOLDING MACHINE.—THOMAS DICKINSON, Newark, N. J.—This is a wood-molding machine for working irregular forms on circles or parts of circles, and it consists of the combination, with an ordinary wood-molding machine, of an adjustable box table, arranged with guides to bind the molding to the cutters.

PROTECTOR FOR HORSE'S FEET.—A. H. KNAPP, Coxsack, N. Y.—This invention consists of a leather diaphragm supported upon a spring of the same shape as the horseshoe, and introduced within the shoe in such a manner that the diaphragm completely covers and protects the bottom and frog of the animal's foot. For winter use for preventing falling, and, indeed, for protection against gravel, stones, and all liabilities to external injury, this is an effective and admirable improvement. It may be quickly applied or released. We have seen nothing superior.

CORN SHELLER AND BEAN THRASHER.—B. P. PENDENTER, Mechanic's Falls, Me.—This invention consists of a combination of devices so arranged that they form a strong, compact, and effective corn-shelling and bean-thrashing machine, or grain cleaner, of great practical convenience and utility.

COMBINED KNIFE AND SCISSORS SHARPENER.—M. V. B. HOWE, Ashburnham, Mass.—By this invention the sharpening of both knives and scissors can be accomplished with the utmost ease and facility; the sharpener being both extremely simple and cheap to manufacture.

CHURN.—W. H. TILLOU AND SOLOMON SHUMWAY, Le Roy, N. Y.—This invention consists in the peculiar construction of the gear wheel, and in its combination with the cog wheel attached to the upper end of the dasher handle, for imparting a reverse or reciprocating motion to the churn dasher.

CHURN AND ICE CREAM FREEZER.—THOMAS W. POMEROY, East Hampton, Mass.—This invention relates to an improved churn and ice cream freezer, and it consists in a novel arrangement of the cream receptacle and an external case, whereby cream may be churned and butter produced in the most expeditious manner possible, and superior butter obtained owing to the cream being brought to a proper degree of temperature during the operation of churning. The same device also serves as a superior ice cream freezer.

CAR COUPLING.—HIRAM HUGHES, Sanora, N. Y.—This invention consists in a pivoted latch and a suspended bar arranged within a draw head and used in connection with a link or shackle, whereby a simple and efficient self-acting or self-connecting coupling is obtained, and one which will admit of being readily disconnected when desired.

RAILROAD CARS.—JOSHUA H. ZINN, Kingston, Tenn.—The object of this invention is to arrange the bottom of freight or other cars so as to rest upon the lever frames of weighing scales, to allow the contents or load of the car to be weighed.

WINDOW SHADES.—HENRY READ, Ypsilanti, Mich.—This invention relates to the hanging of a window curtain or shade, whereby it can be rolled up or lowered at pleasure and with the utmost ease and facility.

BROOM HEAD.—MARTIN HANDELIN, Clear Creek, Ind.—This invention consists principally in the combination of the metallic plates and toothed and wire bars with the wooden frame of the broom head.

FENCE.—S. H. MITCHELL, El Paso, Ill.—This invention consists in covering the notched ends of the seats of the panels, where they are locked together with wire, in order to preserve the ends or prevent them from splitting; and also in a novel arrangement or application of the stakes of the fence and the securing of the notched ends of the panels in position.

BROOM.—S. S. EVANS, El Paso, Ill.—The construction of this broom is exceedingly simple. The upper or butt ends of the corn are inserted in a ring, the handle is driven up through the corn and ring, and a ring clasp slipped down over the corn a little below the end of the handle, and bent so as to give the desired shape to the broom.

MEDICAL COMPOUND.—T. W. SPEISSEGER, Charleston, S. C.—This invention consists in a compound of certain ingredients to be applied as a salve for the cure of the itch, and all cutaneous diseases, bruises, cuts, chaps, eruptions of the skin, etc. The patent was issued June 17, 1886 (last week). The inventor wishes to say that one-half of the patent right will be sold or arrangements made with some moneyed party to enter into the manufacture of the ointment.

TOPSAIL-KEEPING RIG.—WILLIAM G. SMITH AND DANIEL HOOPER, New York City.—The object of this invention is to obviate the necessity for hauling out the reef-tackles by providing a means for holding up the body of the sail when the upper yard is lowered for reefing, so that, in effect, the reef-tackles are already hauled out, as soon as the upper yard is down, and the men can go upon the yard at once, without first having to stop and expend time and labor in hauling up the reef-tackle.

BROOM HEAD.—JAMES WASSON, Fairwater, Wis.—The broom head, in this invention, is formed of two parts, the upper ends of which are soldered to the socket, for the handle, and the lower ends are secured to each other by barbed spikes or hooks, which also assist in holding the corn to its place. The lower side edges are kept from bulging by hooks that pass through the corn and hook upon the edges of the broom head.

PASSING FISH OVER DAMS.—DANIEL STECK, Hughesville, Pa.—This invention has for its object to furnish a means by which fish may be enabled to pass over dams in ascending streams. It consists in the arrangement of a series of inclined planes, with each other, with the end of the dam, and with the bank of the stream.

FAN MILL SIEVE.—E. D. NORTON, Bradford, Pa.—This invention consists of an improved screen or upper sieve, for a fan mill, formed of strips of corrugated sheet metal, the edges of which overlap each other.

HARVESTING CORN.—ABRAHAM DYSON AND W. C. MACQUEEN, St. Louis, Mo.—The object of this invention is to obtain a device which will perform the work efficiently, admit of the cutting devices being adjusted to suit the width of the spaces between the rows of plants, and also admit of the cut stalks or plants being discharged in gables or bundles of the desired size.

ICE CREAM FREEZER.—JOHN R. CHAMPLIN, Laconia, N. H.—This invention consists in the form and arrangement of the vertical arms of the beaters, in the construction of the frame that supports the gearing, and in the manner in which the gearing is connected to the beater shaft.

BRICK PRESS.—JOSIAH S. ELLIOTT, East Boston, Mass.—This invention consists in an improved means for preventing the clogging-up of the hopper and carrier, and also in an improved manner of operating the carrier and the mold in which the bricks are compressed. Also, in a sweep for discharging the brick from the stationary bottom of the mold.

BOOK HOLDER.—DAVID I. STAGG, New York City.—The object of this invention is to obtain a simple, neat, and cheap device, which may be adjusted to suit books of different thicknesses, and to hold them open equally well with a greater or less number of leaves at either side.

SCREW WRENCH.—JOHN C. TAFT, Worcester, Mass.—In this invention, the screw is fitted in a step connected with the ferrule of the handle. The ordinary wrenches of this kind are very liable to have the ferrules of the handles forced back on the latter, under the action of the screw, in adjusting the movable jaw of the wrench to its work, and this renders the screw liable to slip out from the step, a contingency which this invention fully obviates.

HORSE RAKE.—H. A. BAILEY AND A. R. BURDECK, Racine, Wis.—The object of the invention is to obtain a horse rake which may be readily operated, and be under the complete control of the driver, and one which will be strong and durable.

SKATE.—J. L. PLIMPTON, New York City.—This invention consists in a novel and improved construction and arrangement of the several parts, whereby several advantages are obtained.

MEDICAL COMPOUND.—W. T. SALIE, Bowdoinham, Me.—This is a new and improved medical compound, especially intended for the cure of diphtheria, sore throat, and canker in the mouth.

WELL BORING APPARATUS.—DAVID MORRIS.—Patent was issued June 26, 1886.—This invention consists in a novel arrangement of the horse-power for operating the drill. Also, in the form and construction of the drill and in the water pipe in connection therewith, as fully shown in the drawings and set forth in the claims.

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.

LAW APPLICABLE TO REISSUE OF LETTERS PATENT.

BEFORE THE EXAMINERS-IN-CHIEF ON APPEAL.

S. H. HODGES for the Board.

Application for the Reissue of a Patent for a Grain Separator.

The entire application was rejected upon the ground, in the first place, that "there appears to be no such defect or insufficiency in the original specification as to render the patent granted therein inoperative." There was but one thing claimed in the patent—the passages for the blast (through the fan tube, the vertical tube, and over the delivery board), as controlled by the valve. If the applicant is entitled to the first combination he now claims, it is manifest that his patent does not protect this right. So of other claims. It cannot, therefore, be intended by the above objection, to assert that it is not inoperative to secure to the applicant the monopoly of those claims. It must be intended—and such is the apparent purport of the language in which the objection is couched—that the patent, being operative, for certain purposes, and securing the right to a part of the invention, it is not a proper subject for a reissue. Such would seem to be a fair construction of the statute on the subject; and, were the question an open one, strong reasons might be given for adopting it. But it has been often settled in this Office, before the Circuit Court of the District, on appeal, and by the highest judicial tribunals, in trials at law, that a patent may be reissued for devices not originally claimed, although it effectually embraces others. It must, therefore, be considered the established doctrine of law, that however valid a patent may be, and however sufficiently it may secure to the patentee some of his rights, he is, notwithstanding, entitled to a reissue to secure others.

The following quotation embodies another objection: "The Office can see no force in your argument that, in deciding your case, the Examiner did not consider the feature of a 'divided blast,' inasmuch as no such feature was mentioned in any of your claims. It is the practice of the Office to act upon claims as they are presented, not as they may be afterwards modified to avoid the references given."

As the argument referred to is not in the files, it is not clear what is intended by this. The express design of the statute is to enable an applicant to avoid the references given in any case, and to modify his specification for that purpose, and the practice of the Office has always conformed to this. Hence, the passage quoted cannot be supposed to allude to the references given in answer to this application, but to those furnished in the original case. Even in that view, it cannot be sustained. It has been expressly decided, on appeal to a Circuit Court Judge, that a reissue may embrace devices expressly disclaimed in the original specification. (Haydn's case, decided Aug. 8, 1880.) Much more may it be made to embrace devices once rejected, after such a modification as shall distinguish them from those which have been adduced as anticipating them.

This consideration also disposes of the further objection, that substantially the features now claimed were relied upon in the original application, and were rejected. If the patentee were even persuaded to disclaim such devices, it would not debar him from now insisting on them. But it is added that the patentee accepted a very limited claim for eleven years, and that numerous patents have since been granted, embracing devices similar to those before us.

The objection last raised has been more than once urged without avail, against reissued patents, as for instance, against Woodworth's, for a planing machine. Neither the fact that the devices sought to be monopolized on the reissue were considered and refused in the original application, nor the fact that the patentee has acquired for many years, in a limited claim, constitute a bar. And we are not prepared to say that these two circumstances combined, amount to a sufficient objection.

It is said, further, that great inconvenience will follow from the effect of granting this reissue, upon those who have patented similar devices since the applicant first petitioned this Office. The patentees cannot be prejudiced from this cause, however. If the claims interfere with those of the applicant, they must fall, whether the reissue is granted or not, if it appears that they were anticipated by the applicant in their supposed inventions. The disastrous operation upon those who have become engaged in the manufacture of these machines, and in the use of them, cannot be doubted. But it is impossible to avoid this so long as the doctrine announced in *Stimpson vs. The Western Railroad Company*, 4 How. 380, and *Battin vs. Taggart*, 17 How. 74, remain unimpaired by competent authority. The evil, great as it undoubtedly is, must be submitted to for the present. (See, also, *Wilson vs. Bonseaw*, 4 How. 647, and *John A. Taplin's case*, 1 Com. Dec. 107.)

An elaborate comparison of the devices claimed, with those referred to as anticipating them, is omitted.

Washington, D. C., Oct. 30, 1882.

NEW PUBLICATIONS.

PETROLEUM: A HISTORY OF THE OIL REGION OF VENANGO COUNTY, Pa.—By Rev. S. J. M. Eaton. Published by J. P. Skelly & Co., 732 Chestnut street, Philadelphia.

From the publishers we have received a duodecimo volume with the above title, and have examined its contents with much gratification. From personal observation we can testify to the correctness of the descriptions and the fidelity of the illustrations. Next to visiting the oil regions a perusal of this volume will give an excellent idea of that wonderful locality. In some respects the information given in this work is more reliable and satisfactory than that gained by personal inspection. The book is not intended as a scientific treatise, but for the gratification of a laudable curiosity. It is profusely illustrated, and contains an excellent map of the oil region of Western Pennsylvania.

CHICKENS.—Prang & Co., Boston, Mass.

Messrs. Prang & Co. have published a beautiful chrome lithograph of one of Tait's pictures, consisting of a group of five chickens. It is an excellent specimen of the art, and few would be able to detect that it was not a genuine oil painting.

SPECIAL NOTICES.

Henry C. Smith, of Cleveland, Ohio, has petitioned for the extension of a patent granted to him on the 28th day of September, 1882, for an improvement in Lath Machine. The Petition will be heard on the 10th day of September next.

Samuel Hurlbert, of Ogdensburg, N. Y., has petitioned for the extension of a patent granted to him on the 20th day of September, 1883, and ante-dated September 20, 1882, for an improvement in Flows. The petition will be heard on the 3d day of September next.

William Moore, of Brooklyn, N. Y., has petitioned for the extension of a patent granted to James Carman, assignee of the said William Moore, on the 14th day of September, 1882, for an improvement in Door Locks. The petition will be heard on Monday, the 27th day of August next.

Wanton Rouse, of Taunton, Mass., has applied for an extension of his patent on Self-acting Mules. The petition is to be heard on the 15th of October next.

EXAMINATIONS.—If an inventor wishes our opinion in regard to the 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

Bushing, Adjusting and Lubricating Millstones.

It entails often a large loss of time and expenditure of labor to raise the running stone of a mill for the purpose of lubricating the spindle. The difficulty, also, of properly adjusting the runner on the bed stone, so that the contact may be even, is a serious one. It is the object of this invention to obviate those difficulties.

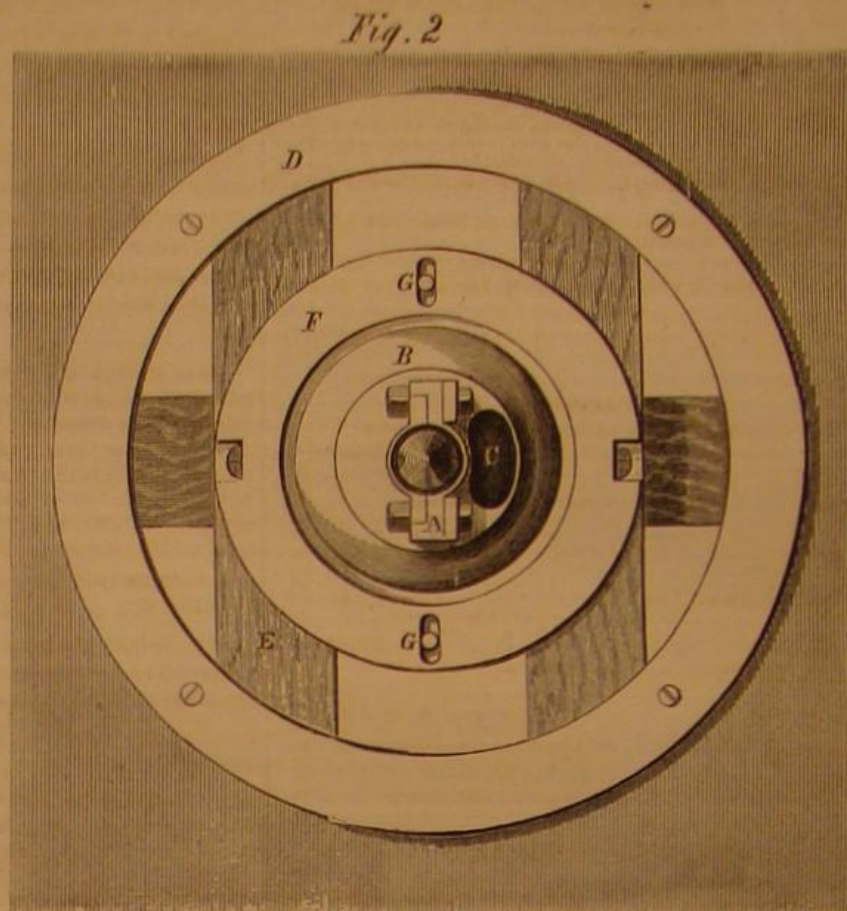
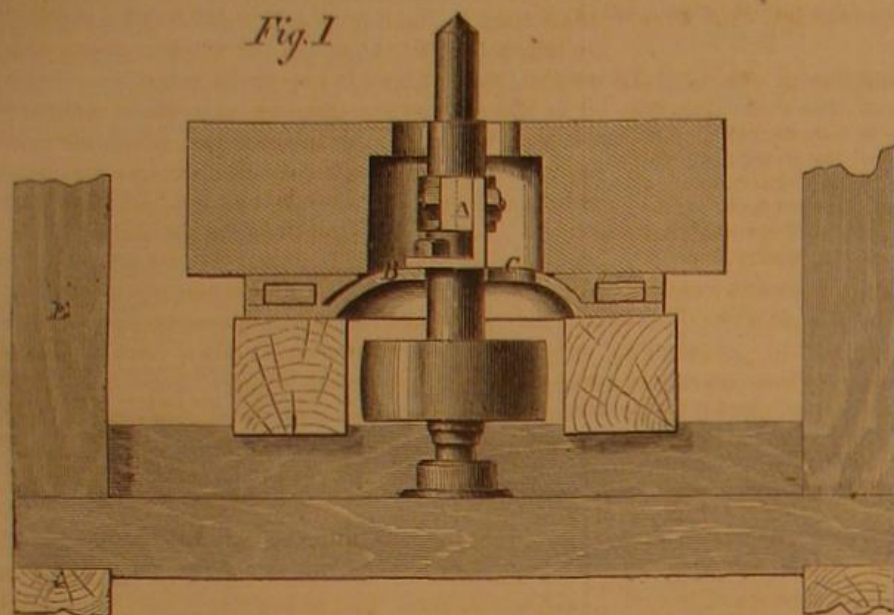
The accompanying illustrations, with the explanation, will convey an accurate idea of the improvement. Fig. 1 is a vertical section of the lower stone, with the bushing supported on a convex circular plate. Fig. 2 is a plan or top view of the bushing, the convex plate, and an outer plate designed to support the stone.

At A is a bushing or box, inserted in the eye 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, at a time when the exhaustion of our coal fields is under consideration.—*Mining Journal*.

[It is hard to argue against facts, and we have had repeated assertions through the press and by individuals, of the great apparent gain by the use of wet fuel, but common sense would say that the heat required to drive off or decompose the gases of water would be equal to that obtained from

fits on the lathe spindle or center. The front of the shell is bored to receive the jaws, C, whose outer surfaces correspond with the incline of the inside of the shell, so that in screwing up the shell, the friction of the thread acts with the compression of the two inclines of the jaws and the conformation of the interior of the shell. The core, B, is slotted to re

**WESTON'S IMPROVEMENT IN MILLSTONES.**

stone and bolted to the plate, B. At C is a hole through the plate designed to admit the hand into the eye of the stone, which is larger where the bushing is than above. The upper outer edge of the bushing is sharp, being beveled toward the spindle, forming a cup-shaped receptacle. This is to facilitate the lubrication of the spindle with tallow or other similar substances.

D, Fig. 2, is a circular plate bolted to the frame, E, sustaining the stone. The plate, F, same figure, is secured to the bottom of the stone, and is curved or concave to fit on the surface of B, and thus allow of an automatic adjustment of the bed stone to the face of the runner; the slots, G, receive pins secured in B, so that a slight lateral motion is allowed, sufficient to insure a perfect adjustment of the two stones at all times.

It will be seen that by this device the lubricating of the spindle can be effected without raising the runner or upper stone, which consumes considerable time and labor, and that the even working of the stones is always secured by the adjustment of the bed stone to the runner.

Patented through the Scientific American Patent Agency, Oct. 24, 1865. Application on other improvements pending. For particulars address the patentee, Charles T. Weston, Scranton, Pa.

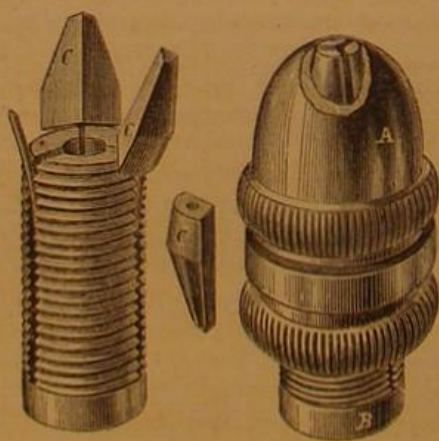
Water as Fuel.

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 wet cinders. The poor employ wet tan. And there are not many 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. Mouie, of Dorchester, has had constructed a cooking stove, in which the combustion, to a certain extent, of water is the principal feature. In the trials made a few years since for ascertaining the economy of burning wet fuel, the results obtained were perfectly marvelous. Fuel containing actually 70 per cent of moisture was burnt in an arched brick stove or furnace. The heat produced was sufficiently intense, the thick wrought-iron door having been previously closed, to raise to whiteness the arch of the

their subsequent combustion. Dr. Hagan's water-burning stove has been in use for some time, but whether it anticipates that of Dr. Mouie is a question.

OLMSTED'S PATENT DRILL CHUCK.

We well remember the time when the "live" spindle of a lathe was provided with a tapering square hole to which the shank of the centers and each drill used was fitted. Then came the round hole, and then the drill chuck, holding the shank of the drill by a set screw or by a flatted portion fitting in a transverse slot through the chuck. The idea of a



proper drill chuck, adapted to all sizes of drills and demanding only perfectly round chucks, is quite modern. Yet these chucks are considered now an absolute necessity in every well ordered shop.

The chuck hereby illustrated seems to be a very convenient form, easily adjusted and holding the drill securely. It is also well adapted for holding wire to be threaded. Every piece of which it is composed is of cast steel well hardened. It can be furnished with a shank to fit the hole for the center, screwed on the spindle, or slipped on the center. No wrench is necessary, the gripe of the fingers being sufficient to secure the shank of any drill. The inventor claims that he has used a one-inch drill, in tenacious wrought iron in one of them, receiving a shank of only three-eighths of an inch diameter without using a wrench.

A represents the shell of the chuck with milled bosses for the fingers. The core, B, is threaded and

ceives a steel wire spring which is inserted into the rear of each jaw, so that when relieved from pressure, the jaws open automatically.

With this brief explanation, the operation of the chuck can be easily comprehended. These chucks are made of two sizes, one with an opening of three-eighths of an inch, and the other of three-sixteenths of an inch, and they can be made of larger sizes. Patented May 15, 1866. For more particular information address L. H. Olmsted, Stamford, Conn. [See advertisement in another column.]

Water-proof Enamel for Card Photographs.

The following process for enameling cards is a very good substitute for the collodion transfer process, and is much easier of application. First apply to the surface of the card, with a brush, a solution of gum arabic in water, of sufficient strength to give considerable gloss when dry. As soon as dry, apply a coating of plain collodion in the same manner as coating a plate. If the collodion is not very tough, two or three coatings may be applied to advantage. Finish by passing the card through a roller, and you will have a fine gloss. Care must be taken not to have the gum solution too thick, or the surface will crack when dry, though there is but little danger if the collodion is applied soon after the gum is dry. Gelatin, instead of gum arabic, answers the purpose well, though it gives hardly as much gloss. Perhaps you or your readers may have a better process than this. If so let us have it.—*Philadelphia Photographer*.

VARNISH FOR PHOTOGRAPHS.—M. Bussi first brushes the prints over with a solution of gum arabic, and when this is dry, applies a coating of collodion. The following are the proportions recommended:—

- 1.—Clear transparent gum arabic, 25 grammes; distilled water, 100 cub. cents.; dissolve and strain.
- 2.—Gun cotton, 3 grammes; alcohol, 60 grammes; ether, 50 grammes.

By this double varnish the inventor insures the preservation of the proofs.—*Chemical News*.

THE engines and boilers for the new steam frigate *Ammonoosuc*, are constructing at the Morgan Iron Works, in New York, at a cost of \$700,000, and are of the most powerful description.

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NEW YORK, SATURDAY, JULY 7, 1866.

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EDUCATED MECHANICS.

In a recent number we spoke of the advantages of intellectual education for mechanics and workmen, in addition to that derived from the shop, the farm, or the road. We alluded to it as a means to raise the position of the workman and to elevate the status of his profession.

In the ordinary prosecution of his business, the artisan must be stolid indeed if he did not gain some knowledge beyond that of mere manual dexterity. His judgment and his capacity for comparison is stimulated by hints, incidents, and accidents, so that he must improve more or less. But an acquaintance with the laws which govern matter in all its forms, whether at rest or in motion, the means of availing himself of the operation of those laws, come slowly to him unless he understands the principles upon which those laws are founded. Such knowledge is not readily gained in the prosecution of his business, but by study. Knowing the existence of the phenomena, of which he is a daily witness, he must spend years in using that knowledge by piecemeal as he receives it, and work over again the experiments, the processes and results of which have been recorded for him, unless by reading and study he is willing to avail himself of the labors of those who have gone before him.

Therefore we cannot too strongly insist on the study of the natural sciences by all who aspire to use the latent or active forces of nature for the benefit of themselves or of mankind in general. An instance of the benefit to be derived by mechanics by a judicious course of study, we cannot forbear to introduce here, an instance of the recognition of merit—in the hope that others may be induced to follow so shining an example. We have mentioned the fact that at the annual commencement of the University of the City of New York, held June 21st, at Niblo's Garden, the degree of Doctor of Physical Science (*Doctor Physicis Artibus, A. P. D.*), was conferred upon Erasmus W. Smith, an eminent mechanical engineer. It was the first honorary degree of this character conferred in this country.

We have obtained some facts in regard to the recipient of this honor which may not prove uninteresting. Mr. Smith served an apprenticeship at the Allaire Works, in this city, remaining there four years, when he entered the University and pursued a course of study in the physical sciences, graduating with the class of 1844. He returned to the Allaire Works and spent several years as workman, foreman, and superintendent. He has since filled important positions as engineer of the American U. S. Mail

Steamships, comprising the Bremen, the Southampton, the Havre, and the Collins's Liverpool lines.

He designed and superintended the construction of the engines for the New Orleans Water Works, and of the engines of several inland lines of steamers, including the *Metropolis*, of the Newport route, and is now designing and constructing engineer of the Harlem Bridge, the engines of the New York and Bristol line of steamers—the cylinders of which measure 110 inches with twelve feet stroke,—of several other steam-transportation companies, and of the *Dunderberg*, under the Government contractor, Wm. H. Webb.

Application to and love for his business, with a determination to fit himself for the highest positions in his profession, we believe, have been of more service to Mr. Smith than the patronage of influential men or capitalists. In his letter conveying the information of the honorary testimonial, Prof. Draper said:—

"I am sure it will be gratifying to you to learn that yours is the first degree of the kind ever conferred in this country, and is the highest we can give. It is for these reasons all the more honorable to you. The establishment of this degree places the University in connection with mechanical engineering—one of the most important and growing professional interests of our city and country."

Our object in thus noticing this acknowledgment of merit is not to add to the well-earned reputation of the recipient of these honors, but to present it as an incentive to our mechanics. When literary societies and educational institutions accord to the educated mechanic and the scientific engineer the position to which his usefulness and worth entitles him, the status of the mechanic is raised and his profession becomes, in the eyes of the world, more honorable. Practical knowledge, combined with natural genius, aided by mental acquirements, is sufficient to enable any intelligent mechanic to reach the uppermost round in the ladder of his profession.

FREE AND EASY LEGISLATION ON PATENTS.

On the 25th ult., Senator Cowan, chairman of the Patent Committee, reported a bill for the extension of Thos. D. Burrall's patent for a corn sheller; he also reported a bill for the extension of Thos. W. Harvey's patent for the manufacture of wood screws; also for the extension of Stephen R. Parkhurst's patent for ginning cotton and burring wool. It remains to be seen what action the Senate will finally take in regard to those important measures.

Mr. Cowan reported the House bill, which provides for the payment of a ten-dollar tax on all cases taken from the primary Examiner, on appeal, to the Examiner-in-Chief. After the Senator had stated the nature of the bill, the following debate took place:—

Mr. Cowan.—I will merely state that an application for a patent is first referred to the primary Examiner, and if the decision is adverse there is an appeal to the Board of Examiners, but on that appeal there is no fee now paid. It is complained in the Office that parties do not appear before the primary Examiners, because they can appeal without any additional cost; and it is therefore thought to be advisable, for the purpose of compelling them to attend to the case before the primary Examiners, that there should be an appeal fee, to be paid before going to the Examiners-in-Chief. The committee think this is proper, and have therefore recommended the passage of the bill.

Mr. Grimes.—Is that all there is in the bill?

Mr. Cowan.—That is all.

The bill was reported to the Senate, ordered to a third reading, read the third time, and passed.

Thus a bill which will draw from the pockets of inventors between \$4,000 and \$5,000, annually, passed without a show of opposition. Mr. Cowan's, "That is all," satisfied the Senate, and the thing was done.

We regret the success of this unjust measure. The Patent Office has nearly \$150,000 surplus funds, and does not need to tax inventors any more for the privileges they now enjoy.

A FOUR-TOOL PLANER.

Some few weeks ago we gave a description of a seven-tool lathe for working out railway cranks with accuracy and dispatch, which was in use at the locomotive works of Crewe, England. We find, in a recent number of the *Engineer*, an engraving and brief description of a planer designed to economize time, it being well known to practical men that half the

time of an ordinary tool of this class is wasted; or, in other words, that during the return of the bed the tool is idle.

Planers that act both ways are not new, by any means, Whitworth having, long ago, introduced a machine of this class with a rotating tool post that faces about after the bed has made one stroke, and cuts on the return. What degree of popularity this device meets with in England, we are unable to say, but few machines have been imported to this country. On long lathe beds, steam engine bed plates, and similar work, such an arrangement would seem to be very desirable, but there must be some practical difficulties in the way which prevent their adoption.

We have been informed that it is a matter of difficulty to adjust the tool so that the cut is equal in running both ways, and that the least hesitation or inaccuracy in the reverse action of the tool causes it to take a heavier cut at one time than at another, and so, break the tool or spoil the work.

In Elder's machine there are two sets of standards or uprights in the middle of the bed, which face each other, and are fitted with sliding carriages and headstocks, as usual, there being two headstocks on each slide. These are so arranged that but one or all may be in use at the same time; that is, two cutting when the bed runs one way and two when it returns.

This duplication of parts, of course, entails great expense in construction and adds to the weight of the machine, besides rendering it much more complicated; but there is no question about its efficiency, which is the main point to consider.

A JUST MEASURE.

In a previous number we stated that the bill to pay Examiners in the Patent Office, for extra service rendered by them, had passed Congress. A dispatch to the Associated Press made it appear that the money thus appropriated was to come from the Treasury, which is not the case. The facts are simply these: Soon after the breaking out of the rebellion the number of applications for patents was greatly reduced, which caused also a considerable reduction in the patent fund, and in order to comply with the law making the Patent Office a self-sustaining bureau, the Commissioner was obliged to reduce the salaries of Examiners and Assistant Examiners below the amounts fixed by law, which was the best course he could adopt as a temporary expedient, as it could not be regarded wise to remove experienced Examiners in such a contingency, which was not likely to last for a long time. During the years from 1852 to 1860, the average number of cases examined per man was one hundred and forty-two; from 1860 to 1865 the average was two hundred and forty—an increase of eighty-two per cent. This increased amount of labor was done on reduced salaries and at a time when the cost of living was double what it was before the war broke out. The Examiners, as a body, are a faithful, laborious, intelligent set of men, and, at best, are not overpaid for their services, and now that the patent fund has so largely augmented, there is great justice in the act of Congress which authorizes the Commissioner to pay Examiners and Assistants out of the patent fund for services actually performed by them.

Mr. Wentworth, of Illinois, attempted to defeat the bill, but his effort did not produce any effect. Mr. Jenckes, the mover of the bill, and to whom much credit is due, met all the objections, and the bill passed by a large majority.

THE 9-22-inch bore or 12½-ton Armstrong gun burst to splinters a few days since at Shoeburyness during ordinary gun practice, and after 390 rounds had been fired. The gun's crew had a very narrow escape for their lives, and Capt. Reeves, who was conducting the practice, was nearly struck by a large piece of the gun as it flew past him.—*Mechanics' Magazine*.

ALUMINIUM ARMOR.—A trial has just been made at Florence of a cuirass of aluminium, which is as light as an ordinary waistcoat, nearly as flexible, and capable of turning a musket ball fired at the distance of 38 paces, and of resisting a bayonet thrust from the heaviest hand. Each cuirass costs only 5 frs. Two regiments are, it is said, to be immediately provided with them.



ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING JUNE 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.

55,799.—MODE OF CUTTING BOOTS.—John Adams, Kokomo, Ind.:

I claim as a new article of manufacture, a boot produced as follows, to wit, by cutting the foot and leg portion out of a single piece of leather, the counter or heel piece being left out, and then constructing the uppers of the boot from said foot and leg portion and a separate counter-piece, by having a seam extend down the back to the tops of the counter, then running the seam to the front edges of the counter and from thence down to the shank of the boot, said horizontal and vertical side seams serving to fasten the separate outside counter-piece of leather over the opening which was left in cutting the foot and leg of the boot, all substantially as and for the purpose described.

55,800.—GRAIN SEPARATOR AND CLEANER.—William M. Arnall, Sperryville, Va., assignor to himself and W. H. Brownell, New York City:

I claim, 1st, The arrangement of the cylinder, E, the rollers, F, F, F, in the arc of a circle described by a radius from cylinder, E, together with the adjustable brushes, A, A, A, and dividing board, P, substantially as and for the purpose herein set forth.

55,801.—DEVICE TO PREVENT BOILER EXPLOSIONS.—Alfred Arnold, Tenaply, N. J.:

I claim, 1st, The mode of preventing steam boiler explosions, substantially as herein set forth.

55,802.—EGG-BEATER.—Frederick Ashley, New York City:

I claim the grooved or screw threaded slide or sleeve, E, in combination with the plain shaft, A, having a fixed stud or pin, A, and a beater, B, arranged together and operating as and for the purpose specified.

55,803.—WATER WHEEL.—Samuel W. Ayres, Monticello, Ind.:

In combination with the spiral scroll, A, I claim the double wheel, B, C, when so arranged that the water shall be discharged from the scroll through the upper section, towards the center, and thence passing into the lower section be discharged from the center through the periphery, substantially in the manner set forth.

55,804.—HORSE RAKE.—H. A. Bailey and A. R. Burdick, Racine, Wis.:

We claim, 1st, The metal heads, J, provided with lips, g, and grooves, I, and retained on the rake-head by the upper ends of the rake teeth, K, passing through them and the rake-head, substantially as and for the purpose herein set forth.

55,805.—ROOF OF BUILDINGS.—William W. Beach, New York City:

I claim, 1st, The use of mica or mineral isinglass in sheets or plates as a roofing material, transparent, translucent, opaque, and ornamental, substantially in the manner and for the purpose herein set forth.

55,806.—LAMP.—Jacob H. Beidler, Lincoln, Ill.:

I claim, 1st, The method herein described of creating an ascending current of air to feed the flame, by means of steam generated by the calorific emanating from the illuminating flame of the lamp.

55,807.—GRATER AND EGG-BEATER.—William A. Bemis, Spencer, Mass.:

I claim, 1st, The combination with the lower half, B, of the body of the beater, of the removable frame, D, provided with the cutting wires, A, substantially as and for the purposes set forth.

55,808.—MACHINE FOR FRAMING MATCHES.—Jacob Bentz, Brooklyn, N. Y.:

I claim, 1st, In combination with the grooved bed and hopper, the loose hopper-box or frame, constructed and operating substantially as described.

55,809.—STUMP EXTRACTOR.—John W. Blodgett, Plymouth, Ind.:

I claim, 1st, The combination and arrangement of the posts, C, and foot-boards, E and N, substantially as and for the purposes set forth.

55,810.—UTILIZING STEAM.—John M. Brosius, Liberty, Va.:

I claim the arrangement, with a stationary depot or water station engine, of the locomotive boiler, substantially in the manner and for the purpose described.

55,811.—COTTON-SEED PLANTER.—Frederick H. Brown, Chicago, Ill.:

I claim, 1st, In a cotton-seed planter the combination of the shaft, R, provided with arms, V, and the conveying belt, L, provided with teeth as described, arranged, and operating substantially in the manner and for the purposes herein specified.

55,812.—MODE OF CONSTRUCTING VACUUM VESSELS FOR EVAPORATING, ETC.—Duncan Bruce, Rossville, N. Y.:

I claim the method, substantially as herein described, of strengthening and rendering wooden vessels air-tight, for the purposes set forth.

55,813.—HAMMER FOR BENDING COUPLINGS.—John T. Bruen, New York City:

I claim, 1st, The anvil, the hammer, the connecting-rod, and the treadle, when constructed and arranged substantially as and for the purpose herein specified.

55,814.—LOCK.—Henry and Samuel W. Budd, Philadelphia, Pa.:

I claim, 1st, The bolt, B, and its spring, d, in combination with the sliding block, F, and plate, b, or its equivalent, the whole being constructed and operating substantially as and for the purpose described.

55,815.—BRUSH FOR BOILER FLUES.—Charles H. Bush, Fall River, Mass.:

I claim an expanding and contracting brush for clearing obstructions from the flues of steam boilers, constructed and operating as herein set forth and described.

55,816.—RAILROAD WATER-ELEVATOR.—William H. Butler, Chicago, Ill.:

I claim, 1st, A metal tank lined with wood which has been previously saturated with oil or other resistant to rapid condensation of steam, or coated with such resistant on one or both sides, substantially as described and for the purpose mentioned.

55,817.—STEP-LADDER.—E. P. H. Capron, Springfield, Ohio:

I claim, 1st, The ladders, A and B, platform, C, and the notched bar, E, all combined and arranged to operate as shown and described.

55,818.—TREATING ORES.—Charles F. Carpenter, Louisville, Ky.:

I claim the mode of using steam of any temperature for the purpose of facilitating the process for extracting gold and silver from ores, and consists in introducing said steam into a reverberatory furnace between the flame of said furnace and the ores containing gold or silver which are spread upon the hearth of said furnace, as herein described, or any other substantially the same.

55,819.—WATER-INDICATOR FOR STEAM GENERATORS.—Franklin Chalfant, Lancaster, Pa.:

I claim, 1st, The vibrating column or cylinder, F, in connection with a steam boiler, A, when employed for the purpose specified.

55,820.—ICE-CREAM FREEZER.—John R. Champlin, Laconia, N. H.:

I claim, 1st, The slide-scraper, G, when made in the form and adjusted in the manner described, in combination with the horizontal arms, E, of the beater, substantially as and for the purpose set forth.

55,821.—PUMP.—Robert Cochran, Morrison, Ill.:

I claim the combination and arrangement of the valve, I, pipes, O and P, and cylinders, A and B, substantially as herein described and set forth.

55,822.—PUMP FOR DEEP WELLS.—Robert Cornelius, Philadelphia, Pa.:

I claim the combination of an outer case with apertures, an interior wire gauze or perforated screen, and a receptacle below for the debris, substantially as described.

55,823.—DOOR-BELL AND BURGLAR-ALARM.—Elliot H. Crane, Burr Oak, Mich.:

I claim, 1st, So arranging two hammers to a bell that, while the bell answers the purpose of an ordinary door-bell, its parts can be adjusted to act as a burglar-alarm when the door is opened, substantially as described.

55,824.—HORSE HAY-FORK.—Thomas C. Craven, Albany, N. Y.:

I claim, 1st, Applying a hook or barb, h, to the hollow point of a harpoon hay-fork, so that this hook shall work loosely within said point, and projected therefrom by the depression of a rod, C, substantially as described.

55,825.—CHURN.—F. J. Crissey, Leesburg, Va.:

I claim the arrangement and combination of the center dasher with fly-wheel at top and propelling cord on the shaft, so that the shaft is operated swiftly with a forward and reverse action, as herein described and for the purposes set forth.

55,826.—CULTIVATOR.—John Custer, Sandusky, Ohio:

I claim, 1st, The hinged cleaners, H, in combination with the levers, I, arranged to operate with the cutting rollers, D, in the manner and for the purpose herein specified.

55,827.—MARINE COMPASS.—Samuel Custer, Salem, Va.:

I claim, 1st, The combination of the lower battery magnet with the upper indicator magnet, substantially as and for the purpose described.

55,828.—ROLLER-FEED FOR CARDING AND PICKING MACHINES.—James Dempster, Naugatuck, Conn.:

I claim as an improvement in roller-feed for cards and pickers the combination and arrangement of the rolls, B, C, D, E, F, G, and the gear-wheels, I, L, M, N, S, R, and the gear-wheels, J, K, O, P, T, U, with each other and with the frame, A, of the machine, substantially as described and for the purposes set forth.

55,829.—HAY-RACK FOR WAGONS.—Daniel Dennett, Buxton, Me.:

I claim the stretchers, b, b, b, cut in two at d, d, in the manner and for the purposes specified.

55,830.—CAR FOR TRANSPORTING PETROLEUM.—J. Densmore, Meadville, Pa., and G. W. N. Yost, Corry, Pa.:

We claim the combination of the two-tank car with the one-tank car, being the three tanks, B, B, B, attached to and combined with the car-platform, A, A, A, by means of the frames, C, C, C, C, C, C, C, C, and C', C', C', C', and the bolts, D, D, D, D, D, D, D, D, and D', D', D', D', when constructed in the combination herein-before described, and for the application to the purposes herein-before written, or when done by any other mechanical construction substantially the same and which will produce the same results.

55,831.—CAR FOR TRANSPORTING PETROLEUM.—J. Densmore, Meadville, Pa., and G. W. N. Yost, Corry, Pa.:

We claim the one tank, B, attached to and combined with the platform of a car, A, by means of the frame of cars, C, C, C, C, and the bolts, D, D, D, D, D, D, D, D, over and upon the middle of the platform and car, when constructed and combined for the purposes herein-before described and set forth, or when attached and combined by any other mechanical construction substantially the same and which will produce the same results.

55,832.—CAR FOR TRANSPORTING PETROLEUM.—James Densmore, Meadville, Pa., and Amos Densmore and G. W. N. Yost, Corry, Pa.:

We claim, 1st, The one tank, B, square or oblong square of wood planks, bolted together and attached to an ordinary railway car, A, by means of the cleats, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

55,833.—MACHINE FOR PLANING MOLDINGS.—Thomas Dickinson, Newark, N. J.:

I claim the arrangement and represented for dressing two moldings simultaneously by one cutter-head, consisting of the adjustable box-table, W, X, constructed and operated substantially as described.

which are adapted to serve as a locking device, substantially as described.

3d, The combination of the tripping lever or eccentric, f, or its equivalent, with locking toggle-levers and rod, C, for the purpose of unlocking said rods.

4th, Curving the upper portion of the rod, C, for the purpose substantially as described.

55,825.—CHURN.—F. J. Crissey, Leesburg, Va.:

I claim the arrangement and combination of the center dasher with fly-wheel at top and propelling cord on the shaft, so that the shaft is operated swiftly with a forward and reverse action, as herein described and for the purposes set forth.

55,826.—CULTIVATOR.—John Custer, Sandusky, Ohio:

I claim, 1st, The hinged cleaners, H, in combination with the levers, I, arranged to operate with the cutting rollers, D, in the manner and for the purpose herein specified.

55,827.—MARINE COMPASS.—Samuel Custer, Salem, Va.:

I claim, 1st, The combination of the lower battery magnet with the upper indicator magnet, substantially as and for the purpose described.

2d, The construction of the cruciform indicator-magnet with a pointer placed midway between the north and south poles of its two needles.

3d, The arrangement of the indicator-magnet upon and eccentric with the main compass-card or its frame, for securing a longer radius to the pointer.

55,828.—ROLLER-FEED FOR CARDING AND PICKING MACHINES.—James Dempster, Naugatuck, Conn.:

I claim as an improvement in roller-feed for cards and pickers the combination and arrangement of the rolls, B, C, D, E, F, G, and the gear-wheels, I, L, M, N, S, R, and the gear-wheels, J, K, O, P, T, U, with each other and with the frame, A, of the machine, substantially as described and for the purposes set forth.

55,829.—HAY-RACK FOR WAGONS.—Daniel Dennett, Buxton, Me.:

I claim the stretchers, b, b, b, cut in two at d, d, in the manner and for the purposes specified.

55,830.—CAR FOR TRANSPORTING PETROLEUM.—J. Densmore, Meadville, Pa., and G. W. N. Yost, Corry, Pa.:

We claim the combination of the two-tank car with the one-tank car, being the three tanks, B, B, B, attached to and combined with the car-platform, A, A, A, by means of the frames, C, C, C, C, C, C, C, C, and C', C', C', C', and the bolts, D, D, D, D, D, D, D, D, and D', D', D', D', when constructed in the combination herein-before described, and for the application to the purposes herein-before written, or when done by any other mechanical construction substantially the same and which will produce the same results.

55,831.—CAR FOR TRANSPORTING PETROLEUM.—J. Densmore, Meadville, Pa., and G. W. N. Yost, Corry, Pa.:

We claim the one tank, B, attached to and combined with the platform of a car, A, by means of the frame of cars, C, C, C, C, and the bolts, D, D, D, D, D, D, D, D, over and upon the middle of the platform and car, when constructed and combined for the purposes herein-before described and set forth, or when attached and combined by any other mechanical construction substantially the same and which will produce the same results.

55,832.—CAR FOR TRANSPORTING PETROLEUM.—James Densmore, Meadville, Pa., and Amos Densmore and G. W. N. Yost, Corry, Pa.:

We claim, 1st, The one tank, B, square or oblong square of wood planks, bolted together and attached to an ordinary railway car, A, by means of the cleats, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

2d, The two tanks, B, B, square or oblong square, directly over the trucks or abutting together in the middle of the car, of wood planks bolted together and attached to the car, A, by means of the cleats, E, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

3d, The three tanks, B, B, B, square or oblong square, of wood planks, bolted together and attached to the car, A, by means of the cleats, E, E, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

4th, The square or oblong square tank or tanks of wood planks, attached to an ordinary car, when constructed and combined by any other mechanical contrivance, substantially the same, and which will produce the same results.

55,833.—MACHINE FOR PLANING MOLDINGS.—Thomas Dickinson, Newark, N. J.:

I claim the arrangement and represented for dressing two moldings simultaneously by one cutter-head, consisting of the adjustable box-table, W, X, constructed and operated substantially as described.

55,834.—APPARATUS FOR MAKING PAPER-PULP, FOR BLEACHING AND FOR OTHER PURPOSES.—John W. Dixon, Philadelphia, Pa.:

I claim, 1st, The combination of the digester, A, the man-hole, B, the diaphragm, C, and the discharge-pipe and aperture, N.

2d, The combination of the digester, A, the heating coil, and the pump, D, as described.

55,835.—APPARATUS FOR MAKING PAPER-PULP FROM WOOD, STRAW, AND OTHER MATERIALS.—John W. Dixon, Philadelphia, Pa.:

I claim the combination of the circulating pump, the pulp digester and heating coil, or its equivalent, for heating the liquid while being made to circulate by the pump.

55,836.—PROCESS OF MAKING PAPER-PULP FROM WOOD, STRAW, AND OTHER MATERIALS.—John W. Dixon, Philadelphia, Pa.:

I claim, 1st, The pulping of wood, straw, and other vegetable substances with a solution of highly-heated aluminate of soda under pressure, substantially as described.

2d, I claim the pulping of wood, straw, and other vegetable substances by circulating a highly-heated solution of aluminate of soda through the mass to be pulped, substantially as described.

55,837.—HARVESTER.—John A. Dodge, Auburn, N. Y.:

I claim, 1st, The combination of the cam, B', bed-piece, B, and frame, A, resting upon the platform, the said several parts being respectively constructed and arranged for use, substantially in the manner and for the purpose set forth.

2d, The plate, E, and ratchet, E', upon the outside of the driving-wheel and pulley, D, upon the projecting extension of the axle, in combination with the belt, M, pulley, C, and bevel gear, for actuating the rake with the forward motion of the machine, substantially as set forth.

3d, The device for supporting the arm, H, by means of the bracket, L', attached to the socket, I, secured to the frame, substantially as set forth.

4th, The arrangement as herein set forth for supporting adjustably the inner end of the cutter-bar and platform by means of the arm, G, attached to the platform and connecting chain and projecting arm, H, secured to the main frame by the bracket, I', and socket, I.

55,838.—POCKET-BOOK PROTECTOR.—Alonzo Drummond, Newark, N. J.:

I claim, 1st, The combination of the spring, B, or springs, B, B, with the lever, D, and piece, C, clamping, C', C', in the manner and for the purposes set forth.

2d, The plate, I, with its buttons or studs, K, in combination with the springs, B, B, when constructed in the manner and for the purpose described.

3d, The lever, D, the clasp or hinge, E, slot, e, and knob, d'', constructed and operating substantially as set forth.

4th, The spur, F, dog, G, slide, f'', lever, D, and knob, g'', in combination for operating the spur, substantially as set forth.

55,839.—LANTERN.—A. M. Duburn, Chicago, Ill.:

I claim, 1st, The part, H', secured by the hinge, K, when constructed as described, and used for the purpose set forth.

2d, The recess, m, m', m'', for the purpose set forth.

55,840.—CORN HARVESTER.—Abraham Dyson and William N. Macqueen, St. Louis, Mo.:

I claim, 1st, The rotary cutters, C', arranged at the front end of the machine, with the plates, U, gearing, and the racks and pinion, substantially as shown and described, to admit of the lateral adjustment of the cutters to suit the width of the spaces between the rows of stalks or plants, as set forth.

2d, The particular manner of constructing the rotary cutters, C', to wit by having blades, b, fitted between the two parts, 1, 1', of a hub, D, which parts are secured in contact by a screw-nut, J, one of the parts being notched to receive the inner ends of the blades, b, substantially as shown and described.

3d, The arrangement of the racks, G, G, fenders, A*, frame, A, and cutters, C', relatively with each other, and operating in the manner and for the purposes herein specified.

4th, The lever, I, provided with the clamps, J, and arranged relatively with the upper edges of the racks, G, as shown and described, for the purpose of preventing the casual tilting of the racks, as described.

55,841.—BRICK MACHINE.—Josiah S. Elliott, East Boston, Mass.:

I claim, 1st, The operating of the carrier, N, by means of the levers, P, connected with the sleeve, K, to which the arm, O, of the carrier is attached, and actuated by the cam, Q, substantially as shown and described.

2d, The operating of the mold, G, by means of the bars, H, H, arms, c, c, and toothed segment, J, on shaft, I, toothed segment, K, and cam, L, all arranged substantially as and for the purpose specified.

3d, The rods, r, arranged and operated substantially as shown and described, for insuring the proper filling of the carrier, as set forth.

4th, The sweep, V, arranged and applied to operate substantially in the manner as and for the purpose set forth.

55,842.—DRESS-ELEVATOR.—Henry Essex, West Haverstraw, N. Y., and Job Johnson, Brooklyn, N. Y.:

We claim the fastening for garments formed by the spring, a, eye, 3, and pusher, 2, combined with the sliding-ring or slide, b, as and for the purposes set forth.

55,843.—BROOM HEAD.—S. S. Evans, El Paso, Ill.:

I claim an improved broom, formed by combining the ring, A, and handle, B, constructed as described, with each other, and with the clasp, D, and corn, C, substantially as described and for the purpose set forth.

55,844.—HYDRAULIC SPINDLE AND TURNING APPARATUS FOR DRAW-BRIDGES.—Philip L. Fox and George P. Herthel, Jr., St. Louis, Mo.:

We claim, 1st, The application of fluid pressure to the pivot of turning bodies, when used to raise the same and diminish the friction resistance to the turning motion, substantially as described and shown.

2d, The counter-balance, when operating in connection with such fluid pressure in raising the structure to be turned, substantially as shown and described.

3d, The combination and arrangement of the pivot, C, and cylinder, D, in conjunction with the counter-balancing apparatus, E, and the pump, F, all acting substantially as and for the purposes shown and described.

4th, The ring surface, M, the friction-rollers, N, the gearing, N', when used in combination substantially as and for the purposes set forth.

55,845.—MODE OF MAKING TIN FRUIT CANS.—John M. Francis, Waldo, Ohio:

I claim the section, A, and wedge, B, connected by strips, a and b, arranged in the manner and used substantially as and for the purposes herein set forth.

55,846.—TABLE-LEAF SUPPORT.—George Fyfe, Ottawa, Ill.:

I claim, in combination with the leaf of a table, the hinged arm, F, and the frame, C, the peculiar arrangement of the spring, G, operating upon said arm, F, as and for the purposes specified.

55,847.—FEEDING-WHEEL FOR SEWING MACHINES.—Anton Galleth, New York City:

I claim the arrangement of the wheel, A, lever, B, with its side, G, as described, block, E, spring, F, and friction spring, J, combined and operating in the manner and for the purpose herein specified.

55,848.—ROLLER AND CORN-STALK CUTTER.—Roland R. Gaskill, Mendota, Ill.:

I claim, 1st, The combination of the roller, A, and knife, H, the two being so connected by intermediate mechanism, as that the knife shall fall with the forward movement of the roller, substantially as and for the purpose set forth.

2d, The combination of the knife, H, rod, G and G', and levers, E, and arm, F, substantially as and for the purpose set forth.

3d, The roller, A, with pins, B, in combination with the levers, D and E, and knife, H, substantially as and for the purpose set forth.

55,849.—BABY-JUMPER.—William Gibson, Fort Wayne, Ind.:

I claim, 1st, The extensible post, A, A', in combination with step and cap pieces, B, C, substantially as described.

2d, The combination of a spring, D, or its equivalent, with an extensible post, A, A', substantially as described.

3d, The combination of a strap or cord, G, a spring, D, and a post which will rotate where it is erected between two fixed objects, substantially as described.

55,850.—HAND CORN PLANTER.—William Gilbert, Bardstown, Ky.:

I claim the hand seed planter, constructed, arranged, and operating substantially in the manner described for the purpose set forth.

55,851.—FRUIT BASKET.—Isaac C. Gleason, Middletown, Conn.:

I claim a polygonal fruit basket having tapering sides formed of a single piece cut partially through to form the angles of the sides, its ends being secured together by eyelets, and having a circular bottom held in place by its edge fitting into slots formed in the said sides near their lower edge, substantially as described and for the purpose set forth.

55,852.—LACING FOR BOOTS AND SHOES.—Charles Goodyear, Jr., New York City:

I claim, 1st, The method herein described of applying lacing eyelets to boots or shoes by inserting and fastening the same in between two sheets or thicknesses of leather, in such manner that the lacing-eye alone shall protrude at and at right angles to the edge of said leather, substantially as herein shown and set forth.

2d, The lacing-eyelet constructed substantially as herein shown and described, that is to say, forming the same of a single

piece of wire, the ends of which are bent into eyes standing at right angles to each other, substantially as herein set forth.

3d, In combination with eyelets constructed substantially as herein described, I claim the employment of rivets traversing one of the eyes of the lacer and either or both thicknesses of leather between which the said lacer is confined.

4th, The employment in combination with lacers and rivets, as heretofore described, of a folded leather welt, binding, or equivalent, the folded edge of which having at right angle to it incisions through which the lacing eyes protrude, substantially as herein shown and described.

55,853.—LACING FOR BOOTS AND SHOES.—Charles Goodyear, Jr., New York City:

I claim, 1st, The method herein described of applying lacing eyelets to boots or shoes by securing and holding a series of eyelet-rings in their proper positions, as set forth, by means of a single holding device which serves as the common support of said rings, as and for the purposes herein shown and described.

2d, As lacing eyelets, I claim rings in combination with one or more fastening devices as set forth, holding the said rings to the edge or to the face of the welt or upper, at right angles thereto, and transversely to the length of the shoe, as and for the purposes herein described.

3d, In combination with rings for forming the lacing eyes as described and for the purpose of holding the same in their proper positions as set forth, I claim the wire imbedded between the folds of the welt or two thicknesses of leather, so that the eyelets may be strung or held on a support common to all, as and for the purposes herein shown and described.

4th, In combination with the eyelet-rings, as described, I claim the wire corrugated or bent at the points of support of the rings, substantially in the manner and for the purposes herein set forth.

55,854.—BUCKLE.—J. F. J. Gunning and Isaac T. Meyer, New York City:

We claim a buckle made of one piece of metal, wire, or other suitable material, bent so as to form a shank, a, and two spring jaws, b, c, substantially as and for the purposes set forth.

55,855.—DISTILLING PETROLEUM AND OTHER LIQUIDS.—C. H. Hall, New York City:

I claim, 1st, In the continuous distillation of petroleum or other liquids, the use of a retort, B, in combination with furnace, D, and arch, C, substantially as shown and described and for the purpose set forth.

2d, The series of scrapers, h, h, h, or their equivalent, connected to the rod, m, in combination with retort, B, constructed and operating substantially as shown and described, or in any other manner whereby a scraper is used for the purpose specified.

3d, The device herein described for generating steam, consisting of the water-jacket, G, and water supply-pipe, Y, and steam tube, I, in combination with condensing tube, F, substantially as shown and described, or any other means whereby steam is generated by passing the vapors of oil or other liquids, being distilled, through a vessel containing waters, or vice versa.

4th, The method herein described of separating the condensable from the non-condensable gases, or any other method whereby the condensable gases are made to collect in the lower part of a receiver, while the non-condensable gases are made to pass off by the suction of a current of steam, substantially as herein set forth and for the purpose specified.

5th, The water-jacket, G', connected with supply-pipe, H, and water-tank, R, in combination with tubular condenser, F, operating as described, or in any other manner to accomplish the purpose specified.

6th, The receiver, L, in combination with tubular condenser, F, steam-pipe, K, and discharge-pipe, O, operating substantially as and for the purpose shown and described.

7th, The annular chamber, E, composed by an inner and outer vessel, in combination with the condenser, F, constructed and operating substantially as and for the purpose specified.

8th, The method herein described of freeing the retort, B, from residuum, or any other equivalent means, whereby a retort or still is freed of its residuum by the force of a jet of steam, operating substantially as shown and described.

9th, The within-described process of cleaning the residuum by treating it with steam and water, substantially in the manner described and for the purpose set forth.

55,856.—BROOM-HEAD.—Martin Haneline, Clear Creek, Ind.:

I claim, 1st, The wooden frame, A, and the metallic plates, B, constructed and combined substantially as described and for the purpose set forth.

2d, The combination of the screw, C, and staple, D, with each other and with the wooden frame, A, substantially as described and for the purpose set forth.

55,857.—BUTTER-WORKER.—William H. Hart, Medfield, Mass.:

I claim, 1st, The combination consisting of the table, A, inclined table, e, sliding-receiver, g, churn, h, and salt receptacle, a', when constructed and arranged substantially in manner and to operate as herein-before described.

And in connection with such a combination of parts, I claim the heater surrounding the churn, essentially as set forth.

55,858.—BOOT OR SHOE.—Gilbert Hawkes, Lynn, Mass.:

I claim, 1st, An inner sole, A, formed of a textile fabric, to be used either with or without a stiffening preparation, as set forth and described.

2d, A strip, B, of a textile or any other suitable material, when used as and for the purpose specified.

3d, The combination of an inner sole, A, formed of a textile material with a strip, B, of any suitable material, as and for the purpose specified.

4th, The application to the lasting of boots and shoes sewed by machinery of an inner sole of textile material, substantially as described.

55,859.—NECK-TIE FASTENING.—John G. Hitchcock, New York City:

I claim, 1st, The spring-snap, A, having the cross-stop, a2, on the socket, a, and the locking-end, b2, on the catch, b, arranged as represented and having an opening, d, in the front of the socket, a, adapted to receive pressure as indicated, substantially in the manner and for the purpose herein set forth.

2d, A neck-tie, one end of which is held by a clasp behind the bow, and the other is held adjustable by a hook and loops, all substantially as shown and described.

55,860.—MACHINE FOR CUTTING FLY-NETS.—Austin D. Hoffman, Detroit, Mich.:

I claim, 1st, The combination of two or more guillotine knives with an intermittently moving cutting-board for carrying the leather which moves in a direction transverse to the length of the knives.

2d, The combination with the said guillotine knives of the spring-block, T, arranged substantially as described, for detaching the leather from the knives.

3d, In combination with a pair of guillotine knives, I claim a vertically moving strip between the blades to disengage the leather therefrom.

55,861.—MACHINE FOR FINE-CUTTING TOBACCO.—Elijah Holmes, Lynn, Mass.:

I claim the knife, D, the bed-plate, G, and the gauge-plate, E, combined and arranged in the manner and for the purposes specified, substantially as above set forth.

55,862.—LAMP-CLEANER.—Benjamin F. Horn, Boston, Mass.:

I claim my improved lamp chimney-cleaner as made with the loop-spring, D, or its equivalent, and the brook, E, arranged and combined with the series of covered bow-springs and the handle, arranged and applied together substantially as specified.

55,863.—BUTTON-HOLE SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Working a button-hole automatically and on

both side, without turning the cloth by the devices, substantially as described.

2d, The scroll cam ratchet-wheel to give a rectilinear reciprocating motion to and govern the length of the button-hole, substantially as described.

3d, The combination of the scroll cam ratchet-wheel, shifting pawl, and jog-bar, substantially as and for the purpose set forth.

4th, The combination of the scroll cam ratchet-wheel, the sweep bent-lever, and jog-bar, to space the stitching, substantially as set forth.

5th, The combination of the reciprocating vibrating clamping plate, the adjustable switch-wedge, and the jog-bar, for the purpose of varying the length of stitching for a button-hole, substantially as described.

6th, The combination of the jog-bar, clamping-plate, movable switch, and switch-block, to sew both sides of button-holes automatically, substantially as described.

7th, The combination of an adjustable stitching-plate with the fixed bed-plate, substantially as and for the purpose set forth.

8th, The combination of the clamp to hold the cloth with an adjustable screw-pivot to render the bearing surface of the clamp parallel with cloth of varying thicknesses, substantially as set forth.

9th, The combination of the vibrating and reciprocating plate with the adjustable clamp, when so arranged that both shall move together to hold the cloth smoothly between them, as set forth.

55,864.—BUTTON-HOLE SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Working button-holes automatically above or below the bed-plate of sewing machines, substantially as and for the purpose set forth.

2d, Sewing button-holes automatically, giving the goods a progressive rotary and a vibrating movement from a center, to stitch the sides and ends of the button-hole with stitches of uniform length.

3d, The combination of a jog-bar, a rack-bar, and a ratchet-wheel with the cloth-holder, substantially in the manner and for the purpose set forth.

4th, The combination of a jog-bar, a pawl-lever, and toothed wheel with the cloth-holder, substantially as and for the purpose set forth.

5th, The combination of a jog-bar, a crank-lever, and supporting beam, L, with the cloth-holder, substantially in the manner and for the purpose set forth.

6th, The combination of an adjustable slide with the feed-device and cloth-holder, substantially in the manner and for the purpose set forth.

7th, The combination of a jog-bar, a pawl-sweep, and a ratchet-wheel with the cloth-holder, substantially as and for the purpose set forth.

8th, The jog-bar, when combined with the cloth-holder and pawl-sweep, substantially as described to give the cloth-holder all its required motions, to vary the spacing between the stitches, and to adapt the sewing to button-holes of different lengths, substantially in the manner described.

55,865.—BUTTON-HOLE SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Operating the button-hole mechanism from the spooling-pin, substantially as and for the purpose set forth.

2d, The bed-plate, E, having a reciprocating motion and being laterally and longitudinally adjustable, substantially as and for the purpose set forth.

3d, The revolvable, reciprocating feeding-plate, combined with the vibrating bed-plate, substantially as and for the purpose described.

4th, The adjustable stitching-plate, combined with its eyelet guide, substantially as and for the purpose described.

5th, The combination of the center-plate and gibs, substantially as and for the purpose set forth.

6th, The dog-lever, combined with the center-plate, the block-cramp, and the revolvable plate, substantially in the manner and for the purpose described.

7th, The combination of the clamping-lever, with the revolvable plate, substantially as described, to admit of the turning of the cloth, so that the button-hole can be worked at a right angle or less than a right angle to the selvege, or parallel therewith.

8th, The combination of the grooves in the rotating plate with those in the clamping-lever, substantially as and for the purpose set forth.

9th, The feeding-screw to intermittently reciprocate the feeding-plate, or hold it at rest, substantially as and for the purpose described.

10th, The combination of the feeding-screw with the feeding-plate by spring half-nuts, substantially as and for the purpose set forth.

11th, The combination of the feeding-screw with the bed-plate and adjustable plate on the switch cam-plate, substantially as and for the purpose set forth.

12th, The combination of the switch, the jog-bar, and the slotted strap, substantially as and for the purpose set forth.

13th, The combination of the jog-bar with the adjustable slide-bar, substantially as and for the purpose set forth.

14th, The combination of the bed-plate and shield-cap, substantially as and for the purpose set forth.

15th, The combination of the bed-plate and table with the adjustable lever and stitching plate, substantially as and for the purpose described.

16th, The combination of the bed-plate, jog-bar, lever, and stitching-plate, substantially as and for the purpose described.

17th, The combination, of the friction-spring and adjustable stops of the throw-lever y, with the jog-bar and its stop-pin, substantially in the manner as and for the purpose described.

18th, The combination of the plate and its adjustable screws and pins with the switch-cam and jog-bar, substantially as and for the purpose set forth.

55,866.—SEWING-MACHINE CLAMP.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Surrounding the opening in the table of sewing machines, through which the needle passes, with a lining of india-rubber, substantially in the manner and for the purpose set forth.

2d, The combination of the yielding presser with the rubber-lined opening, substantially as and for the purpose set forth.

55,867.—KNIFE AND SCISSORS SHARPENER.—M. V. B. Howe, Ashburnham, Mass.:

I claim the combination of holder, A, having angular notches, E, and concave sharpener-plate, C, as and for the purposes described.

55,868.—TRUSS.—N. W. Hubbard, Fulton City, Ill.:

I claim a truss in which a pad of the form and arrangement substantially as set forth is connected in the manner set forth with a main spring of the form and rigid character, substantially as herein described.

55,869.—PUNCTURING MACHINE FOR MAKING PATTERNS.—Samuel Huffman, Carthage, Ill.:

I claim a machine, when so constructed with a puncturing point in combination with a spring, and when the machine entire is movable when in use, as is a pen or pencil tracing-point, substantially as herein described and for the purpose herein set forth.

55,870.—CAR COUPLING.—Hiram Hughes, Savona, N. Y.:

I claim the combination of the latch, B, with its catch, c, and pendants, d, d', of the form shown, and the pivoted bar, D, operating in combination with a suitable link, E, in the manner and for the purpose herein specified.

55,871.—FERTILIZER.—Joseph and Abraham Hursh, Philadelphia, Pa.:

I claim the application of ochre as a fertilizer, in either a raw or burnt state, substantially as described.

55,872.—GRINDING MILL.—John Hutchinson, Three Rivers, Mich.:

I claim the slip coupling in combination with the central shaft having stirrers and the hopper, arranged and operating as described.

55,873.—WASHING MACHINE.—Andrew Irion, Fennimore, Mo. Antedated May 14, 1866:
I claim the combination of the wheels, B, C, C', and crank-shaft, D, with the rubbers, F', and box, A, as and for the purpose set forth.

55,874.—FENCE.—Theodore E. King, Painesville, Ohio:
I claim, 1st, The plate, A, constructed as shown in Figs. 1 and 2, and herein particularly specified and used in series by overlapping or interlocking each other consecutively, for the purpose set forth.
2d, The plate as shown in Figs. 3 and 4, and constructed as specified, the same consisting of the addition to the foregoing plate of a vertical or upright part and arched braces, L, L', and used in series in like manner, as and for the purpose specified.
3d, The manner of plating or strapping the couplings of the sections and covering their abutting ends, together with the mode of adjusting and bracing the panel, J, by means of the combined parts herein described, viz., plates Figs. 5, 6, 7, and 8, projecting plates, L, M and M', O and T, and bolts, R and S, arranged and operating as herein set forth.
4th, The adjustable hinge constructed with the depressions, a, a', b, a', and slots, U, U', substantially as shown in Figs. 10 and 11, in combination with the tooth, b, and screw-holes, c, c', of the lower plating of the gate, as herein described and for the purpose specified.
5th, The adjustable catch, as shown in Figs. 14 and 15, provided with the screw-bolt, W, and projecting stud, X, in combination with the opening, Y, of the post, and constructed and arranged as and for the purpose set forth.

55,875.—WATER WHEEL.—Louis Kratzer, Baltimore, Md.:
I claim the arrangement of the wheels, A, B and C, so as to make use of the whole body of water in its descent to the level below, and its action in passing off, as herein set forth and described.

55,876.—FARM GATE.—Joel Lee, Galesburg, Ill.:
I claim, 1st, The friction rollers, A, A', when used as set forth and described.
2d, The arrangement of rollers, A, A', with the roller, B, and the roller support, C, all arranged as set forth and described.

55,877.—HARVESTER RAKE.—Edward J. Leyburn, Lexington, Va.:
I claim, 1st, Combining a rake with a revolving reel in such manner that the rake shall receive a rectilinear movement across the platform at every revolution of the reel, and without stopping the movement of the latter, substantially as described.
2d, Supporting and guiding a rake-staff, D, by means of a revolving reel in such manner that the rake shall revolve with the reel after the termination of each raking stroke, and then move across the platform in a line which is at right angles or nearly so to the line of draught, substantially as described.
3d, Supporting and guiding the rake-staff by means of a slotted cross-piece, b, applied to the reel, and arranged so that the rake, D', shall be held at right angles to the finger-beam in its passage across the platform, substantially as described.
4th, A rake which is applied to a revolving reel and moves in a right or nearly right line across the platform, in combination with means which finally discharge or deliver the gavel of grain with their length at right angles or nearly so to the path of the machine, and also out of the return track of the horses, substantially as described.
5th, A rake which moves in a right or nearly right line across the platform, so pivoted to the reel that it is capable of swiveling and vibrating, substantially as herein described.
6th, In combination with a revolving reel and vibrating rake, I claim pivoting the rake to its staff, substantially as described.
7th, Providing for moving the rake to the outer end of the reel previously to the action of the guide-arm, b1, upon the standing grain, substantially as described.
8th, The rake pivoted to the reel so as to revolve with it, constructed and controlled substantially in the manner and for the purpose described.

55,878.—CAN-OPENER.—O. J. Livermore, assignor to himself and Clark, Lawyer & Co., Worcester, Mass.:
I claim a can-opener, constructed substantially as above described.

55,879.—TAG OR LABEL FOR EXPRESS COMPANIES, ETC.—E. A. Locke and L. Heuser, Boston, Mass.:
We claim, 1st, The combination of the two parts of the tag, a and b, when united by the folding of the end of a over and with b, and perforated through the reinforcement of the folds for reception of the band.
Also, in combination with a tag and band a projecting unclinch eyelet secured to the band by the confinement of its head or flanch between the adjacent surfaces of the parts eyeleted together, to secure the tag to the band, the eyelet being thus held in position for application and securement of the opposite end of the band, substantially as set forth.

55,880.—BURNING-FLUID.—David Mansfield, Oshkosh, Wis.:
I claim a burning-fluid for illuminating purposes which is composed of the several ingredients mixed together in about the proportions herein mentioned.

55,881.—CARDING MACHINE.—James McDonald, Detroit, Mich.:
I claim, 1st, The use of a thin shell in the place of the thick and wooden one heretofore used, which thin shell is set in combination with the roller for the purpose of taking the wool from the roll-doffer at once without comb-crank or intermediate roller, said shell being set closer up to the roller than heretofore, and made adjustable nearer to or far from the roller at will.
I also claim, as a component part of said improvement above described, the insertion of narrow bits of wool-cards (the teeth of which should be a trifle shorter than, and set contrariwise to, the ordinary card-teeth of the roll-doffer) in the spaces of the roll-doffer heretofore left suitable and unfurnished with cards or teeth, and the change above prescribed in the size of the pulleys, by means of which pulleys the band of the machine turns the roller and roll-doffer.

55,882.—GATE FOR FOREBAYS.—J. J. Meeker and Levi Cartright, Columbia, Pa.:
We claim the flexible gate, B, constructed and operating substantially as and for the purposes set forth.

55,883.—FENCE.—S. H. Mitchell, El Paso, Ill.:
I claim, 1st, The stakes, B, D, connected by bolts, C, in combination with the upright posts, A, of the panels with which posts the upper ends of the stakes, B, are connected by bolts, E, substantially as and for the purpose specified.
I also claim the covering of the notched ends of the slats, F, of the panels with sheet-metal or strap-iron, c, substantially as and for the purpose set forth.
I further claim the securing of the panels so as to prevent a vertical movement of the same by means of a screw, b, or its equivalent, applied as shown, when used in combination with the notched ends of the slats, F, of the panels, substantially as described.

55,884.—WELL-BORING APPARATUS.—David Morris, Bartlett, Ohio:
I claim, 1st, A drill having two or more wings, W, with their cutting edges constructed and arranged as herein described and represented.
2d, The tube, H', provided with a valve, h, and attached to, and moving with, the drill-rod, h, substantially as and for the purpose explained.
3d, The combination of the circular frame, A, cogged rim, C, rotating and revolving shaft, D1, pinion, D2, crank-wheel, F, connecting-rod, G, rope, I, and drill, H, the whole being constructed and arranged as herein described and represented.
4th, The combination of the cogged rim, C, and gearing, S, S', with the beveled gear, R, windlass, Q, shifting-rod, S', rope, N

and adjustable block, L, the whole being arranged to operate in the manner and for the purpose set forth.

55,885.—FLOUR PACKER.—John Musser, Frizellburg, Md.:
I claim the movable covers, E, operating on the vertical stampers, G, with the upright revolving cylinder, J, when arranged, combined, and operated as herein described and for the purpose set forth.

55,886.—APPARATUS FOR AGITATING AND HEATING SUBSTANCES.—George Nebeker, Wilmington, Del.:
I claim a tube, A, in combination with an internal pipe, B, and with a tube, C, communicating with the said pipe, B, and with a steam boiler, substantially as and for the purpose described.

55,887.—SUGAR-MOLD.—Frederick Nishwitz, Williamsburg, N. Y.:
I claim, 1st, Combining a sugar-mold tip with a body of paper-mache, or other equivalent material, the two parts being constructed and arranged substantially as described.
2d, Clamping the body of the mold to the tip, and holding the two parts in place, by means of a wrapping of wire, substantially as described.
3d, Combining with the dovetailed flange on the tip the shoulder on the body of the mold, when the latter acts as a stop to prevent the wrapping from slipping off the cone, substantially as described.

55,888.—SUGAR-MOLD TIP.—Frederick Nishwitz, Williamsburg, N. Y.:
I claim, 1st, A separate and separable tip for sugar-molds, constructed and operating substantially as described.
2d, Clamping the body of the mold between an inner metallic tip and an outer metallic cap, substantially as described.

55,889.—EYE-WATER.—Michael Noll, New York City:
I claim the herein-described eye-water, composed of sulphate of zinc and the white of an egg dissolved in distilled water, substantially as set forth.

55,890.—MILL SIEVE.—E. D. Norton, Bradford, Pa.:
I claim an improved screen or upper sieve for a fan-mill, formed of strips, B, of corrugated sheet-metal, attached at their ends to the side-bars of the frame, A, of the sieve, and so arranged that the forward edge of each strip, B, shall overlap the rear edge of the adjacent strip and that the concavities, b', of each strip shall be in the same vertical plane with the convexities, b2, of the adjacent strips, substantially as herein described and for the purposes set forth.

55,891.—ROOFING.—Rufus Norwood, Baltimore, Md.:
I claim, 1st, A roof which is in part composed of several overlapping strips of felt, or its equivalent, applied in counter-diagonal positions, substantially as described.
2d, The combination of the several strips, c, c', and strips, d, with the felting, as described, so that gutters or channels at the junction of the roof with the fire wall can be formed, preventing thereby the cement covering from being detached from the roof and wall, substantially as described.

55,892.—CARBON BATTERY CONNECTION.—Aaron S. Ogden, Newark, N. J.:
I claim surrounding the junction of the wire, A, with the platina, and a portion of the said wire, A, with the covering, B, or its equivalent; also the combination of the carbon with the said covering, B, and platina, D, substantially as described and for the purposes set forth.

55,893.—HYDRANT.—James Old, Pittsburg, Pa.:
I claim, 1st, Connecting the operative parts of the hydrant to the supply or service-pipe at a point below the working valve or cock by means of a joint, in such manner that the hydrant may be removed and separated from the supply or service-pipe without cutting any pipe or unscrewing any joint, substantially as herein-before described.
2d, So constructing the hydrant, substantially as herein-before described, as that all the operative parts above and including the working cock or valve are connected together as one piece, and may be attached to a removable slide, either placed in or forming part of the hydrant-box, substantially as and for the purposes herein-before set forth.
3d, The check-valve placed below the working-valve of a fire-plug or hydrant, so constructed and arranged as that the valve will shut whenever the hydrant or fire-plug is removed from the supply or service-pipe, and that it shall be opened to allow of the passage of water from the supply-pipe either by the opening of the working valve whenever the fire-plug is used, or be kept open by the plug or hydrant when it is placed in connection with the supply or service-pipe, substantially as herein-before described.

55,894.—LIFTER FOR STOVE-COVERS AND CULINARY VESSELS.—Joseph Old, Reading, Pa.:
I claim the described universal lifter, constructed with hooks, C, D, in combination with the fixed jaws, A, B, at one end, the other being prolonged into a handle, E, in the manner and for the purpose specified, as a new article of manufacture in design and figure.

55,895.—DRILL COUPLING.—Edward E. and Charles T. Packer, Philadelphia, Pa.:
We claim a section having an external screw-thread and a recess, in which is a spring-spline or feather, in combination with a section having a socket with an internal screw-thread and a slot adapted for the reception of the end of the said spline or feather, the whole being constructed substantially as and for the purpose specified.

55,896.—SHEEP-RACK AND HOLDER.—Enos Page, Streetsborough, Ohio:
I claim the adjustable sides, B, B', lips, b', b', and grooves, a, a', in combination with the cleat, D, and buttons, D', arranged as and for the purpose set forth.

55,897.—BOOK-HOLDER.—Owen B. Parker, Woodville, Mass.:
I claim the combination as well as the arrangement of the two bars, A, B, their lips, a, a', b, b', and leaf-holders or arms, D, D', with the elastic bands, C, C'.
I also claim the combination and arrangement of the brace-hole and looped strap or ribbon, with the two bars, A, B, and their lips, a, a', b, b', the elastic connections, C, C', and arms, D, D'.
I also claim the combination and arrangement of the brace or prop and the looped strap, with the two bars, A, B, their lips, a, a', b, b', elastic connections, C, C', and arms, D, D'.
I also claim the combination of the fingers, g, g', with the arms, D, D', the bars, A, B, their lips, a, a', b, b', and elastic connections, C, C', the whole being as and for the purpose set forth.

55,898.—MEDICINE TO CURE CHOLERA, ETC.—Anna E. Parrott, Norfolk, Va.:
I claim the medicine prepared substantially as herein described.

55,899.—CORN-SHELLER AND BEAN-THRASHER.—Benjn. P. Pendexter, Mechanic's Falls, Me.:
I claim combining the feeding-drum, C, having horizontal buckets, m, and hooks, n, on the outside, with the toothed beater, D, the elastic concave toothed bed, E, made in sections, the elastic bed-plates, F, supported and operated by the spiral springs, b, the fan, G, the sieve, H, and the elevator, I, the whole several parts being constructed, connected and arranged, substantially as and for the purposes herein described.

55,900.—WATER-CLOSET.—Barton Pickering, Milton, Ohio:
I claim, 1st, The arrangement of the vessel, A, seat, B, and valve, C, the whole constructed substantially as described and for the purposes set forth.
2d, The arrangement of the spring, f, and bar, p, to hold the seat, B, in a vertical position, and the valve, C, in a nearly horizontal position, substantially as described and for the purposes specified.

55,901.—SKATE.—J. M. Plimpton, New York City:
I claim, 1st, The construction of the plates, B, and hangers, C, arranged and applied to the stock or foot-stand, to operate in the manner substantially as and for the purpose set forth.
2d, The key, F, provided with the slots, j, l, and the button, G, and arranged in connection with the pin, K, substantially as and for the purpose set forth.
3d, The springs, p, applied to the screws, n, which secure the hangers, C, to the plates, B, for the purpose of preventing vertical or upward and downward play of the hangers, and controlling the turning, tilting, or canting of the stock or foot-stand, as set forth.
4th, The clamps, H, composed of two parts, g, r, for holding the reversible runners, I.
5th, The reversible runners, arranged substantially as shown, for the purpose specified.

55,902.—HORSE HAY-FORK.—Isaac T. Price, Leesville, Ohio:
I claim, 1st, The combination and arrangement of link, C, hook, H, catch, G, and trigger, Q, substantially as and for the purpose set forth.
2d, The construction and arrangement of the handle, B, head, A, and prongs, p.

55,903.—LOCOMOTIVE LAMP.—James Radley, New York City:
I claim the combination of the lamp with the oil-tank by means of one or more small oil-tubes incased with a non-conductor of caloric, arranged and constructed in the manner substantially as described.

55,904.—ENGINE HEAD-LIGHT.—James Radley, New York City:
I claim, 1st, The foundation piece, with its recess and covering-plate, in combination with the inclosing tube and the wick so arranged and constructed that the parts may be conveniently brazed together instead of being soldered, thereby rendering the lamp more safe and permanent, substantially as herein shown and described.
2d, The wick-pinion and its spindle, in combination with the removable stuffing-box, arranged and constructed substantially as described.

55,905.—MOWING MACHINE.—Amos Rank, Salem, Ohio:
I claim, 1st, The construction of the hanger, E, with a depressed stirrup, E', which is open on all sides but one above the shaft, e, and below the shaft, b, substantially in the manner and for the purpose described.
2d, The combination of the hanger, E, constructed with the open stirrup, E', and the rear hanger, F, all constructed and arranged substantially as described.
3d, Constructing the front hanger, E, E', so that it can be attached to the top of the longitudinal beams, A, A', and at the same time will serve as a support for the two shafts, e, b, in the manner substantially as shown and described.
4th, The hanger, E, and open stirrup, E', cast in one piece, substantially as shown and described.

55,906.—FENCE-GATE.—F. Raymond and A. Miller, Cleveland, Ohio:
We claim the cord, h, adjustable case, c', and sheave, e, in combination with the gate, A, arm, F, when arranged and operating substantially as and for the purpose set forth.

55,907.—WINDOW-SHADE.—Henry Read, Ypsilanti, Mich.:
I claim the combination of the staples or rings, C, C2, C3, or their equivalents, cords, E, E', secured to a tassel, D, either weighted or not, when arranged and connected together and to a window-curtain or shade so as to operate thereon, substantially as and for the purpose described.

55,908.—CORN-PLANTER.—W. E. Rich, New Providence, Iowa:
I claim, 1st, The hinged bars, D, D', provided with the rollers, I, and boxes, G, in connection with the wheels, H, having seed-cells, b, made in them and rods, c, attached with weights, f, at their upper ends, all arranged to operate in the manner substantially as and for the purpose specified.
2d, The hoes, F, attached to the rear ends of the bars, D, in combination with the seed-dropping mechanism attached to said bars, D, for the purpose set forth.
3d, The rollers, I, I, in combination with the seed-dropping mechanism and covering-hoes, substantially as and for the purpose specified.
4th, The attaching of the rollers, I, to arms, g, pivoted to the bars, D, and retained in position by bars, i', and pins, j, arranged substantially as shown and described for the purpose of adjusting the bars, D, as set forth.

55,909.—AUTOMATIC MACHINE FOR LIGHTING AND EXTINGUISHING GAS.—H. Stone Richardson, assignor to himself and E. P. Russell, Manlius, N. Y.:
I claim, 1st, The setting-wheel, C, in combination with the hands, d and e, shafts, g and h, and cams, D, D', substantially as and for the purposes set forth.
2d, The match cylinder, G, constructed and operating substantially as and for the purposes set forth.
3d, The dogs, K, K', and K2, in combination with cylinder, G, and plate, J, substantially as and for the purposes set forth.
4th, The cams, D, D', cam-levers, N, N', connecting-levers, O, O', dog-levers, L, L', and springs, P, P', constructed and arranged substantially as and for the purposes set forth.
5th, The setting-wheel, C, provided with cog-wheel, j, when so combined with cog-wheel, i, as to alternately turn the gas on or off, substantially as herein set forth and described.
6th, The draught-pipe, H, operating substantially as described and in combination with the match-tubes, K.

55,910.—REAPING MACHINE.—E. P. Russell, Manlius, N. Y.:
I claim, 1st, The "side-dumper," O, or its equivalent, substantially as and for the purposes set forth.
2d, The dumper-reel, H, in combination with the side-dumper, O, substantially as and for the purposes set forth.
3d, The combination of the dumper-reel, H, side-dumper, O, and track-clearer, U, substantially as and for the purposes set forth.
4th, The device used for tripping the dumper-reel, substantially in the manner described.
5th, The device used for tripping the side-dumper, substantially in the manner described.

55,911.—MEDICAL COMPOUND.—W. F. Salie, Bowdoinham, Maine:
I claim a medical compound composed of the several ingredients herein named, and either with or without a flavoring material or substance, when mixed together in about the proportions described, as and for the purposes specified.

55,912.—MACHINE FOR MAKING HORSE-SHOE NAILS.—George W. Sargent, Fairhaven, Mass., and Benjamin P. Rider, Chelsea, Mass.:
We claim, 1st, Operating the hammers, C, C', C2, C3, by means of the sliding connecting pieces, D, and cam, F, substantially as and for the purpose specified.
Also, the adjustable boxes, G, in combination with the cam-shaft, E, connecting pieces, D, and the hammers, as and for the purpose specified.

55,913.—RAILWAY SWITCH.—Charles H. Sawyer, Hollis, Maine:

I claim, 1st, The combination of the jointed levers, b, with the sliding bar, g, and curved arms, a, with the cross-bar, h, all constructed, arranged, and operating as herein set forth and described.

2d, The arrangement of the springs, y, to lift the levers, i, as described.

3d, The arrangement of the arms, z, z, for the purpose of locking and unlocking the switch by hand, as described.

55,914.—AUTOMATIC GATE.—J. H. Schenck, Chicago, Ill.:

I claim, 1st, The gate, A, pivoted at the top of the post so as to swing like a pendulum, when the way is to be opened, substantially as described.

2d, In combination with the vibrating gate, A, the reciprocating platform, for the purpose set forth.

3d, In combination with the vibrating gate, A, the latch, substantially as and for the purpose set forth.

4th, The reciprocating platform, supported upon the lary bars, and connected to the gate by the rod, substantially as described.

5th, In combination with the reciprocating platform and the flanges, substantially as described and for the purpose set forth.

55,915.—APPARATUS FOR PRODUCING EXTRACT OF HOPS, ETC.—John Schneider, Williamsburg, N. Y.:

I claim the siphon-tube, E, in combination with the tightly-closed vessel, A, which is provided with a horizontal partition or spurger, D', false bottom, C, and discharge coil, F, substantially as and for the purpose described.

55,916.—MANUFACTURE OF CAR WHEELS.—J. Scoville, Buffalo, N. Y.:

I claim the combination of spiegelisen and iron in the manufacture of car wheels, in the manner herein described.

55,917.—PICTURE NAIL.—Frederick J. Seymour, Wolcottville, Conn.:

I claim an ornamental picture nail-head made with a screw for the nail, in the manner specified.

55,918.—DRILLING MACHINE.—Frederick Shaller, Hudson, N. Y.:

I claim, 1st, The fixed feed-screw, E, the hand-wheel, F, containing the nut, x, and the arms, i, a, and b, in combination with the drill-spindle and frame, B, of the machine, all arranged substantially as herein specified.

2d, The combination of the frame, f, f, the drill-spindle, C, the pulley, D, and rod, d, substantially as and for the purpose herein set forth.

55,919.—MACHINE FOR CUTTING WINDOW-SHADE SLATS.—P. P. Simmons, Davenport, Iowa:

I claim, 1st, The arrangement of the nearly horizontal rotary cutters, C, C, table, A, and the guides, a, a, substantially in the manner and for the purpose described.

2d, The arrangement of the socket-bearings, D, cutter-arbor, b, cutter, C, adjustable devices, c and d, and table, A, substantially in the manner and for the purpose described.

55,920.—GARBAGE BOX.—James Joseph Slevin, New York City:

I claim, 1st, The garbage box, with its top constructed so as to form a part of the sidewalk of the street, and with a door or lid in said top, so that the said top with its door covers the garbage box, forms part of the sidewalk for pedestrians, and permits the contents to be readily thrown out, thus enabling the garbage box to be sunk below the level of the sidewalk, as described.

2d, The construction of the garbage box with two horizontal doors, to form parts of the sidewalk, the smaller within the larger, as described.

3d, The garbage box with one of its sides constructed so as to form a part of the curb of the sidewalk, so that the box may be set as close as possible to the carriage-way for convenience of throwing its contents into a cart.

4th, The combination of the garbage box with a drain grating extending up to or near its top, so that the liquid matter may drain from the surface of the garbage, wherever that may be, as described.

5th, The combination in a garbage box of the following parts, viz., the body of the box, the top constructed with a door to form part of the sidewalk of the street, and one side constructed to form part of the curb of the street, as described.

55,921.—GANG PLOW.—Joseph D. Smith, Peoria, Ill.:

I claim, 1st, Arranging the gang of plows between the forward and the rear points of support of the carriage frame, to which said plows are attached when they are free to rise or fall independently of each other, substantially as described.

2d, Pivoting the forward ends of the plow-beams, D, D, to the carriage frame, by means of rods, b, b, which are adjustable at their outer ends in slots, c, c, for the purpose of leveling the plows, substantially as described.

3d, The combination of the vibrating plow-beams, D, which are pivoted to a carriage frame at a point which is in front of the transporting wheels, with a device which will admit of the forward part of said frame being elevated or depressed at pleasure, substantially as described.

4th, In combination with plows which are arranged in advance of the axle-tree, B, and pivoted so as to be capable of rising or falling, I claim the gravitating catches, d, d, or their equivalents, substantially as described.

5th, The arrangement of levers, F, E, vibrating plows, D, D, and catches, d, d, substantially as described.

6th, Providing for adjusting the forward end of the carriage frame, for regulating the pitch of the plows, by means of draught-pole, G, lever, H, substantially as described.

7th, Connecting the rear end of the pole, G, to the axle, B, by means of a pin, c, and a laterally adjustable plate, f, substantially as described.

8th, The adjustable draught-rod, K, arranged and applied to the plow frame so as to operate substantially as described.

9th, The combination of a pole, G, which is adjustable at its rear end, with a draught rod, K, which is adjustable at its front end, substantially as described.

55,922.—TOP-SAIL REEFING RIG.—Wm. G. Smith and Daniel Hooper, New York City:

We claim, 1st, In connection with a single top-sail, a flowing middle yard or reefing-boom, D, checking-line, g, g, bifurcated lifts, M, m, m, and preventer lifts, K, all arranged and operating as herein shown and explained.

2d, The combination of the binding-rope, f, f, and loops formed by stops, e, e, for securing the belly of a top-sail to a boom, D, or middle yard, substantially in the manner and for the purpose specified.

55,923.—LACING FOR BOOTS AND SHOES.—Leonard A. Sprague, New York City:

I claim, 1st, The lacing-eyel in which the lacing-eye is formed in one piece with the fastening device, substantially as herein shown and described.

2d, I claim the combination of two or more lacing-eyes with intermediate links, when the same are formed of one piece of wire, substantially as herein shown and described.

3d, The method of fastening lacing-eyellets, substantially as described, by confining the shanks or links thereof in the folds or between two thicknesses of leather or other material, to which the lacing is attached.

55,924.—BOOK-HOLDER.—David J. Stagg, New York City:

I claim the arms, C, C, secured in the cleat or strip, B, by screws, b, b, and provided with pivoted fingers, D, at their outer ends in connection with the inclined frame or base, all arranged substantially as and for the purpose specified.

55,925.—STAND, DESK, AND BOOK-HOLDER.—David J. Stagg, New York City:

I claim the stand, writing-desk and book-holder consisting of the bed-piece, D, hinged-frame, E, hinged-board, F, provided with the fingered arms, G, G, and hinged-bar, I, combined and operating in the manner and for the purpose herein specified.

55,926.—PORTABLE FENCE.—Jno. K. Staman, Mifflin, Ohio:

I claim the braces, d, d', and counter-brace, d'', in combination with the posts, B, and cross-rails, e, e', when constructed and arranged in the manner and for the purpose set forth.

55,927.—NEEDLE FOR SEWING MACHINES.—Monroe Staimard, New Britain, Conn.:

I claim the employment of the needle as described, in combination with a shuttle or its mechanical equivalent, substantially as and for the purpose described.

2d, As a new article of manufacture, I claim an eye-pointed sewing-machine needle, a, eccentric with reference to its shank, c, substantially as and for the purpose described.

55,928.—WASHING MACHINE.—Henry H. Staples, Woburn, Mass.:

I claim the arrangement and combination of the bar or lever, D, its handle or handles, d, d, and the standards and roller, e, with the rubber, the tub, and the series of rollers disposed in such tub, the whole being substantially as specified.

55,929.—MEANS FOR FISH TO PASS OVER DAMS.—Daniel Steck, Hughesville, Pa.:

I claim an improved device for facilitating the passage of fish over dams, formed by combining a series of inclined planes, E, I, J, K, L, with each other, with the partition walls, G, O, P, R, with the side walls, F, N, and with the end walls, T and S, the whole being constructed and arranged in connection with the end of the dam and with the bank of the stream, substantially as described and for the purpose set forth.

55,930.—HORSE RAKE.—Henry Stimmel, Canton, Ohio:

I claim the combination of the peculiarly shaped iron, "G," having a slot, "K," therein, with the screw, "H," in connection with the lever, "F," substantially in the manner and for the purpose specified.

55,931.—STOP-COCK.—Herman Strater, Jr., Roxbury, Mass.:

I claim in a stop-cock providing its plug with elastic yielding filling, substantially as and for the purpose described.

55,932.—WRENCH.—George C. Taft, Worcester, Mass.:

I claim the arrangement of the nut, I, in combination with the handle, G, tang, A, and ferrule, H, with its shoulder, b, and step, J, constructed and operating in the manner and for the purpose herein described.

55,933.—BUCKLE.—D. S. Thompson, West Haven, Conn.:

I claim the combination of the frame, A, with the tongue, B, and bar, C, when the tongue and bar are hinged to the rear bar of the frame, the whole constructed and arranged to operate substantially in the manner herein set forth.

55,934.—CHURN.—W. H. Tillou and S. Shumway, Le Roy, N. Y.:

We claim the gear or cog-wheel, D, constructed with curved cogs or flanges on the side of its rim, substantially as herein described, in combination with the cog-wheel, C, of the dasher-handle, B, for the purpose of frequently reversing the motion of the dasher, A.

55,935.—CARPET-STRETCHER.—E. W. Twing, Springfield, Mass.:

I claim, 1st, The coupling consisting of the slides, D, E, pivot, b, socket, c, and set-screw, a, or its equivalent, in combination with the shafts, A, B, of a carpet-stretcher, substantially as specified.

2d, The rounded head, C, in combination with the levers, A, B, and slides, D, E, arranged and operating in the manner and for the purpose herein specified.

55,936.—BROOM-HEAD.—James Wasson, Fairwater, Wis.:

I claim, 1st, An improved broom-head, formed by combining with each other and with the socket, A, the two parts or halves, B and C, constructed substantially as herein described and for the purposes set forth, said halves being held together at the lower part of their side edges by the barbed spike-hooks, F.

2d, The combination of the two perforated or roughened plates, D and E, constructed as described, with the parts or halves, B and C, substantially as and for the purpose set forth.

3d, The combination of the barbed spikes, F, with the halves or parts, B and C, substantially as described and for the purpose set forth.

55,937.—TOBACCO-PRESS.—W. H. Watson, Yonkers, N. Y.:

I claim, 1st, The inner or secondary box, constructed and operating substantially as described, for the purposes set forth.

2d, In combination with the same, I claim the outer box top-plate and clamps, when the same shall be constructed, combined, and operated substantially as shown.

55,938.—APPARATUS FOR OILING JOURNALS.—James E. Weaver, Temperanceville, Va.:

I claim the combination of the vessel, c, and pipes, d and e, with a "plumber-block," or bearing of shafting, as herein described and for the purpose set forth.

55,939.—STOVE-PIPE DRUM.—Harvey G. Whittaker, Brattleboro', Vt.:

I claim the combination of the internal drum, B, intermediate drum, A, and external drum, C, with the pipes, D, E, F, G, when the parts are constructed and arranged in the manner and for the purposes herein described.

55,940.—SASH-SUPPORTER.—Martin V. B. White, Troy, N. Y.:

I claim the employment of the arm-piece or rod, c, having the thumb-piece, I, thereon and the opposite end thereof so constructed as to receive the roller, D, and operate the same within the triangular recess, E, each being arranged and combined in the manner substantially as herein described and set forth.

55,941.—MEASURING-FUNNEL.—A. H. Whitney, Portland, Me.:

I claim the combination in a funnel of the graduated scale, the stop-cock, the flange and air vent, all as and for the purposes specified.

55,942.—HARNES-HOOK.—J. J. Wilkins, Virdeu, Ill.:

I claim the hook, A, provided with the transverse opening or hole, n, and the horizontally projecting ears, a, constructed and operating as shown and described.

55,943.—RAILROAD SWITCH.—John A. Williamson, Lafayette, Ind.:

I claim the combination of the bridge, A, tapered guide, B, and tapered car, C, when the latter is securely pivoted to the guide, B, and all constructed and arranged in the manner and for the purpose herein specified.

55,944.—DIE FOR CUPPING OR RAISING ARTICLES OF METAL.—Samuel R. Wilmet, Bridgeport, Conn.:

I claim the attachment of the blank-holder, B, directly to the bed-plate or fixed die, A, substantially as herein set forth for the purpose specified.

55,945.—BORING MACHINE.—Benjamin T. Young, Charlestown, Mass.:

I claim a grooved cam constructed with inclined sides, in combination with a cone-traveler.

55,946.—WEIGHING-CAR.—Joshua H. Zinn, Kingston, Tenn.:

I claim, 1st, The arrangement of the levers or frame, B and C, within the bottom portion of the frame of a car and connected together, and with any suitable weighing-lever or beam in combination with the inside box or casing resting at each end upon such frames, B and C, substantially as described and for the purpose specified.

2d, The shaft, P, having cam-shaped disks, R, so arranged as to lift the inside box from the weighing-levers or frames, for the purpose set forth.

55,947.—MACHINE FOR HULLING COFFEE.—Robert Anderson, Brooklyn, N. Y., assignor to S. O. Ryder, New York City:

I claim the combination in a machine for hulling and polishing coffee of an obliquely ribbed wheel, E, rotating within a slightly conical toothed concave, A, constructed as described, and a series of wings, G, rotating within a horizontal tapering or conical case, A, the whole arranged to operate substantially as herein set forth for the purpose specified.

55,948.—BROOM-HEAD.—J. D. M. Armbrust, assignor to himself and Jacob Freely, Apollonborough, Pa.:

I claim the metallic band composed of thin metal and furnished with slots, in combination with the strengthening pieces and bolts and nuts as and for the purpose described; also the combination of the movable cap piece and the handle slotted at its lower end, for the passage of the bolts constructed as described, and for the purposes set forth.

55,949.—APPARATUS FOR CARBURETING AIR.—Franklin H. Brown, assignor to himself and James F. Griffin, Chicago, Ill.:

I claim, 1st, The combination of a series of revolving buckets, F, and a hollow stationary shaft, G, provided with the openings, a and b, arranged and operating substantially as and for the purposes specified.

2d, The combination of a series of revolving buckets, F, and a stationary hollow shaft, G, when provided with the partition, m, and the openings, a and b and c and d, arranged and operating as and for the purposes shown and described.

3d, In combination with a carbureter, A, arranged above the burners, I claim the employment of a device for compressing and forcing air into the burner, substantially as and for the purposes herein specified and shown.

4th, The employment of an automatically closing valve, V, in combination with a close carbureter, arranged above the burners and a device for compressing and forcing air into the carbureter, and a weight or its equivalent, for operating the same, substantially in the manner and for the purposes specified.

55,950.—APPARATUS FOR CARBURETING AIR.—Franklin H. Brown, assignor to himself and Jas. F. Griffin, Chicago, Ill.:

I claim, 1st, The combination in one device of two or more siphons, arranged and operating substantially as and for the purposes specified and shown.

2d, The arrangement of the pans of a carbureter in two or more independent sets, in combination with devices for drawing off the contents of said sets separately, and of the pans in each set simultaneously, substantially as specified and shown.

3d, The arrangement of a deflector, V, with the inlet tube, N, substantially as and for the purposes described.

4th, Providing the inlet tube, N, with a cap, P, arranged as shown and for the purposes set forth.

5th, The combination and arrangement of the deflector, V, and cap, P, with the inlet-pipe, N, substantially as specified and shown.

55,951.—COMPOSITION OF MATTER.—Lewis Francis, assignor to himself and Cyrus H. Loutrel, New York City:

I claim combining glue, glycerine, and silicates, with or without saccharine matter, to form a new and useful composition of matter for various purposes.

55,952.—GRAIN SEPARATOR.—John Green, assignor to himself and James W. Barker, Norwalk, Ohio:

I claim, 1st, The two fans, c, c', in combination with the two shoes, F, F', operated by means of the gearing, connecting-rods, and levers from the driving-shaft of the machine, substantially as and for the purpose herein set forth.

2d, The double inclined ends of the upper screens, i, of the shoes, F, F', in combination with the side openings, m, in the shoe-boxes, substantially as and for the purpose set forth.

55,953.—FASTENING FOR FRUIT CANS.—George H. Hammer, Newville, Pa., assignor to himself, D. J. Brounger and Wm. A. Middleton, Harrisburg, Pa.:

I claim securing the cover, a, by means of the ball, B, attached to ears, e, or lugs, c, substantially as shown and described.

55,954.—BUTT HINGE.—James C. Hyde, assignor to D. S. Thompson, West Haven, Conn.:

I claim a hinge, the two parts of which are formed and united, substantially in the manner herein set forth.

55,955.—METALLIC SEAL ENVELOPE.—Ralph S. Jennings, assignor to himself and Norman G. Kellogg, New York City:

I claim, 1st, The metallic seal applied to envelopes in their manufacture, substantially as and for the purpose described.

2d, The new article of manufacture herein described and shown, to wit, an envelope for letters furnished with a metallic seal, which envelope is ready for being sealed when on sale, as set forth.

55,956.—CLOTHES-SPRINKLER.—John L. Kendall, assignor to himself, R. H. Trested, and Lewis Hurst, New York City:

I claim a clothes-sprinkler, composed of a conical vessel, A, handle, B, neck, C, and nipple, D, as a new article of manufacture.

55,957.—FIRE-ALARM.—C. D. Kubach, assignor to himself and W. W. Clay, Philadelphia, Pa.:

I claim the casing, E, with its piston, G, pin, w, and spring, t, in combination with the slotted plate, F, and the within-described alarm mechanism, or its equivalent, the whole being constructed and operating substantially as and for the purpose described.

55,958.—MODE OF SETTING STATIONARY STEAM BOILERS.—Caleb S. Nelson, West Troy, N. Y., assignor to himself and Henry I. Seymour, Troy, N. Y.:

I claim, 1st, The annular chamber or surrounding chamber, A, formed between the stationary boiler, B, and steam-dome, C, and the inner part or surface of the brick or mason work, A, in

the manner and for the purpose substantially as herein described and set forth.

2d. The suspending of the stationary steam boiler, B, within the brick arch or masonry work, A, surrounding the same so as to form an air-chamber, a, immediately upon and over the upper surface of such steam boiler so as to prevent the escape of heat, in the manner and for the purposes substantially as herein described and set forth.

55,959.—PICKER-ARM FOR LOOMS.—George W. Paterson, assignor to himself and H. M. Payne, Newburyport, Mass. :

I claim, 1st, The picker-arm, constructed and arranged for operation substantially as herein shown and described.

2d, In a picker-arm, I claim the combination of a friction-roller with a shell including the same on top and sides, as herein described.

3d, In a picker-arm and in combination with an inclosing shell, as herein described, I claim the friction-roller when of an ovaloid or equivalent shape, and having its bearings in the shell, as herein shown and set forth.

55,960.—CHURN AND ICE-CREAM FREEZER.—Thomas W. Pomeroy, assignor to himself and Wm. J. Layman, East Hampton, Mass. :

I claim the combination of the cylinder, C, with the case, A, and rotary dasher, B, when the cylinder, C, is secured within the case, A, by means of horizontal arms, b, projecting from C, and fitted between guides or lips, a, attached to the inner surface of A, and either with or without the foot, c, to rest on the bottom of A, substantially as and for the purpose specified.

55,961.—MOP-HEAD.—Louis C. Rodier, Springfield, Mass., assignor to himself and Henry Hammond. Antedated Dec. 26, 1865 :

I claim the jaws, B and C, having fingers or teeth, for the purpose herein specified, when combined with the handle and ring, d, in such manner as to form a floor mop, the whole being arranged substantially as herein described.

55,962.—LIQUID-COOLER.—Joseph R. B. Schwarze, assignor to himself and Daniel Pfeil, Washington, D. C. :

I claim the chamber, C, provided with a pipe, B, and arranged for attachment to the faucet by the coupling, E, as described and represented.

55,963.—PLATFORM SCALE.—F. M. Strong and Thomas Ross, assignors to John Howe, Jr., Brandon, Vt. :

We claim, 1st, The combination of the levers, C, C, and the links, k, k, with their upper and lower bearings, m, l, and the secondary lever, D.

2d, The shaft, F, in combination with the adjustable arms, E, E, as and for the purpose described.

3d, The combination of the poise, s, lever, P, x, graduated plate, u, and movable stop-pieces, w, as and for the purpose described.

55,964.—CAR-BRAKE.—James Temple, assignor to himself, John Schock, and H. E. Miller, Selinsgrove, Pa. :

I claim the combination of the rock-shafts, D, arms, f, f, and rods, a, with the arms, e, and rubbers, E, operated by the levers, h, and arranged as described for the purpose set forth.

55,965.—NUT TAPPING MACHINE.—Frederick Voteler, assignor to Jacob W. Holenshade, Cincinnati, Ohio :

I claim, 1st, The combination in a tapping machine of taps for right and left-hand nuts, arranged and operating substantially as described.

2d, The combination of two or more taps with a mechanism for adjusting simultaneously a nut to each, arranged and operating substantially as described.

55,966.—PENCIL-CASE.—D. T. Warren, assignor to himself and Amedee Spadone, New York City :

I claim the arrangement of the lead-holder, a, shaft, b, tube, c, straight slot, d, stud or pin, h, loose sleeve, m, with its enlargement, o, spiral slot, l, tube, r, pen-holder, t, tube, v, straight slot, w, pin, x, spiral slot, y, and loose sleeve, z, as and for the purpose set forth.

55,967.—WATER-CLOSET.—Darius Wellington, assignor to Cornelius Wellington, Boston, Mass. :

I claim, 1st, The arrangement of the shaft, d, slotted plate, f, arm, l, and rod, k, for supporting the pan by the connection between it and the operating rod, substantially as described.

Also, combining with the supply-pipe and pan the flexible air-ball or chamber, operating to seal the pan, substantially as set forth.

Also, in combination with the hopper, a, the divided nozzle and plate, o, operating as and for the purpose described.

Also, the combination of the ring (serving as an elastic packing) with the flange, p, and stand, b, substantially as described.

Also, connecting the supply-pipe to the hopper by means of the flanged coupling, t, the nut or screw in the supply-pipe, and the interposed packing, u, arranged and operating substantially as shown and described.

55,968.—KNITTING MACHINE.—H. L. Williams, assignor to The National Knitting Machine Company, Seneca Falls, N. Y. :

I claim, 1st, The combination of the cogs, k, k, with the lags constituting the "form" and with the gear-wheel by which they are driven, substantially as specified.

2d, The combination of the curved guide, G, with the form, B, and gear-wheel, C, substantially as described.

55,969.—MANUFACTURE OF ARTIFICIAL STONE.—William Kirrage, London, England :

I claim, 1st, The manufacture of artificial stone, bricks, and tiles, or other hard material, by mixing and using the sulphate of iron or other similar metallic sulphates, or other similar mixtures of acids with metallic bases, and the several materials herein-before described, in combination with cements and silica, and lime and silica, contained in the materials such as I have mentioned for the purposes herein-before described.

2d, The application of the coloring matters before named in combination with the silica and other materials.

3d, In the manufacture of bricks and tiles from plastic materials, the application of the materials specified for the purpose of effecting a more perfect combustion, burning, and hardening, thus producing a superior form of article.

55,970.—PETROLEUM TANK.—Paul Jacovenco, Bucharest, Wallachia :

I claim the herein-described apparatus for preserving or storing petroleum and other oils, the same consisting of two concentric cylinders, the space between them being divided by a transverse partition, and communicating with the interior cylinder by means of apertures, as described, in combination with pipes arranged for operation as and for the purpose set forth.

55,971.—HOT-AIR ENGINE.—William Reintein, Barcelona, Spain :

I claim, 1st, The arrangement of the support of an air engine so that the axis of the motor cylinder shall be vertical, in the manner and for the purposes set forth.

2d, The combination and arrangement of a tubular boiler in the place of the dome which serves as a furnace in the Ericsson machine, as and for the purposes described.

55,972.—CORSET.—E. Hamburjer, Detroit, Mich. :

I claim, 1st, A corset made substantially as herein-described, with a continuous or connected back, forming a lap or gore when the lacings are drawn to tighten the garment around the person.

2d, In combination therewith I claim the skirt supporting hooks, H, H, arranged substantially as described.

RE-ISSUES.

2,292.—LIQUID-COOLER.—Adalbert Fischer, New York City. Patented May 15, 1866 :

I claim the movable heads, E, with annular recesses, a, in combination with one or more bolts, F, annular cylinder, A, and vessel, b, all constructed and operating substantially as and for the purpose described.

2,293.—STRAW-CUTTER.—Warren Gale, Chicopee Falls, Mass. Patented March 7, 1854 :

I claim, 1st, The fixed pivot, F, on which the moving-knife works, provided with a flanch for fastening to the cutter-box, and made adjustable thereon by means of slots and bolts, or their equivalents, substantially as and for the purpose herein specified.

I also claim the arrangement of the adjustable gauge-plate, G, in front of the fixed knife in such a manner that it shall be raised above the said fixed knife in proportion to the increased distance at which it is adjusted away from the knife, to give a longer cut and vice versa, substantially as herein set forth.

2,294.—HARVESTER.—William K. Miller, Canton, Ohio. Patented July 2, 1861 :

I claim, 1st, The pulleys at or near the lower end of the inner reel support, for the purpose specified.

I also claim the single endless belt or chain passing from the driving-pulley, g, on the main frame, to and over intermediate pulleys placed to one side of a vertical plane passing through said driving-pulley, and thence to and over the pulley on the inner end of the reel-shaft, substantially as and for the purpose described.

2,295.—HARVESTER.—William K. Miller, Canton, Ohio. Patented July 2, 1861 :

I claim the bent levers, s, pivoted at the heel of the shoe, and extending to a point between the driving wheels, and thence connected to a lever near the driver's seat or stand, for the purpose of raising the outer end of the finger-beam, substantially as described.

2,296.—HARVESTER.—William K. Miller, Canton, Ohio. Patented July 2, 1861 :

I claim the brace on the grain side of the machine extending from the front end of the frame to the axle of the driving wheel as a support for the finger-beam and the reel-post, substantially as described.

2,297.—METHOD OF WARMING AND VENTILATING BUILDINGS.—E. Y. Robbins, Cincinnati, Ohio. Patented May 6, 1862 :

I claim, 1st, The arrangement of the hot-air chamber or reservoir of heat for warming the floor and lower part of the walls, in connection with the arrangement for the introduction at the bottom of the room of moderately warmed fresh air, which has not been in contact with the hot metallic surface either of hot-water pipes or steam pipes, or of a stove or furnace, or any other highly-heated surface, substantially as above set forth.

2d, The fresh-air chamber, F, Fig. 1, under the hot-air chamber, C, Fig. 1, and under the reservoir of heat formed by the pipes, mortar, etc., of the radiator, W, Fig. 6, all substantially as set forth.

3d, In case of warming the upper rooms by the waste heat of the fire in the lower story, I claim the arrangement of an inner smoke-flue within the brick flue or chimney, E, Fig. 3, and the diaphragm, F, Fig. 5, for turning the current of hot-air rising between this inner smoke-flue and the sides of the chimney inwards under the floor of the upper room for warming it, or any equivalent device, substantially as set forth.

4th, In using hot-air pipes for warming cars or rooms, I claim the making of said pipes in their different parts of different materials and of different shapes, so that their conducting and radiating power shall increase as the distance from the furnace or source of heat increases and as the temperature of the air within them decreases, so that they shall distribute the heat as nearly uniform as possible throughout their entire length, substantially as above set forth.

5th, The horizontal radiator, W, Fig. 6, formed of tiles, mortar, cement, or other similar material (which has acquired, or will acquire, a sufficient degree of hardness), placed in and forming a part of the floor, in combination with the arrangement for heating it by hot-water pipes or steam pipes, placed under the tiles or other material of which said radiator may be formed.

2,298.—WATER-PROOF GAITER SHOE AND BOOT.—The Goodyear Metallic Rubber Shoe Company, Naugatuck, Conn., assignees of Thomas C. Wales, Dorchester, Mass. Patented February 2, 1858 :

We claim a new or improved manufacture, or water-proof vulcanized rubber and cloth gaiter shoe, made in manner and with its external layer of cloth and its lining of cloth arranged together and with respect to the remainder or rubber parts or foxing, substantially as specified.

DESIGNS.

2,340.—ENVELOPE.—Samuel Rayner, New York City.

2,341.—TRADE-MARK.—Levi Sohl, A. J. Sohl, and David Gibson, Indianapolis, Ind.

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It is formed of a combination of cast-iron hollow spheres—each 8 inches in external diameter, and 4 1/2 inches 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 is 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 effectually absorbed than in the ordinary tubular or cylinder boiler.

It gets up steam quickly, and with little fuel. It produces superheated steam without separate apparatus, and is not liable to priming or foaming.

It is easily 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.

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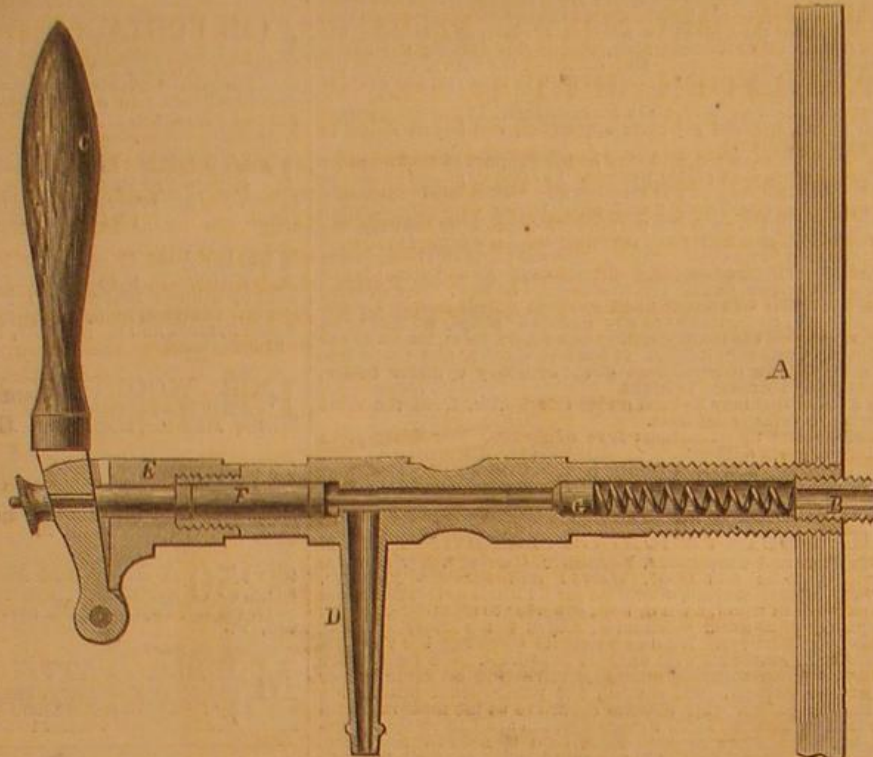
Improved Gage Cock.

The common try-cock for steam boilers is similar in construction to the faucet, or is operated by a button in the line of the barrel, the pressure of steam or a spring returning the valve to place. The engraving illustrates an improved gage cock which is easily understood. A represents the front of the boiler into which the cock is screwed. B is a hollow screw plug to admit the steam or water, which, by the movement of the lever, C, is discharged through the pipe, D. E is a stuffing-box, or cap, provided with a projection, with rule joint, to receive the end of the lever. The plunger, F, fits the chamber, so that its movement forward closes the aperture in front of the delivery pipe, and obviates the necessity of close packing.

The operation is perfectly simple. By a pressure on the lever the valve, G, is opened, and on the removal of the pressure the coiled spring returns it to place, if there is no adequate pressure of steam. The view is that of a horizontal section, and can be understood by any mechanic.

Patented through the Scientific American Patent Agency, May 15, 1866.

Address, for further information, Frederick Henke, Scranton, Pa.

**HENKE'S GAGE COCK.**

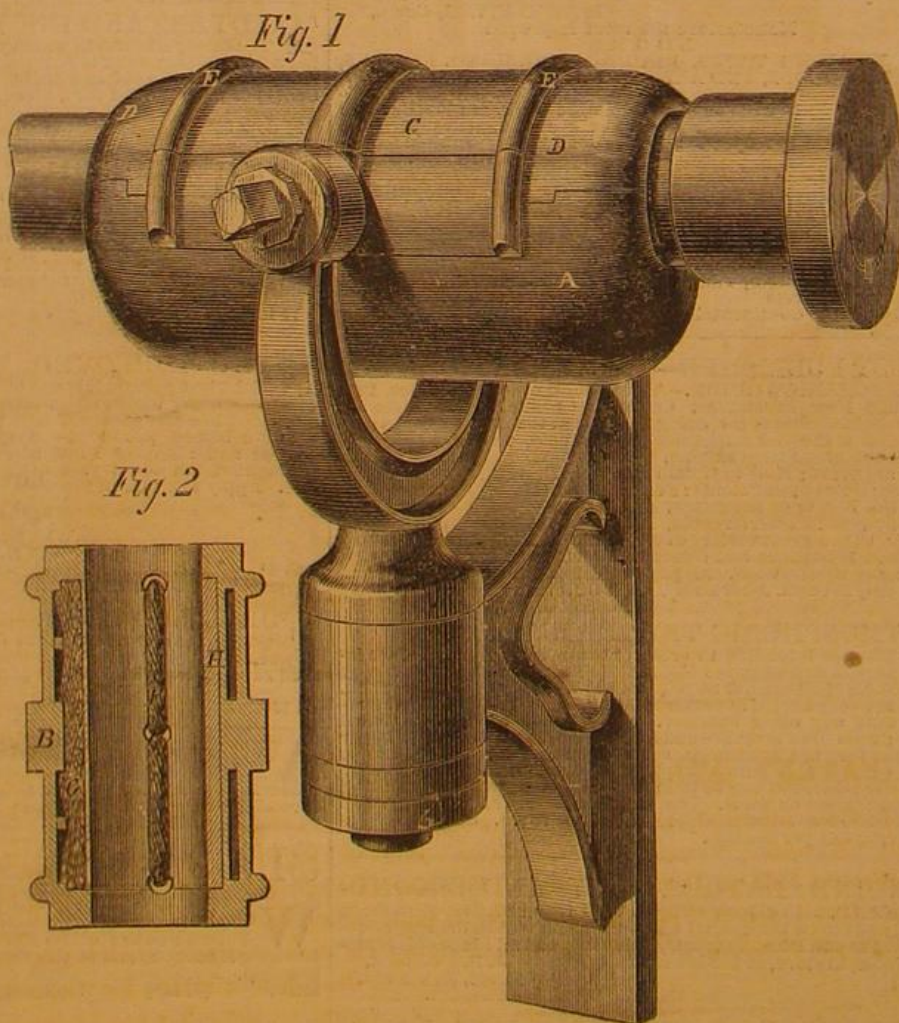
into the inclosed spaces between them and the ends of the shell, and is again deposited in the reservoirs. It will be seen that the lubricated portion of the shaft is kept closed against the admission of dust. It is claimed that when worn, the lower part of the box can be adjusted by the introduction of a piece of card board, tin, or sheet metal. On common shafting the supply of oil in the reservoir is said to be sufficient for six or eight months' consumption. In its appli-

Improved Journal Box.

The waste of oil by the overflow of journal boxes, the annoyance of drippers, and the loss and inconvenience by the upsetting of the oil receptacles, comprise together a source of much trouble and vexation in every manufactory using shafting. Added to this is the time required daily in proper attention to the journals of shafting. A self-lubricating box, therefore, which requires but little attention, and which obviates the necessity of using dripping tins, would be a valuable improvement.—Such is the design here illustrated.

A, Fig. 1, is the case of the box, and B, Fig. 2, is the lower half of the box proper. It will be noticed that the case or shell projects much further below the shaft than the cap, C, does above it. The space between the bottom of the shaft and the inner lower surface of the shell is an oil receptacle, intended to receive the lubricator. The cap, C, is the top of the box proper and is lined, as is B, with Babbitt metal or other anti-friction material. The box is not so long as the shell, leaving a space at either end, which is covered, at D D, with a hood held in place by a movable pin passing through the top of the head, E. These end hoods or caps can be removed at will to examine the bearing and replenish the receptacle or reservoir.

This is the general construction of the box and its parts. The means of lubricating are wicks, shown at F and G. Through the bottom of the box, B, are

**SELF-LUBRICATING JOURNAL BOX.**

cation to saw arbors it will supply the bearings of a shaft running 400 turns per minute for from one to three days. These boxes can be mounted on swivels and adjusted to post bearings, hangings, pillow blocks, or in any other position desired.

Patented March 14th and Aug. 22, 1865, by Rice &

Miller. For further information apply to M. J. Rice, assignee, No. 1,211 Washington street, Boston.

The "Galaxy."

One of the most brilliant periodicals that has appeared in a long time is the *Galaxy*. It is devoted to general literature, such as stories, narratives, biographies of men celebrated in art or science, and to such as are favorites of the muse of poetry it lends a willing but discriminating ear. Many of the names best known in modern literature are to be found in the *Galaxy*.

The *Galaxy* possesses many features that are novel and pleasing, and not the least is the Editor's peculiar department; he brings up the rear of the book, and styles his lucubrations *Nebula*—not a happy name, for they shine with no faint light, but with a steady and abiding radiance.

We publish on another page an article on the Spectroscope, by Prof. Draper, which is taken from the *Galaxy*, and our readers will thus have a chance to taste its quality. It appears every fortnight in a brilliant dress of brown and gold, and is already a permanent institution in the world of magazinedom.

University Law School.

On Tuesday the 19th ult., the graduating class of the Law School of the University of the City of New York were admitted, by the Supreme Court, to practice as Attorneys and Counselors at Law. The examination of the students occupied the greater part of five days, and was held before a committee appointed by the Supreme Court of this State. The commencement exercises were held in the large chapel of the University on the evening of the 19th, and the degree of Bachelor of Laws (LL. B.) conferred upon the graduating class.

We understand that Prof. J. N. Pomeroy, Dean of the Law Faculty, intends, in addition to the usual course of study, to introduce a course of instruction in Patent Law. This will be a new feature in our law schools, and one which we hope will be successful. The practice of patent law has grown to be a distinct and important branch of the legal profession, and any one attempting to practice it needs to be well instructed.

It is in contemplation to build a new and costly Executive Mansion on the high grounds east of the Capitol, and turn the White House into a fire-proof building for the State Department.

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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 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. XV.—No. 3.
[NEW SERIES.]

NEW YORK, JULY 14, 1866.

{ \$3 per Annum,
[IN ADVANCE.] }

Improved Quartz Stamper.

The days of pan washing and surface mining of the precious metals are ended. The richest deposits, both of gold and silver, are found on the unyielding quartz rock, frequently in such minute particles as to escape the eye, yet so thoroughly impregnating the rock as to yield enormous returns to well-directed labor. An efficient mill, therefore, for crushing and disintegrating the rock is the first requisite in working quartz lodes.

The improvement by the invention here illustrated consists in the mode of lifting the stampers by means of an inclined plane, for which the following advantages are claimed:—The mill works smoothly and opposes a uniform resistance to the motive power. The plane being long, and the lift gradual, the amount of friction is very small. The construction of the mill is compact and self-sustaining. It can be fed with more regularity, as all the batteries are within the immediate observation of the feeder, and its compactness renders the expense of housing comparatively small.

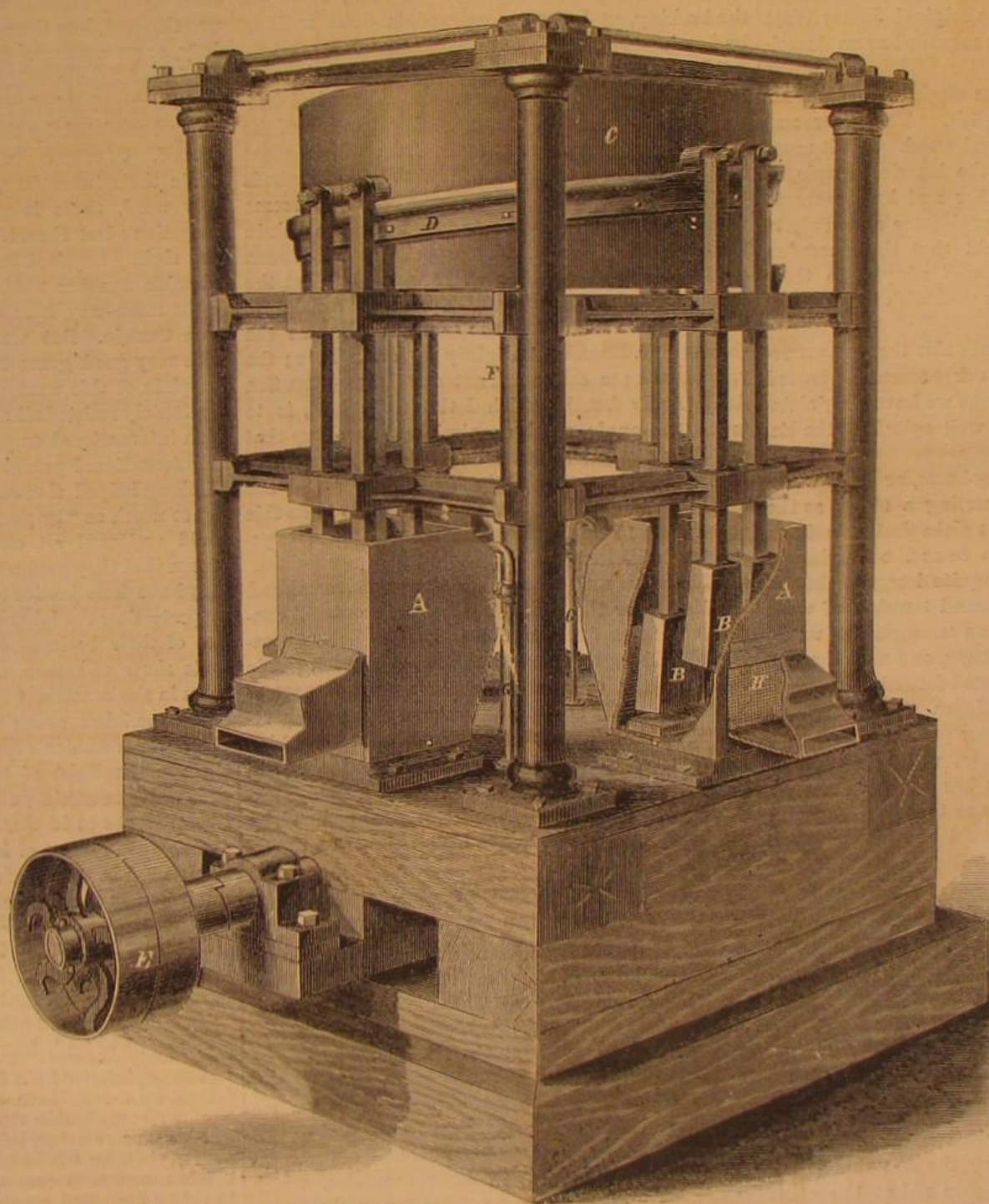
The prime advantage, however, which it possesses over all other stamping mills consists in its ability to lift the stamps to any required height, and thereby concentrate any desired amount of power in the crushing operation, by means of the superior velocity acquired in the fall of the stamps.

The framing of the mill may be constructed either of iron or wood, and is cheaper and more durable than any other of the same power and material.

The engraving annexed represents a mill of four batteries, A, having four stampers, B, each weighing 400 pounds and having a crushing surface of 64 square inches with a vertical lift of 18 inches. With the cam wheel, C, making 100 revolutions per minute, the stampers deliver 1,600 blows in the same time. Fed with 3-75 gallons of water for each stamper per minute, the mill will pulverize and pass through a wire gauze of one-twentieth of an inch, about 1,500 bushels of quartz in twelve hours, requiring 46 nominal horse-power for the operation.

The action of the machine can be readily understood by the illustration. The wheel or drum, C, has on its outer surface a spiral ledge, D, like a screw, the ends of which slightly lap and are vertically about 18 inches apart. The inside of the drum carries another incline precisely similar. The whole is driven by the pulley and horizontal shaft, E, which, by bevel gears, rotates the upright shaft, F. The stampers, B, are gradually raised by means of friction

rolls traversing the incline, half by the inside and half by the outside spiral, and as the upper end of the spiral reaches the rolls successively the stampers are dropped in rotation. G are pipes feeding the batteries with water, and H shows a wire gauze through which the liquid quartz is discharged in a continuous stream.



[PATENT QUARTZ STAMPER.]

For further information address John Ahern, President "Excelsior Stamper Mill Company," Box 610, Baltimore, Md., or Davison, Stiles & Woolsey, 200 Water street, corner Fulton, New York, at both of which places working models may be seen in operation.

An English Ship-builder on American Engines.

Mr. Norman Scott Russell entertains the following views with respect to our beam engines:—"The American steamboat engine has long been a subject of wonder to the English engineer. It is ugly, straggling, and inconvenient-looking; its incompactness, and want of snugness and economy of room, make it the reverse of everything we think good in a steamboat engine. It certainly made the same im-

pression on me that it has done on all my countrymen, but it was at first sight, and at first sight only. Daily the unfavorable impression became mitigated by familiarity, and after a careful study of its details and qualities, I do not think it possible to design an engine more admirably fit for its use and purpose, under the circumstances where it is ap-

plied. In this country there is not a single engine which can be said to be entirely English and preeminently suited to any one purpose. The American walking-beam engine, on the other hand, is universal in the States, and acknowledged to be best suited to their Eastern river navigation. I think it will be admitted therefore, that the permanence of this kind of engine in the American steamers must be held as *prima facie* proof of its excellence, and that it is entitled to our respectful consideration, and likely to reward our careful study.

"I have examined its structure in the best workshops of America, and have watched its practical working in their best steamboats. I have satisfied myself that it is cheaper in construction, lighter in weight, more economical in management, less costly in repair, more durable, and better suited for high speed, than any of our own engines would be. I think that for the navigation of large rivers, like those of China and India, it might be adopted with great advantage, and many of its details, indeed, might be adopted with advantage in any engine.

"One great advantage which the walking-beam engine possesses is that of being the only one

which imposes no restraint on the engineer in regard to length of stroke or diameter of wheel. I ought to except the fixed inclined engine; but it takes up so much valuable room in the hold of the ship that it is now entirely abandoned for river steamers, although still in use for ferry boats. The beam-engine, on the other hand, takes up but little additional room in the ship in proportion to the increase in length of stroke, but only raises the walking-beam higher above the vessel.

"It will be seen that the shallowness of the water determines one material point in the structure of the engine. It becomes impossible to get a long stroke directly under the shaft, the position in which English engineers have shown themselves so anxious to place it. Driven from below the shaft from want of height, the Americans have placed their

cylinder immediately behind the crank, and with the center of the cylinder on a level with the shaft. This necessarily throws the walking-beam to more than four times the length of the crank above the level of the shaft, which, with a 12-foot-stroke, is equal to 24 feet. This also determines four times the length of the crank as the length of the connecting rod, and four times its length for that of the walking-beam. These parts are, therefore, in tolerable working proportions, and they necessarily determine the arrangement of the minor parts of the engine.

"The condenser, as in the older James Watt and Newcomen engines, is directly under the cylinder, forming a continuation of it, so that the cylinder stands immediately by means of this contrivance upon the keelsons of the ship, which are there made particularly strong.

"The arrangement of the air and feed pumps is like the old James Watt pumping engines, so that it seems as if the Englishmen on the other side of the water were more faithful descendants of James Watt than those on our side. The inventive and volatile Yankee—as we think him—has adhered doggedly to tradition and the original James Watt engine, which has come to be regarded as an American institution.

"One more feature of these engines is very remarkable and very un-English. The floor and framing of these engines are of wood. But it must be remembered that wood is the American staple, as iron is ours—they prefer timber and know how to use it. We have given our preference and study to iron. But there is no doubt that their wooden framing and engine floor are well adapted to their light wooden boats, and work well with this kind of engine.

"The details of the engine are also throughout remarkably at variance with our present improved practice; remarkably like things we have long abandoned, and at the same time well suited to the circumstance.

"The details of the walking-beam, or great working lever, are quite as interesting a study as the wooden framing. It is quite plain that this lever has exactly the same work to do as the framing on which it rests; and one can quite imagine that at one time it too was a compound trussing of wood and iron. The fault of such an arrangement would be, first, the room it would occupy, and next the considerable quantity of complicated fastening required at the working points of the lever. The Americans have, therefore, made the center portion of cast iron, and the four sides of the beam, which is lozenge-shaped, form one continuous bar of wrought iron, the two diagonals of which are the cast-iron frame before mentioned. There would be no other parts of this lever, but for its having to work the air pump; and, therefore, a small subsidiary truss, similar in principle, is contained within. The whole of this walking-beam is a fine piece of workmanship, and nicely fitted and finished.

"The connecting rod between the lever and the crank is an exception to the principle which regulates the rest of the structure. It is a wrought-iron bar thick enough to bear both the push and the draw, and, therefore, looks out of proportion to the rest of the structure. It is trussed against vibration by two stays afore and abaft it, and its weight is possibly compensated for by the fact that it has to balance the piston and piston rod at the other end.

"The valve and valve gear are, perhaps, the most refined and successful parts of the engine, and are certainly those in which it differs most widely from ours. They have reduced its details to an absolute working perfection. Nothing can be simpler, quicker, or quieter than their best specimens of valve gear.

"There are four valves, two for steam and two for exhaust; each consists of two circular disks placed some distance from one another, so that the pressure of steam on the upper may be counteracted by the pressure on the lower disk, while one is made a little larger than the other to keep the valves shut by the difference of pressure. Two pillar tubes, with cross entablature at top and a cross plinth at bottom, compose the old steam passages. Two shafts, worked by separate eccentrics, and four wipers on

these shafts, give independent motion to each of the valves, so that the best points of steam and vacuum can be independently given. The great delicacy consists in giving to the wiper the precise curve that shall open and shut the valve exactly when wanted, and do it quietly.

"The great theoretical defect of the balanced valve is the loss of steam between the valves and in the passages, and when high steam is used and great expansion, the loss increases in a high proportion. In an engine of 400 nominal horse-power, the loss of steam is about 10 cubic feet of steam at every stroke. It may be urged that there is an equal loss of steam in the steam passages of the slide valve, but this loss can and has been reduced to a minimum by placing the valve immediately over the steam port, whereas the defect in the balanced valve is incurable.

On the other hand, there are advantages peculiar to the puppet valve, which, for the purpose it is intended, render it invaluable. The amount of power required to open and shut the valves is so small, that the largest engines, some of them 500 horse-power, are worked with perfect ease by one man, although the backing, as before mentioned, is done entirely by hand.

"I have before mentioned the principal theoretical defect of the balance valve. But a practical difficulty presents itself in the unequal expansion of the valves and their respective seats, from which great leakage and loss of steam result. Various methods—all of them ingenious—are applied to overcome this difficulty. One way is to grind the top disk in its seat while a piece of thick paper is placed between the lower valve and its seat. A second, to set the valves when hot and already expanded. A third, to cast the valve stem from the same melting as the chest. [Mr. Russell is slightly in error here; the valve stems are cast steel, not cast iron.—Eds. SCI. AM.] And a fourth, which I think the best, is to make the angle of the conical seat so sharp that any little expansion makes but little difference; and that both valves are tightly seated, without, at the same time, jamming. The requisite angle to do this varies from 15 to 20 degs., according to the experience of different engineers.

"The valve motion, which is almost universal, and is called, after the inventor, 'Stevens's cut-off,' consists of wipers fixed on the rock-shaft before mentioned, which, by lifting toes, attached by long rods to the valves, open and shut them for any part of the stroke easily and quietly. A rapid motion is attained by lengthening the wipers and toes, which are sometimes 30 inches, and even 36 inches, in length. The starting gear consists of a small rock-shaft, with small toes and wipers, worked by hand, by means of a long lever in the same manner as the eccentric.

The Canadian Patent Laws.

We find that in both branches of the Legislature the Patent Laws of the Province have again been receiving considerable ventilation. This is a sort of stock subject which comes up session by session, and numerous futile attempts have been made to get them altered, but most generally by parties desiring to favor the American inventors, or perhaps we should say, the owners of patents in the United States, who, in many cases, have got hold of processes and machines invented in other countries, which they have managed to get patents for in their own country. Our Government have all along resisted the attempts to change the law in a direction to afford greater facilities to our Republican neighbors to get exclusive rights of manufacture or sale for their notions and nostrums in Canada, believing that when the question of a renewal of the Reciprocity Treaty came again on the tapis, the concession would count for something; but they were evidently reckoning without their host, for Brother Jonathan never so much as adverted to the subject, or if he did, we must have overlooked the matter. No, no! he was too much impressed with the magnificent advantages he had to offer us, or perhaps we should say, to withhold from us, to advert to such a trifle as the introduction of his patents into the Provinces. But to return to our muttons, our rulers seem to have abandoned the idea of keeping the door close shut against foreign inventions, be they American, French,

or Chinese. Not that they have proposed a new policy, or offered to bring in a measure to change the law, but they recommend, or rather suggest, to Parliament, that hereafter, each application for a patent right should be received and considered solely upon its merits; that is, that the advantage of the introduction of such a patent into the country should be examined with reference to the country itself, and not so much, if at all, with reference to the inventor or patentee. This seems reasonable enough; but the Honorable Mr. Ferrier, in the Legislative Council, further suggested, and, as it appears to us, very properly, that, in granting rights of this kind, it should always be made a condition that the article or thing to be produced or manufactured under such patent should be produced or manufactured in the Province. This was hitting the nail right on the head; for, in the past, rights have been granted by special legislation to aliens who, when once in possession of their parchment, went away and very coolly informed us that if we wanted the article they had acquired the exclusive privilege to make or to sell, we must go to Connecticut, Baltimore, or some other equally accessible place where the manufactory was situated, lose time, pay the packing, freight, and duty, or go without. But for these patents, our own handicraftsmen would have made the machines, and sold them at half price; and so our people, instead of being benefitted by the arrangement, were in fact injured. Of course our neighbors complain that we pirate their inventions, and, although it may be an ugly word, there is probably some truth in the allegation; but then, if the American patents were very rigidly inquired into, we apprehend a very considerable number would be found to have been got in the same way from other nations, and not a few from Canada. But we apprehend it hardly comes with very good grace from the American people to complain of this wrong, when they themselves have obstinately resisted all attempts at the establishment of an international copyright law, or, in other words, an international patent law for books. They have all along helped themselves to the best without saying so much as "by your leave," and, until recently, could undersell all other nations, for the simple reason that they paid nothing to the authors. When they have done justice to the literary men of Europe, by protecting the labor of their brains from the piracies of their booksellers, then they may talk with some show of reason of the wrong we have done them in the matter of mowing, thrashing, sewing, and other labor-saving machines. We trust Parliament will consider every application submitted to them in the light of the recommendations made, and, while exercising all proper neighborliness and liberality, see to it that, as much as possible, and especially in respect of inventions likely to be extensively used in the country, the manufacture shall be carried on in the Province.—*Quebec Gazette*.

LEAD IN SOUTHERN ILLINOIS.—Recent geological investigations, verified by actual experiments, seem to establish the fact that a large portion of Southern Illinois, contiguous to the Ohio river, contains valuable deposits of lead. The *Louisville Journal* says that "in the opinion of Professor Lyon, which is confirmed by the uniform experience of miners, there can be no reasonable doubt that the whole region is filled with like veins, lying from thirty to fifty yards apart, yielding ore in paying quantities at a depth below the surface varying in the main from twenty to thirty feet, and reaching down to the enormous depth of from thirteen hundred to sixteen hundred feet, growing richer the deeper they descend. Science and experiment unite in warranting the conclusion that the earth there is literally swelling with lead ore under conditions of development the most inviting to capitalists."

CEMENT FOR MILLSTONES.—Our readers doubtless remember that many persons were poisoned from eating flour ground on stones in which lead was used to fasten them. It would be valuable to many persons, especially those who use lead, if some experienced miller would send us a recipe for a cement for this purpose. All the hand-books on milling are silent on this subject.

AN American watch factory at Elgin, Ill., with \$250,000 capital, will be ready to make sixty watches per day by September. Most of the stockholders were formerly workmen at Waltham.

OIL-MINING MACHINERY WANTED.

The whole series of machinery used in oil mining needs to be remodeled and improved, to say the least, while new and better kinds than those used, would be a boon indeed to the oil miner. During the war the best portion of the inventive genius of the country was engaged in devising means to kill off their fellow beings more rapidly. Now that meek-eyed Peace reigns triumphant over the land, the talents of inventors can be turned to better account in the peaceful arts. No better field was ever presented for the benefit of the practical inventor than the petroleum region of Pennsylvania. New methods, or new applications of old ones, are badly needed in every department of the oil-mining business.

Machinery of greater power and strength is needed for the drilling of oil wells; that which will dispense with the cumbersome samson post, and creaking walking beam, with its great waste of power; that which will also render the drilling of a well fifteen inches or even twenty in diameter as easy as it now is to drill one of four and a-half inches. Let it be so arranged that the driller cannot help from drilling a round hole to any depth, and one that can be measured with some degree of accuracy, after it is drilled. Machinery, combining these qualifications, will render the fastening of mining tools in the well almost an impossibility. At any rate, with sufficient room to fish for them they can be speedily recovered. This would save the oil region of Pennsylvania nearly a million of dollars, and perhaps three times that sum annually. Scores of wells are abandoned on this account, that gave promise of being as good producing ones as any in the oil region. Experiments should be tried with the wire instead of the rope cable, if cables cannot be altogether dispensed with. We don't believe that more than one out of every ten wells drilled, are true. This is, in a great measure, to be attributed to the use of rope cable. At the depth of five hundred feet it would seem hardly possible that the driller can tell whether his boring tools turn or not.

Machinery for the proper testing of wells, and the pumping thereof, is the greatest want of all. The liquid treasure is beneath the surface of our soil, Messrs. Inventors, and we want it. So does the world generally. Surely there is some effectual and comparatively easy way of getting it. Show us the way, and the greenbacks will flow into your coffers at a rate that will alarm you. Give us something that will supersede the use of the present coffee-mill apparatus, with its sucker-rods that always break just at the wrong time, and working barrel that always wants fixing. An article is wanted with suction enough to lift the oil from a depth of 1,000 feet. If one pump won't do it, why not use more? These are only a few of the articles needed. If a machine is effective, and meets the want for which it is intended, we want the inventor to commence the manufacture of the same forthwith. Oil miners have no time to peddle patent rights.

The inventors of every nation are invited to compete for the mastery in this contest. And we shall take great pleasure in publishing through the columns of the *Register*, all the results of their efforts that they will favor us with, or will furnish them with any information relating to the kinds of machinery now in use here.—*Oil City (Pa.) Register*.

In our observations in the oil regions of Western Pennsylvania, extending over a period of four or five weeks, we were struck with the want of common ingenuity displayed in the contrivances used for boring and pumping oil wells. The walking beam contrivance, mentioned in the *Register*, was simply an adaptation of the old-fashioned well-sweep, and lacked the first qualification of boring—that of forming a straight hole. The temper screw and simple device calculated for the turning of the drill, at each stroke, in passing through rock, seemed to us to be miserably inefficient. The twist of strands in the cable, perhaps two hundred or three hundred feet deep in the earth, would neutralize all the efforts of the driller, who was satisfied with giving a partial revolution to the end of the cable he managed. If the drill struck a stratum of rock inclined at an angle, or the sloping face of a boulder, the tendency, all the time, until the drill had bedded itself, was to slip off at an angle and consequently to make a crooked hole. This, we believe to be the cause of many of the annoyances of tools sticking in the well. In fact this want of mechanical genius is understood by oil men, who, to remedy the defective operation of the ordinary drill, have the follower, or reamer, made very thick so that the area of the bearing surface shall neutralize, to some extent, the neglect of regular rotative motion in the drill.

We scarcely agree with the *Register* that "machinery for the proper testing and pumping of wells

is the greatest want of all." It seems to us that the machinery for this purpose has been improved much faster than the machinery for boring. In No. 1 of the present volume we noticed a device for elevating the oil in wells which promises to be effective. But an improved apparatus for boring wells is greatly needed. Many wells have been abandoned because the tools, or some portion of them, could not be extricated. Any deviation from a straight line in the bore of a well must be a great hindrance to its proper tubing. If the tubing can be placed to the bottom of such a well, there is a strain on the pipe which severely tries the joints, and makes the drawing of the tube for deeper drilling almost, if not quite, an impossibility.

There certainly appears to be an excellent opportunity for inventors to exercise their talents on the improvement of well-boring machinery.

Sodium Amalgamation.

Some time since, and before I had heard of the use of sodium as an assistant in amalgamating metals, I prepared the result of the following experiment for publication. Circumstances delayed it, but I now give it to the interested for what it is worth. Having given my views to several practical men in this city, they tell me that the theory explains many things which they have met in their experience that were incomprehensible to them, and they have urged me to make it public.

THE EXPERIMENT.—Take a clean tumbler and fill it about two-thirds full of clear water; then drop a little finely-pulverized metallic powder upon the water. Gold dust or bronze (such as printers use, and nearly every printer has it), or silver powder will answer, provided it be sufficiently fine. Then stir it smartly with the handle of a spoon or the blade of a knife. It will be seen that the powder will not sink in the water; but, on the contrary, the more it is stirred the more obstinately it keeps at the top. When you have sufficiently demonstrated to your own satisfaction the almost impossibility of sinking the metal, which, being heavier than the water, by the laws of gravity should sink, drop into the tumbler a little caustic potash or soda, and stir a little, the powder will then be seen to leave the top, and in a short time settle at the bottom of the water.

THE CAUSE OF THE METAL FLOATING.—Atmospheric air adheres with great tenacity to any highly polished surface, and is very difficult to displace. It preserves a knife blade by preventing the moisture from getting to it to oxidize it. Dip a knife blade or a razor into water, drawing it out you will find that it has not been wet—a film of air interposed between it and the water. So with each particle of dust which you placed on the water in the tumbler. Notwithstanding its being so exceedingly fine, it is surrounded with a layer of atmospheric air as thick as that on the surface of a knife blade. The particle being round and smooth, no mechanical means which you can use will displace the air so that the water can get to it, and the air being lighter than water acts as a balloon to sustain the piece of metal. If you agitate it in the water with a spoon, or force it down by any other means, the air will stick to its piece of metal, and as soon as you let it alone it will rise to the surface. How it is that the alkali makes the air let go its hold on the metal I do not know. The experiment shows that it does do so, and the metal sinks.

APPLICATION OF THIS TREATMENT TO AMALGAMATING THE IMPALPABLE GOLD DUST IN QUARTZ ROCK, AND ITS THEORY.—Suppose every particle of gold dust in quartz rock to be as fine as the dust with which the experiment is made (and much of it is finer), very little of it would have its film of air displaced by the mechanical operation of crushing, although, on account of much of it clinging to the particles of quartz, it would not float; part of it would sink to the bottom, part would remain floating between the bottom and the surface of the water, the film of air and the quartz dust fighting for the mastery, the air trying to take it to the top, and the quartz dust trying to pull it down. As long as the particle of gold or silver remains covered with the air, the mercury cannot come in contact with it any more than can the water. The mercury to take it up must come in contact with the naked gold, and not with the gold protected by a mantle of atmos-

pheric air. Therefore, in order to the effectual amalgamating of gold or silver dust from quartz rock, some means must be used to disperse the air surrounding the particles of dust. Heat will do this partially, but caustic potash or soda will do it effectually. It also acts as a deoxidizing agent—that is, if the oxide of some base metal should be in contact with the gold, it will remove it, or clean the gold, and it will keep the mercury clean. About 1 lb. of caustic potash or soda will remove the air from metal that is immersed in 5 gallons of water. Does not this explain the cause of the advantage derived from the use of sodium? If this is the true theory, whence the necessity of using the expensive metal itself? It cannot be denied that the sodium is oxidized and becomes soda, and is dissolved in the water in the pan. When that takes place, and not until then, does this sodium produce the beneficial results. I am aware that alkalies have been used in amalgamating pans with partial success. But have they been used intelligently? Common potash, or soda of commerce, in the best state in which you can buy it, is composed of 40 or 50 per cent of carbonate. In transporting it to the mines, and from exposure to the air when opened, a much larger percentage is turned into carbonate, and in that state is of little use to disperse the atmospheric air. To be effectual for this purpose it must be as nearly caustic as possible. In regard to the electrical effect resulting from the use of alkalies in the amalgamating pans, my experience proves that it cannot be otherwise than highly beneficial. Zinc, lead, and antimony would be taken up in large quantities by a caustic alkaline solution when contained in an iron vessel. I have used, and for some purposes prefer to all others, especially for precipitating the reguline copper, a battery composed of iron and zinc in a solution of caustic potash.—*Wm. Hilmer in the San Francisco Mining and Scientific Press.*

Profits on Tea.

In the report of the Revenue Commission we find the following facts about the profits on tea:—

The original price of good tea is about 18c. per lb. This is the "ship off" price. The Chinese producer does not get this. There is the export duty, tolls levied at the various stations on the way to port, expenses of packing, and the two or three profits accruing before the tea reaches the hands of the exporting merchant. Adding his profit, the price at a Chinese port of shipment is, as stated, about 18c. per lb. for good tea. Staple grades of black Oolong tea are laid down in New York at about 30c. per lb., free of duty—that is to say, "in bond." This includes all charges, selling commission, freight, insurance, etc.; all over this price being profit.

The Commission state that the profits of the tea trade, after leaving the importer's hands, and before reaching the consumer, have been enormous. They add, that of the profit paid by the consumer not more than one-fourth reaches the original importer. Three-fourths of it stops in the pockets of the jobber and the retailer.

The Commission tested this by the following case: A pound of Oolong tea was purchased of each of two different and respectable grocers in New York, on the same day, at \$1 50 per pound. This tea was immediately taken to one of the leading "tea-brokers" and valued by him at a market price of 90 cents for one of the samples, and 93c. for the other. The market for tea at the time was steady, and had been so for months, gold also being steady at 146 to 147. The broker's valuation, returned to the Commission on the samples submitted to him, was the price at which the tea would have been sold by the importer. The tea in question cost, say about 80 cents in currency, laid down in New York, duties and all charges paid. The importer's profits ranged from ten to thirteen cents per pound, while the balance of the cost to the consumer, amounting to fifty-eight cents, or seventy-two per cent upon the cost to the importer, is cribbed by the jobber and the retailer. The Commission say: "A condition of trade that admits such an iniquitous profit to be made out of the consumer, certainly needs reformation."

The consumption of tea in the United States is set down at 30,000,000 pounds annually.

EMERSON'S SWAGE FOR SPREADING AND SHARPENING SAW TEETH.

No tool in the mechanic arts is more useful than the saw, and any improvement in the saw, or in the manner of keeping it in order, will be of interest.

The new tool here illustrated is intended to spread the points of the teeth, bring them to a proper cutting edge, and make them all of uniform width at the same operation. Fig. 1 shows the body of the swage or upset; Fig. 2 the sliding swage pin; Fig. 3 the saw tooth; Fig. 4 the long jaw or guide of the swage; Fig. 5 shows a slot to allow the swage to be used on a fine-toothed saw.

The faces of the guide, 4, and the sliding pin, 2, are hardened. In the pin, 2, is a slot cut the exact shape and width of the point of the tooth as it



should be. The sliding pin, 2, is made to fit exactly in the swage, so that the point of the tooth coming in the joint will be left with a proper cutting edge without filing. By placing the point of the tooth, 3, in the die, as shown in the engraving, and striking on the end of the swage with a light hammer, repeating the blows till the point of the tooth is brought to a proper width and shape, a better cutting edge is obtained than can be made by filing.

This simple, cheap, and effective tool was patented through the Scientific American Patent Agency, June 6, 1866. For further information address the American Saw Company, sole manufacturers, No. 2 Jacob street, New York, or Trenton, N. J.

NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

[From the London Mechanics' Magazine.]

NEW METHOD OF OXYDIZING LIQUIDS.

Mr. James Hargreaves, of Widnes, has recently devised an apparatus for the oxidation, by air alone, of bodies dissolved in water, which constitutes a novel and very ingenious application of the injector principle. It was devised for use in the soda manufacture, for the oxidation into sulphate of the sulphide of sodium contained in the complex solution obtained by the lixiviation of "black ash." This oxidation had previously been effected by means of nitrate of sodium, which is a very costly material, the necessity for the use of which, for the purpose in question, Mr. Hargreaves's contrivance entirely obviates. Mr. Hargreaves puts the crude liquor into a vessel furnished with a false bottom, which false bottom is perforated with numerous small holes, and has inserted in it, at its center, the lower end of a pipe which passes up to a little above the top of the vessel, and terminates at its upper end in a throat, immediately above which is fixed a jet connected with a boiler, the steam in which should be kept at a pressure of about 40 lbs. per square inch. Steam from this jet rushes into the funnel-shaped throat and then down the pipe, carrying with it into the space between the bottom of the vessel and the false bottom very large quantities of air, which then issue through the holes in the false bottom and rise through the solution, "causing," says Mr. Hargreaves, "an intense commotion," and coming into contact with so large a surface of the solution as very rapidly to oxidize all oxidable matters contained in it. The heat communicated to the solution by the steam greatly facilitates this process of oxidation. Mr. Hargreaves states that a large charge of crude soda solution may have all the sulphide in it completely oxidized by this method in from four to five hours.

THERMO-ELECTRIC PROPERTIES OF MALLEABLE AND CAST IRON.

It has been well known for some little time that a thermo-electric pile, constructed of malleable iron and bronze, deflects the needle of the galvanometer to the left, whereas a similar pile constructed of cast iron and bronze deflects the galvanometer needle to

the right. This curious fact, showing that malleable iron and cast iron have opposite thermo-electric properties, has lately suggested to M. Arnould Thenard, the idea of constructing a thermo-electric battery having cast iron for one element and malleable iron for the other, and that gentleman has found that a very powerful battery may be constructed in this way. A comparison of the electro-motive force of a malleable and cast-iron battery with that of a malleable iron and bronze battery, and that of a cast-iron and bronze battery, all three batteries being of the same size, showed that the electro-motive force of the malleable and cast-iron battery was equal to that of the cast-iron and bronze battery and that of the malleable iron and bronze battery put together.

PRODUCTION OF COLD BY METALS.

Dr. Phipson has found that when 207 parts of lead, 118 of tin, 284 of bismuth, and 1,617 of mercury, are mixed together, the air being at the temperature of + 17 deg. Centigrade, the temperature of the mixture falls to -10 deg. Centigrade. The mercury in such a mixture being readily recoverable, for use over again, by distillation, Dr. Phipson is of opinion that the production of cold by this method is susceptible of numerous useful applications.

THE "MIANTONOMOH" AT QUEENSTOWN.

The arrival, after a very successful trip across the Atlantic, of one of our monitors, seems to have given a new idea to our English cousins. Only a short time ago they were endeavoring to disparage our monitors as sea boats, while reluctantly admitting their possible value as harbor defenses. The performances of the *Monadnock*, a twin ship to the *Miantonomoh*, in passing Cape Horn, did not receive full credit, on the supposition that, instead of doubling the "stormy cape," she might have "crept through the Straits of Magellan." But the *Engineering* now says (issue of June 22d):—

"Our own advices from America leave no room for doubt that the *Monadnock* weathered Cape Horn, instead of going through the Straits of Magellan, on her most successful voyage to the Pacific."

The subsequent performance of the *Monadnock* in her run to San Francisco is additional evidence of her merits as a sea-going vessel.

In regard to the *Miantonomoh* the *Engineering* says:—

We are not dependent, either, upon interested or exaggerated American testimony as to her performance, for Captain Bythsea, R. N., who has been in America for some time on Admiralty service, came across in her in company with Mr. Fox, the Assistant Secretary of the United States Navy, and if the gallant captain did not himself write the *Times* account of the ship and her voyage, we may be sure it was written upon the best authority. "Crossing the Bay of Fundy, she encountered weather which, without amounting to a gale, was considered very boisterous, but she rode through it easily. On the voyage to Queenstown, the indicator marked no greater rolling than 7°, while 2° is stated to be the average. Her paddle wheel consorts, on the other hand, rolled to a maximum of 18° and 24° respectively."

The monitors, therefore, are not only seaworthy but comfortable. They are such ships as a crew can live in without want of light, air, or shelter, in at least a summer voyage across the Atlantic or around Cape Horn. And yet in Mr. Fairbairn's work on iron shipbuilding, published only a few months ago, and to which we refer for very clear plates of the double-turreted monitor, *Chickasaw*, and the single-turret, light-draught, twin-screw monitor *Nauset*, we find this conclusion: "As regards armor-plated sea-going vessels, the Americans have not made much progress. During the war they were not requisite, as the Confederates had nothing to compete with them; and hence followed a description of monitors which can only be admired as floating batteries or well-shaped rafts, calculated for the destruction of forts and a similar description of craft in smooth water." This was no more than the general belief, a few months ago.

The *Mechanics' Magazine* after saying that she

made the run from St. Johns, Newfoundland, in ten days and ten hours, remarks:—

On the whole, her speed was at least respectable while, if her peculiar build be taken into consideration, we may even call it surprising. Taking, then, the general circumstances of the case we cannot consider this first voyage of a monitor otherwise than satisfactory, and as exhibiting the triumph of engineering skill as applied to naval construction. At the same time this successful visit must be suggestive to our Admiralty of dangers we are little prepared to face. The Federals have much larger classes of monitors, and if the *Miantonomoh*, which only represents one of the smaller, has been able to cross the Atlantic, is it not obvious that a squadron of powerful monitors can at any moment visit our shores? This monitor is on her way to Cronstadt, where she will meet with a flotilla of ships constructed much on the same principle. It follows that a junction of an American and a Russian fleet might eventually be made in our waters, and consequently, since it is given to no one to foretell events, it is the duty of Government ever to be prepared for the worst.

WHY NOT?

The *London Spectator* says that a firm in Manchester bound themselves by a trust deed to divide their profits, over fifteen per cent. on the capital invested, among their workmen:—

"The first result was a sudden decrease in waste, the men not seeing why they should waste their own property any more than any other master's; and waste is, perhaps, next to bad debts, the greatest source of manufacturing loss. The next was an immense advance in the pace of the work done, the men putting their hearts into it as hired people will not do, and scolding each other for neglect, as if each man was overseer. The last was a great increase of orders, every man being as anxious to obtain work, and profitable work, or, as he himself expressed it, to 'carry some'ut to bonus,' as if he had been the sole master. The result was a first dividend at the rate of fifteen per cent per annum, and four or five per cent over for division among the men."

Why would not the plan work well generally? A man who places his money at interest, by investing in loans, is satisfied with the regular and uniform percentage of profit. Why could not the dividends on manufacturing stocks be limited to the stockholders, and the surplus be divided among the employees? Indeed, we cannot see that the stockholders could lose much by such an operation, and it is certain the workmen would be great gainers. In a measure, they would become joint owners in the stock, at least they would feel jointly interested with the stockholders, and manifest a degree of interest in the success of the concern impossible to be realized when their profits did not so much depend upon the contingency of application, care, and economy. Such an arrangement would greatly reduce the liabilities of failure.

The Great Trial of Agricultural Machines.

Many of our readers may not be aware that a special trial of the principal reapers and mowers, is to take place at Auburn, New York, on the 10th instant. In view of the important interests connected with the trial, both agricultural and manufacturing, we shall dispatch a special reporter to the trial who will give a faithful and impartial account in detail.

The amount of premiums offered is very large, and the celebrity obtained by the best machine will be very wide.

The Atlantic Cable.

Our foreign files come filled with the all-absorbing subject in English circles of the Atlantic Cable. Want of space compels us to delay the publication of some interesting facts until another issue. The *Great Eastern* was to have left on the 8th instant, so that we shall soon know whether this third attempt is successful.

Unparalleled Success.

A telegram to the Associated Press announces that Commissioner Theaker will issue, this week, 203 patents. Of this number ONE HUNDRED AND FOURTEEN are for the clients of the Scientific American Patent Agency. The business of this office has rapidly increased during the past year.

PROF. HODGKINSON has shown that strains, however feeble, if long applied, produced some permanent elongation or contraction in bars of iron.



The Preservation of Timber from the Terebo.

MESSRS. EDITORS:—I notice in your last "Notes and Queries" an inquiry in regard to protecting timber in salt water from the ravages of the "teredo" or borer. As any information on the matter was solicited, I wish to state to you what has been done in our vicinity.

The bridge just built over the Taunton river, at Somerset, Mass., for the Old Colony and Newport Railway Company, by Capt. Wm. Cobb, of this place, has nearly half a mile of pile-work, and as the water is infested with the terebo, it became an important matter how to protect the piles; various schemes were presented, but the following method was finally adopted, it having borne the test of experiment in other waters:—

In a building erected for the purpose, a tank was sunk in the ground capable of holding 200 or 300 barrels. A cylinder of best boiler iron was built, sixty-five feet long and five feet in diameter, air-tight. Connected with the cylinder is a small steam engine force pump and air pump. The tank is filled with dead oil or creosote of commerce, an iron carriage loaded with piles is run into the cylinder, and the head, packed with rubber, is screwed down tight. The air pump is put on and a vacuum is produced in the cylinder, then, a valve being turned in the feed pipe, between the tank and cylinder, the dead oil rushes in and nearly fills the cylinder. The force pump is now applied and oil is pumped into the cylinder until the gage shows a pressure of 115 to 120 lbs., then the whole is suffered to rest from twelve to twenty hours, when the oil is allowed to run back into the tank, the head unscrewed, the carriage run out, piles unloaded and all made ready for another charge. The oil is kept hot in the tank by steam from the boiler.

This method is said to have been successfully tried in Germany and England, but I do not know whether it has ever been tried in the United States. Possibly some of your readers may have heard of it often.

G. C. B.

Dighton, Mass.

[In Vol. XIII, page 407, we published an article on this subject, detailing the plans which had been adopted in different places for the above purpose. One of the processes therein described was precisely like the one our correspondent describes, except that chloride of zinc was used to impregnate the wood rather than creosote. The letter of our correspondent will prove valuable to many of our readers.—EDS.]

Large and Small Pulleys.

MESSRS. EDITORS:—In your valuable paper of April 7th, I notice a communication on the above subject, which is liable to mislead, as can be easily demonstrated by any one who will take the pains to duplicate the experiments mentioned by your correspondent, who has, as is often the case, deceived himself, in some way or other, in his deductions. It is not quite clear, in his statement, that he made the trial with a two-foot pulley. I would advise him to make that trial; and if he kept the 50-pound weights on the ends of his belt, he would find that it would take the same addition of weight to the one side to make the belt slip, as it did in the case of the 1-foot pulley. After making that trial, he can double the width of his belt, and if the same weights are put on (no matter which pulley), the same weight on one side, as in the first case, will make it slip—provided, always, that the belts are in the same condition.

Some five years ago I made quite a series of experiments in order to demonstrate the laws which control the transmission of power by pulleys and belts; the results were carefully noted by me at the time, for future reference, and I will give them to you in as concise a manner as possible. I hope they will prove as useful to your readers as they have been to me, and that they will cause more definite experiments to be made by those who have better means at their disposal than I had.

My first experiments were to determine the strain that leather and rubber belting, as well as lacing, would break at. These materials were subjected to a dead weight (*i. e.* no levers of any description), on a platform, which was also taken into account. The fastenings of the materials were such, that no part of their width was subjected to a greater strain than another, and if the fracture occurred near the fastenings, the experiment was not counted or noted.

Five experiments with leather belts, three-sixteenths of an inch in thickness, by one inch in width, gave a mean result of 552 pounds as the breaking strain of each; before breaking, their width contracted to about three-fourths of an inch.

Five experiments with leather belts, three-sixteenths of an inch in thickness, by two inches in width, gave a mean result of 1077 pounds as the breaking strain of each. Before breaking, their width contracted to about one and five-eighths inches, fracture commencing perceptibly at the edges, first appearing by many slight breaks on the skin side, which gradually widened until it broke at one of them.

Three experiments with leather belts, three-sixteenths of an inch in thickness, by three inches in width, gave a mean result of 1532 pounds as the breaking strain of each, contraction to two and three-fourth inches, fracture beginning as in former cases.

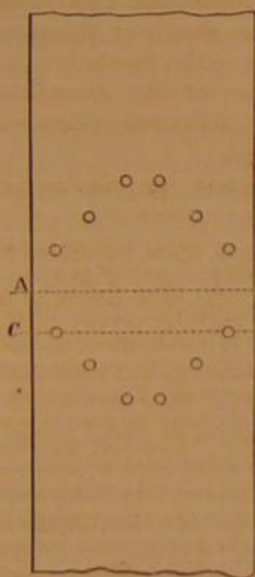
The rubber belting tried was cotton-filled and "three-ply" in thickness.

Five experiments with two-inch rubber belting gave a mean result of 1211 pounds as the breaking strain of each, did not contract in width perceptibly, and broke all at once, emitting a perceptible smell of rubber.

Five experiments with three-inch rubber belting, gave a mean result of 1763 pounds as the breaking strain of each—other items as before.

Experiments in great number were made with lacing, of various widths and thicknesses, but the results varied so much—no two being at all alike—and very much appeared to depend on the part of the skin from which the thong was cut. For instance, in some cases, a thong from near the back bone had four times the strength of that from other parts, so I could get no data that was worth noting.

The next experiments were made to determine the weakening effect of punching belts for the lacing, and the results proved that the belt was weakened to the extent of the sum of the diameters of the holes, if they were in a straight line across the belt.



The diagram here given will show the position of the holes in the belt which gave the very best results, as its cross section is only weakened by two holes at any place. A B was not cut, and C D was the invariable line of fracture, which first began at the edges, found assistance at the nearest holes to the edges, and continued across on the same line.

From these trials it can be seen that oval punches would be much superior to any other, as they would cut away less of the cross-section of the belt, and

still give ample space for the lacing.

The next experiments were made with belts punched as in the above diagram, but cut through the line, A B, and then laced in a secure manner—results as follows:—

In leather belts, tearing began at the holes at five-eighths of the breaking strain, and continued on until the lacing tore out at the end holes, when the rest went suddenly.

In leather belts, after being subjected to one-half of the breaking strain for twenty-four hours, a slight addition to the weight caused them to tear at the holes, which, after commencing, proceeded rapidly, until the end holes tore out, when it went as before. After being subjected to one-half of the breaking strain for forty-five hours, it went as before stated. They stood one-third of the breaking strain for one

week, and at the end of that time showed no signs of fracture.

In rubber belts, tearing began at one-third of the breaking strain. They stood one-fourth for twenty-four hours, but tore on a slight addition of weight. They stood one-eighth for one week without showing any signs of fracture. Eyeletting the holes brought the standing point up to the standing point of leather belting, the clinching of the eyelets on the cotton fiber or filling reducing the tendency to tear. I think that large oval eyelets would materially improve the fastening of such belts, particularly if the eyelets had large flanges so as to grasp or confine the material. They also operate well with leather belting, as their action is to distribute the strain all round the circumference of their holes, which is not the case without them, only a portion of the hole then receiving the strain. They likewise take from the belt the rubbing action of the lacing in rendering through the holes, which must have some effect on the portions in contact, as no belt can be laced so that the lacing will not render to some extent, saying nothing about the action of the same in the passage over pulleys, especially those of small diameter, where the action is continuous while in use transmitting power. My experiments with eyelets were not as satisfactory to me as I could have wished, as I was unable to carry them to any great extent, after so favorable results, on account of not being able to get them sufficiently large to take the lacing. I am confident that if I could have got them large enough, and of the right shape (oval), that I could have tested the belts up to very near their breaking strain, provided the lacing would have stood; and if it had not, I would have tried something else (catgut, etc.), until I found what would give first. As it was, the eyelets did not sufficiently bind the materials, although they gave much better results. I think that eyelets made expressly for the purpose would materially increase the duration of belting, as well as form a profitable article of manufacture.

I made no experiments with riveted belts, for two reasons:—1st. That it is a self-evident fact, that a riveted belt can be made much stronger at the junction than if the same were laced. Eyelets will act in a precisely similar manner, but only on one thickness of material, when used in conjunction with lacing; this was the reason I tried them. 2d. That all belts, being liable to stretch more or less from time to time, must have some portion of their length, which is easily accessible for the purpose of taking up the same, and as the usual and most ready means of doing this is by lacing, which is the weaker mode of fastening; then, the whole belt is liable to the contingencies of the same, and is therefore no stronger than that part, no matter how the other fastenings are made in its length. From these facts it can be seen that, as a matter of self-instruction, which was my object, experiments made with riveted belts would be money, time, and considerable labor thrown away.

ROBT. G. CARLYLE.

Virginia, Nevada, May 10, 1866.

[To be Continued.]

Trouble With an Air Furnace.

MESSRS. EDITORS:—We manufacture malleable cast iron, and use an air furnace with smoke-stack about sixty feet high; but in warm, cloudy weather it does not draw good, or at least we cannot melt more than half the quantity we can in cold, clear weather. The opening or inside of the smoke-stack is square.

Would it draw better if the opening or inside was circular instead of square as it is now? Would it draw better, that is, melt quicker, if the stack was higher? if so, how high should it be? Lastly, if we were to build a furnace the same as we now use and attach a blast to it, would the iron be as good as that made with the regular air furnace (or natural draft)?

THOMAS DEVLIN.

Philadelphia, Pa.

A NEW museum has been projected in this city with a large capital, and John Banvard as president. The principal novelty in the exterior is that the brick is to be vitrified or glazed similar to the common brown pottery. This will give it a very brilliant appearance in clear weather and on moonlight nights.

Breech-Loading Rifles.

MESSRS. EDITORS:—I have read with no little interest, the letter of your Washington correspondent on the "trial of breech-loading rifles for the army," and also your remarks on "breech-loading rifles for sportsmen," in No. 24, Vol. XIV. of the SCIENTIFIC AMERICAN.

It is always pleasant to find one's own opinions endorsed and confirmed, as I do in two or three points in the above articles. First, it was a great satisfaction to me to learn that the Peabody rifle received the preference in the trial at Springfield, as I have always considered it the best and simplest gun for the use of the ammunition to which it is adapted, and which it has been decided to adopt for army use. I have urged its merits upon every one who has asked my opinion for two years past, and in repeated instances, when new inventions have been sent me for trial, my reply has been, after examination: "It is not equal to the Peabody." The letter of your Washington correspondent gave me the first intimation of its success with the Army Board, and without any interest in the gun itself, I am greatly pleased with such a decided confirmation of my opinion. The gun has never been in the market, and is comparatively little known, but if manufactured for sporting purposes, I am confident it would supersede all others yet produced for the use of the copper cartridge. But notwithstanding this opinion of its merits, and without any denial of the excellence of that kind of ammunition for military use, I still say that the Maynard is the only breech-loader that comes fully up to my ideas of what is requisite in a sporting rifle. There would be no difficulty in finding plenty of backers to the bet offered by Mr. Bradley, among those who are familiar with its powers. I have witnessed and taken part in a great many trials of rifles, of almost every description, and I have never seen any better shooting done with any muzzle-loader that was fit for field service, than with the Maynard. I do not compare it with the unwieldy target rifles with telescope sights, false muzzles, etc., for those can never be available for sportsmen; but I can show targets made with the Maynard, of ten successive shots, at fifty yards, all within a circle of an inch diameter; ten shots, at 100 yards, within a three-inch circle, and sixteen shots, at 220 yards (40 rods), within a nine-inch circle, and I have never yet seen a better performance with a muzzle-loading sporting rifle. I have a letter by me from an experienced Western rifleman who ordered a Maynard rifle on trial, and reports: "I can beat any muzzle-loader I ever saw, weighing less than thirty pounds." And I have testimony to the same effect from many different quarters. No other breech-loader, that I have tried, is so invariably accurate, and this accuracy is undoubtedly due, as your correspondent was assured by Dr. Maynard, to the exact centering of the bullet, which is attained by his mode of loading the cartridge.

The objection which I find most frequently made to the Maynard rifle is, that it is too light, "seems too much like a pistol," etc. No man was ever more strongly prejudiced in favor of heavy guns and muzzle-loaders than I used to be, but later experience has convinced me that the power of using a light or a heavy gun, with equal efficiency, is a matter of habit. For many years I hunted with a rifle made by Dickson, of Louisville, Ky., in 1835, with a barrel 33 inches long, the gun weighing 14 lbs. I now do better shooting, and at longer ranges than I ever dreamed of attempting in those days, with a 20-inch Maynard, weighing six pounds. I have a barrel of 26 inches to fit the same stock, but I can do no better work with it than with the 20-inch barrel, and prefer the latter for sporting for convenience sake, as I sling it by a strap over the shoulder, and can bring it up to an aim without unslinging. Every one who has been used to a heavy gun will complain at first that he cannot hold a light one steady, but I know by experience that a little practice will enable one to do it, and any man who knows the importance of economizing weight on such expeditions as are made in pursuit of game worthy of the rifle, will appreciate the difference on a long day's tramp between six pounds and ten or twelve, in the weight of gun.

The targets I have named afford sufficient proof

of accuracy for sporting purposes. Every one of the ten shots at fifty yards would have taken a squirrel's head, as those at a hundred would have taken a partridge, and at forty rods would have been good for a deer and the sportsmen are rare who would attempt anything better at those ranges.

Can you give any satisfactory explanation of the bursting of guns at the muzzle with ever so slight a stoppage? I have seen a very strong barrel split for an inch from the muzzle, simply from having a little light snow in it, which the owner of the gun thought could be easiest cleaned out by firing the gun; and I could tell you of some experiences of the same kind which are so surprising as almost to make one doubt the evidence of his own senses; but I am not sure that I have not already trespassed too long and will venture no further.

Danvers, Mass., June 22, 1866.

[The information sought for by our correspondent in regard to the bursting of guns at the muzzle, cannot now be given, but we would be glad to publish his experiences on that subject.]

Magnetic Electricity.

MESSRS. EDITORS:—The new era in magnetic-electricity, so clearly predicted by Prof. Page, seems to have already dawned in a brilliant manner, and in its light the whole field of electrical science will doubtless unfold to us many of its hidden treasures. The wonderful magneto-electric machine, described in your paper of June 23d, of Mr. H. Wilde, of Manchester, England, is a realization of the proposition made by Dr. Page in *Silliman's Journal*, in 1839 (Vol. XXXV., page 252), at a time when the magneto-electric machine was hardly known. After indicating a way of increasing its power without limit by "multiplying the pairs of magnets," he says: "Nothing but the want of means has restrained me from erecting a magneto-electric machine, which I feel confident would rival the largest galvanic battery in existence." Again, in the preliminary Patent Office Report, for 1863, after summing up the achievements of the magneto-electric machine, he remarks as follows:—"From these and other cursory observations of the recent developments of magneto-electricity, flattering promises rise up in the contemplation of its future. The steam engine is hardly eighty years old, and the magneto-electric machine hardly thirty. It is only about forty years since the steam engine was fairly appreciated, and hardly a decade since the magneto-electric machine was duly recognized in the family of practical mechanics, and if its future career should be commensurate with its past, it will take high rank among the great engines of human progress."

One of the most extraordinary feats of magnetic electricity was witnessed in Washington a few days since, in the simultaneous explosion of forty torpedoes by one little magneto-electric machine not more than a cubic foot in its dimensions. The experiment was conducted by Tal. P. Shaffner, with a view to exhibit his improvements in artillery mining. The simultaneous firing of charges is a feature of incalculable value in mining; and although the assertion of Col. Shaffner, in his programme, that he is confident of firing a "thousand charges at once," seems very extravagant, yet, after the successful explosion of 40 charges with his little machine, what may we not expect in this line of progression when Wilde's improvements are introduced and the magneto-electric machine carried to its highest degrees of development?

L. EDAN.

Let Americans use American Tools.

MESSRS. EDITORS:—Believing you are ever ready to advance the interests of the mechanic, I wish to say a few words through the SCIENTIFIC AMERICAN, in relation to watchmakers' tools. All the tools now used by us are imported—Swiss or English—and of very poor material and imperfect. It is impossible to obtain a good set of tools at any price. Now I wish to suggest that some enterprising Yankee go into the business, make himself rich, and watchmakers happy.

We have some splendid dentists' tools made in this country; why can't we have watchmakers' tools also?

Let some one make us a good, nice lathe, with drawing-in spindle, split chuck, etc., of some fine

composition; make us a nice thing, and we will pay. We also want pliers of all kinds and styles, tweeze etc., all thoroughly made, well finished, and fine temper.

This is the best chance for a smart mechanic to make his fortune, and we and our children will "rise up and call him blessed."

"LYCURGUS."

St. Johnsbury, Vt., June 25, 1866.

Corrosive Action of Lead on Iron.

MESSRS. EDITORS:—The scientific man and others interested or curious can see the effects of contact of two metals, iron and lead, by examining three flights of stone stairs on the Front-street side of Fulton market. The steps are of brown stone, flanked by an iron balustrade on either side. The newel posts are iron, 1½ inches square, and the balusters, also of iron, are 1 inch square. These are all inserted at the lower end in the stone and secured by casting lead around them in the usual manner. The upper ends are secured to an iron rail, the upper ends of which are secured to a brown-stone pillar in the same manner, the lower end to the newel post. On the top of the rails is riveted a narrower strip of iron, flat on the side in contact with the rail, the outer side rounded to make a finish.

The lower ends of these balusters, just above the junction with the lead, are, for an inch or two, reduced to a quarter of an inch, and many of them are entirely corroded or cut off, while above they are entire. Some of the newel posts, in the process of being destroyed, have, by the products of dissolution—being increased in bulk beyond the original diameter—burst the stone and now are free.—The top ends are entire, but the rail to which they were secured has suffered a great depreciation of its bulk. This seems to have taken place between the two plates of iron where they were riveted together. Here, also, we see the force of the increased bulk of the products of dissolution, as we find that the rivets are mostly withdrawn. In some that are not, we find that the mass of oxide (or whatever it may be) has forced up the top plate some three-fourths of an inch, and is there held as in a trap. The rails, where they are joined to the stone pillars, seem not to have been reduced much.

I send you a piece of one of the balusters, which you will see, was entirely cut off; though, as you will notice, it is of good fibrous iron. I also send you some of the products of the dissolution, which I forced off the iron.

The above are some of the phenomena as seen by an unscientific eye. The scientific observer would undoubtedly see much more. It would be an interesting fact to know, how long it has taken Nature to do this work. It would indicate that lead is not a good material to secure iron to stone.

Query: Is brimstone liable to the same objections?

F. W. BACON.

84 John street, New York.

Long Feed.

MESSRS. EDITORS:—I write to mention a plan of preparing "long feed" for horses and cattle, which does not seem to be generally known. It is made of dry straw and green clover, and in this manner: Lay brush or poles for a stack; spread the fresh-cut clover a foot thick; on this lay the straw a foot thick, and so on, in alternate layers, until the stack is made. The juices, gases, etc., from the clover will so thoroughly permeate the straw as to prevent the clover from "firing," and make both equally good food for stock. Cattle will eat the one as readily as the other. Not only is there saving of time, etc., by the operation, but also of all those valuable parts of the clover lost in the process of drying.

J. P. LITTLE, M. D.

Richmond, Va., June 13, 1866.

[We have no doubt that this plan will make an excellent feed, and in some places where straw is abundant and cheap it will utilize what is now wasted to some extent. In this section, however, the demand for straw in the manufacture of paper is so great that it commands a higher price than hay.—EDS.]

Professor Abel found that hardened steel wire dissolved in hydrochloric acid without residue, whereas, the same steel in the softened state yielded by such action a dark flocculent carbonaceous residue

How to Find Variation and Attraction of the Mariner's Compass.

MESSRS. EDITORS:—You will much oblige your humble servant by giving the following a place in your useful columns, for the benefit of mariners at large:—

A New Mode for Finding the Variation and Local Attraction of the Mariner's Compass.—Take an ordinary compass-card and erect upon its center a fine copper wire, from four to six or eight inches in height, and perpendicular to its plane, at the moment of the sun's meridian passage, as indicated by the noon observation for latitude, note the direction of the shadow cast by the wire on the compass-card. The angle contained between this direction and that of the north and south line of the card, will give the variation and local attraction combined. Small errors are involved in this method, but the approximation is close enough for the purpose for which it is intended.

MARINER.

Naval Academy, Annapolis, Md., July 3, 1866.

[The above communication was sent to us by a well-known commander in the navy, and the information given is no doubt correct.—EDS.]

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

ROW-LOCK.—CAPT. J. W. NORCROSS, Middletown Conn.—This invention relates to a row-lock which is mounted on a wooden bed plate and composed of metal sockets with wooden thole-pins, in such a manner that the row-lock can be sold ready mounted, and all the boat-builder has to do is to fasten the bed plate down to the gun wale of the boat, the metal portion of the row-lock with the thole-pins being secured to the bed plate so that it can be easily fastened or unfastened, thus enabling the owner of a boat to take off his row-lock when the boat is laid up ashore, and to attach the same at a moment's notice if the boat is needed for use.

CORN CULTIVATOR.—C. W. TALIAFERRO, Keittsburg, Ill.—This invention relates to a corn cultivator plow, and it consists in a novel construction of the same, whereby the plows may, with the greatest facility, be adjusted both vertically and laterally, as may be required, and a strong and durable implement obtained.

BRUSH.—R. P. GILLET, Sparta, Wis.—This invention consists in arranging within a suitable frame, a series of parallel layers of bristles, broom-corn, or any other material ordinarily used for brushes, with a cross block or piece between each layer, which layers and cross blocks are secured together by bolts and nuts in a novel and peculiar manner.

QUARTZ CRUSHER.—JOHN T. BONNELL, Columbia, Cal.—This invention relates to that class of quartz crushers which are provided with rising and falling weights, pounders, or stamps, and it consists in a novel and improved means for operating the weights, pounders or stamps, whereby the machine may be worked by hand with a very moderate expenditure of power.

BRIDGE.—DAVID HAMMOND AND W. R. REEVES, Canton, Ohio.—This invention relates to a novel construction and arrangement of cast-iron arches, king and queen posts, and wrought-iron string pieces, etc., in such a manner as to insure a light, strong and durable bridge.

WINDOW SASH FASTENING.—H. DE BAUN, Paterson, N. J.—This invention consists of a latch attached to one side of the window sash, in combination with a rack attached to the window frame, in such a relative position with the latch that the latter may catch into the rack, and thereby support the sash.

SHEEP-FEEDING RACK.—M. S. EYREY, Bridgewater, Mich.—The object of this invention is to so construct a sheep-feeding rack that the same may be used for feeding out either hay or grain.

STEAM TRAP.—T. M. FORCE, Norwich, Conn.—This invention relates to a novel construction and arrangement of the trap whereby efficiency and reliability of operation and simplicity are secured.

POCKET-BOOK PROTECTOR.—CHAS. H. BAGLEY, Elgin, Ill.—This invention relates to a mode of securing a pocket-book, memorandum book, bill holder, or the like, in a person's pocket, in such a manner as to frustrate any felonious attempt to abstract the same, but, at the same time, which will not hinder the owner of the pocket-book from withdrawing it whenever occasion requires.

BEE PASSAGE AND PROTECTOR.—JAMES WASH, Mount Sterling, Ill.—This invention is designed to protect bees from the moth by preventing their entrance into the hive, and to this end the invention consists in the employment or use of a tube applied to the hive in such a manner that the entrance will be at some distance from the hive, and having the latter provided with decoys composed of openings covered with wire gauze, these openings being directly over vats or receptacles supplied with grease or any substance which destroy the millers as they drop into it.

INSECT PROTECTOR.—SAMUEL CLARK, New York City.—This is a device for protecting bedsteads from bedbugs and other crawling insects. It consists in placing a thin band or annular pendant projection within an united cup-shaped base, one being provided for each leg or foot of the bedstead to rest upon, so that the bugs cannot pass from the floor up the legs of the bedstead.

BLACKSMITHS' FORGE.—JAMES PATTERSON, New York City.—This invention consists in having the bed of the forge upon a hollow base provided with a perforated valve, and having the nozzle of the bellows entering it, whereby the hollow base is made to perform the double function of a wind chamber and an

axle receptacle, and two important results attain—an uniform or even blast supplied to the fire—sudden gusts or puffs, being avoided—and ashes, dross, etc., very readily abstracted from the fire whenever necessary.

CARRIAGE DOOR HINGE.—GEORGE W. BEERS, Bridgeport, Conn.—By means of this hinge the carriage door may be securely attached to the side of the door way, and yet be readily removable when desired. The invention consists in the combination of plates and a catch with the swinging arm of an ordinary concealed carriage door hinge, and with the edge of the door.

BROOM HEAD.—JOHN H. LIGHTNER, Shirlaysburg, Pa.—This invention consists principally in attaching toothed bars to the inner sides of the cap; in hinging a portion of the sides of the cap to its upper part; and in securing the parts of the broom head to each other and to the corn by a band slipped down over the broom head for that purpose.

NAILS AND TACKS.—RACHEL SPEER, Passaic, N. J.—This invention relates to that class of fastening by which two or more articles or pieces of any material are secured to each other by driving the fastening through them.

LOOK FOR MAIL BAGS, CARPET SACKS, ETC.—JOHN B. LOGAN, Thornton, Ind.—This invention consists in a peculiar arrangement of bolts and catches, whereby a rapid opening and closing of the bag or sack is insured, which, when locked, will be secure and reliable.

OILER.—GEORGE J. CAPEWELL, West Cheshire, Conn.—This invention consists in providing an ordinary spring-bottom oiler with a tube extending from the nozzle to near the bottom of the oiler, where it has attached to it, by a swivel joint, another tube nearly at right angles with it and turning by its own weight in a plane parallel to the bottom, so that the end of it is always near the side of the can which is lowest.

WATER ELEVATOR.—J. C. BARRETT, Stamford, Conn.—This invention consists in a novel application of the "lazy tongs" system of levers for elevating water for domestic use, and it consists in the means employed for actuating the system of levers and in the means for tilting the bucket.

SCREW WRENCH.—A. M. OLDS, New York City.—This invention consists in the arrangement of a spring tooth bearing at one end against a shoulder of the movable jaw of a screw wrench, and at the opposite end against the shank of the wrench in such a manner that if an attempt is made to slide the movable jaw down, the spring tooth catches firmly between its bearing points and the jaw is locked; but in moving the jaw toward the stationary jaw the spring tooth is released and permits this motion without obstruction.

CHURN.—EDWIN HOYT, Stamford, Conn.—This invention consists in a novel device for holding the dasher rod while being operated, whereby it can be quickly released for removing the dasher from the churn; and it also consists in a novel construction of the dasher whereby a better effective power is obtained for agitating the cream.

CANE JUICE EVAPORATOR.—JOHN F. RIGGS, St. Joseph, Mo.—In this invention the evaporator pan is made of cast iron and arranged with ledges or flanges protruding from the sides alternating so as to form a transverse channel.

STAMP MILL.—ALEX. HERDLEIN, Egan Canon, Nev.—This invention consists in the arrangement of double-armed levers, the long arms of which are about ten times longer than their short arms, in combination with the stamper and with suitable cranks or eccentrics on the driving shaft, in such a manner that, by the assistance of the double-armed levers, the operation of raising the stamper is facilitated and the number of blows of each stamper can be increased almost to any desired number per minute without danger of having the wipers come in contact with the descending tappets.

TOOL FOR FINISHING AUGER HEADS.—RUSSELL JENNINGS, Deep River, Conn.—This invention consists of a rotary wheel of a peculiar shape, whereby the workman is enabled to apply the auger to the wheel and manipulate the former in such a manner that all parts of its cutting portions, necessary to be operated upon, may be brought in contact with the tool and the work performed in an expeditious and perfect manner.

HEAD BLOCK.—C. LEFFINGWELL, Clarksburgh, Ohio.—This invention consists in the construction and arrangement of the pawl blocks, and the combination of the rods, levers, and racks, by means of which the knees of the head blocks are worked with each other, and with the movable pawls.

TABLE-LEAF SUPPORT.—L. R. CAVENDER, Eureka, Ill.—The object of this invention is to furnish a simple, convenient, and safe support for a table-leaf. It consists in the combination of a pivoted arm, a spring, and a cord, with each other, and with the frame of the table.

SHIP'S WINDLASS.—JOHN S. GETCHELL, Machias, Me.—In this improvement the ship's windlass may be worked with increased power, or increased speed, as desired, and it consists in the combination of two sets of single or double pawls and bent-lever stops with each other, with the ratchet wheels of the windlass, and with the operating levers.

CULTIVATOR.—A. M. BLACK, Auburn, Ill.—The object of this invention is to provide a frame-work and operating movements which have the qualities of great simplicity, cheapness, and efficiency.

HEATER.—NATHANIEL A. BOYNTON, New York City.—This invention relates to that class of stoves which are commonly called heaters, and it consists in providing a novel course for the products of combustion on their way to the exit flue.

GATE.—CHAS. DIXON AND S. H. CLOSE, Port Byron, N. Y.—This invention consists especially in the construction and combination of the spur wheel, shaft, and bevel gear wheel, so that the first effect, upon operating the levers, is to unlatch the gate, and the second effect is to swing it open or shut.

MILK RACK.—ALBERT JACKSON, Clifton Springs, N. Y.—This milk rack is so constructed as to afford a sure support for the milk pans, and to guard against their slipping off when the rack is revolved; and it consists, principally, in the combination of ring guards with the supporting arms and wires

PLOW.—T. E. C. BRINLY, Louisville, Ky.—This invention consists in constructing the mold-board with a point having a hook or shoulder at its under side to fit over the front end of the land side, whereby a smooth, unbroken surface is obtained at the upper side of the mold-board, and no opportunity allowed for weeds and trash to catch and collect on the point. The construction of the plow is also much simplified.



C. C. H., of Mass.—The velocity of water in falling is the same as that of other falling bodies. One pound of water in falling one foot would do one foot-pound of work if all its power could be utilized, and no lever or other device can make it do any more. Practically the best turbine will utilize 91 per cent of the power, good breast and over shot-wheels, between 70 and 80 per cent. It is always best to take the power of a breast wheel from the circumference. With gears, pulleys, and other mechanical devices, it is an invariable law that what is gained in power is lost in speed.

A. J. T., of Ohio.—Breast wheels are generally run with a velocity at the periphery of six to seven feet in a second.

W. P., of N. Y.—The lateral pressure of water is a little more than half a pound per square inch for each foot in depth, being 15 pounds at the depth of 24 feet. We should make a dam like yours 13 feet thick at the bottom, and lay the upper side in cement to a thickness of 2 feet.

G. W. P., of Conn.—By turpentine varnish in the laquer recipes is understood copal varnish diluted with spirits of turpentine.

F. M. L., of Pa.—It would seem to be a simple matter to regulate the rise and fall of the weight by a governor but from the incomplete description you give it is hard to form a proper opinion.

J. E. B., of Mass.—You understood us precisely—we did not mean to ridicule the question. In regard to the question, "Which is the mother of the chicken, the one that lays, or the one that hatches the egg?" we refer you to Ralph Waldo Emerson.

S. W. W., of S. C.—Rosin is bleached by melting in a suitable vessel at a temperature of not more than 600 deg and passing steam through the fluid mass. The steam and rosin are then condensed in a receiver and the product dried. Carbonic acid, or a mixture of carbonic acid and nitrogen or hydrogen gas, are introduced sometimes, to perfect decolorization. Rosin oil is one of the products of destructive distillation of rosin, the residuum being tar.

J. M. M., of Conn.—We are not aware that Arago's plan for proving the theory of light, has been tested. The undulatory theory is becoming recognized and accepted. The calcium light is not polarized. We cannot tell whether laying a razor aside for some months will restore its quality of holding an edge or not. The experiment can be tried.

A. B., of Mass.—Your transfer ink, judging from your description, is probably a lithographic ink, composed of tallow, wax, and soap, each 4 oz., shellac 3 oz., gum mastic, 2½ oz., black pitch 1½ oz., and lampblack. To your inquiry: "does a piece of cloth colored with an aniline dye fade on exposure to sunlight?" we reply, that much depends on the nature of the fabric. Silk or woolen will retain an aniline dye very well, but cotton, being a vegetable, must be albumenized or animalized to receive the aniline. Sunlight affects these dyes more than madder and some other dyes.

J. S. R., of Pa., asks if there is such a thing as a suction fire engine, how far it will supply itself, and where it can be got, and the price? There was a time when the tank of fire engines were filled with buckets by hand, but they have gone the way of the hand-card and old fashioned spinning wheel. All fire engines, hand and steam, are now built to elevate their own water by what is commonly called suction, that is the elevation of water by atmospheric pressure in a vacuum. The supply keeps pace with the delivery through the forcing pipe.

R. N., of Nebraska.—The only receipt we know of for restoring burnt steel is to work it repeatedly at a low heat and even that won't do sometimes.

K. R. P. of Ind.—When the furrows are laid off in a mill stone, the miller strikes a circle near the eye and another near the verge of the stone, he then draws lines from the circumference of the small circle to points on the large one, the angle, or, more properly, the lead of these lines, constitutes the draft of the furrows.

T. G., of Canada.—Your proposition in hydraulics is not of sufficient general interest to warrant its publication. It would better suit the columns of *Silliman's Journal*.

I. C. T., of Del.—Refer to Vol. XI, pp. 295 and 373 for rule to find gears for lathe screw cutting. We have published this rule so many times we dislike to produce it again. You will find a hint also in our reply to T. R., Sing Sing in No. 26, Vol. XIV., page 439.

SPECIAL NOTICES.

L. C. Q. Wishart, of Philadelphia, Pa., has applied for the extension of his patent for ornamenting bottles. The petition is to be heard on the 8th of October next.

Lorenzo L. Langstroth, of Oxford, Ohio, has petitioned for the extension of a patent granted to him on the 5th day of October 1832, and reissued on the 26th of May, 1863, for an improvement in Bee Hives. The petition will be heard on Monday the 17th day of September, 1866.

Lamp Chandelier for Burning Kerosene.

The difficulty of utilizing all the light from the common kerosene lamp is well known. If the light is required to be concentrated upon one spot, a shade is necessary, and then the shadow of the lamp interferes with the projection of the light. The usual lamp top also prevents a thorough combustion of the oil, from the inability to supply the flame with sufficient oxygen, thus requiring the use of a chimney to create a draught. The object of the improvements here illustrated, is to remedy these defects in the ordinary lamp, and to derive the maximum amount of light from the minimum of oil.

A represents an ordinary lamp, receiving in the top, in lieu of the usual cone, a cap, B, sustaining two branches, C, which are provided with larger tubes, D, at their extremities. These branches contain a wick, E, which can be met by that from a common burner, or extended, as at E, to the top of the tube. This branch shows a burner requiring no chimney. The tapering tube, F, is made of a sheet of metal, wound spirally, the edges overlapping, and the aperture at the top compressed to flatten the wick, thus presenting a large surface to the action of the atmosphere. The lower portion of the burner is formed by splitting the tube, D, longitudinally, and spreading the parts, which are secured in their expanded form by a circular plate, G. The spur, H, works eccentrically, entering the wick and, by a sliding motion, raising or depressing it, and then leaving it when the operation is performed. The cone, I, is corrugated at the top by lines running obliquely toward the opening, by which means the air traverses across the flame, spreading it over a larger area, and increasing the amount of light. As an addition to the brilliancy of the light, the cone is covered with an open jacket of glass beads, shown at J. The advantage of the spiral tube, F, is that the heat from the flame cannot pass directly down toward the oil, thereby rapidly volatilizing it, but is compelled to follow the spirals.

These are among the principal advantages claimed for this improvement, but there are other and different applications of the improvement which can be advantageously employed in many forms. Patented Oct. 13, 1863, by James Adair, Pittsburgh, Pa., to whom apply for rights and for further particulars, care of Hussey, Wells & Co.

Trial of One of the New Frigates.

The *Chattanooga*, one of the new steam frigates built to attain great speed, has had a trial trip at sea, and has performed well. She attained a speed of 15½ statute miles per hour under steam alone. The amount of coal burned was 12,000 pounds per hour, and the engines, which were built by Merrick & Sons, of Philadelphia, averaged 44½ revolutions per minute, the highest number being 52. The diameter of the cylinders is 84 inches by 48 inches stroke.

We hope soon to be able to give full details of the *Maclawska's* engines designed by Capt. Ericsson. They are expected to achieve great results.

Thread from Cotton-Plant Stalks.

An ingenious person in New Orleans has been engaged in making thread from the stalks of the cotton plant. It is very fine and strong, and looks very much like flax, being nearly as soft and pliable. He proposes to make this thread into cloth, which he says will be as strong and durable as that made

from cotton itself. Forty pounds of thread can be made from one hundred and twenty pounds of stalk. A new factory will soon be established for the manufacture of cloth from this substance. The discovery is not a new one. It has been known for several years that there was a fibrous substance in the cotton stalk which very much resembles flax, but it has never before been put to practical use. Should this prove successful, it will double the value of the cotton plantations at the South. The next in-

the largest amount of light without smoke. Even the most practiced hand frequently fails to cut the wick aright, and when the lamp is lighted, a stream of flame and smoke shoots up on one side, while the other side burns dimly. The annoyance of removing the heated chimney to repair the defect, the repeated failures, and the danger of cracking the glass, make together quite a sum of vexation.

The improvement illustrated herewith is designed to remedy these difficulties. Instead of one flat wick,

two of half the usual width are used and moved independently of each other. A is the lamp; B is the chimney; C is a lamp top of the usual form, but having a double instead of a single feeder. D is the head or button of one feeder, furnished with the usual spur inside the wick tube, which raises one wick, and E is another secured to a sleeve that rotates on the shaft of D. This is also furnished with a lifting spur which moves the other wick. Either of these wicks, therefore, may be raised or lowered independent of the other, or both may be moved together by grasping both disks at the same time. A third spur can be used for a treble wick, the disk or button projecting from the opposite side of the top.

Patented Feb. 14, 1865
For further particulars address Lewis Hoyer, 50 State street, Chicago, Ill.

The Trichiniasis.

Our attention has been called to a very able paper on this subject by James

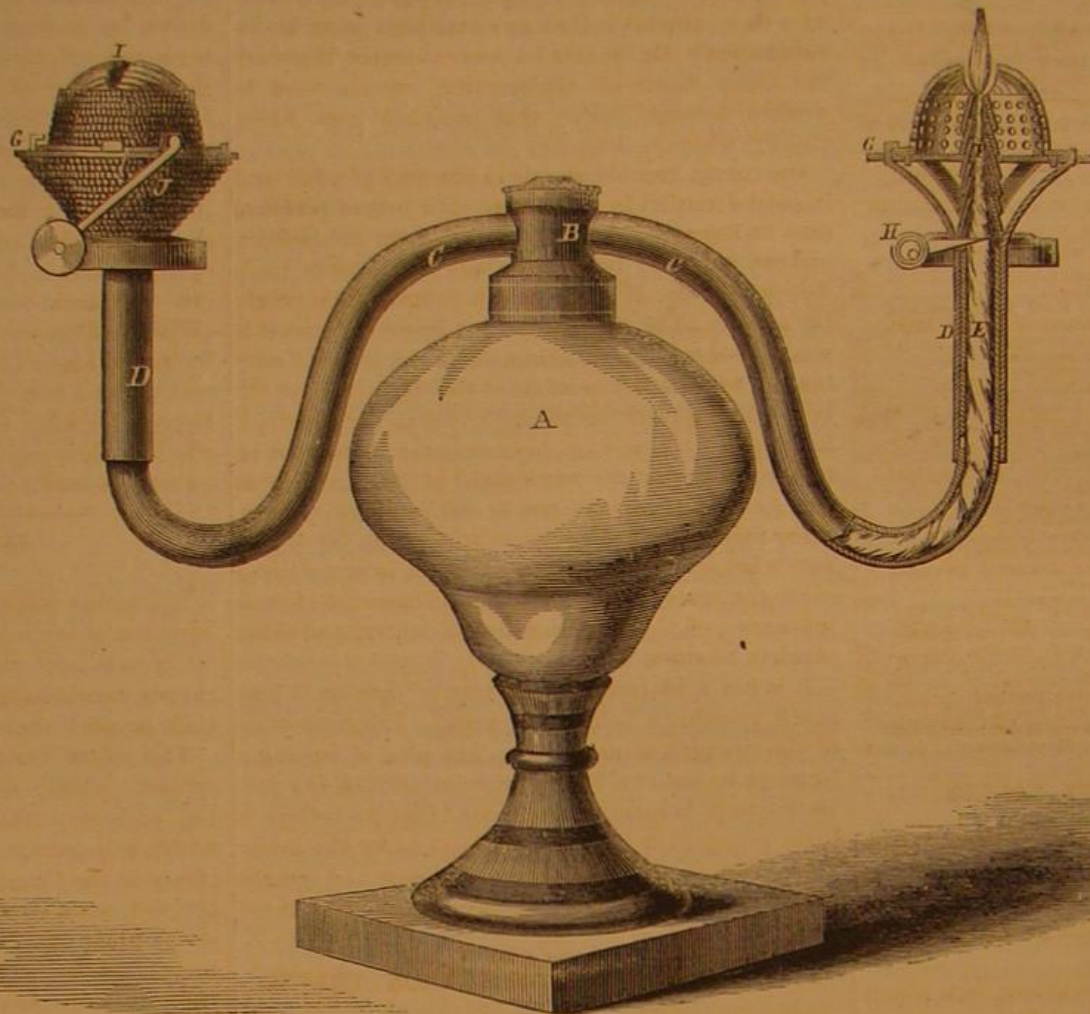
C. White, M. D. published in the *Boston Medical and Surgical Journal*, which confirms the correctness of the idea that pork, raw or partially cooked, is unfit for food. The presence of trichinæ in pork, he says, can only be recognized by its effects on those who eat it, or by microscopic examination.

The well-authenticated account of the death of several members of a family in Marion, Linn county, Iowa, from trichiniasis, caused by eating raw ham, ought to be a sufficient warning against the use of pork in an uncooked state. It seems, from this account, that salting and smoking is not sufficient to destroy these parasites. The only member of the family who escaped illness was one who had not partaken of the ham. It was discovered that the hogs which furnished the bacon had been afflicted with the "hog cholera," but being supposed to have recovered, were fattened and killed. The connection between "hog cholera" and trichiniasis seems thus to be sufficiently well established to render the flesh of diseased hogs a dangerous article of food.

Locomotive Boilers.

We believe our Yankee brethren make an engine better adapted to rough, and even to ordinary lines, than our own, and, on the other side, we consider our engines simpler and stronger for their work. A Yankee boiler would burst, by hydraulic pressure, long before ours would give way, and yet they carry as high steam as we do.—*Engineering*.

VANILLA.—A successful effort, it is said, has been made to raise this plant in France. The experiment was made in the public gardens of the St. Bruno, and the quality is affirmed to be equal to the best imported from the West Indies. The seed of the vanilla is remarkable for its fragrant odor, and yields an oil which is much used as a flavor. It is also employed in medicine in place of valerian, all the virtues of which it is supposed to possess, while it is at the same time far more grateful to the taste

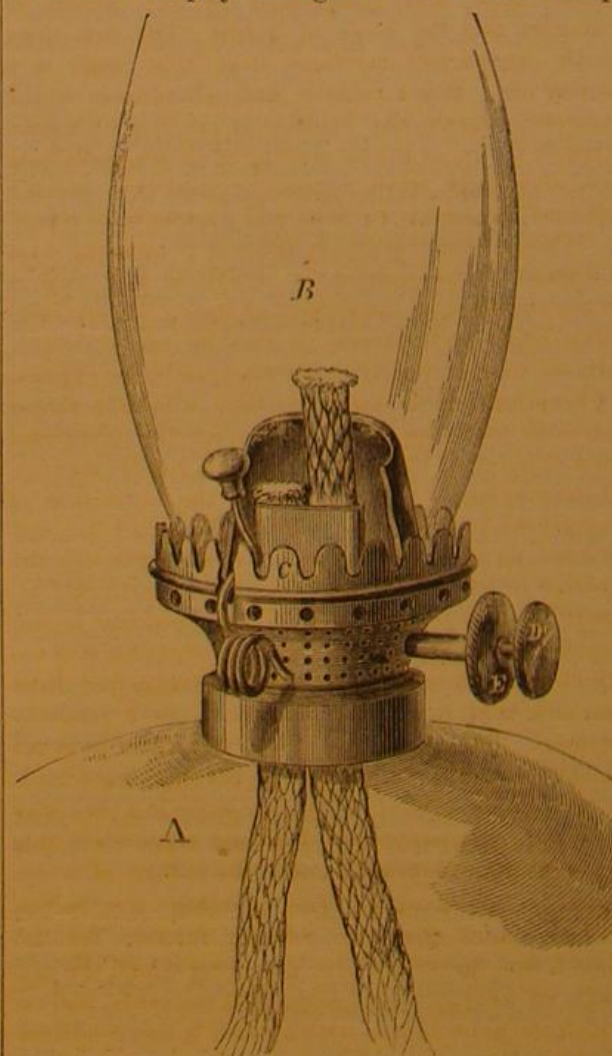


ADAIR'S KEROSENE CHANDELIER.

vention in order, for the development of the South, is a method of making paper from sugar-cane stalks. Whoever does this ought to make a fortune.

IRWIN'S LAMP TOP.

Much of the prejudice against the kerosene lamp



arises from the difficulty of keeping the wick in proper trim, so that the flame shall be even and give

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MAN-HOLES AND SAFETY VALVES.

The Boiler Insurance Company, of Manchester, England, whose proceedings we so often notice, because they are doing a good work, have made a monthly report from which we extract certain parts of interest to our readers.

In the course of certain investigations, in a recent catastrophe, they discovered that the seat of the disaster was the man-hole. The boiler itself was quite a small affair, being only five feet and three inches high, two feet and four inches diameter, composed of plates one-fourth of an inch in thickness. The pressure carried was eighty pounds to the square inch, and the boiler was warranted for one hundred and fifty pounds.

The boiler failed at the man-hole, which was without any saddle or casting to strengthen it. The vents were three in number, diverging like cracks in a pane of glass, one running round a seam of rivets, and completely stripping off the external shell, which was blown into fragments.

The jury, who were probably instructed before, had brought a verdict that the explosion was caused by the absence of the saddle plate or casting which is to be found on all properly-made boilers. The boiler in question was only six months old.

In addition to the bad construction of this boiler, as regards the omission alluded to, the jury called attention to the dangerous character of the safety valve. This was a small valve 1½ inches in diameter, loaded by a spiral spring in such a manner that it was equal to a percussion cap in a charged shell, or in other words, was so utterly unreliable as to be worse than no valve, as will be seen from the following details:—

The spring that held the valve was checked at the top by a yoke which passed over two standing bolts—one on each side of the seat. This yoke was secured by nuts, and no provision existed for regulating the tension of the spring so that the amount of pressure could be known. It was found that one turn of the nuts would increase the pressure from 80 to 150 pounds. Moreover, the spring was of so stubborn a character that at the point of blowing off, the steam barely wheezed through without raising the valve perceptibly. This valve, and the error of cutting a large hole in the boiler for the man-hole plate, was the cause of the "accident."

We have repeatedly shown, by argument, by facts, and by illustration, that vague and unsound theories concerning boiler explosions are of no value whatever in ascertaining the cause. Men committed

to certain views go prepared and indeed eager to find something in the accident to corroborate their assertions, and they generally succeed in so mystifying the matter, if called upon to testify in court, that neither they nor the jury have the slightest idea what they are talking about.

But let a practical man go and look for evidences of weakness, for proofs that the boiler has been misused, or badly constructed, and he will find natural causes for the explosion. The safe load of a boiler plate, per square inch of section, has been ascertained; why then not take that as a starting point for investigation? Or, if this be proven correct, there are the many faults of construction, which tend to weaken a steam boiler, that practical men know exactly where to look for.

One great trouble stands in the way of a full and impartial verdict in such cases. If a jury of practical men be impaneled, they are tradesmen themselves, and are naturally bound by trade ties to keep trade defects secret. If John Smith judges of his neighbor's boiler as he should, and condemns it because it was chisel-cut in caulking, because it was badly braced, because it was made of thinner iron than the laws which govern the strength of materials demand, he knows not how soon his turn may come, and he be the prisoner at the bar instead of "the intelligent jury." It is, therefore, not at all strange that so many men of sound common sense, who say in private what they cannot say in a verdict, lend a willing ear to the voices of those who sing of ozone, of electric influences, of the decomposition of water, and other obsolete theories.

It is not a matter of any man's "opinion" how much pressure a boiler will stand. It is a question of the strength of materials. The plan of cutting a huge piece out of a boiler, without adding any protection to it, is manifestly an error that we believe is little practiced in this country; and as for the safety valve, experience shows that the lever and weight is entirely reliable when properly made and cared for.

BUILDING OF ROADS FOR COMMON TRAVEL.

The usual custom of making roads by covering a substratum of common soil, sand, or even turf, with coarse gravel left loosely on the surface, is one which is anything but economical or wise. A prolonged storm—occasionally a violent shower—gullies the roadway, washing off the gravel, and leaving treacherous mud holes. Even where broken stone is used upon a proper foundation, it is left to be consolidated and compressed by the wheels of vehicles and the hoofs of horses. The tax upon both horses and carriages from this cause is a severe one. It is a vexation and a hindrance to the traveler. Again, the roadside is left in such a state that in a rain, or at the melting of snows, pools form and ultimately wash across the roadway, making chasms dangerous to cross and expensive to repair.

While so much is said in favor of permanent ways for steam transportation, it would be well to give some attention to the subject of improving our common roads and streets. It can be easily demonstrated that, on poorly constructed roads, the expense of keeping them in repair so they will be in proper passable condition, is greater than the additional cost of building the road at first in a correct manner. It is unnecessary to speak now of the foundation of a good road. That is a matter that may be considered at some future time. The surface is the portion to which we wish to direct particular attention. Where proper stone for breaking is not readily attainable, and the cost of preparing it is too great to be incurred, gravel, measurably free from soil and sand, is the best substitute for a roadway surface. But spreading this material, however thickly, over the foundation is not making a road. A bed of loose gravel or broken stone is a poor way for horses and carriages. But just consolidate this material by compression, and the nature of it appears to be changed. The yielding, treacherous surface, which gives no reliable fulcrum for the horse's feet, becomes a firm floor over which the carriage or heavily-loaded team rolls smoothly, and on which the horse moves with a much less expenditure of muscular exertion.

The plan of rolling the roadways is now largely adopted in England and France. For this purpose,

in England, rollers are used of ten and twelve tons weight, drawn either by horses or traction engines. In France they use a roller with locomotive attached, having a power of about ten horses. The result is to consolidate and solidify the material, until, although greatly differing from an unyielding surface, it is sufficiently homogeneous and enduring to resist the action of the elements and the wear of travel. Undoubtedly immense rollers carrying the weight of engine and boilers are the most effectual, yet we cannot see why rollers capable of being drawn by a team of horses might not be advantageously employed on our common roads in more than one stage of the process of road-building, but especially in finishing the surface. The cost of the rollers could not be very great, and it would soon be saved in the lessened expense for repairs. Roads in the country are generally made and repaired by the towns, or at the expense of the counties, under the direction of county commissioners. Let each town, or the commissioners, provide suitable rollers at convenient points to use on different sections of the roads, and although the first cost of road construction might be somewhat enhanced, the after repairs could be easily and cheaply effected when required, which would not be so frequently as now.

CANADIAN PATENTS.

In another column our readers will find an article upon the above topic, copied from the *Quebec Gazette*, which sets forth that the Canadian Parliament is seriously considering the policy of relaxing somewhat their present exclusive or one-sided patent system.

The editor truly says: "This is a sort of stock subject, which comes up session after session," but hitherto without success. American inventors wishing to secure their inventions from wholesale piracy in the Canadas, have been tantalized, year after year, with hopes of speedy reform, which would enable them to protect their rights in those Provinces; but the hope has been deferred from year to year, until the delay seemed likely to wear out human expectation.

We would not be premature in the matter, but trust we shall soon be able to announce that our citizens can secure their just patent rights in Canada.

The *Gazette* admits that the Canadians have pirated our inventions, but as an off-set, hints very strongly that our people have stolen some inventions from Canada—which is possible, though it seems hardly probable. We will, however, consent to square accounts on this point, if our non-reciprocal neighbors will only hurry up their scheme of relaxation so as to admit Americans, Frenchmen, and Chinese to patent-right privileges.

A Theory in Regard to Rinderpest, Pleuro-Pneumonia and Cholera.

A communication has been received at the Department of State, from our legation at London, inclosing two pamphlets relating to certain experiments by Dr. James Dewar, of Kirkcaldy, Scotland, for testing the efficacy of sulphurous acid gas as a disinfectant. Results are cited which lead to the conviction that the diseases—cholera, rinderpest, pleuro-pneumonia, and others—may be not only very much modified, but even wholly prevented by this means.

The method of generating the gas is very simple and inexpensive. It is only necessary to have a chaffer of red-hot cinders. Set a small crucible into them and drop a piece of sulphur stick about as large as a man's thumb into it. This will fumigate a large cattle shed in twenty minutes.

The animals seem to enjoy it, and it acts as a tonic on man and beast. The shed must be well ventilated during the fumigation, as well before as after it, and sanitary rules must be enforced in regard to cleanliness, removal of dung heaps, etc. During the prevalence of such epidemics as are above named, the fumigation may be made according to the foregoing directions four or five times a day; and not only is this treatment said to cure these diseases, but it is stated that mange, ringworm, and lice have also vanished before it, and that grease heels in horses have also been cured by it, while severe cases of phthisis and tubercular affections of the lungs have also been relieved in human beings.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JULY 3, 1866.

Reported Officially for the Scientific American.

23—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.

55,973.—EXTINGUISHER FOR LAMPS.—Charles E. Abbott, Boston, Mass.:

I claim the tube, c, with its lid or cover, d, and rack, g, or equivalent, operated by the toothed wheel, h, upon the rod, C, substantially as set forth.

55,974.—PAPER AND CLOTH BOSOM.—Charles Arnold, Chicago, Ill.:

I claim a bosom with cloth front and paper back, when secured together substantially as described and used for the purpose set forth.

55,975.—OIL-CAN.—James Ashton, Fall River, Mass.:

I claim the combination of an air inlet, I, I, I, supply-tube, T, T, dripping-chamber, Y, Y, spiral-spring, S, shut-off rod, A, B, valve, V, and rod, C, D, all as applied to an oil-can, in the manner described and for the purposes set forth.

55,976.—DROP-HAMMER.—Jefferson Aughe, Dayton, Ohio:

I claim, 1st, The mode of connecting a die to the ponderous hammer, E, of a swaging machine, substantially as herein described and represented.

2d, The arrangement of the dies, F, F', the hammer, E, and bolt, G, substantially as described and for the purposes specified.

55,977.—WATER-ELEVATOR.—A. S. Babbitt, Keeseville, N. Y.:

I claim the arrangement of the wheels, D and B, the wheel, B, being provided with a hub upon which cams are formed, with the lever, A, which is also provided with cams to correspond with those upon the wheel when used with the springs, E, E', and collar, F, as and for the purposes specified.

55,978.—CURTAIN FIXTURE.—Henry O. Baker, New York City:

I claim the lever-button, in combination with the perforated side of the frame, substantially as and for the purposes herein set forth.

55,979.—HAY-RAKER AND LOADER.—Horace Baker, Cortland, N. Y.:

I claim, 1st, The rake-teeth, P2, in combination with two positively actuated endless aprons, W, W', revolving in opposite directions, and so placed in relation to each other that the cut grass raised over the teeth shall be seized between the aprons and elevated, substantially in the manner set forth.

2d, The standards, T, T', when so constructed that by their elasticity they shall maintain the aprons, W, W', face to face, and permit variations in the quality of grass carried between them, substantially as set forth.

3d, In combination with the endless aprons, W and W', I claim the guides, T2 and T', when attached to the standards, T, T', and so constructed as to carry the cut grass over and beyond the endless aprons, substantially as set forth.

4th, The driving-wheel, B, and cap-shaped wheel, C, constructed as described, in combination with the spur-wheels, G, H, and K, substantially as and for the purpose set forth.

5th, The shoe, y, in combination with the wheel, Y, and roller, x', arranged substantially as and for the purpose set forth.

6th, The combination of the teeth, P2, shaft, N, and rollers, P3, substantially as and for the purpose set forth.

55,980.—WATER-ELEVATOR.—J. C. Barrett, Stamford, Conn.:

I claim, 1st, The lazy tongs, B, in combination with the lever, D, provided with the rocker, E, all being arranged substantially as and for the purpose set forth.

2d, The pendant rod, I, provided with the cross-head, j, and attached to the lazy tongs, in connection with the lip, k, on the bucket, substantially as and for the purpose specified.

55,981.—SASH-FASTENING.—H. De Baum, Paterson, N. J.:

I claim the combination of the case, E, latch, D, and spring, e, operating with the rack, C, when constructed and arranged in the manner and for the purpose herein specified.

55,982.—WASH-STAND.—Alfred Bayley, Newark, N. J.:

I claim as a new article of manufacture a portable metallic wash-stand, constructed and its parts arranged substantially as described.

55,983.—BEVERAGE.—George Beck, Rochester, N. Y.:

I claim the production of a beverage by the mixture of wine or other similar fermented liquor with water, in the proportions set forth or thereabout, and the addition of sugar to produce a secondary fermentation, to be conducted and continued in a close vessel, so as to retain the gases produced thereby, for excluding the air and expelling the beverage in an effervescent state, substantially as and for the purpose herein specified.

55,984.—PLOW.—Solomon Beckett, Olive Branch, Ohio:

I claim, 1st, The sheathing plate, B, fitted and secured to "mold-board," A, of a plow, for the purpose above described and set forth.

2d, The sheathing plate, B, in combination with cutter, C.

55,985.—CARRIAGE SPRING.—B. M. Beckwith, Plattsburg, N. Y.:

I claim the boxes, F, applied to the hind axle and bolster of a buggy to admit of the attachment of the springs and permit their extremities to vibrate about the points of support, substantially as and for the objects specified.

55,986.—WASHING MACHINE.—Ormus D. Beebe, Beaver Dam, Wis.:

I claim, 1st, Securing the slats, c, c, within the tub, upon the

metallic bottom, by having them extend under or mitering with the sides, A, A, substantially as and for the purposes herein set forth.

2d, The combination of the metallic bottom with the slats, c, c, lying thereon, and mitered with the sides, as herein set forth.

55,987.—CARRIAGE HINGE.—George W. Beers, Bridgeport, Conn.:

I claim the plates, E and G, and the catch, F, constructed as described, in combination with the swinging arm of an ordinary concealed carriage door-hinge, substantially as described and for the purpose set forth.

55,988.—IMPLEMENT FOR GROOVING THE MOUTHS OF GLASS BOTTLES.—Edwin Bennett, Philadelphia, Pa.:

I claim the application to a glass-blower's bottle-clamp of the toothed wheels, C, E, the same being arranged and operated substantially as and for the purpose described.

55,989.—CAR-COUPLING.—William Bergmann, Philadelphia, Pa.:

I claim the casings, A and A', with their dogs, H, H', levers, F, F', and links, M, M', in combination with the within-described devices, or their equivalents, for operating the levers and securing the dogs, the whole being constructed and operating substantially as and for the purpose specified.

55,990.—CRADLE AND CHAIR.—Alois Berny, Williamsburg, N. Y.:

I claim a chair provided with a hinged additional seat, additional back, and hinged additional arm-pieces, said seat being made to swivel on its frame, D, and the arm-pieces being secured to each other, and to the seat, A, by catches, c, and screw, o, or other equivalent fastening, substantially as and for the purpose described.

55,991.—CLOTHES-TONGS.—John T. Bever, Bethel, Ill.:

I claim, as a new article of manufacture, the within-described clothes tongs, to wit, a pair of wooden tongs furnished at their ends with united wooden hemispheres, as described.

55,992.—GIB FOR CROSS-HEAD.—William R. Bishop, Sherwood, Wis.:

I claim a gib composed of a metal body, A, and strip of leather, a, substantially as and for the purpose described.

55,993.—CULTIVATOR.—A. M. Black, Auburn, N. Y.:

I claim, 1st, The pole, a, having a cross-bar, A, rigidly secured thereto, and a frame-work composed of the plow-beams, B, B, with cross-pieces, b, b', pivoted to the ends of said cross-bar, A, substantially in the manner and for the purpose specified.

2d, The cross-bar, A, plow-beams and frame, B, B, b, b', the adjustable prop, c, and lever, H, all arranged and operating in the manner and for the purpose set forth.

3d, The hook and eyebolts, f, f, which project from the inside of the plow-beams, B, B, and fasten the standards, m, m, to beams, B, B, the connecting-rod, g, eye and rod fastening in cross-piece, b.

55,994.—GAS-PURIFIER.—Richard C. Bocking, Indianapolis, Ind.:

I claim, 1st, The combination of the liquid reservoir, tube, B, and the wheel provided with vanes having reticulated surfaces, and revolving on a horizontal axis under the impulse of the entering gas, substantially as described.

2d, The mode of having the said wheel in orifices in the sides of the chamber, capped on the outside, as described.

3d, The combination with the series of reticulated vanes of the bands, supported on the vanes by the pins or equivalent means.

55,995.—QUARTZ MILL.—John T. Bonnell, Columbia, Cal.:

I claim the drum, C, provided with ratchets, D, D, and a pendant rod, A, with a weight or bob, o, attached, in combination with the spur-wheels, E, E, placed loosely on the shaft of drum, C, and provided with pawls, F, to engage with the ratchets, D, the above parts being used in connection with the pinions, I, I, on the shafts, J, J, which actuate the weight or pounder-rods, L, substantially as and for the purpose specified.

55,996.—CHURN.—Jacob Boyers, Orrville, Ohio:

I claim, 1st, The oblique shaft, C, as arranged in its connection with the dasher-shaft, D, by means of the curved plate, b, and staples, b', as to give an oblique or nearly rectilinear rotary motion, when operating substantially in the manner and for the purpose herein set forth.

2d, The retention of the rod of the oblique shaft, C, in its axis by the flexible rod, E, and pivot, c, as arranged and applied substantially in the manner and for the purpose as herein set forth.

3d, The movable slide-plate, F, strips, e, e, and bridge-plate, d, in its connection with the dasher-shaft, D, as arranged substantially in the manner and for the purpose as herein set forth.

4th, The flexible rod, f, pin, f', and catch, g, for retaining the slide-plate, F, when in operation, substantially in the manner as arranged and for the purpose as herein set forth.

5th, The disk, a', and air-tube, a, as arranged in combination with the lid, B, substantially in the manner and for the purpose as herein set forth.

55,997.—COAL STOVE.—Nathaniel A. Boynton, New York City:

I claim the combination of the flanged fire-chamber, B, cylinder, C, cylinder, D, with perforated bottom, G, forming an annular space, E, air flues, F, semi-circular flue, G, and exit flue, H, all arranged and operating in the manner and for the purpose herein described.

55,998.—BEEHIVE.—Joseph Bradt, La Porte, Ind.:

I claim the arrangement of the doors, B and E, flap, d, incline, plates, g, g, comb frames, F, and hinged cap, A, substantially as and for the purposes set forth.

55,999.—PLOW.—T. E. C. Brimly, Louisville, Ky.:

I claim a plow provided with a point, E, welded, rolled, or otherwise formed or permanently secured to a steel mold-board, with a hook or shoulder, b, at its under side to fit over the front end of the land-side of the plow, substantially as herein shown and described.

56,000.—HAY RAKE.—Hiram Brown, Cape Elizabeth, Maine:

I claim the combination and arrangement of the frame, A, connecting-rod, B, arm, C, and hinges or bands, D, attached to the tongue and head of a rake, as herein set forth, and operating as and for the purposes described.

56,001.—WASHING MACHINE.—William Burnham, Union City, Mich.:

I claim, 1st, The employment of a revolving tub, C, in combination with the fluted conical rollers, R, R, which rollers operate against the clothes by spring pressure, and are arranged relatively with and connected to the frame of the machine, substantially in the manner and for the purpose herein specified.

2d, The combination of the band, M, pulley, P, P1, and P2, with the machine frame and tub-shaft, D, substantially as and for the purpose set forth.

56,002.—APPARATUS FOR RAISING BREAD.—Ezra Buss, Springfield, Ohio:

I claim, 1st, A box or chamber, A, for receiving the dough to be raised, when provided with a close vessel filled with heated water for communicating a very gradual, continuous, dry heat to the atmosphere within the chamber, and arranged and operating substantially as herein specified.

I also claim locating the hot-water vessel, H, in a drawer, G, closed except at the top, and provided with apertures near the bottom, substantially as and for the purposes herein set forth.

I also claim providing the chamber with an opening, C, con-

trolled by a valve, e, for the purpose of admitting fresh air therein and of regulating the temperature inside, as herein described.

I also claim the opening, D, in the top controlled by a valve, d, for the purpose specified.

I also claim the use of a thermometer, a, in connection with the apparatus, arranged substantially as specified.

I also claim the use of the glass, b, in the door or side, for the purpose set forth.

56,003.—LEEWAY INDICATOR FOR VESSELS.—Thomas Byrne, New York City:

I claim an apparatus for indicating the leeway of a vessel, consisting of a graduated plate attached to an oscillating support, whether such support presents a plane conical or globular surface, and of an index-finger operated by a cord and a plummet or other equivalent device in the water, and vibrating on a fixed pivot with a double support, or on double hinges, substantially as and for the purpose set forth.

56,004.—OILER.—George J. Capewell, West Cheshire, Conn.:

I claim an oiler constructed with the tube, C, and the tube, D, in combination with the swivel joint, substantially as and for the purpose herein described.

56,005.—TABLE-LEAF SUPPORT.—L. R. Cavender, Eureka, Ill.:

I claim an improved table-leaf support formed by combining the pivoted arm, F, the spring, H, and cord, I, constructed and arranged substantially as herein described with each other and with the frame, A, of the table, for the purpose set forth.

56,006.—FIRE-ESCAPE.—J. A. Chambert, Ogdensburg, N. Y.:

I claim, 1st, The combination of the rollers, C, sectional ladder, E, hinged as described, and sliding-frame, D, substantially as and for the purpose set forth.

2d, The supports, B, with the flanges, P, in combination with the sectional ladder, E, and the gearing for elevating the same, the parts being severally constructed and arranged for use, substantially as and for the purpose set forth.

56,007.—PEN AND PENCIL-HOLDER.—James M. Clark, Jersey City, N. J.:

I claim the slotted tube, e, with its ring, i, in combination with the screw-tube, c, attached to the tube, h, and acting upon the pen-socket, o, introduced between the tubes, c and e, in the manner and for the purposes set forth.

56,008.—BED-BUG PROTECTOR FOR BEDSTEADS.—Samuel Clarke, New York City:

I claim, 1st, The combination of the cup, B, and ring, C, with its pendant flange, D, substantially in the manner represented and described.

2d, The pendant flange, D, in combination with the cup or guard, B, and support, A, and with the legs of a bedstead, substantially as and for the purpose specified.

56,009.—CANE-STRIPPER AND KNIFE COMBINED.—Robert Conarroe, Camden, Ohio:

I claim the cane-knife and stripper, consisting of a handled blade provided with a spring gripping jaw which is supported by the guard, E, and combined with the blade by means of the forked ends, w, substantially as described and represented.

56,010.—COMBINED LAMP-CHIMNEY AND SHADE.—Joseph H. Connelly, Wheeling, West Va.:

I claim the combination with the glass chimney, A, and metal top, B, of the shade or reflector, C, when provided with supporting points, c, c, c, and otherwise, constructed and applied as herein specified, to leave an air-space between it and the chimney, lessen the conduction of heat, permit its ready removal, and avoid confining the glass, substantially as set forth.

56,011.—LAMP-SHADE SUPPORTER.—Joseph H. Connelly, Wheeling, West Va.:

I claim a lamp-shade or screen, B, having a metallic rim, a, and a wire or other metal band, c, arranged substantially as set forth, in combination with a supporter consisting of the collar, D, and suspenders and hook, c, d, e, constructed and operating substantially as described, for the purpose of adapting the shade, B, to use with a common bulged chimney or a straight wide chimney, as set forth.

56,012.—DRAFT ATTACHMENT.—Charles W. Connelly, Rochester, N. Y.:

I claim, 1st, The adjustable bows, B, when attached to the front of the hames and used without tugs, substantially as and for the purposes set forth.

2d, In combination with the bows, B, the suspension straps, S, and the steadying straps, S'.

3d, The swivelled clip, C, constructed and arranged as described and for the purposes set forth.

56,013.—GONIOMETER.—William W. Cooper, Washington, D. C.:

I claim an instrument constructed substantially as herein described, and which when made of pocket size, or any other size, serves for measuring vertical angles with great precision, by means of a spirit-level and graduation made along a spiral or zigzag, grooved to receive the free ends of the case which carries the spirit-level bulb.

56,014.—SAFETY WATCH-POCKET.—William W. Covell, New York City:

I claim a watch-protector formed of a case having a spring connected with the hinges by which it is held closed, and against the force of which it must be opened, and having loops upon the rear side by which it is to be attached to the interior side of the pocket, all substantially as described.

56,015.—HEATING-STOVE.—Daniel M. Cummings, Enfield, N. H.:

I claim the combination and arrangement of air-flues or passages, c, a, d, o, n, r, together or singly, with the fire-box or chamber of a stove constructed for heating purposes, substantially in the manner and for the purpose herein set forth.

I claim, also, the combination and arrangement of the direct air-flues, n, with the radiating flues, c, e, f, of a heating stove, A, substantially in the manner and for the purpose herein set forth.

56,016.—HOOP-SKIRT.—Theodore D. Day, New York City:

I claim, 1st, A spring forming the edges of the opening at the upper and front part of a skeleton skirt, for the purposes and as set forth.

2d, The edge-springs, e, in combination with the bustle-springs, b, b, the ends of said bustle-springs being connected to the edge-springs by hinges or otherwise, as specified.

3d, Attaching the ends of the edge-springs, e, to the upper body hoop or hoops, a, of the skeleton skirt, for the purpose and as set forth.

56,017.—LOW-WATER DETECTOR.—Jules Delery, Parish of St. Bernard, La.:

I claim the general arrangement of all the different parts composing my machine, and the combination of the device with the steam-boilers, in the manner and for the purpose described.

56,018.—DUST-BRUSH AND BROOM.—Andrew Dietz, New York City:

I claim the use and application of leather in the construction of brushes and brooms, substantially as and for the purposes set forth.

56,019.—GATE.—Chas. Dixon and S. H. Close, Port Byron, N. Y.:

We claim, 1st, The spur-wheel, G, shaft, E, and bevel-gear,

wheel, H and K, constructed and arranged as described, in combination with each other, with the gate-post, D, and with the rear upright bar, A, of the gate, A, substantially as described and for the purpose set forth.

2d, The combination of the levers, S and T, and band or chain, R, with each other and with the spur-wheel, G, substantially as described and for the purpose set forth.

3d, The combination of the pin, M, band, L, and rod, O, with each other and with the shaft, E, and bolt, F, substantially as described and for the purpose set forth.

4th, The combination of the pin, J, with the shaft, E, and gear-wheel, H, substantially as described and for the purpose set forth.

56,020.—SEWING MACHINE.—George L. Dulaney, Mechanicsburg, Pa.:

I claim, 1st, The construction of a looping-hook formed of one individual piece of metal of the shape shown at f2, g2, g3, and so connecting said hook in such a manner directly on to the extremity of a rotating axle as to dispense with all secondary joints, rods, elbows, or crank-arms; and so also that while its pivoted end, c2, moves within a slot, j2, up and down with a reciprocating motion, the hooked or barbed end, g2, g3, moves in and describes parts of an ellipse, E, E, and also diagonal lines, R, R, as shown in Fig. 11, the action of said looping-hook being received direct from the end of a primary axle, the motions of both being around one common center, as shown and described.

2d, The manner or mode of constructing, combining, and arranging the cloth "feeding-wheel," r2, r3, r4, so that the hub or center, q2, thereof revolves over and around a stationary sleeve, p2, within which sleeve rotates the driving axle, a2, a3, Fig. 1, and through which construction the action of a primary driving-wheel is communicated direct to said feeding-wheel, and by which combination and arrangement the looping-hook, f2, g2, g3, receives direct motion, and whereby great simplicity, compactness, and durability of construction are attained, substantially as and for the purposes set forth and described.

3d, The manner or mode of hanging or attaching the cloth feeding-wheel, r2, r3, on to a jointed, hinged, or pivoted standard bracket, bearing, or an axle, W, W, so that said feeding-wheel may be cast off or turned outwardly to one side out of position, or from beneath the material, in the manner as shown by dotted lines in Fig. 1, as and for the purposes set forth and described.

4th, The construction and arrangement of the laterally working detached clutch devices, d3, d3, c3, c3, with the yoke-wires, f4, f4, g4, g4, and the vibrating-lever, x2, x2, y2, y2, as set forth and for the purpose specified.

5th, The peculiar construction and arrangement of the thread tension-wheel, m, m, l3, j3, and the detachable lifting and intermittently acting lever-clutch, n, n, h3, Figs. 1 and 2, or its equivalent, for the purpose substantially as set forth and described.

6th, The peculiar construction of the stationary spool-case holder, K2, K2, L2, L2, Figs. 2, 3, and 16, formed of two concave jaw-like pieces provided with (or without) the slot, n6, together with the latch or spool-case guard, n2, n2, Figs. 1, 2, 3, and 16, or its equivalent, as set forth and described and for the purpose specified.

7th, The detachable shield, n5, or its equivalent, in combination with the spool-case holder, for the purpose as set forth and described.

8th, I claim the construction of the inclosed spool-case (or its equivalent) Figs. 7, 8, and 9, together with the encompassing wire-fillet, formed as shown in Figs. 7 and 10, for the purpose substantially as set forth and described.

9th, Constructing a sewing-machine needle with short abrupt grooves, one edge of one (or both) of the grooves being indented or cut away immediately at the side of the eye, as shown at f5, Fig. 12, and by which form of construction any kink, knot, or inequality of thread is prevented from chafing, catching, or clogging between the needle and edge of the needle-puncture at the position where one thread overlaps the other close to the edge of the needle, as herein described, as and for the purpose specified.

56,021.—OPERATING ORDNANCE.—James B. Eads, St. Louis, Mo.:

I claim, 1st, The arrangement and combination of the gun-trunnions, A, with the boxes, A, levers, a22, the support, c, screw-shaft, d, nut, e, and connections acting to permanently support the gun at d', and to raise and lower the same, substantially as set forth.

2d, The arrangement and combination of the trunnions, A, boxes, A', slots, b, levers, a22, pin, a23, and guides, f, as shown in Figs. 1, 2, and 3, or their general equivalent combination of the trunnions, A, boxes, A', and circular slots, b, of Figs. 4 and 5, when used to produce a change in the axial direction of the gun, substantially as set forth.

3d, The combination and arrangement of the different parts mentioned in my foregoing first and second claims to produce a pendulous gun-motion about a horizontal axis lying in or near the face of the gun, as set forth.

56,022.—CULTIVATOR.—Thos. E. Ellett, Monmouth, Ill.:

I claim, 1st, The combination of wheel, A, bar, P, and axles, G, G, with the ends at right angles, for the purpose substantially as described.

2d, The attachment of tongue with side movement, substantially as described.

3d, The bars, H, H, for supporting axle-boxes, F, and clevis, O, substantially as and for the purpose described.

4th, The rod, 2, for the purpose described.

5th, The combination of the axle, G, bars, H, H, wheel, A, and tongue, in a manner to produce side movement, for the purpose and substantially as described.

56,023.—HAY-LOADER.—Wm. H. Elliott, New York City:

I claim, 1st, Joining the arm, c, d, e, to revolving base, b, by means of pivot-bearings, p, so that the arm may have a vertical movement, as described.

2d, The spring-clasp, h, in combination with the fork-handle, g, and cord, m', substantially as and for the purpose set forth.

56,024.—SHEEP-FEEDING RACK.—M. S. Every, Bridgewater, Mich.:

I claim, 1st, The roof, c, c, hinged at the outer edges as described, so as to fall down and shut off access to the troughs whilst the latter are being filled with the feed, substantially as specified.

2d, The manner of pivoting the troughs so that they can be emptied, substantially as specified.

56,025.—SCRUBBING BRUSH.—B. Figer, Cleveland, Ohio:

I claim the removable back or brush, C, in combination with the head, A, and screw-bolts, in the manner and for the purpose set forth.

56,026.—MANUFACTURE OF STEEL.—Anthony L. Fleury, Pittsburg, Pa.:

I claim the processes herein described for the manufacture of bars, rails, or ingots, or steel like iron by treating wrought-iron with melted cast-iron and subjecting the product to the varied treatment of squeezing, compressing, rolling, or hammering, substantially as set forth.

56,027.—DESULPHURIZING GOLD AND SILVER ORES.—Anthony L. Fleury, Pittsburg, Pa.:

I claim, 1st, To treat sulphurets containing gold or silver in the way and for the purpose specified.

2d, The compound obtained, denominated as metalliferous eoke, when prepared as above specified.

56,028.—TETHER.—C. L. Folsom, Upper Gilmanton, N. H.:

I claim the construction and arrangement of the swivel-ring, G, and its swivel collar, a, and sleeve, b, substantially as and for the purpose herein specified.

56,029.—STEAM TRAP.—Albert M. Force, Norwich, Conn.:

I claim, 1st, The cylinder having escape-port, G, piston, B, attached to a hollow stem or tube, C, connected with an expanding tube fixed at one end, when combined and arranged together substantially in the manner described, so as to operate as and for the purpose specified.

2d, So hanging the cylinder to the bed-piece, that it can be moved laterally thereon, to adjust its escape-port to the piston, substantially as described.

3d, So constructing or forming the piston, B, that the steam within its chamber or cylinder will act upon both sides and thus balance the same, substantially as specified.

56,030.—CAR-BRAKE.—Nelson R. Forrest, Auburn, N. Y.:

I claim, 1st, The cam, C, placed on the axle of a railway car, for the purpose of actuating automatically a brake, substantially in the manner set forth.

2d, The device for automatically stopping and releasing the hook, M', by means of a pulley, H, and levers, I and L, constructed and arranged substantially as set forth.

56,031.—WASHING MACHINE.—Gilbert S. Foster, Sullivan, Maine:

I claim my improved washing machine, as composed of the washboard, the sectional rubber, the center bolt, and the spring, constructed, arranged, and combined substantially in manner and so as to operate as specified.

56,032.—CAR-SPRING.—Carlos French, Seymour, Conn.:

I claim a car or other spring made of a steel plate previously folded into two, three, four, or more folds, and then bent into form around a mandrel or over a former, substantially as and for the purpose described.

56,033.—TOOL FOR CUTTING TWIST DRILLS.—Wm. Frost, Newark, N. J.:

I claim a tool for cutting twist drills in which that surface or portion which cuts that side of the groove terminating in straight cutting lip shall have a curvature, and the tool be otherwise constructed substantially as described and indicated in Fig. 3 of the drawings.

56,034.—SHIP'S WINDLASS.—John S. Getchell, Machias, Maine:

I claim the combination of the two sets of single or double pawls, L and M, and bent lever-stop, N, with each other, with the lever, H, and with the ratchet-wheels, G, of the windlass, B, substantially as herein described and for the purposes set forth.

56,035.—SCRUBBING BRUSH.—R. P. Gillett, Sparta, Wis.:

I claim the combination of the frame, A, alternate layers of bristles, b, b, or their equivalents, and cross-blocks, c, screw-bolts, B, having nuts, D, and center cross-bar, C, when arranged together so as to operate in the manner and for the purpose described.

56,036.—CHURN.—Theophilus Gillmor, St. Louis, Mo.:

I claim, 1st, The combination of the crank, connecting-rod, and cylinder, substantially as described and for the purpose set forth.

2d, The combination and use of a strap-joint on the connecting-rod, E, with the crank, B2, when used to connect the churn cylinder, C, with the motive power, as set forth.

3d, The combination of the cylinder, C, with the head, C1, and its scoop, C2, also with the inlet funnel, C3, and the outlet faucet, C2, substantially as described and set forth.

56,037.—WOOL-BURRING MACHINE.—C. L. Goddard, New York City:

I claim the manner of constructing inner or skeleton cylinders for burring machines of thin bars or strips of metal inserted in slots in the heads on the shaft, substantially as and for the purpose described.

56,038.—CYLINDER FOR WOOL-BURRING AND CARDING MACHINES.—C. L. Goddard, New York City:

I claim the manner of constructing cylinders for burring and carding machines of a series of wooden lugs secured to two heads on the shaft, and with radial bars inserted in grooves or gains cut into the periphery, substantially as and for the purpose described.

56,039.—GATE.—John H. Graves, Rochester, N. Y.:

I claim the employment in connection with a sliding gate of the extension guide, c, running on rollers, d, f, and provided with sockets or depressions, i, k, l, for fitting over the said rollers, and closed by the reaction of a weight or spring, substantially as described.

I also claim in combination with the above forming the lower edge of the guide, c, and the periphery of the roller, d, with the tongue and groove, g, h, substantially as and for the purpose specified.

I also claim the combination of the catch, q, and handles, r, r, with the projection, o, of the extension guide, when so arranged as to hold the gate from being raised and thrown back when closed, substantially as specified.

I also claim the special arrangement of the wire, w, with the sliding weight, v, cord, t, and pulleys, u, f, for producing the reaction of the gate, as set forth.

56,040.—ROOFING CEMENT.—William Green, Cleveland, Ohio:

I claim a cement or paint for roofing, or other purposes for which it may be adapted, composed of pulverized iron ore in combination with pulverized slate, stone, coal, coke, or other of them, the said substances being mixed with mineral or other oils, as herein specified, applied, and used, as set forth.

56,041.—RANGE AND FURNACE COMBINED.—William A. Greene, Troy, N. Y.:

1st, In combination with the oven-flues, P', P', and combustion-chamber, A, I claim the direct communication-flue, N, arranged in manner substantially and for the purposes as herein set forth.

2d, The removable partition plate or wall, D, or its equivalent device, arranged in manner substantially and for the purpose as herein specified.

3d, In combination with the removable partition plate, D, or its equivalent device, and the flue, C, I claim the arrangement of the boiler-hole plate, J, and the sliding doors, L, L, for the purpose of forming additional fire-chamber space, in manner substantially and for the purposes as herein set forth.

4th, In combination with the oven-flues, P', P', and direct flue, N, I claim the arrangement of the dampers, b and c, to operate with reference to each other in manner and for the purpose as herein shown.

56,042.—CONSTRUCTION OF METAL WHEELS.—Ansee Haines, Pekin, Ill., and John Kirkman, Kiekapoo, Ill.:

We claim, 1st, The combination of a wrought-metal felloe ring or rings, formed of angle iron or angle steel of the shape substantially as shown, with wrought-metal spokes formed of angle iron or angle steel, of the shape substantially as shown, the said felloe ring or rings being encircled by a tree, and the said spokes being fastened by their outer ends to the flange of the felloe ring or rings, and their inner ends cast into the metal hub, all substantially in the manner and for the purpose herein described.

2d, The manner substantially as herein described of constructing and applying removable thimbles, a, a, to the cast-metal hub of the wheel, for the purpose set forth.

56,043.—BRIDGE.—David Hammond, Canton, Ohio:

I claim, 1st, The peculiar combinations of the double T-irons, b, b, and clamping-pieces, D or P, with bolts, M, M, and hole, N, substantially in the manner and for the purpose herein set forth.

2d, The peculiar combination of the covering-piece, H, the double T-irons, b, b, the securing pieces, J, J, with bolt, e, and nut, K, thereon, substantially in the manner and for the purpose herein set forth.

56,044.—COMPOSITION OF MATTER FOR RENDERING PAINT FIRE-PROOF.—Joseph B. Harris, Germantown, Ky.:

I claim the combination of calcined schist, shell, or mineral coal, prepared as above described, with any kind of oil paint, to render the same unflammable or fire-proof, substantially as above set forth.

56,045.—STEAM-ENGINE VALVES, ETC.—R. Francis Hatfield, New York City:

I claim, 1st, A rotary valve arranged to supply alternately the parts of two or four double-acting cylinders as required when the shaft-cranks are placed at right angles to one another, substantially as shown and described.

2d, The rotary valve, I, Fig. 10, constructed with two or more wings as shown at Figs. 10, 14, and 21, in connection with the arrangement of the ports, 1, 2, 3, and 4, Figs. 9, 13, and 19, substantially as described and for the purpose specified.

3d, The crank-pin bosses, 1 and q, Fig. 24, in combination with the screw-bolts, p, p, and the screw-channel in the piece, q, substantially as described and for the purpose set forth.

4th, Arranging the upper part, r, r, Fig. 24, of the crank cross-head to serve as an oil-cup, in combination with the supply wicks, u, u, u, substantially as shown.

5th, The combination of the above several improvements, as shown by the drawings.

56,046.—LEATHER-STRIP.—Hiram A. Hawkins, Vir-dien, Ill.:

I claim the strip, a, in combination with the sliding-lever, c, rollers, E and o, and spring, m, and the incline, n, when said parts are constructed and arranged to operate substantially as and for the purpose set forth.

56,047.—QUARTZ STAMP-MILL.—Alexander Herdlein, Egan Cañon, Nevada:

I claim, 1st, The double-armed levers, F, in combination with the stampers, E, and cranks or other equivalent devices on the driving-shaft, C, constructed and operating substantially as and for the purpose described.

2d, The hinged tappets, 1, in combination with the adjustable heads, G, levers, F, and stampers, E, constructed and operating substantially as and for the purpose set forth.

56,048.—MACHINE FOR FOLDING CLOTH.—William F. Heywood, Cumberland, R. I.:

I claim, 1st, The spring nipping-jaws, E, E, in combination with the pendulum frame, C2, and operating together in the manner substantially as described.

2d, An elastic table, M, in combination with the pendulum frame, C2, substantially as described.

3d, Combining with the piece of cloth to be folded the belt-shipping apparatus herein described, operating as and for the purposes set forth.

56,049.—SAFETY POCKET.—William Hindhaugh, New York City:

I claim the bolt, D, and spring-frame, B, in combination with the mouth of a pocket constructed and operating substantially as and for the purpose described.

56,050.—CHURN.—Edwin Hoyt, Stamford, Conn.:

What I claim is a churn in which all the parts described and represented are arranged in the manner set forth.

56,051.—SOLDERING LAMP AND BLOW-PIPE.—John S. Hull, Cincinnati, Ohio:

I claim the arrangement of the condensing pump on the outside of the reservoir, substantially as and for the purpose herein specified.

I also claim the employment of a cut-off valve, c, between the pump and the reservoir, for the purpose set forth.

I also claim the employment of a regulating and cut-off valve, E, between the reservoir and the gas-generator, as described.

I also claim a regulating valve, I, between the gas-generator, G, and the jet orifice, L, as herein set forth.

I also claim the employment of a gas-generating burner, supplied by gas produced by the gas-generator itself, together with the main supply, substantially as and for the purpose herein specified.

56,052.—GAS-HEATER FOR COOKING ETC.—John S. Hull, Cincinnati, Ohio:

I claim the employment of atmospheric pressure to force the liquid to the burner, in combination with a self-generating gas-burner for cooking and heating purposes, so as to produce a blowing jet of flame at any distance from the reservoir, substantially as herein specified.

I also claim the gas-generating burner retort, M, constructed and operating substantially as described in combination with the condensing-pump and reservoir for forcing the oil to the "retort," for the purpose specified.

I also claim the air-valve, H, having a cork cushion, covered with buckskin, or its equivalent, when applied to the condensing-pump of the reservoir of a cooking apparatus supplied by the force of atmospheric pressure, substantially as described.

I also claim surrounding the pump with the case or tube, C, arranged in combination with the condensing-pump and reservoir of a cooking apparatus supplied by the force of atmospheric pressure, substantially as set forth.

I also claim the packing of asbestos around the stem of the jet-regulator, for the purpose herein set forth.

56,053.—HAND CORN-PLANTER.—D. Humphreys, Oskaloosa, Iowa:

I claim the arrangement in a hand corn-planter of the compound slide, H, I, having the described slotted wings, J, J, and K, k, openings, b and l, and rod, h', in combination with the stud, f, for the plunger, F, on the openings, b, b', in the floor, B, as set forth.

56,054.—FIBROUS PACKING FOR STEAM-ENGINE.—J. L. Husband, Philadelphia, Pa. Ante-dated June 19, 1866:

I claim the manufacture of packing for steam-engines, as herein-before described and more specifically set forth, and desire to secure the same by letters-patent therefor.

56,055.—CIGAR PRESS.—Anthony Iske, Lancaster, Pa.:

I claim the arrangement of my combined cases, A, B, constructed by alternate slats, o, y, and spaces meshing one into the other, substantially in the manner and for the purpose specified.

I also claim the use of clamping-irons, I, or their equivalent, for securing the pressure when removed from the press until the cigars have dried, substantially in the manner specified.

56,056.—MILK RACK.—Albert Jackson, Clifton Springs, N. Y.:

I claim, 1st, The combination of the ring-guards, E, with the supporting-arms, D, and wire, F, substantially as described and for the purpose set forth.

2d, The combination of the tin-plate, C, or its equivalent, with the standard, B, substantially as described and for the purpose set forth.

56,057.—VISE.—Abiezer Jameson, Trenton, N. J.:

I claim, 1st, The screw, E, with its convex collar or washer, adapted to the concave sliding washer, K, all substantially as and for the purpose described.

2d, The combination of the above with the washers, 3 and H, intervening between the collar, f, of the socket, F, and the fixed jaw, A, of the vise.

56,058.—TOOL FOR FINISHING AUGERS.—Russell Jennings, Deep River, Conn.:

I claim a rotary wheel or burr having a beveled surface, a, at one side, and a semi-circular edge or periphery corrugated to form a series of cutters, b, which have a radial or nearly radial position and extend from the inner edge of a to the outer edge of the same and entirely around the semi-circular periphery of

he wheel, in combination with the concave surface, c, at the opposite side of the wheel, substantially as and for the purpose herein set forth.

56,059.—DRILL CHUCK.—Frank G. Johnson, Brooklyn, N. Y.:

I claim, 1st, The double spring jaws, A, B, made with the tapering hole, R, P, between them, in the manner and for the purpose substantially as described.
2d, The combination of the said jaws, as described, with the chuck, C, and its tapering-bottomed socket, L, by means of which different-sized drills are at once both centred and held at the back end and about midway of their length by simply screwing up the nuts, E, E, essentially in the manner and for the purpose set forth.

56,060.—RAILROAD SWITCH.—Robert V. Jones, Canton, Ohio:

I claim, 1st, The lever, B, bar, E, arms, a, a, crooked uprights, D, D, treadle, M, and switch-rod, C, arranged and used substantially as herein specified.
2d, The pitman, H, and spring, K, working in the case, E, the same being locked by the spring, I, with plate, d, and key, g, said pitman being connected to the lever, B, the whole being constructed, arranged, and operating in the manner and for the purpose set forth.

56,061.—DEVICE FOR PREVENTING HOGS FROM ROOTING.—Whitcomb Judson, Galesburg, Ill.:

I claim the construction and application of the device on the top of the snout of a hog to prevent rooting, substantially in the manner as described.

56,062.—MACHINE FOR MAKING NUTS.—Edward Kaylor, Pittsburg, Pa.:

I claim, 1st, The combination of the side dies, F, F', so constructed as to inclose the nut on all sides but not at the ends, the square punch, d, stationary eye-punch, h, and swage, f, fitting the cavity formed by the side dies, constructed and operating substantially as described, for the purpose of making nuts by cutting off a square blank, forcing it over a perforating punch, molding it into shape, and finishing it with the blow of a hammer.
2d, Finishing the nut after it has been perforated and molded laterally into shape, and while still confined in the side dies, by means of the swage and hammer, substantially as herein-before described.

56,063.—SPRINKLER AND DREDGE.—M. Keep and S. R. Dummer, New York City:

We claim, 1st, The valve-stem, D, when provided with teeth, bars, flanges, or their equivalent, as and for the purposes herein described.
2d, A combination of the valve-stem, D, when barbed or flanged or provided with their equivalents, cups, H, spring, G, cover, B, operating substantially and for the purposes herein described.

56,064.—SOFA BEDSTEAD.—John S. Kinyan, Webster City, Iowa:

I claim, 1st, The hinged bottom, A, A', in combination with the hinged head and foot-boards, B, B', C, C', all arranged to operate substantially as herein specified.
2d, In combination with the above, I claim the catches, E, E, and recesses, F, F, substantially as described.

56,065.—HORSE-SHOE.—Peter A. La Frame, Elmira, N. Y.:

I claim the slotted shoe, B, when constructed with recesses in the upper face and elongated openings, D, in combination with the receiving plate, A, when constructed with a flange, C, on its inner edge.

56,066.—Suspended.

56,067.—BROOM-HEAD.—John H. Lightner, Shirleysburg, Pa.:

I claim, 1st, The toothed bars, I, constructed as described, in combination with the side-plate, B, and door or flap, H, of the broom-head, substantially as described and for the purpose set forth.

2d, The combination of the hand, K, constructed and arranged as described, with the side-plate, B, and door or flap, K, substantially as described and for the purpose set forth.
3d, Hinging the door or flap, H, to the solid part of the side-plate, A, at the upper edge of the notch formed in said side-plate, substantially as described and for the purpose set forth.
4th, Securing the handle, E, to the cap, A, B, C, by the wire, G, passing through the notch, e', formed in the side of the said handle, E, substantially as described and for the purpose set forth.

56,068.—TOILET SOAP.—George H. Lincoln, Providence, R. I.:

I claim the improvement in soap described, consisting of a bar or cake of soap made up of soaps of different colors and arranged so as to exhibit an infaceable ornamental design or trade-mark in one or more contrasting colors, the article being substantially as specified.

56,069.—LOCK FOR MAIL-BAGS AND CARPET-SACKS.—John B. Logan, Thorntown, Ind.:

I claim, 1st, The combination of the slide-bolts, B, C, D, and stops e, e, slotted sliding bar, E, of the jaw, A, operating with the catches, f, g, h, of the jaw, A', constructed and arranged in the manner and for the purpose herein specified.
2d, The combination of the plate, G, and sliding bar, F, plates, F, F, and jaws, A, A', the plates having suitable holes, i, i, to receive the shackle of a padlock, and preventing the withdrawal of the bolts unless the padlock is removed, arranged in the manner herein represented and described.

56,070.—STEAM GAUGE.—Joshua Lowe, New York City:

I claim, 1st, The inverted cup, C, working in the annular chamber, D, in combination with a series of weights of gradually increasing size, and with a suitable index, all constructed and operating substantially as and for the purpose described.
2d, Arranging the walls of the annular chamber, D, as and for the purpose set forth.

56,071.—DOOR KEY-FASTENER.—Samuel Macferran, Philadelphia, Pa.:

I claim, 1st, Constructing the fastener, E, with the hooks, e, e, substantially in the manner herein-before described and for the purpose specified.
2d, The combination of the fastener, E, with the slide, F, by means of the eye, a, of the former, substantially as described and for the purpose specified.

56,072.—MEDICAL COMPOUND.—Lucinda Marmaduke, Shelbyville, Mo.:

I claim the compounding of said herbs or vegetables, as above described.

56,073.—WAGON SPRING.—Charles S. Martin, Milwaukee, Wis.:

I claim constructing the springs of vehicles of solid blocks of India-rubber, in the form of the frustrum of a cone or pyramid, or having only an opening sufficient for the passage of a bolt through them, substantially as set forth.

56,074.—WAGON SPRING.—Charles S. Martin, Milwaukee, Wis.:

I claim, 1st, Springs, M, inclosed within cylinder, K, substantially as and for the purpose described.
2d, Springs, O, in combination with bolster, C, bar, D, bolts, I, and cups, P, substantially as described.

56,075.—MEDICINE FOR HOG CHOLERA.—John L. Mason, Jefferson, Ky.:

I claim a combination of the components above-named in the proportion above set forth (or of any other components when combined resulting in a compound with similar properties), which components or combined compound is a prevention and cure of the disease popularly known as hog cholera.

56,076.—SEED-PLANTER.—Ives W. McGaffey, Chicago, Ill.:

I claim, 1st, The seed-distributing cylinder, having holes or cups in its periphery, with screws fitted into the cups for adjusting their capacity, and set-screw at the side to hold them in place, when adjusted in connection with the shifting-slide, N, constructed and operated in the manner and for the purpose substantially as specified.

2d, The adjustable cone or tooth-gears, g and h, for regulating and controlling the seeding device while the machine is moving over the field, constructed and operated substantially as and for the purposes specified.

3d, In combination with the adjustable toothed or cog-gear, g and h, and seeding device, I claim a revolving pointer or marker, P, for marking or indicating the position of the hills in automatic check-row planting.

4th, Constructing a brush for seed planting machines with cap, bolt, and nut for holding the bristles, in the manner specified, or its equivalent.

5th, The detachable spur or rod-cutter, r, fitted to the heel of the runner, in the manner and for the purpose specified.

6th, The oscillating plate, W, provided with the sockets for the lever, y, and having the arm, W', provided with the segmental rack, arranged to operate in combination with the pinion, y, on shaft, K, substantially as and for the purpose set forth.

56,077.—HARNES-MOTION OF LOOMS.—W. W. McGregor, Dedham, Mass.:

I claim the combination or mechanism, substantially as described, for operating the harness-carriers, the same consisting of two sets of levers, a, b, the connecting-rods, g, the vibratory arms, f, and the lifter, D, and its rotary cranked wheel, 3, with its crank-pin, r.

I also claim the combination of the rest-frame, F, or its equivalent, with the mechanism or combination, substantially as described, for operating the harness-carriers.

I also claim the combination of the stop-bar, y, and the series of studs or catches, z, with the rest-frame, E, the harness-carriers, and their operative mechanism, substantially as described.

I also claim the combination of the slot, u, and adjustable crank-pin, r, and the adjustable rest-frame, E, with the harness-carriers and the mechanism for operating them, substantially as described.

I also claim the application of the slotted curved arm, l, to the remainder of the lifter, D, so as to be adjustable with respect to the same, substantially as and for the purpose specified.

56,078.—COMPOSITION FOR COATING SHIPS.—Charles R. Milks, Waterford, N. Y.:

I claim a composition of matter compounded from the herein-upon named ingredients or their chemical equivalents, substantially in the manner and for the purposes set forth.

56,079.—BOTTLE-STOPPER.—T. W. Mirick, Boston, Mass.:

I claim in combination with the frusto-conical stopple, a, wire, c, hinge, d, and latch, e, the wire, c, when bent into two parts, each passing through the stopple, and thus serving both to hold the stopple down and to prevent any sidewise tipping movement.

56,080.—SASH-FASTENING.—R. E. Monaghan, West Chester, Pa.:

I claim the application of alternating inclined planes attached to both sides of window-sash, doors, gates, and other perpendicular slides, and the use of wheels or rollers and springs operating on both sides of the sash, doors, gates, and other perpendicular slides, and acting as braces to support the sash, doors, gates, and other perpendicular slides, for the purposes above set forth and described.

56,081.—WOVEN BAG.—Charles Moore, Trenton, N. J.:

I claim, 1st, As my invention and improvement in bags or sacks, increasing the filling or vent of the cloth gradually from the place of tying near the top to the bottom, to make the bag thicker, heavier, and strongest where it is subject to the greatest strain and the most wear, substantially as described.
2d, In combination with a bag woven gradually thicker from the place of tying to the bottom, I claim the thick welt or edge around the mouth or open end of the bag, formed substantially as described, for the purpose set forth.

56,082.—CLOTHES-SPRINKLER.—Herbert A. Morse, Canton, Mass.:

I claim in a clothes-sprinkler constructed as described and provided with the opening, D, the combination and arrangement of the flange, C, substantially as described and for the purposes set forth.

56,083.—SIFTER AND STRAINER.—James M. Muhley, Cambridge, Mass.:

I claim the combination and arrangement of the curved metallic beaters and the changeable sliding sieves and strainers, and the devices for securing them in position, as described, for the purpose specified.

56,084.—CAR SPRING.—William R. Nichols, Philadelphia, Pa.:

I claim, 1st, A car-spring constructed of a series of elliptical plates of steel, each of which is complete in itself, and of such size that, being arranged concentrically, they shall fit snugly upon one another, substantially in the manner set forth.

2d, In combination with the above-described form of springs, I claim the case, D, cap, E, and rods, C, when constructed and arranged for use, substantially in the manner and for the purpose set forth.

56,085.—CAR-COUPLING.—James A. Niman, Mansfield, Ohio:

I claim the combination of a pair of draw-bars, each constructed with a swinging-pin, A, an oscillating-bar, B, a link-bed, Q, Q, a link-holder, D, D, and bolt, C, substantially as described, and each provided with a coupling link, as and for the purpose described.

56,086.—ROW-LOCK.—Joseph W. Norcross, Middletown, Conn.:

I claim, 1st, The bed-plate, D, with cylindrical sockets or studs, E, in combination with the plate, C, and bed-plate, A, constructed and operating substantially as and for the purpose described.

2d, The wooden thole-pins, F, in combination with the segmental metal sockets, E, constructed and operating substantially as and for the purpose described.

3d, The latch, h, and lugs, c, d, in combination with the plates, C, D, and studs or sockets, E, constructed and operating substantially as and for the purpose described.

56,087.—TACKLE-BLOCK SHEAVE.—Joseph W. Norcross, Middletown, Conn.:

I claim a sheave composed of a metal pulley, B, and wooden cheeks, as a new article of manufacture, when composed of the shoulders, d, or the rim, a, to support the cheeks, C, and the projections or spurs, e, on the rim, to retain the cheeks in position, substantially as described.

56,088.—HARROW.—Oscar D. Padrick, Shelbyville, Ind.:

I claim the application of hinged harrow carrying-arms, C, C, to a rigid triangular harrow frame, A, in combination with the extensible braces, D, D, which are provided with means for fastening them together, substantially as described.

56,089.—SHEET-METAL WATER-WHEEL.—Rees Palmer, West Chester, Pa.:

I claim, in combination with the sheet-metal band, A, supported by the arms, D, as described, the sheet-metal buckets, B, when the said buckets are constructed and applied to the said band, in the manner and for the purpose described.

56,090.—TUYERE.—James Patterson, New York City:

I claim the combination of the rod, G, with its catch, e, the rods, E, F, and perforated conical valve, D, arranged relatively with the hollow base, A, and the fire-bed, B, with the conical flange, c, constructed and operating in the manner and for the purpose herein specified.

56,091.—DOUGH-KNEADER, MEAT-POUNDER, ETC.—Philander Perry, Charlestown, Mass.:

I claim, 1st, The spring, K, in combination with the jointed lever, or pillar and platform, when constructed and used substantially as described.

2d, The dovetailed groove for the purpose of holding the tools in connection with the movable lever and platform, all constructed and used substantially as described.

3d, The whole machine, being the combination of the above tools, viz., the beef-tenderer, potato-masher, meat-chopper, pastry-roller, and dough-kneader, or either of them, with the double-jointed lever, pillar, and platform, when constructed and used substantially as described.

56,092.—LAMP-CHIMNEY, BOTTLE, OR CAN-CLEANER.—C. M. Pond, Oberlin, Ohio:

I claim the adjustable rubber, A, and handle, B, when combined substantially as and for the purpose described.

56,093.—MOWING MACHINE.—Calvin Peed, Springfield, Ohio:

I claim, 1st, The cam-wheel, E, in combination with the rock-shaft, h, for operating the sickle-bar, D, when arranged as shown and described.

2d, Connecting the sliding-lever, p, to the shoe, K, by means of the bolt, l, and spiral rod, t, when said parts are arranged to operate as herein described.

3d, The combination of the levers, y and p, with the pivoted or hinged shoe, K, arranged and operating as and for the purpose set forth.

56,094.—REFRIGERATOR.—Charles B. Rees and J. B. Tevis, Philadelphia, Pa.:

We claim, 1st, Retaining the drippings from the ice in vertical and horizontal pipes, for the purpose specified and described.

2d, An adjusting carrying-block, for adjusting the height of the ice in the vertical pipes, substantially as shown.

3d, The vertical pipes, F, and the horizontal pipes, E, combined and arranged and situated either on one or both sides of the refrigerator, as specified and described.

4th, The vertical pipes, F, and the horizontal pipe, E, and the grip-pan, D, combined and arranged and placed either on one or both sides of the refrigerator, substantially as shown.

56,095.—MACHINERY FOR TAPPING NUTS.—David Reese, Newburg, Ohio:

I claim, 1st, The standards, b, sheaves, J, and weights, h, in combination with the mandrels, J, pinion, r, gear, H, and braces, f, arranged and operating in the manner and for the purpose set forth.

2d, The arrangement of the trough, C, revolving arms, E, E, and shaft, D, in combination with the gears, D' and C', and weighted stop, L, operating in the manner and for the purpose set forth.

3d, The stop, L, in combination with the revolving frame, K, as and for the purpose set forth.

56,096.—AUTOMATIC BOILER-FEEDER.—G. A. Riedel, Philadelphia, Pa.:

I claim, 1st, The two reservoirs, F and F', in combination with a chest, A, valves, B and B', and ports, pipes, and passages, substantially as described, the whole being applied to a steam boiler, and operating substantially as set forth.

2d, In combination with the two vibrating reservoirs, I claim the weight, H, so arranged and operating as to prevent the tendency of one reservoir to balance the other.

3d, The arrangement substantially as described of the tank, Q, and the injector, for the purpose specified.

56,097.—EVAPORATOR.—J. F. Riggs, St. Joseph, Mo.:

I claim, 1st, A cast-iron transverse current evaporator, when made in sections, so as to be able to increase the size of the pan by the insertion of one or more sections, substantially as and for the purpose described.

2d, Suspending a skimming apparatus over the pan by an elastic contrivance, for the purposes described.

3d, The sections, A, A, A, the connecting-rods, B, B, the lugs, C, C, C, substantially as and for the purposes described.

4th, The lugs, C, C, C, the connecting bolts, b, b, the side-bolts, h, h, substantially as and for the purposes described.

5th, A scum trough inclining from the ends towards the center with an opening covered with any suitable strainer, substantially as and for the purposes described.

6th, The socket, O, O, the elastic springs, T, T, the chains, t, t, the handles, s, s, the grooves, U, U, the sliding gates, V, V, and the hooks, X, X, substantially as and for the purposes described.

56,098.—WATER-BOX FOR TUYERES.—George M. Robinson, New Wilmington, Pa.:

I claim the water-box, h, with tuyere-pipe, g, passing through it, when constructed and arranged as described, the box being open on top and projecting outside of the back-wall or chimney for the purpose herein-before set forth.

56,099.—CUTLERY.—William W. Robinson, Ripon, Wis.:

I claim constructing and attaching the blades and handles of knives and forks in such manner that the handle, composed of any suitable material, shall be secured between the tongues, C, and to the flange, E, substantially in the manner set forth.

56,100.—SAW-GUMMER.—Phillip Roche, Binghamton, N. Y.:

I claim the combination and arrangement of the adjustable lever, B, sliding-block, D, eccentric lever, C, and indicator, E, substantially as described and for the purposes set forth.

56,101.—PUMP.—J. M. Roebuck and W. R. Reece, Donaldson, Pa.:

We claim in a pump the removable case, C, divided by partitions substantially as described, and furnished with valves and openings, as set forth, for the purpose of being readily repaired or renewed without disturbing the rest of the machinery, as set forth.

56,102.—CULTIVATOR.—John S. and Ira Rowell, Beaver Dam, Wis.:

We claim the combination of the slotted beam, A, shank, B, brace-bar, C, and bolt, D, when the parts are constructed and arranged to operate as and for the purposes herein specified.

56,103.—CHURN.—Jacob T. Rust, Oquaka Junction, Ill.:

I claim constructing, arranging, and operating the dashers, L, M, in the manner and for the purposes herein specified.

56,104.—COMBINED INKSTAND, WAFER OR SAND-BOX, CALENDAR, LETTER AND ENVELOPE HOLDER, AND PEN-RACK.—George Schmidt, New York City:

I claim the combination of inkstand, wafer or sand box, calendar, letter and envelope holder, and pen-rack, substantially as herein shown and described.

56,105.—FAUCET.—Conrad Schullian New York City:

I claim operating the air-valve or vent of a faucet by the action of the handle which serves to open and close the plug, substantially as and for the purpose set forth.

56,106.—MUSICAL INSTRUMENT.—Daniel Schuyler, Buffalo, N. Y.:

I claim a combination of valves and air-chambers so constructed and arranged that by blowing the wind through the air-chambers or drawing the wind back and out of the air-chambers the wind will in both cases pass through the reeds in one and the same direction, substantially for the purpose set forth.

56,107.—CARBON-OIL FIRE-TESTER.—George E. Shaw, Pittsburg, Pa.:

I claim, 1st, The water-bath, D, with its double casing, F, and top, E, as described, and the pipe, C, for the purpose of obtaining heat from the bottom only, as specified.

2d, The combination of the two thermometers, J and N, with the water-bath, D, and oil-pipe, H, for the purpose specified.

3d, The shield, P, with its notch, Q.

4th, The combination of the pivoted lever fire-brand holder, R, with the ring and rod, S, and the spring, T, arranged as described and acting as specified.

56,108.—QUARTZ-CRUSHER.—Thomas I Shaw, Philadelphia, Pa.:

I claim the employment of metal balls secured by chains to a revolving wheel, the whole constructed and operating for the purpose described.

56,109.—CHIMNEY-CAP.—J. Herbert Shedd and Benjamin Worcester, Waltham, Mass.:

We claim, 1st, The combination of a fixed cover above a flue, with a movable shield so adjusted as to be made by the force of the wind to close the opening between the flue and the cover on the windward side while the leeward side is left open.

2d, The construction and arrangement of the base, B, with its spherical surface, K, and of the cap, C, with its curved under surface and projection, M, substantially as described.

3d, The ring, E, with the tunnel-shaped jets, N, N, in combination with the base, B, and cap, C, substantially as described.

56,110.—WASHING AND WRINGING MACHINE.—W. S. Shoemaker, Greenwood, Md.:

I claim, 1st, The hinged shelf in combination with the wash-tub and the rollers, substantially as and for the purpose described.

2d, The hand-lever, J, in combination with the hinged shelf-rollers and wash-tub, substantially as and for the purpose described.

3d, The combination of the two squeezing-rollers, B, B', stretching-roller, D, rubber-belt, G, and hinged shelf, G', substantially as and for the purpose described.

56,111.—LIFTING-JACK.—Luther Smith, Rochester, Minn.:

I claim, 1st, The catch, G, actuated by the spiral spring, G', in combination with the jack-bar, B.

2d, The arrangement of a lifting-jack having the stock, A, bar, B, lever, D, stamp, E, catch, G, and spiral spring, G', the parts being constructed and combined substantially as and for the purpose set forth.

56,112.—BUTTER-WORKER AND MOLD.—T. D. Smith, Independence, Ohio:

I claim the arm, F, pivoted or hinged at E, and lever, H, pivoted or hinged at N, in combination with the frame, A, mold, P, and stamp, L, arranged as and for the purpose set forth.

56,113.—CAR SPITTOON.—Willison G. Smith, Carlisle, Pa.:

In combination with the sides of an inserted box of any shape, even with the floor of the car, I claim the adjustable lid and bottom connected by the bolt and sliding in the guides, as described.

56,114.—NAIL AND TACK.—Rachel Speer, Passaic, N. J.:

I claim making nails and tacks with bodies formed of double cones, or having conical outlines on opposite sides thereof, substantially as described.

56,115.—CHURN.—Otis W. Stanford, Lebanon, Ohio:

I claim the combination of the standard, C, catch, D, c, pulleys, E, G, and driver, g, constituting a detachable propelling device and arranged to operate in connection with dasher, K, L, substantially as and for the purposes set forth.

56,116.—TREATING GAS FOR ILLUMINATION AND OTHER PURPOSES.—Levi Stevens, Fitchburg, Mass.:

I claim, 1st, The combination of two or more gas-meter wheels, propelled by gas or other power, for the purpose of carbonizing atmospheric air and super-carbonizing ordinary illuminating coal-gas, so that when combined and mixed the whole will become an illuminating gas, substantially in the manner and for the purpose described.

2d, The combination of two or more gas-meter wheels, propelled by gas or other power, with a chain elevator, and all with a tank or reservoir for holding hydro-carbon and for receiving and mixing super-carbonized gas and carbonized atmospheric air for the production of an illuminating gas, in the manner and for the purposes described.

3d, The combination of two or more gas-meter wheels, propelled by gas or other power, with a chain elevator, a, and the receiver, C, and all with the reservoir, A, in such manner that the gasoline or other hydro-carbon may be kept at the desired height in the cases of the gas-meter wheels, in the manner and for the purposes described.

56,117.—SHIP'S TABLE.—Isaac H. Stoddard, Amenia, N. Y. Ante-dated June 30, 1866:

I claim the arrangement of the tables (C), with the rods (F), (G), and (H), and with the arm, g, and weight, E, substantially as and for the purpose herein set forth.

56,118.—MEANS FOR DRIVING PADDLE-WHEELS.—Joseph M. Story, Cincinnati, Ohio:

I claim applying the power to the paddle-wheels of boats near the periphery of the same by means of friction-wheels and levers in the manner and for the purpose substantially as herein set forth.

56,119.—BROOM-HEAD.—William D. Stroud, Oshkosh, Wis.:

I claim a broom-head made of flexible bands connected by a rigid strip with an open space between the bands and an open space around the handle, as described, in combination with the rigid binders, D, D, and handle, C, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,120.—HYDRAULIC ENGINE.—Homer H. Stuart, Jamaica, N. Y.:

I claim the valve with its passages as shown, when operated by the eccentrically grooved plate in connection with the guide-pin and connecting-bar, substantially as described.

56,121.—PROCESS FOR REFINING OIL.—E. G. Sutherland, San Francisco, Cal.:

I claim the within-described process for extracting and refining oil from whales and other marine animals and fishes, all substantially as described and for the purposes set forth.

56,122.—CORN CULTIVATOR.—C. W. Taliaferro, Keithsburg, Ill.:

I claim, 1st, The particular manner of constructing the frame of the machine, to wit, of two parallel bars, A, connected by semi-circular metallic bars, B, with the axles, K, fitted between or having their bearings in said bars, substantially as shown and for the purpose set forth.

2d, The connecting of the plow-beams, F, F, to the axles, E, by having the latter formed with slots, a, to receive clevises, a', at the front ends of the beams, with pins, b, passing through the angles and clevises, substantially as and for the purpose specified.

56,123.—PAPER GAUGE FOR PRINTING-PRESSES.—J. Warren Thyng, Salem, Mass.:

I claim the combination and arrangement of the graduated grooved bar, B, attached to the edge of the platen, the adjusting clamps, C, C, C, and gauge-rods, F, F, G, substantially as and for the purpose herein specified.

56,124.—NUT.—Levi Till, Sandusky, Ohio:

I claim so securing a washer to a screw or other nut that, while it can freely turn on the face of the nut, it cannot become disengaged therefrom, substantially in the manner described.

56,125.—BINOCULAR EYE-PIECE FOR MICROSCOPES.—Robert B. Tolles, Canastota, N. Y.:

I claim the construction of an eye-piece in such a manner that the division of the optical pencil necessary to give binocular vision of an object is effected in the eye-piece itself, restricting my claim, however, to that form of a binocular eye-piece, in which two real or virtual images of the object are formed in the eye-piece, after such division of the pencil has taken place.

56,126.—FIXTURE FOR RATCHET-WHEELS FOR LAMPS.—Howell Popping, Marion, N. Y., and Merritt Gally, Auburn, N. Y.:

We claim the application of a spring to the shaft of the ratchet-wheels of a lamp-top, pressing the wheels against the wick, in combination with slots in the sides of the lamp-top, allowing the movement of said shaft for different degrees of compression, substantially as herein set forth.

56,127.—BEEHIVE.—James Wash, Mount Sterling, Ill.:

I claim the combination of the rats, C, trunk, D, door, e, tube, E, and leg, g, table, A, and hive, B, constructed and arranged in the manner and for the purpose herein specified.

56,128.—MOSQUITO-BAR.—Chauncey L. S. Walker, Newark, N. J.:

I claim the frame adjustable by the slots, a, and screws, e, in combination with the wire-cloth upon both parts of the frame, as herein specified.

56,129.—RECIPROCATING PUMP.—D. M. Weston, Boston, Mass.:

I claim the cushions or springs, C, C, made of rubber or other elastic material, or their equivalents, so placed as to form part of the connection between the piston of a pump and the driving-gear, substantially as above described and for the purpose of relieving the pump and machinery from jar or concussion.

56,130.—CONDENSER.—Norman W. Wheeler, Brooklyn, N. Y.:

1st, In an apparatus for surface condensation or refrigeration, I claim producing the desired result by directing the refrigerating fluids into the refrigerating vessels in such a way that they shall form their sheets or strata on the inner surfaces thereof, which cling to such surfaces under the influence of centrifugal forces, when such vessels are prevented from filling with liquid, substantially as above described.

2d, In an apparatus for surface condensation or refrigeration, I claim facilitating the object sought by directing the substances to be condensed or cooled into inclosed spaces, surrounding the refrigerating vessels in such a way that they will not infringe primarily against the principal refrigerating surfaces, but against the inclosing surfaces under the influence of centrifugal force, substantially as and for the purpose above set forth.

3d, In an apparatus for surface condensation or refrigeration, I claim the mode herein described of preventing the refrigerating liquid from accumulating in the interior of the refrigerating vessels, to wit, by means of injecting air into such vessels by mechanical means, substantially in the manner above described.

56,131.—KEROSENE-BURNER.—Luther C. White, Waterbury, Conn.:

I claim combining the deflector, H, constructed substantially as described, with the wick-tube, cap, and shell, when the same shall be combined substantially as shown for the purposes specified.

56,132.—BED-SPRING.—Nelson B. White, South Dedham, Mass.:

I claim the arrangement and application of the overlapping clamps, C, C, made as described with the slat, B, the base coil of the spring and the projection, a, to enter such slat, the whole being substantially as and for the purpose set forth.

56,133.—SPINNING MULE.—Robert Wilde, Philadelphia, Pa.:

I claim the sliding-rod, E, levers, F, G, and H, and the weight, D, or its equivalent, the same being constructed, arranged, and applied so as to operate substantially as and for the purpose described.

56,134.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim the clip, B, in combination with the bar, A, calk, C, rivets, f, f, and keys, e, d, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,135.—STEAM GAUGE.—Charles A. Wilson, Cincinnati, Ohio:

I claim the diaphragm, A, for steam-pressure gauges, when constructed with my intersecting corrugations, as and for the purposes set forth.

56,136.—GRAIN-COOLER.—George D. Woodworth, Chicago, Ill.:

I claim the new and useful mode of preventing grain and other material from being heated while in process of grinding, as herein set forth, and particularly the following:—

1. Covering the eye of the stone to prevent the escape of the air, substantially as set forth.

2. The construction and arrangement of an air-tube, in the manner above set forth.

3. The construction of a pipe made flexible in whole or in part by loose joints, o, otherwise, in order that it may adjust itself to the vibrations of the stone.

4. The construction of a false eye of wood bolted in some oily substance, to furnish a durable and substantial bearing for the lower end of the tube or cylinder.

5. The construction of a door in the cover of the stone, to remove any obstructions collecting therein.

6. The constructing the sides or tops, or both, of the discharge-spout, conveyors, or elevators, of bunting or other suitable material, to allow the escape of the air after being used and to further cool and dry out the material ground.

56,137.—TUBULAR WELL.—W. G. Wright, Hornellsville, N. Y.:

I claim the use of hemp or any suitable fibrous filtering material, as described.

56,138.—SAWING MACHINE.—T. L. Yates, Utica, N. Y.:

I claim the combination of the roller, E, arm, F, slotted bent-arm G, applied and operating with the gauging and feeding saw, in the manner and for the purpose herein specified.

56,139.—SAFETY POCKET.—Charles H. Bagley, assignor to C. E. Mason and P. S. Bartlett, Elgin, Ill.:

I claim, 1st, Providing the plate, A, with the spring, B, substantially as and for the purpose specified.

2d, The combination of the button or shed, E, with the plate, A, and spring, B, substantially as specified.

56,140.—METHOD OF PREPARING COTTON-SEED FOR PLANTING.—William Blessing, Jeffersonville, Ohio, assignor to himself and Horatio B. Maynard, Washington, Ohio:

I claim the mode of preparing cotton-seed for planting by the application of mucilage, sand, and flour, or their equivalents, substantially as and for the purposes set forth.

56,141.—TOOL FOR TURNING OR PLANING.—Theodore Cooper, Warwick, R. I., assignor to himself and Thomas Phillips, Providence, R. I.:

I claim the holder, A, cutter, B, clamp, C, and key, D, arranged substantially as described for the purposes specified.

56,142.—SAW.—J. E. Emerson, assignor to The American Saw Company, Trenton, N. J.:

I claim constructing the teeth of a saw with recesses in such a manner that they may be attached to projections from the saw-plate, substantially in the manner herein shown and described.

56,143.—APPARATUS FOR PRODUCING AND BURNING THE GASES FROM PETROLEUM AND WATER.—Alva J. Griffin, Lowell, Mass., assignor to himself and William T. Vose, Newtonville, Mass.:

I claim, 1st, Constructing the chamber, A, with a longitudinal partition, K, and lateral ribs, H, elevated and depressed at alternate ends, substantially in the manner and for the purpose set forth.

2d, In combination with the chamber, A, divided into two compartments by a central partition, I claim the pipes, D and E, when constructed and arranged in relation to the chamber, A, and to one another, as and for the purpose set forth.

56,144.—KNIFE FOR REMOVING HAIR FROM HIDES.—Barzilla Harrington, assignor to himself and J. L. Newton, Boston, Mass.:

I claim a short hair knife with its form of blade, b, its rib, c, and its guard, d, combined and arranged substantially as and for the purpose above set forth.

56,145.—HEAD-BLOCK FOR SAW-MILLS.—C. Leffingwell, Clarksburg, Ohio, assignor to himself, H. Blandy, and F. J. L. Blandy, Zanesville, Ohio:

I claim, 1st, The pawl-blocks, C, G, F, H, I, when constructed and arranged substantially as herein described and for the purpose set forth.

2d, The combination of the lever, K, rod, M, rods, N and O, rods, R and U, levers, P and T, rods, S and V, and movable racks, E, by means of which the knees of the head-blocks are worked with each other and with the movable pawls, F, substantially as described and for the purpose set forth.

56,146.—CLASP FOR THE BOTTOM HOOPS OF SKIRTS.—Luther W. McFarland, assignor to Frederick S. Otis, Brooklyn, N. Y.:

I claim the bottom clasp formed with teeth, as specified, for attaching the tape to the hoop and protecting said tape, as set forth.

56,147.—WRENCH.—A. M. Olds, New York City, assignor to himself and Albert Manvel, Elizabethport, N. J.:

I claim, 1st, So combining and arranging the spring-tooth, D, jaw, C, and shank, B, that the tooth will gripe or bind against the bottom of the mortise of the shank and retain the said tooth in position without serrations in the shank, substantially as described.

2d, The mortise, b, in combination with the shank, B, spring-tooth, D, and jaw, C, constructed and operating substantially as and for the purpose described.

56,148.—COAL-STOVE.—J. W. Paige, Corning, N. Y., assignor to himself and J. L. Paige, Rochester, N. Y.:

I claim, 1st, The arrangement of the concentrating-plate, E, in combination with the fire-pot, P, and the outer case of the stove, substantially as shown and described and for the purposes set forth.

2d, The arrangement of the radiating-plate, F, in relation to the concentrating-plate, E, substantially for the purposes specified.

56,149.—GEAR-CUTTER.—Edward Parker, assignor to himself and Julius Hotchkiss, Middletown, Conn.:

I claim the jointed bracket, G, in combination with the bed-plate, F, slide, E, with head, D, or D', and arbor, A, constructed substantially as and for the purpose described.

56,150.—QUARTZ-CRUSHER.—S. B. Pike, assignor to himself and Robert H. Vance, San Francisco, Cal.:

I claim, 1st, The use of the guides, L, L, when arranged as described, to insure the passage of all the ore under the rollers, substantially as herein specified and for the purpose set forth.

2d, The employment of the horizontal bar, H, hub, I, and slotted boxes, K, K, or their equivalents, for the purpose of allowing the rollers, F, F, to accommodate themselves to the varying amount of ore on the revolving plate, B, and die, C, substantially as described and for the purposes set forth.

3d, The gutter, D, operated by the binders, Y, Y, and keys, X, X, in combination with the revolving plate, B, rollers, F, F, guides, L, L, annular die, C, and scrapers, when constructed to operate in the manner specified and for the purposes set forth.

56,151.—SHELLAC VARNISH.—Lewis A. Smith, assignor to himself and George Burrows, Cincinnati, Ohio:

I claim, as a new article of manufacture, a varnish compounded of shellac and bicarbonate of soda, in any suitable proportions, substantially as set forth.

56,152.—MACHINE FOR MAKING METAL TUBES.—P. L. Weimer, Lebanon, Pa., assignor to the Aurora Iron Co., Lebanon, Pa.:

I claim, 1st, The arrangement of the bending rollers, d, d, e, e, and f, f, in a machine which is constructed and operates substantially as and for the purpose described.

2d, While not claiming broadly the scarfing-rollers, b, b, and the bending-rollers, c, c, I do claim these rollers in combination with the bending-rollers, d, d, and the rollers, e, e, or f, f, all arranged and operating substantially in the manner described and for the purposes set forth.

56,153.—CHURN.—George L. Witsil, Philadelphia, Pa., assignor to himself, John W. Olcott, and Warren S. Smith, New York City:

I claim the combination in the dash-rod of a churn of a lower hollow section, b, and an upper spirally grooved solid section, a, c, the former serving to admit a supply of fresh air, while the latter receives a tooth, e, by which the dash-rod is rotated as it is moved up and down by the swivel-handle, G, or other device, substantially as described.

56,154.—REFRIGERATOR.—John Worrall, assignor to himself and Jesse Cadworth, New Haven, Conn.:

I claim the closely-fitting ice-chamber, B, with aperture, A, in its ends, in combination with the provision-chamber, C, tube, E, and water-pipe, F, constructed and operating substantially as and for the purpose described.

Also, the water-trap, F, in the interior of the tube, E, in combination with the ice-chamber, B, and provision-chamber, C, constructed and operating substantially as and for the purpose set forth.

56,155.—HYDRO-CARBON BURNER.—Moritz Herzog, Vienna, Austria, and D. L. Cohn, London, England:

I claim the combination in a lamp of the following devices, viz., the hydro-carbon reservoir, the gas-burner, the air-forcing mechanism, connecting-pipes, and case, the whole being combined and operating substantially as herein-before set forth.

56,156.—LIQUID AND SPIRIT METER.—William Murphy, Cork, Ireland:

I claim, 1st. The beveled plates, H, in the inclined plane, R, in combination with the bucket-wheel, I, and sample-receiver, F, constructed and operating substantially as and for the purpose described.

2d. The method herein described of checking the motion of the bucket-wheel, I, according to the specific gravity of the spirits, consisting of the hydrometer, N, balance weight, I, lever, L, and pulleys, K, J, or other equivalent means which will produce the same effect.

3d. The balance-funnel, B, and tilting-frame, D, in combination with the balance-frame, E, and hydrometer, G, Q, constructed and operating substantially as and for the purpose set forth.

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2,346.—PAPER COLLAR.—Chas. D. Elliot, Cambridge, Mass.

2,347.—BOTTLE.—E. C. Fougere, Brooklyn, N. Y., and B. A. Vanderkloft, New York City.

2,348.—COLLAR AND CUFFS.—Edward J. Frost, Springfield, Mass.

2,349.—ORNAMENTATION OF TOPS.—Edward F. Kelly, Chicago, Ill.

2,350.—COOK'S GROVE.—J. Martino, J. Beesley, and J. Currie, assignors to A. Sheppard, Philadelphia, Pa.

2,351.—BASE-BALL BAT.—W. H. and Philip Reed, Philadelphia, Pa.

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WITH **EMERSON'S PATENT MOVABLE TEETH.** Require less Power, less Skill, less Files, saw smoother and better, cut less Kerf; the saw always retains its original size. Send for descriptive pamphlet containing information of value to all parties interested in lumber and sawing of any description. Address **AMERICAN SAW COMPANY, 26 4*] 2 Jacob street, near Ferry street, New York.**

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and Introduction of the Georgia Cotton Planter solicited. Patented May 22d, 1866. Apply to Inventor. 13*] **ALBANY PACKHAM, Prestonville, Carroll Co., Ky.**

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From the earliest historical times the product of the bee has been considered valuable. The land of Canaan was described as a "land flowing with milk and honey," and the works of the ancient heathen poets descanted on the delights of honeyed preparations for the palate. The breeding of the honey bee and the proper contrivances for the deposition of honey have become, in this country, important adjuncts to the means of the husbandman.

The improvement illustrated in the engraving claims to be superior to the hives in common use. Its advantages are, rendering the hive proof against the disastrous and sudden changes of temperature, and the ravages of the bee moth, furnishing a superior breeding chamber, and facilitating the removal of the comb and honey.

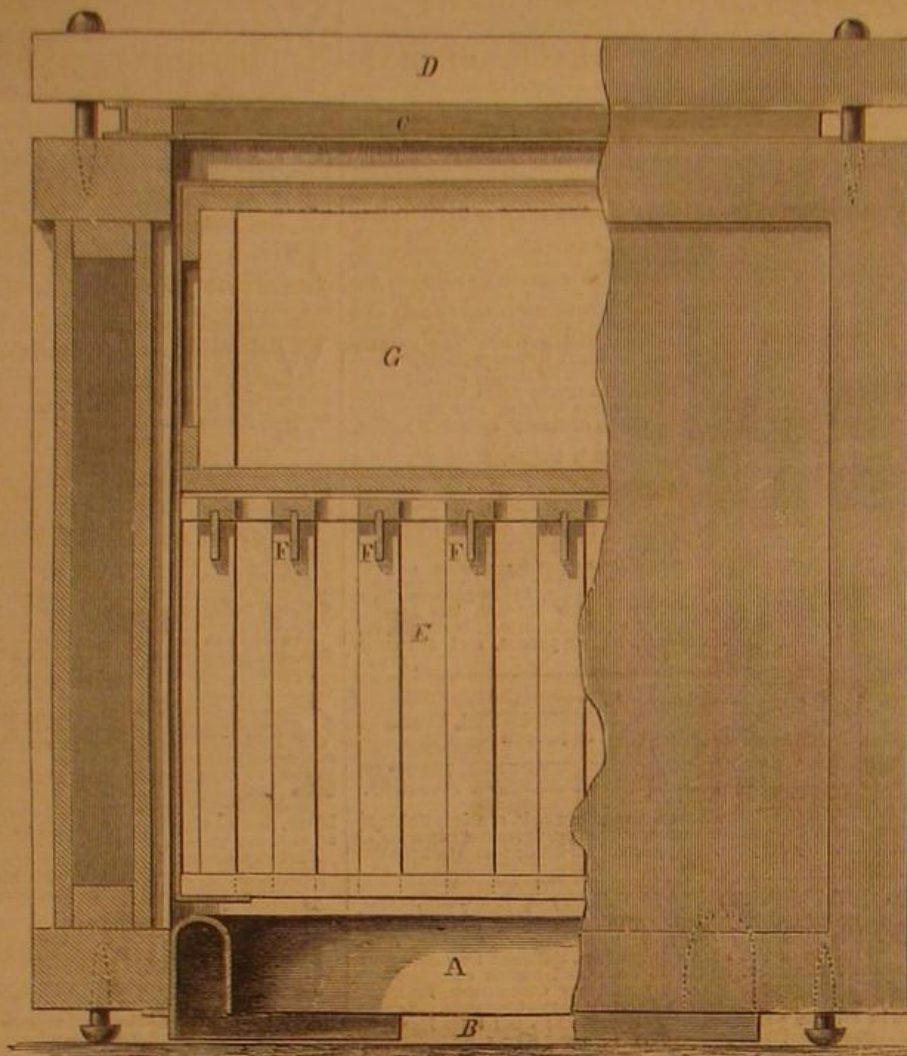
The engraving represents the hive partly in elevation and partly in section. It is built of frame work, the up-rights and horizontals connected at the corners, to which are nailed, both inside and outside, laths, leaving an air space between; these laths are coated with plaster, making a perfectly air-tight box in connection with the top. The bottom has, extending around the sides, a moth guard, A, in section, like an inverted U, having the inner leg the

shortest. At B is the door, and the inner surface of the guard is smeared with lard, or some other substance of similar consistency, which effectually prevents the entrance of the moth. The top of the hive is secured by means of a raised rim, C, sheathed with tin, which projects above the rim, and on which the cover, D, shuts down and is fastened by screws.

Strips of leather or rubber may be interposed between the rim and the cover. The brood or comb box, E, is made of thin slats of wood, except the bottom, which is open, and covered with paper pasted on all sides but the top and bottom. This is furnished with strips of tin, F, let in to the top of the up-rights and dipped in wax, as an inducement to the bees in forming the comb. By this means each comb is separated, and the strips of comb will always be vertical and distinct. The honey box fits into the space, G, and is of similar construction to the brood box, except that the sides are formed by up-rights at the corners, while the top and bottom are of slats. The sides of the box are composed of paper. The apertures between the top slats of the lower box, and the bottom slats of the upper, afford egress from the lower and ingress to the upper box. By this arrangement it will be seen that the two thicknesses of mor-

tar on the sides inclosing an air space, the hermetical sealing of the top, and the paper sides of the inside boxes, insure a uniform temperature at all times. The comb, and the comb box itself, can be easily divided by a chisel-shaped knife, corresponding in width of blade with the width of the box, and the comb be thus easily removed.

Patented Feb. 13, 1866. For further information

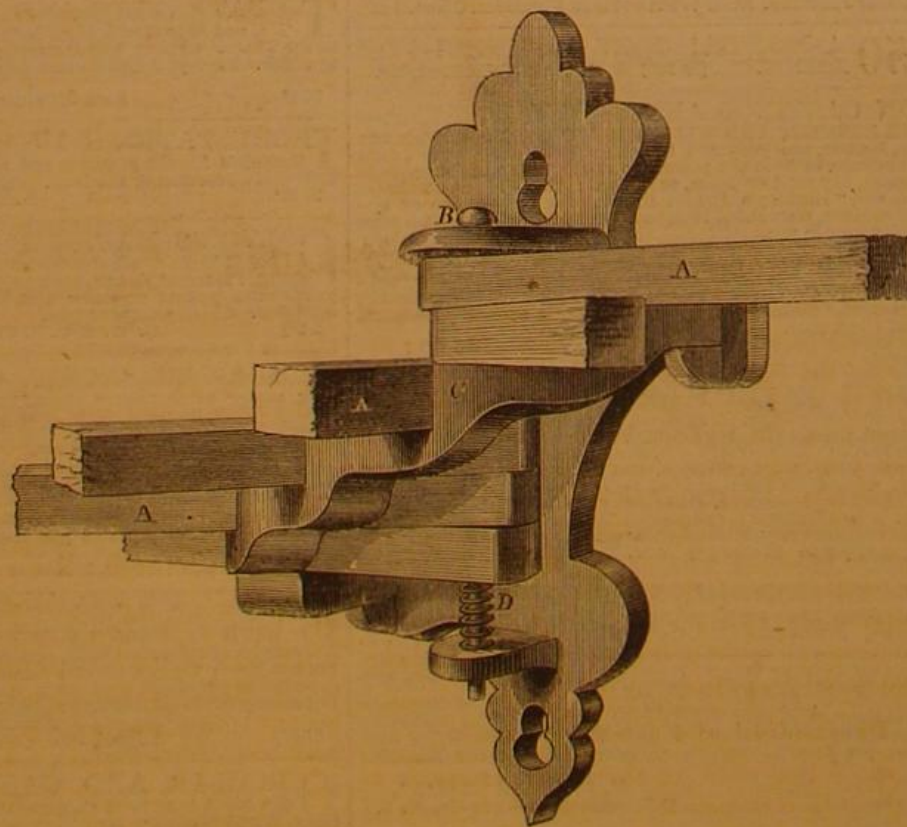


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Improved Towel Rack.

The unstable character of the common towel rack or clothes-bar used in the dressing room, and the unhandy form of the common clothes-horse, with the



HOTCHKISS'S TOWEL RACK.

space it occupies when spread, renders this neat improvement a very useful article. Its structure and operation can be readily understood by the engraving. It is designed to be secured to the wall by

screws, and when not in use the bars, A, are swung back out of the way. By simply moving them on a common pivot, B, the bars can be extended at varying angles and are supported by the ledges, C, and held in place by the spiral spring, D.

Patented May 15, 1866. For further information address M. D. Hotchkiss, Sheboygan Falls, Wis.

THE SEWING MACHINE AND THE SHOE U-FACTURE.

A recent number of the *Shoe and Leather Reporter* contains an article on the results of the application of the sewing machine to shoemaking. While allowing for celerity and facility of production, it insists that the quality of the work is inferior to that produced by the old hand-sewing. It says:—

"The sole-sewing machine has no strength of tension, no power of 'pull,' if we may so express it, and added to this defect, is the very faulty distribution or incorporation of wax with the thread, which, it appears, is a part of the business of the machine to attend to. Little or no wax is applied. This sole-sewing machine necessitates another defect. The upper has to be nailed to the inner sole. In a week after wearing, these nails begin to work through the shoe, and cut the stocking, and generally in thirty days, if there has been wet walking, the outer sole rips, although scarcely worn, and the shoe is ruined; for no ordinary shoe repairer can well re-sew a machine-sewed sole. He must own just such a machine to do it, and not one shoemaker, so called, in a thousand, can afford it."

Another difficulty in making the sewing machine equal the work of the human hand, is the necessity of having the thread much smaller than the perforation of the needle. In sewing leather, especially, the thread should completely fill the space made through its substance by the needle. This can be done only by drawing, or tension, which the *Reporter* thinks the sole-sewing machine is incapable of exerting to a sufficient extent. It is certain, whatever may be the reason, that machine-sewed shoes are much inferior to those sewed by hand by an honest and conscientious workman. The prejudice against them is strong and increasing. It appears that an improvement is needed in these shoe machines which will enable them to compete with hand labor in the durability and value of their work as they now do in the rapidity of execution. Let our inventors look to this matter.

**INVENTORS, MANUFACTURERS.**

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[NEW SERIES.]

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Improved Washing Machine.

Sore knuckles and aching wrists are the usual concomitants of the washing day, entailing the worse vexations of ill-humor and fretfulness. Many of the attempts to lighten the labors of the washerwoman and prevent the annoyances of washing-day, have been failures, being either too complicated to keep in order or requiring too much exertion to operate them. The improvement herewith illustrated possesses simplicity, and appears to be calculated to do the required work in a satisfactory manner.

A is a water-tight box, elevated at such a height as will best suit the operator. Inside are a series of rollers, B, placed near the bottom, on an arc corresponding with the radius of the arm, C. These rollers turn freely on pivots in the cleats, D. The uprights, E, and the arm, C, support a wash-board or dasher, F, of wood, corrugated on the underside. Propelled back and forth by the handle, G, it will be seen that the process of washing is similar to that of the old-fashioned wash-board, only much more efficient. The dasher is held to its work and yet allowed to yield to suit the material to be washed, by the spiral spring at the top of the arm, C. This machine has been in use about a year, and has received the unqualified commendations of all who have given it a trial.

Patented through the Scientific American Patent Agency Sept. 26, 1865, by Joseph Davenport, Berlin, Wis., to whom apply for further information.

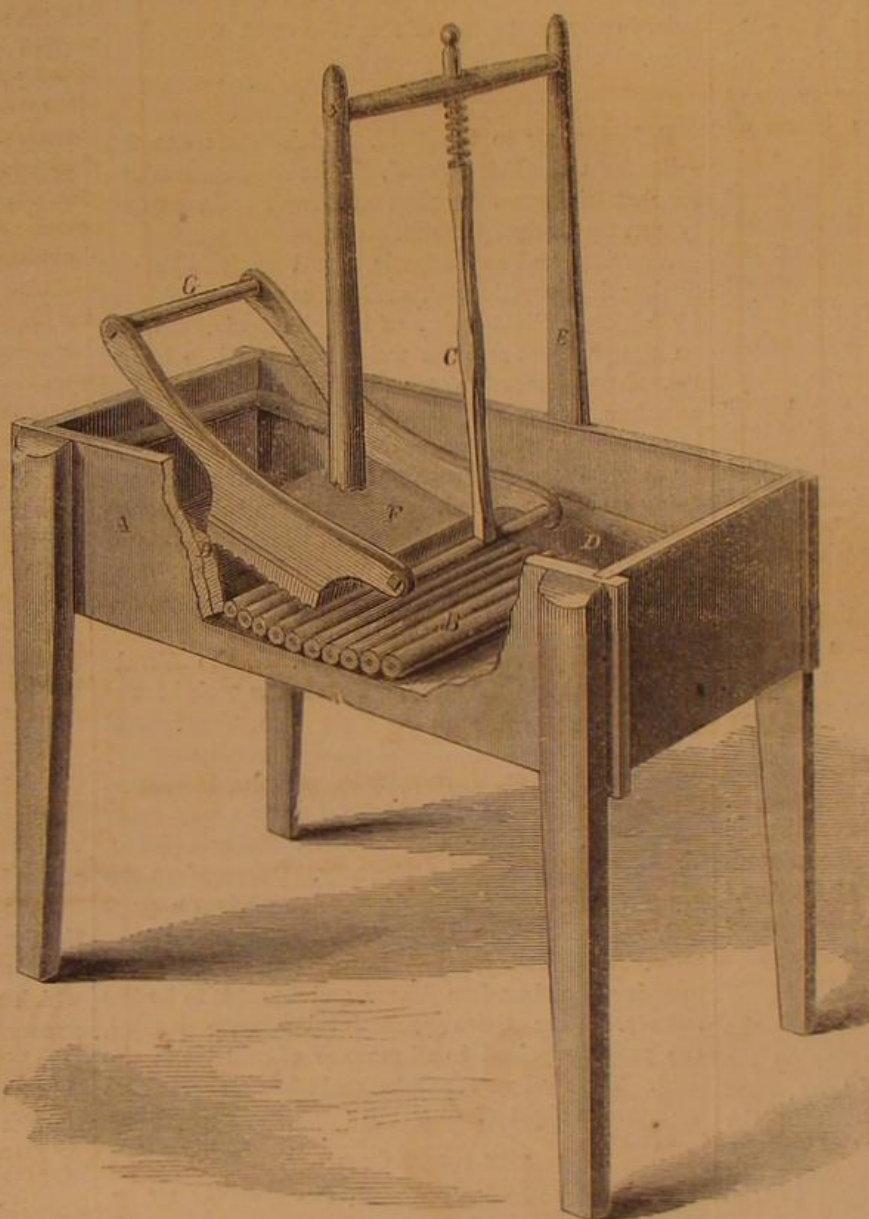
Cheap Ice Pitcher.

The following simple mode of keeping ice-water for a long time in a common pitcher is worth knowing. We have tried it:—Place between two sheets of paper (newspaper will answer, thick brown is better) a layer of cotton batting, about half an inch in thickness; fasten the ends of paper and batting together, forming a circle; then sew or paste a crown over one end, making a box the shape of a stovepipe hat, minus the rim. Place this over an ordinary pitcher filled with ice-water—making it deep enough to rest on the table so as to exclude the air—and the reader will be astonished at the length of time his ice will keep, and the water remain cold after the ice has melted.

Steam on Common Roads.

A paper was read before the French Academy, recently, "On Steam Locomotion on Ordinary Roads," by M. Segulier. The author said that Cugnot, 1770, was the first person who made a machine to run along the floor of the arsenal when he was constructing his dray to carry cannons. This dray was a carriage with three wheels—one in front, and two fixed upon an axle behind. The motive power was applied to the front wheel. This was made to bear the weight of the boiler, the water, and also the furnace, which was made of sheet iron lined with fire-proof earth. The front wheel could be turned at right angles to the hind part, so that the dray could turn as easily as if it was drawn by horses. All modern engineers have applied the motive power to the hind wheels. The author alone, more than twenty years ago, attempted to apply the motive

power in front. He then described at length the plan by which he proposed to carry this into effect. He would imitate, as far as possible, the plan by which horses are harnessed to a carriage in front, and give the driver the same power over each of a pair of machines that a coachman has over his horses.



DAVENPORT'S "COMMON-SENSE" WASHING MACHINE.

Apropos to Segulier's paper, we observe it stated by a French paper, the *Journale l'Aisne*, that on the 25th ult., the common-road traction engine, constructed by the firm of Albaret et Cie., of Liancourt, had descended the inclined road from Laon to the railway terminus, with a speed of 8 kilometres (5.8 miles) per hour. This incline is afterward mounted in eight minutes, with a load of 5 tons, and with a pressure of steam of only 77 pounds on the inch. The inventors conclude from the experience of another trial they made, that the engine is capable of hauling 30 tons, at a speed of from 2½ to 3½ miles an hour, from the terminus to Laon, up this slope.

Production of Beet-Root Sugar.

We spoke last week of the future prospects of sugar production in general; we now have to speak of the prospects of the manufacture from beet-root in France. The *Moniteur* gives us the result of the season of 1865-66, during which there were 419 factories in operation, producing in all, 282,000 tons of sugar. The produce of the preceding season was only 163,000 tons, so that the increase amounted to more than two-thirds of the former yield. M. Pezeyre, a well known writer on such subjects, says "that the native manufacture of sugar was never

before so large or so flourishing." The abundance of the roots and the richness of their saccharine matter were the principal causes of the extraordinary increase in production recorded above; but it must not be forgotten that to the improved modes of manufacture must be attributed the greatly increased

quantity of crystallized sugar—(we referred to the efforts of one manufacturer, M. Robert de Massy, in this direction in *The Grocer* of the second instant). Many sugar houses now produce two cwt. of sugar from a tun and a quarter of beet, which is a considerable increase upon the yield. There are sugar works which divide from twenty to thirty per cent among their shareholders, consequently the sugar fever has seized upon the agriculturists of those departments where the beet-root grows with success, and in some places the growers are subscribing their means in order to make their own sugar. Some few believe that in a short time there will be no such thing as molasses produced in France from beet-root, and that every ounce of extract will be made crystallizable, and that the increase in the growth of beet-root and the manufacture of sugar will proceed so rapidly that the price of the sweet product will be very greatly reduced. If these views are correct, and allowing perhaps for a little enthusiasm, there is no reason to totally discredit them; and provided also that a forced increase of cultivation does not give rise to some kind of disease in the roots—as happens constantly in such cases—this prospect as regards beet-root sugar may create a great change in the markets, for the improvement and increased development of beet-root sugar-making in France will have its effect in all other countries where the industry exists. The cheapening of beet sugar will certainly not aid the recovery of the sugar trade in the West Indies or elsewhere, but until the sugar cane can be made to

yield the amount of juice that it ought to yield, it is a matter for congratulation that the beet-root prospects are so favorable. Caricaturists were very facetious half a century ago, over the notion of making sugar out of turnips, as they chose to call the roots, and one of them represented a nurse presenting an enormous beet-root to the little King of Rome, and saying "Suck, baby, suck! Papa says it's sugar." The commencement of the beet-root sugar manufacture, like that of many other good things, arose out of dire necessity, but men of science and others have turned the laugh against the caricaturists, for it is certain that nearly 300,000 tons of sugar have been extracted from beet-roots in a single season. The progress of the trade reflects the highest honor upon our neighbors, and we heartily rejoice in their having found such excellent employment for the land and its cultivators.—*The Grocer*.

GUN TUBES.—It appears that the steel tubes of the Woolwich guns, although hardened in oil, will not withstand the action of the powder and the bite of the shot. In many cases the steel tubes have been deeply scored, and it is a question which, we believe, has been seriously mooted, whether they shall not, in future, be wholly abandoned.—*Engineering*.

GREAT TRIAL OF AGRICULTURAL IMPLEMENTS —MOWERS, REAPERS, ETC.—AT AUBURN, N. Y.

The trial of agricultural implements now progressing at Auburn, N. Y., is not only the largest but the most thorough ever held. The experiments are conducted under the auspices of the State Agricultural Society, and are not instituted merely to draw a crowd of gaping curiosity-hunters, but to ascertain, for the benefit of the parties chiefly interested—that is, farmers—the intrinsic value of the several machines of all classes offered for sale. The trials are severe and impartial, wholly and unreservedly so, and there is no opportunity for misrepresentation.

The judges are men uninterested in any of the machines, very thorough in their examination of the details, and capable. This last qualification is so rare on such occasions as these, that we italicise it.

Agricultural committees too often sit in their tents and guess at the merits of different machines without conscientiously examining them. The committee of gentlemen in this trial went over the field in the broiling heat of a July sun, noted every detail and peculiarly, questioned the exhibitors, obtained their views, and took notes of the remarks, and, in general, worked like men whose bread depended on their diligence.

The machines to be tried are such as are in general use throughout the country. As follows: Mowers and reapers for two horses; reaping machines (hand rakers), combined mowers and reapers, (ditto) combined reapers with self-acting or dropping attachment, combined reapers for use, as self-rakers or hand rakers, as desired, one-horse mowers.

Further—Horse-powers on the endless chain principle, sweep powers, thrashing machines, combined thrashers and cleaners, hay presses, fanning mills, horse rakes, hay tedders, machines for gathering and loading hay, horse-power hay forks, portable steam engines, hay and straw cutters, grain separators.

The most moderate person will allow that this is a tolerably comprehensive list, and when we add that there are only 46 mowing machines entered for competition (59 reapers and mowers together), including the previous 46, the reader will get some idea of the work before the Committee, and the magnitude of the interests involved.

We shall give, in brief, the points to be considered by the judges in making their awards. To attempt to follow the schedule statement with its "1st" and its (a), and the whole alphabet beside, is simply impossible.

THE POINTS TO BE CONSIDERED.

In deciding upon the machines—mowers—the judges will have a difficult task. It is easy to see that out of 46 different kinds there will be some "weak brethren" who will be distanced in the race for notoriety; all cannot win, that is certain, and the contest will be very exciting, so that when it is narrowed to a few, as it inevitably will be, impartial and conscientious discrimination will be required. It is not improbable that the judges will find themselves compelled to make honorable mention, or give some other distinction equal to a gold medal, in order to do justice.

There will be a Committee on Grains and Grasses, who will report to the Chairman of the Judges on the points in their province. There will be a Committee on Weight and Price, whose duties are obvious; Committee of Description, a Committee of Mechanical Arrangements, who will examine the workmanship, details, how much the machine is heated after work, to what extent it is worn, etc., etc. There will be a Committee on Quality of Work, a Committee of Time, a Committee of Dimensions and a Dynamometer Committee, who will note the power required to draw the machines, side draft, and other details too numerous to mention.

THE PRIZES.

The premiums in each class, that is, each separate and distinct variety of machine offered, such as mower and reaper, hay fork, horse-power, etc., is the society gold medal—5 or more in value—for the best machine, and a cash prize of \$15 for the second best. No machines receive such distinction unless, in the opinion of the judges, they are really entitled to it.

Implements not included in the list before given, are allowed to enter the grounds for exhibition only by paying \$5. Many availed themselves of this privilege, and we saw churn powers, corn shellers, hay elevators, corn planters, and many other useful implements. As there will be thousands of farmers present during the trial, which will last nearly two weeks from this date, July 13th, no better opportunity could be had for an advertisement.

THE WORK TO BE DONE.

The test of each machine is to mow one acre against time on precisely the same ground. A forty-acre lot was selected, and each division marked off into single acres by long stakes easily seen and numbered. The exhibitors drew for position by choosing slips of paper from a hat, which was numbered to correspond with a certain lot in the field, and thus found their places without confusion or envious feelings as to choice. For that matter little discussion could arise, as it would be almost impossible to find a field so uniform in character. These are the principal points; we are necessarily brief in our treatment of them for want of space and time.

THE START.

Before going to the field, which was some four miles from the Fair ground, all the machines entered for that trial were weighed on Howe's scale, expressly put up for that purpose.

A curious and enthusiastic crowd gathered about during the operation. The *Buckeye* machine entered by Adriance, Platt & Co., of Poughkeepsie, was run on the platform and the weight declared to be 594 lbs. Some discussion ensued after this weight was announced, in consequence of the proprietors changing machines with one of their patent, but not made by themselves; their own not having arrived through delay on the railroad. Matters were subsequently adjusted so that the weight was allowed.

D. M. Osborne & Co., Auburn, N. Y., then ran on their machine, known as the "*Kirby*" mower, and the weight was declared 670 pounds.

J. D. Wilber, Poughkeepsie, N. Y., the *Eureka* mower, put his machine on, and the weight was found to be 820 pounds. This was the largest machine on exhibition. It cuts a swath six feet wide and is an entire novelty in mowing machines. The cutter bar is directly in front of two very large wheels, and is operated by a bevel wheel and pinion, as usual, but arranged differently. Our readers can see an engraving and description of it on page 209, Vol. IX., of the SCIENTIFIC AMERICAN.

W. H. Halladay, of Auburn, then weighed his machine, the *American Mower*, and found it to be 590 pounds. After these preliminaries were settled, the people repaired in all manner of vehicles to the field. The road was crowded and after a short drive we came in sight of

THE FORTY-ACRE LOT.

The work to be done was on the farm of W. S. Leach, and was a field of heavy clover of the first seeding, having stems stout and strong, thickly interspersed with a goodly company of weeds twice as stout and strong as the clover. Of the weeds the exhibitors felt no terror, expressing their contempt freely; towards the clover, however, they were much more respectful, and made no secret of their dislike to such a severe test of their powers.

There were four machines tried at once. The *Buckeye*, the *Eureka*, the *American Mower*, and the D. M. Osborne or *Kirby* machine. Each were ranged opposite their respective lots with crowds of friends looking on from a respectful distance.

At a given signal from Mr. Superintendent Dwight the machines bent to their work, and went sweeping over the tough clover in an admirable manner. The knives whistled through the stems, and the gears flew around with great velocity, while the track clearers went silently through the grass and made the way clear for the next swath. On they went with great regularity. The *Buckeye* and the *Kirby* machine especially never faltering nor stopping. Where they passed great patches fell before them, and they made clean lanes through the stubborn clover without hindrance.

The *American Mower* met with some delay from clogging and the *Eureka* got out of order, from the slacking of a nut, which the exhibitor failed to

tighten. This caused much delay, and in fact disabled the machine for a time. In spite of this casualty, however, it mowed the acre in 49 minutes, with the finger bar some of the time springing so that it played over the end of the guard. Much time was lost by the *Eureka*, through stoppage, and the accident was greatly regretted by the spectators. The peculiar condition in which this machine left the grass was noted by all who watched it. From the central position of the finger bar the stems stood as they were cut, the knives passing under, and the machine over without scattering them all over the swath. Mr. Wilber took his misfortune very philosophically and declared that he "had learned something." The box of the pitman rod was very hot after the trial.

The *Buckeye* machine was also watched with great interest for the steady, uninterrupted manner in which it performed. Mr. John P. Adriance, one of the proprietors, drove his own machine. Round and round it went, cutting evenly and true, with few or no stoppages. This was a small machine, with a bar four feet and four inches long. It cut the acre in 56 minutes, and came out of the trial in good order all ready for any number of acres.

The *Kirby* machine was also notable for the steady manner in which it went through. This machine performed its task in the shortest time of any, viz., 46 minutes, and the horses were in first-rate condition without visible distress of any kind; the journals were also very cool. The length of cutter bar was 4 feet and 8 inches. Some little merriment was created about this machine. At a meeting of the Committee, the night before the trial, it was set down as an essential feature of excellence in machines that they could be managed by any man; that is, a cheap man. Mr. D. M. Osborne drove his own machine; as his income is about \$40,000 per annum, it was universally decided that he was a "cheap" man.

The *American Mower*, entered by W. H. Halladay, of Auburn, N. Y., performed very well, but at times the clover was a little too stout for it, and it clogged considerably. The pitman rod was pretty warm, and the box also, but when it is considered that this is a small machine, compared to some others, and that the acre was mowed against time, the driver having no opportunity to oil as he would commonly, it is not extraordinary that the inconvenience alluded to was experienced. The acre was cut in 59 minutes.

At the conclusion—these four machines forming the first trial—much discussion ensued among the spectators as to the comparative merits of each one, which was brought to a speedy close by the welcome announcement of dinner. A collation had been prepared in Mr. Leach's barn, and thither the hungry, thirsty, and excited multitude bent their way. Although the spot was quite remote from the town of Auburn, it did not appear either unfriendly, melancholy, or slow, to judge from the noise and company assembled.

AFTER DINNER.

After this necessary proceeding was over the spectators returned to the field, now shaven and shorn of four acres, and hotter than words can express. Much delay took place by reason of the non-appearance of some of the exhibitors, who were misinformed of the time or who misunderstood when their turn came. But in a short time the *Cayuga Chief*, entered by C. Wheeler, Jr., of Auburn, N. Y., *Columbian Junior*, entered by American Agricultural Works, New York City, *Rhode Island Clipper*, entered by the Company of Newport, the *Yankee Mower*, entered by Dow & Fowler, Fowlersville, and Dodge, Stevenson & Co.'s machine, *Ohio* and *Buckeye* combined, tried their qualities on the field. We cannot notice each in detail, and for some we are obliged to omit mention, not because we do not appreciate their good qualities, but from the inexorable laws of column rules. At some future time we hope to remedy all deficiencies of this kind.

The *Cayuga Chief*, manufactured in Auburn, N. Y., was driven by C. Wheeler, Jr., and did its work well. Mr. Wheeler was placid and cool under the infliction of 120° of heat, more or less, and the glare of the midsummer sun never seemed to affect him in the least. The acre was mowed in 57½ minutes, and well done.

The *Yankee Mower*, Dow & Fowler, was driven by a man who had never sat on the machine before the trial and was totally ignorant of it, but the swath was laid as true as a chalk line could strike, and the action of the machine itself left little to be desired. The grass laid in good order, but the main working parts were very hot at the close of action. Time 48 minutes.

The *Columbian Junior* went over the acre, and seemed to be troubled with clogging. This was doubtless owing to some unfavorable condition of the machine which were not foreseen, as it always performs well and is much esteemed by those who use it. The acre was cut in 66 minutes.

Dodge, Stevenson & Co.'s machine went through its work creditably, but most of these last mentioned suffered from clogging. Indeed it is not at all wonderful, under the circumstances, as the lot was specially selected for its trying nature. Time 63½ minutes.

The *Rhode Island Clipper* was a favorite with many farmers, who watched its performance with enthusiasm. It ran very light and made but little noise; the horses did not sweat, and the swaths were well laid. The time was 55 minutes.

These trials concluded the experiments on the 11th inst. There were twelve machines tried and more should have come but something prevented them from putting in an appearance. One exhibitor told us that he had shipped a machine five weeks previously and that it had just arrived.

THE DYNAMOMETER TRIAL.

The test of draught and power expended by each machine was to have come off on the 13th inst. We were not able to wait for it, but shall have a full report at a later day.

THE DYNAMOMETER.

The machine used on this occasion is Waterman's dynamometer, which registers with great accuracy the exact amount of force expended. We have been promised a full account of this remarkable instrument by the ingenious inventor. If he comes to time we shall publish it next week.

CONCLUSION.

It is expected that the trial of all the machines of all classes will occupy three weeks, and to say that much enthusiasm is shown by all present is using a mild expression. From morn till dewy eve the talk is "mower," "reaper," "mower," "reaper," over again. You hear fragments of conversation about finger bars, guards, gears, track clearers, and if every third man is not interested pecuniarily, his sympathies are enlisted in behalf of one or another concern.

MAGNITUDE OF THE MOWING INTEREST.

The amount of capital enlisted in the manufacture of reapers and mowers is enormous. A friend promised us the exact figures, but he failed to impart them. In 1865, 80,000 machines were manufactured in the United States, averaging \$125 apiece. Walter A. Wood, of Hoosic Falls, informs us that he makes about 6,000 machines a year. C. Wheeler, Jr., of Auburn, 8,000 in different parts of the country; in Canton and Akron, Ohio, there were 10,000 made in 1865, and this year about 7,000, while there are others who make from 500 to 15,000 machines a year. D. M. Osborne & Co., of Auburn, employ upwards of 500 men. All the manufacturers are behind their orders, and some say they put machines together from one day to another to supply customers instead of making up a lot at a time. Every year improves the trade, and it is acknowledged to be in its infancy.

FARMERS ALIVE TO THEIR INTERESTS.

At one time farmers were justly reproached with being a most conservative class of producers. All that is changed. As with mowing, so with other branches of agricultural machines. Hay forks, rakes, tedders, lifters, fodder cutters, and such, are examined, and all are anxious to get the best. This shows a laudable desire, and is at the same time favorable to the inventive spirits of the country, who will doubtless see the advantages likely to arise.

The liabilities of Agra & Masterman's Bank, which recently failed in Liverpool, amounted to \$95,000,000 in gold. During the panic which caused the failure, \$15,000,000 of gold were paid over its counters in three weeks.

TESTING A TURRET.

The English distrust of their iron-clad ships had reached so great a pitch that nothing less than an absolute trial of the one claimed to be invulnerable, would still the public apprehension.

Firing at targets representing sections of ships' sides, had become a stale performance, and a series of trials on the turret of the *Royal Sovereign* was necessary to satisfy cavillers of the absolute impregnability of that structure.

These trials have accordingly come off, and are remarkable for one thing; not the utter failure of the turret, for that might have been foretold, but for the singular manner in which they were conducted.

Without further comment let us quote the details of the experiment from the *London Times*. The turret, be it understood, is not solid iron, but composed of wood and iron in the following manner: the frame inside is of T-angle iron, 10 inches by 6 inches, set 20 inches apart, from center to center. At the top of the turret the spaces are filled in solid with teak wood, and half-inch plates are riveted to the angle irons for a distance of 5 feet and 8 inches from the top to form an inner skin. Outside of this wood and iron a diagonal bracing of iron bands is formed 6 inches wide by three-quarters of an inch thick, which extends around the whole structure. This is again covered with teak 7 inches thick, and lastly a solid plate 5½ inches thick covers the whole. At the gun ports, however, an additional plate of 4½ inches thick is put on. Near the top a ring 14 inches deep by 2 inches thick is placed, and a slighter one 6 inches deep by three-quarters of an inch thick, is fastened. This is substantially the turret of the *Royal Sovereign*. We should add, however, that the turret is half below deck, and that a clear space of 3 inches is given all around it. The opening in the deck is strengthened by a heavy wrought-iron ring all around. The details of the experiment are as follows:—

"The turret selected was the after one, in which a single heavy gun is carried. The shot fired at it was steel from a nine-inch rifled gun, and weighed 246 pounds. The charge was 43 pounds, and the range 200 yards.

"At the first trial the shot struck near the edge of the gun port and broke off a jagged piece 12 inches diameter from the outer 5½-inch armor; it also bent back and broke the 4½-inch inner plating, mashed the wooden backing, and passed through into the turret, where its force was spent.

"A second steel shot conoidal-headed, of the same weight, with the same charge, was fired at the same range, and struck at the junction of two plates 12 inches from the top. Here the plating was only 5½ inches thick, and was driven by the shot twelve inches into the backing, the shot itself first shoving the inside, smashing the ring and everything else in its way.

"A third trial under similar conditions, except that the projectile was made to strike the deck 8 feet from the turret, and glance on to the plates, resulted in breaking out a piece 17½ inches long, 9 inches wide, and 3 inches deep."

These are the unadorned facts, and the result is loudly proclaimed to be in favor of the turret. Surely, this is a somewhat hasty conclusion to arrive at! Three solid shots are fired at a turret twenty feet in diameter, badly shattering it each time, but the real offensive instrument of war, which would cripple it, was not tried at all. If the showers of shell which burst against the monitor turrets during the war of the rebellion had been thrown at the *Royal Sovereign*, the Commission could have found the turrets inoperative after a few broadsides, by reason of the fragments jamming between the wrought-iron deck ring and the turret plates. Why were not a few ten-inch shells tried to test this point?

It is an axiom in mechanics that the strength of any structure is equal to that of the weakest part, so that the shots fired at the gun port, at the top, and at the deck, are no guides to judge of the invulnerability of the ship. What opponent would waste powder in firing at the turret when the broadside was exposed, and he knew that one shot fired at it would go crashing through in to the machinery that moves the turret and disable it immediately? That is the case of the *Royal Sovereign*. A flimsy turret, mounted on a flimsy hull, is gravely experimented on

by a Naval Committee, and because it did not fall to pieces at three shots is pronounced "satisfactory."

Some of our foreign mechanical cotemporaries are by no means pleased with the result. *Mitchell's Steam Shipping Journal* says "although the shot did not get beyond the wooden backing, a few more such blows would have placed the vessel *hors du combat*." The *London Times* says, "although the turret was much shattered it might have been wholly shot away without affecting the working of the turn table."

If the turret is shot away of what use is a turn table?

These experiments seem to have been tried very much as Isherwood's in working steam expansively—to silence the clamor of a clique incapable of judging for themselves. As "tests" of the invulnerability of the *Royal Sovereign* they are quite absurd.

Balloonists in Peril.

Several accidents occurred to aeronauts on the Fourth of July. A large balloon went up from Providence, R. I., with three men and two boys in the car. It was over-ballasted and rose but a few feet from the earth, barely clearing the trees and house tops, and going at the rate of sixty miles an hour. The balloon finally stopped at South Dedham, Mass., having been dragged through a pond, banged against a stone wall, and at last catching in a large elm tree. All of the men were seriously injured.

In this city a tight-rope dancer went up in a Montgolfier balloon. This style is open at the bottom, and rendered lighter than the atmosphere by filling it with rarefied air obtained by burning straw underneath it. The acrobat shot up to an immense height with the balloon and continued to perform various antics as long as he remained in sight. After being in the clouds a short time, the rarefied air in the balloon cooled, and the machine came down earth-ward with great velocity. Happening to be over the North River at the time, the acrobat preferred to take the chance at a jump, and therefore leaped from the ropes at the height of sixty feet from the water. He was only rescued after a long struggle, during which he was completely exhausted.

A New System of Digits.

A correspondent in St. Louis has sent us a long communication on the metric system, in which he proposes a new foundation for numerical calculations, by rejecting the two last figures of the decimal system, and making the number eight the limit of the digits. The advantages claimed are facility of subdivision, without fractions, and greater simplicity in calculations.

The article bears evidence of much thought and study, and the system proposed has the merit of simplicity and convenience; but an exhaustive treatise on the same subject has already been published, which proposes still another step in the improvement of our system of numeration. We refer to the "Tonal System," by John W. Nystrom, C. E. Mr. Nystrom selects sixteen, rather than eight, as the limit of the digits, because it is capable of infinite subdivision without fractions. He proposes six new characters in place of the numerals 9, 11, 12, 13, 14, and 15, and applies his system to common notation, mathematical calculations, time, measurement of superficies, solids, etc., and to navigation and astronomy.

We recommend our correspondent to procure a copy of the treatise referred to, if he desires to investigate the subject further. It is published by J. B. Lippincott & Co., Philadelphia.

POSTAL ORDERS.—The Postmaster General has authorized the issue of postal money orders to the amount of fifty dollars. Heretofore the amount was limited to thirty dollars. This system of postal orders is the safest and cheapest mode of remitting money, and we recommend our patrons to adopt it whenever they can do so.

EXCELLENT samples of silk have recently been exhibited at Sacramento in California. The worms are of the Japanese species and produce silk almost white in color, of very fine quality, but their cocoons are smaller in size than those of the ordinary worm.

SELF-REGISTERING BAROMETER.

Meteorology is a science yet in its infancy. To make it of general utility, its experiments and their records should extend over a period and a territory sufficient to give the basis for a theory, the deductions of which should be reliable. The taking and recording of observations, in different places and for long periods, would entail a vast expense and necessitate the employment of a large number of persons. Mechanical means have been resorted to for the purpose of removing this difficulty, but hitherto their employment has not been attended with much success. Photography has been used as a means of recording the variations in the barometer, but the process is complicated, delicate, and difficult.

Professor Hough, director of the Dudley Observatory, has succeeded in attaching to the common siphon barometer, a system of mechanism, by which the variations of the mercury are noted and also printed. The apparatus may be seen in operation in the rooms of the New York Chamber of Commerce. We have not space for a detailed description, which could not be clearly understood without engravings, but will allude briefly to the principle and the manner of its application.

An ivory float is introduced into the shorter leg of the siphon, and is sustained by the surface of the mercury. It is smaller in area than the inside of the tube, and is kept from friction against the sides by wire guides passing through a disk secured above it. A wire rising from the float sustains a small brass disk in a horizontal position, both faces of which are plated with platinum. The ends of platinum wires are brought into close juxtaposition with the two faces of the disk. These wires are connected at the other end with electro magnets operated by a battery of sulphate of copper. In connection with these electro magnets is a one-toothed wheel, or a vibrating pallet, acting upon a larger wheel which elevates or depresses a fine screw. Whenever, by the rising or falling of the mercury, the float and disk are raised or lowered, the current is closed by the contact of the disk and one of the wires, causing the single cogged wheel to revolve, or the pallet to vibrate, thus moving the gear to the right or left as the mercury rises or falls. The wheel has forty teeth and the screw a pitch of fifty to the inch, thus registering a change on the surface of the mercury of 1-2000th of an inch.

The appliances for permanently recording the variations of the mercury, although somewhat intricate to the eye, are simply those in use in all clocks for recording time. The clock-work is driven by weights and connected to the elevating screw before mentioned. Two arms are provided with pencils, which are placed in contact with graduated paper on vertical cylinders, and record the fluctuations of the mercury in a manner similar to the indicator of a steam engine. The printing is done by a hammer, which is released by clock work when the mercury has raised or fallen to a certain extent, and strikes upon a cushion, between which and type set in a cylinder, a strip of white paper, backed by black impression paper, passes.

This apparatus, though far from perfect mechanically, seems to answer the design of the inventor, and establishes the fact that a cheap and reliable means of recording permanently the variations in the weight of the atmosphere is secured.

Chimogene—A New Anesthetic.

Prof. Vanderweyde, in the *Dental Cosmos* says:—"In experimenting with the highly volatile and gaseous products of distillation, I succeeded in producing a liquid boiling at any desired degree of temperature, say at 60 deg., 50 deg., 40 deg., or even at 30 deg. Fah., causing, by its evaporation, the most intense cold. I propose therefore to call it *Chimogene* (cold generator)."

"The desired degree of its boiling point depends only on a slight modification in its preparation; in fact, it may be made so volatile that it requires very strong bottles and careful stoppering to hold it, as by lifting the stopper it foams like champagne, boiling at the common temperature; pouring it from the bottle in drops or in a small stream, it will be evaporated before reaching the floor.

"Having just read, on page 601, of the last number of the *Dental Cosmos*, the remarks about the

want of such a liquid for anesthetic purposes, it struck me that this was the very thing needed, and I hasten, therefore, to bring this discovery to the knowledge of the profession."

CHAPPELL'S ADJUSTABLE TOILET GLASS.

The distortion of the image, when a person endeavors to obtain a view of the back of the head by the use of a hand mirror, and the lack of satisfaction in being compelled to depend upon the opinions of another for information as to one's appearance, have induced the inventor of this device to contrive something to render the person independent of outside assistance.



It consists of a hanging glass to be used in combination with a mirror on the wall, or dressing case, so as to give a double reflection, the face and rear view being seen together. It is suspended from the ceiling by a telescopic tube, the weight of the glass being equipoised by a weight, which, acting by cord and pulley, can be screened behind any article of furniture. The hanging glass, by the telescopic tube and weight, can be elevated or depressed to suit the height of the person.

The device seems to be simple and effectual. It was patented through the Scientific American Patent Agency, Feb. 13, 1866, by Chappell & Godden; to whom all orders or letters for information should be addressed.

THE PROPOSED METRIC SYSTEM.

A correspondent from Pennsylvania desires that the adoption of the French metric system of weights and measures should be first prefaced by being adapted to the requirements of trade and commerce by graduating degrees. He thinks that the proposed system is too great and sudden a departure from the present plan to recommend itself to the people generally, and fears that the names of the different denominations in the proposed system bear such a similarity that confusion and trouble will inevitably result. He doubts if the French system, for common wants, is practically perfect. The proposed system, he thinks, should be, in a manner, adapted to the plan in general use, or that the nomenclature of measures should conform somewhat to that now in vogue.

The fact that the adoption of the new system in France is not universal nor popular, should, in his opinion, call for some compromise in regard to so radical and sudden a change. He proposes a system of nomenclature uniting the old and proposed new systems.

The proposed change is a radical one. No compromise with previous custom is provided for. The object is to provide a new, simple, and unchangeable scale for measures, whether of superficies or capacity. Any compromise between the proposed plan and the present custom would destroy all the advantages of the improvement, without advantaging those, whose indolence or unwillingness to learn, clings to the old standards. If a change is to be made, we, like our correspondent, desire it shall be as nearly perfect as it can be; but we cannot imagine how the new system can be improved by ingrafting upon it a portion of the defects of the old system.

The example of the people of France is no suitable one for us to follow. That they are slow to adopt a marked improvement need be no reason for us to reject it. There may be some inconveniences in the metric system—we think there are—but it is certain they are of less consequence than those which attach

to our popular system. We have, to be sure, the qualifying fact that we have used them all our lives; on the other hand is the fact that scientists in all parts of the world have adopted the French system for their calculations.

We think it is better to adopt what has been so successful for many years, needing no improvement at the hand of even astute French Academicians, than to propose alterations to *un fait accompli*.

CAUSE OF THE FAILURES OF THE ATLANTIC CABLE.

A correspondent—D. McD., Ohio—believes that the principal cause of the failures to successfully lay a telegraphic cable across the Atlantic, is the untwisting of the external casing, thereby weakening its tensile strain and bringing the suspended weight of the cable on its inner core and conducting strands. He assumes that the outer covering is twisted "against the sun"—to the left—while in coiling it on board it is coiled "with the sun," in the usual way. This coiling being twice performed, once on the tender and again on the *Great Eastern*, contributes still more to a weakening of the cable, and tends to cause kinks.

We do not know whether our correspondent is correct in his statement as to the direction of the spiral. If the cuts we have seen professing to represent the present cable are not reversed, the outer wires are laid around the core "with the sun." The Manilla yarn which covers these wires, however, is twisted the other way. Our correspondent says:—

"The iron wire forming only a casing over the other part, by untwisting, would become loose and separate from the core, and would stretch more than the conducting strand, which being but little affected by the untwisting, would have to sustain the whole weight of the cable or break—it is evident the conducting strand of the old is broken, for in no other way can they account for its not working: it is a principle of philosophy that the same cause will produce the same effect; upon that principle I predicted the last cable would be a greater failure than the one before it. My prediction has been verified and another cable lost. My reason for that prediction was, the cable was first coiled on board the *Amethyst*, and then on board the *Great Eastern*, thus having a second untwisting, and, in paying out the untwisting still continued.

"Now, it is evident that the same cause has produced the failure of the last cable, as the loose and untwisted state of that cable is shown by two pieces of iron wire, two inches long, being pressed into the strand between the wires forming the outer covering of the cable, which would have been impossible had the cable been coiled the way it was twisted."

D McD. is, however, in error in his supposition that the pressure upon the submerged cable, in the act of paying out, is greater than in air, if by pressure he means weight, as he must when referring to the breaking strain. The weight of the present cable is, in air, 31 cwt. per nautical mile; in water only 14½ cwt. If his data are correct his deductions are worthy consideration, although it seems hardly possible that the managers of the enterprise should have overlooked the important matter of retaining the twist. He says:—

"If the cable is coiled the way it is twisted, that will twist it tighter, will shorten and make it stronger, while the conducting strand, being but little affected by the twisting, will be relieved from all strain and will not break, the outer part being made shorter by the twisting will have to sustain the whole strain. This will remove all cause for stopping, the point of suspension being constantly changing, the danger of breaking will be removed, the steamer enabled to hold on her course continually, landing the cable in good working order."

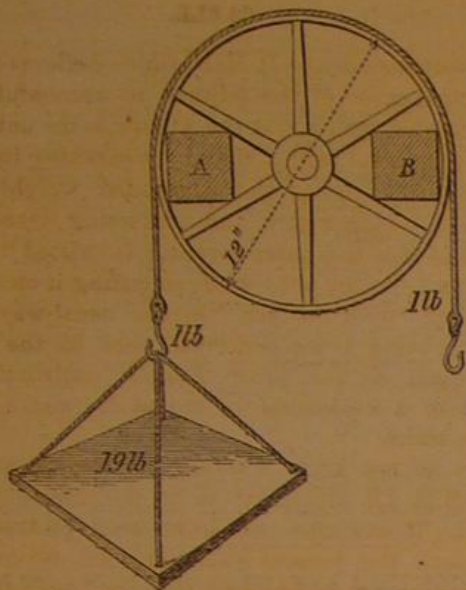
He believes that, with attention to this important matter of keeping the twist, the laying of a cable from Ireland to New York could be made a certain success, and he strongly invites the projectors of submarine lines of telegraph to the subject.

It is said that a plan is in contemplation to supply Buffalo from natural gas wells at Amherst, ten miles distant. A well now sunk flows 40,000 feet of pure gas every day, and five more are proposed.



Transmission of Power by Belts.

MESSRS. EDITORS:—I lately made a series of experiments to ascertain facts governing the transmission of power by pulleys with belts; the apparatus used is shown in the engraving.



The pulley, of cast iron, was supported on the timbers, A and B, in such a manner that it could not turn, and the trials were to be certain weights put on the ends of certain sized belts, when a preponderance would be put on one side until a perceptible motion occurred, when the whole was noted.

The following table will give the facts as they were taken:—

Diameter of Pulley.	Kind of Belt tried.	Thickness of Belt.	Width of Belt.	Weight on Platform—Platform and parts counted in.	Weight on Hook—Hook counted in.	Tension on belt.	Amount of Adhesion.	Proportion existing between the Tension and Adhesion.	Remarks.
12	Lea'r	3-16	1	150	50	200	100	2 to 1	Same belt in each
24	"	3-16	1	150	50	200	100	2 to 1	case, old but good
12	"	3-16	2	150	50	200	100	2 to 1	old lathe belt sticky
12	"	3-16	2	150	50	200	100	2 to 1	old belt, good order
24	"	3-16	2	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
24	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	4	150	50	200	100	2 to 1	do. do. do.
24	"	3-16	4	150	50	200	100	2 to 1	do. do. do.
12	Rub'r	3-16	1	150	50	200	100	2 to 1	do. do. do.
24	"	3-16	1	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	2	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	2	150	50	200	100	2 to 1	do. do. do.
24	"	3-16	2	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
24	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	4	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	4	150	50	200	100	2 to 1	do. do. do.

NOTE.—The pulleys used were of cast iron and turned off to a smooth surface with very little curve on their face.

The deductions to be made from the above results, are, that the adhesion of any belt on a pulley is directly as the tension and not as the surface in contact, for the same results invariably attended the same tension, whether the belt was double the width, or the pulley double the diameter, or both.

Rubber belting adhered better than leather with the same tension; this was particularly the case when belting, which was worn and glazed somewhat on the bearing side by use, was tried. New belting did not give good results, and a great deal seemed to depend on the condition of the belt tried. This was not so much the case with leather belting, which was more uniform in the results, new belting gave very near the same result as old belting "not gummed up," for the more it was gummed the better was the adhesion.

Another series of experiments were made to determine the reason why two pulleys of different diameters, working from the same belt, would not give out the same power—as the small pulley would invariably slip before it would give out the power the large pulley was capable of giving to it. In the case drawn, the tension of the belt would evidently be the same on both pulleys, and as the former experiments showed clearly that it was "tension," and not surface, that gave the effect, then why would they not transmit the same power?

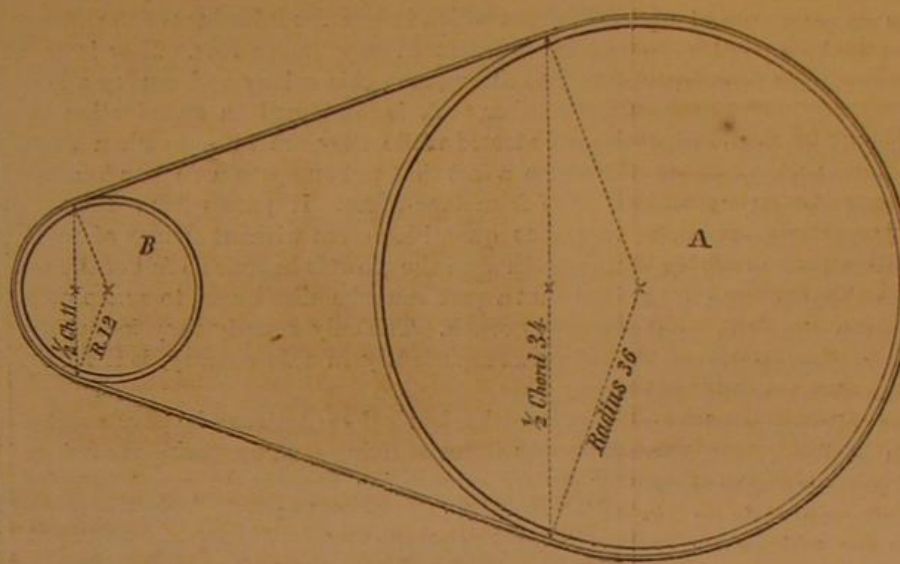
The experiments made to demonstrate the facts were many and conclusive; I will not occupy your space with their enumeration, but give you the re-

sults which were arrived at, without bias or self-deception. I found that the following rules would express the facts of any case.

RULE FOR THE SMALL PULLEY.—If the radius of the pulley expresses the tension of the belt, then the one-half of the chord of the arc that the belt passes over, will express the proportion of that tension that the pulley is capable of receiving in that position.

RULE FOR THE LARGE PULLEY.—If the one-half of the chord of the arc that the belt passes over express the tension of the belt, then the radius of the pulley will express the proportion that the pulley is capable of receiving. [It can be seen that the cases are merely reversed].

As example is much better than precept, the following diagram will illustrate the facts as they are:



Small pulley.— $\frac{1}{2}$ chord=11
Radius 12 of tension of belt.

Large pulley.—Radius=36
 $\frac{1}{2}$ chord=34 of tension.

In looking at the diagram the idea must not be had that the tension of the belt is different on the pulleys, for it is not—the pulleys are merely in better or worse positions to receive it; for instance, the pulley, B, is no better than if its radius was one-half of its chord of contact of belt, if the belt was received on it and given from its parallel; while the pulley, A, is much better than its radius calls for, from its position, it having gained what was lost by B, without the tension being any greater on one than on the other. For it is evident that if there was a certain tension between A and B, continually, that it would act equally on both—as action and reaction are equal. By inspection of the diagram it is also evident that the greater the distance between A and B, the less the difference between the one-half of the chords and their radii; or, in other words, the nearer the top and bottom parts of the belt approach parallelism; consequently, the further such pulleys are apart the better they will work.

From my experiments I made up certain rules for practice in all cases, as I was able to bring the elements down to a fixed basis. Since doing so, I have never made a single failure, besides being able to increase the durability of the parts liable to wear, by really knowing what they were subjected to, and what could be demanded of them.

The following are my rules and practice:—

I always put the side of the belt which transmits the power on the bottom when the power is given out horizontally; in that position the slack side is where it should be—on the top; where the tightener—if one is used—should be. If power is transmitted vertically, I always put on a swinging tightener on the slack side, which operates by falling to a horizontal position.

I submit belts to 50 pounds, per inch in width, of tension, which is made up of the power to be transmitted and their own weight. Where the distance between centers of pulleys give sufficient tension, no tighteners are used. Where they are too close together I use tighteners—no curve on their face—of as large diameter as is convenient. I count on getting 20 pounds of adhesion from 50 pounds of tension in all cases.

I count the power to be transmitted as so many pounds at the end of a lever, of the length of the radius of the pulley—the velocity being in the calculation by which the number of pounds were got—

and divide the number of pounds by 20, the adhesion, for the width of the belt in inches. I then see if the distance between centers will give the necessary tension to make the first calculation good, if not, the remedy is a tightener, if the distance cannot be increased. If the width of belt got by these means is too great, then the diameter of the pulley—or the radius, which is the same—must be increased; by doing so, the number of pounds to be transmitted at the end of the lever is diminished. I again divide by 20; and if the width is again too great, I again increase the lever until I get it down to what I want it; and the whole proceeding is as certain as it is simple.

The system adopted by most engineers, that of associating an inch in width of belt at a velocity of 1,200 or 1,400 feet per minute as equivalent to one horse-power in the same time, is erroneous in principle, and has done more to retard general information on the subject than any thing else in connection with it. I can take that rule and make it too much or too little, as I wish; in one case, by putting the pulleys too far apart, giving too much tension; and, in the other, by putting them too close together, giving too little tension. Therefore, a rule of that description is useless, as it

works both ways, and will only suit one exact condition of circumstances. I hold that any rule should take in and provide for all the elements and changes of condition in the cases; or, if not, it is no rule at all, and is mere guess-work, as such is an injury rather than a benefit to the mechanic.

These are the reasons why I instituted the many experiments narrated. They were distributed over quite a period of time, and were made as opportunity offered, and can be relied upon as being as correct as my simple appliances would admit of; I was careful not to deceive myself.

ROBT. G. CARLYLE.

Virginia, Nevada, May 10, 1866.

[We are greatly obliged to Mr. Carlyle for the pains he has taken in writing these two articles—the one here published and one in a previous number. The practical information is of great utility. It is not astonishing that a narrow belt transmitted as much power as a wider one, when the tension was increased. Belts drive machinery by frictional adhesion to the surface of pulleys, and this is only another instance of the truth of Gen. Morin's rule, that friction is independent at the surfaces in contact, but is directly as the pressure. Nevertheless it is not to be supposed that, in practice, a narrow belt is as economical as a wide one, for the strain imposed by the greater tension required by the narrower one to do the same work is very hard upon all details—lacings, bearings, and other parts.]

To Keep a Saw in Order.

MESSRS. EDITORS:—Much has been said already on the above subject. But a plain man, unacquainted with technical phrases, would find much to puzzle him, and I think if he followed all the directions given, his saw would puzzle him still more. For the benefit of such men, using mills in hard timber, please give me a little space for a few practical rules.

First, To work well the saw must be perfectly round, set the guide up until it touches the shortest tooth. File all the rest, until they will pass, and it is round.

Second, Have the under edge of the tooth to range with a circle, three-fifths the diameter of the saw; the top or back of tooth one inch from the point, nearly one-eighth lower than the point. This is of vital importance.

Third, Spread the points of teeth with the upset, exactly alike on both sides, using a gage; but do not bend the teeth. Upset enough to make the saw clear perfectly.

Fourth, File the teeth perfectly square, and the

same length on both sides. The top near the point about one-sixteenth of an inch in length chisel-shape. This strengthens the point of tooth. One upsetting filed that way will last two days.

Fifth, Set the saw mandrel so that the saw, having run a straight line, will just show daylight between the saw at the center and the log.

Having got this right, never move it under any circumstances.

Sixth, Do not run your saw at the circumference two miles a minute, as advised by Mr. Emerson. If you do, you won't get back the same day; 450 revolutions for a 60-inch saw, is fast enough.

Seventh, File the under edge of your teeth once every 1,000 feet of lumber cut. A smart hand will do this in five minutes. It is the most profitable five minutes of the hour.

Eighth, When the lead gets wrong, stop and file your saw. Tinkering will not make a dull or a badly filed saw run well, and you cannot very easily make a well-filed saw run bad.

These rules, strictly followed, will enable any man, who can use a file, to run a mill with fair success whether his mill has end motion or not. If you undertake to saw 16,000 feet without filing the saw, do not blame end motion, or any thing else but your want of judgment, if you have trouble. If a dull saw will cut 16,000 feet in a given time, the same amount or more can be made by keeping the teeth sharp, and made much easier. What would you think of a man who would mow six hours without whetting his scythe. It can be done. But how much easier and better if he keeps his scythe sharp.

The Martin and Ashcroft attachment is an excellent thing for the purpose for which it is designed, but do not substitute it for filing and setting the saw. Mr. Ritchie's advice is good when he says, "when your saw commences to vary, correct it at once." But it is bad when he says "change the lead of your saw." The proof of this follows in Mr. Ritchie's own statements, that, "he finds it necessary to change the lead many times a day." In morals, it is said, one bad step leads to many more. The above confession proves that one bad move by a sawyer (moving the saw mandrel) leads to a like result in a mechanical point of view.

Ten years' experience with circular saw mills, both with and without lateral motion, leads me to the conclusions indicated. I put up one of the first circular mills used in Ohio—a Lee and Leavitt, with lateral motion. I have used three of their mills, one of Lane and Bodley's, no end motion, and one Blandy. They will all make good lumber if the saw is kept in proper order. If the saw is not filed and set right, neither of them or any other mill will work well.

A. S. PETTIGREW.

Dayton, Ohio, June 13, 1866.

Coffee Making Again.

MESSRS. EDITORS:—Observing in your valuable paper various modes of making coffee economically and good, the object seems to be the extraction of all the strength of the coffee and the retention of all the aroma. I will mention a mode adopted by myself upward of twenty years since. I made use of a common coffee kettle with the spout corked tight and a lid fitting quite tight, into the top of which I inserted a piece of block-tin pipe which passed up through another vessel, holding about a pint of water, and bent down nearly to the bottom of the upper vessel into the kettle; I placed all the coffee to be boiled and nearly all the hot water, the balance, about half a pint I placed in the upper vessel with cold water, and boiled it for ten or fifteen minutes, until the water in the upper vessel got hot from the condensation of the steam containing the aroma, which, by this means, is all saved, as no odor of coffee is perceived during the boiling. A few moments after removing the kettle from the fire, a partial vacuum is formed in the kettle, and all the water in the upper vessel is forced into the lower one by the pressure of the atmosphere—thereby saving all the strength of the coffee and the aroma.

F. W. KOHLER.

Philadelphia, June 29, 1866.

[Mrs. Glass once published a recipe for cooking a hare. At the outset she says "first catch your hare." This seems so applicable to coffee making, that we quote it. To make a palatable beverage one must

have good coffee, or all the art and attention is thrown away. There are some who attach great value to retaining the extractive matter in the berry, but this seems to us a mistake. The extractive matter is bitter and, to our thinking, spoils the coffee. The aroma, or more volatile principle, is the one thing needful, and when that is dissipated, farewell to the pleasant, inspiring, bracing cup that cheers but never inebriates; coffee made out of that left from the previous day, is rich in extract and rich in bitter, making a nauseous beverage. To be good it must be made quickly and drunk immediately.—EDS.

Tape-Worm and Pork Eaters.

MESSRS. EDITORS:—I have noticed in the SCIENTIFIC AMERICAN notices of the theory that the tape-worm which infests the intestines of the human species is produced only from swine. Now it is a fact that throughout this colony and among all the Kaffir tribes, pork is considered an abomination and is never tasted while they are in a heathen state. It is also a fact that not one person in one hundred is free from tape-worm. It passes from them in enormous quantities, often without agency of medicine, as though the bowels became so full of the animal that a part must be discharged to make room for new growth. The only remedy they know, and that grows abundantly in this country, is the male fern.

On the other hand, those natives who have adopted European styles of living—eating pork—are not, so far as my observation extends, so much troubled with tape-worm as the wild natives. The diet of the latter consists chiefly of indian corn and sour milk. They eat the flesh of cattle, sheep, goats, antelopes, etc, but never of hogs or fowls.

One thing more I will mention, which may be of use to others. I have found rock oil—kerosene—a most effective vermifuge. I give it as an enema for the pin-worm, and by the mouth and as an enema for other kinds. It is free from the irritation which spirits of turpentine produces, and is quite as efficient. Has any body else had the same experience?

H. A. WILDER,

Missionary of A. B. C. F. M.

Measuring Logs.

MESSRS. EDITORS:—I have noticed the rules as laid down by Heber Wells and P. Rhoades for getting the contents of squared lumber from a log of given dimensions, and they are both very inaccurate.

Every mathematician knows that multiplying the diameter and half diameter of any circle together, will give the area of the largest square that can be inscribed within that circle; that extracting the square root of this number will give the side of this square, and that a square is of greater area than any other rectangular figure that can be inscribed within a circle; and from this we get the following rule for obtaining the exact contents of a square stick that can be obtained from a log of given diameter and length: multiply the diameter by half the diameter, this product by the length in feet, and divide by twelve; or, if the log is just twelve feet long, the multiplying the diameter and half diameter will give the number of feet required. For a fourteen-foot log, add one-sixth; sixteen-foot log, one-third; eighteen-foot log, one-half, etc., to the product of diameter by half diameter, which is much shorter than multiplying by length and dividing by twelve.

As examples we will take the two used by P. Rhoades. Log, 12 inches diameter, 16 feet long, will give us $12 \times 6 = 72$, then $72 \times 16 = 1152 \div 12 = 96$, or $72 + \frac{1}{4} = 72 + 24 = 96$.

Rhoades gives the contents at about 90 feet, though his rule will give but $64 : 12 - 4 = 8 \div 2 = 4 \times 16 = 64 \times 4 = 256 \div 4 = 64$.

In his other example we have a log 12 feet long by 24 inches diameter, which he makes contain 300 feet, when the actual measurement is but 288 feet, as follows: $24 \times 12 = 288$, and, as the log is 12 feet long, this is the actual measurement. The rule given by Rhoades would make the contents of a square stick sawed from a log 30 inches diameter and 12 feet long, equal 507 feet, when the actual measurement is but 450 feet.

For square lumber, of course, the above measurements would not be the actual areas of the lumber as sawed, as the most of them give inches and frac-

tions of an inch as the side of the square, whereas the lumber would be sawed to full inches, and by leaving a little of the bark on the corners would make more, or, by sawing down to the full inches less than the actual measurement, would give less than the calculated amount; but the foregoing is the only correct rule for obtaining the contents of the largest stick that can be obtained from a log of given dimensions. If the log is to be sawed into inch boards, from one-fifth to one-eighth will have to be deducted for saw cuts. This, of course, will depend upon the width of the cut.

D. W. C. C.

Pottsville, Pa., June 28, 1866.

Weight of Oils.

The following table of the weight, per gallon, in avoirdupois, of petroleum and its products, we copy from the Titusville, Pa., *Herald*. It may prove convenient for many readers. The degrees of gravity are from Beaumé's hydrometer:—

COMMON BURNING OIL AT

40 degrees gravity weighs.....	6 pounds 14 ounces.
41 degrees gravity weighs.....	6 pounds 13 9-22 ounces.
42 degrees gravity weighs.....	6 pounds 12 18-22 ounces.
43 degrees gravity weighs.....	6 pounds 12 5-22 ounces.
44 degrees gravity weighs.....	6 pounds 11 14-22 ounces.
45 degrees gravity weighs.....	6 pounds 11 1-22 ounces.

BENZOLE COMMONLY USED IN PAINTING.

62 degrees gravity weighs.....	6 pounds 1 ounce.
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GASOLINE.

70 degrees gravity weighs.....	5 pounds 12 6-22 ounces.
80 degrees gravity weighs.....	5 pounds 6 8-22 ounces.
90 degrees gravity weighs.....	5 pounds 0 10-22 ounces.
100 degrees gravity weighs.....	4 pounds 10 12-22 ounces.

THE RIGHTFUL INVENTOR THE FIRST TO MAKE THE INVENTION USEFUL.

Elisha Foote for the Board.

Apparatus for Carbonizing Air.

In these devices the gasoline or benzole is raised to the top of a vaporizing chamber by an elevator, and there falls in a shower through the air to be charged. The first conception of the plan unquestionably belonged to D. He experimented upon it as early as 1855 or 1856. It can hardly be said that he carried the idea into practical operation. He himself being witness states that he found practical difficulties in working his machine. The elevator did not work fast enough to supply the requisite quantity of benzole. He allowed a part of the air to escape from the pump to remedy the difficulty, and finally disconnected the elevator from the pump and revolved it by hand. The difficulties were of a mechanical nature, and might, and probably would, have been remedied by further trials and improvements.

He also, at about the same time, made a model of his device, but after that nothing further was done by him, by way of experiment or otherwise, to carry out his idea, until March, 1855—a period subsequent to S.'s application for a patent, and after D. had been informed of S.'s use of the elevator. The model was lost or destroyed in 1856. The machine was broken up and the brass and copper sold for old metal in 1860. A period of eight or nine years elapsed, during which nothing was done to perfect the invention and bring it into practical use. S. made a model of his invention in the fore part of November, 1864, and applied for a patent on the 12th of January following. In January or February he completed a working machine, and ever since has been engaged in the business of making his machines and introducing them into public use.

The first question presented is whether S. is to be regarded as having been anticipated by the previous experiments of D. We have been referred to authorities touching abandonment, and it is urged that in view of them D. cannot be regarded as having abandoned the invention by his delay to prosecute it. We do not think that the principles referred to properly apply to this case. Was D. the sole applicant for the patent, then indeed there would be but little question that he would be entitled to it. But a different question arises when two or more independent inventors apply for the same patent. Then he who first reduces his invention to practice is entitled to the patent, unless the other, though first in conception, was using reasonable diligence in adapting and perfecting it.

The principle which we think applicable to this case is thus stated by Mr. Justice Story in *Washburn vs. Gould* (3 Story, 133): "Whoever first perfects a machine and makes it capable of useful operation is entitled to a patent, and is the real inventor, though others may have previously had the idea and made some experiments towards putting it in practice," and in accordance with this we think that as between the two, S. is entitled to the patent.

An inventor may delay as long as he pleases to carry out his conceptions, but he has to run the risk of another's devising the same thing, and first reducing it to practical use.

As between S. and M. we also think that S. is entitled to the patent. M. was employed by S. to work on his first model, and while so employed he claims that he suggested to S. the use of a belt and buckets for his elevator. This is denied, but whether he did or not does not seem to us to affect the question. Such elevators are in common use. A person who conceives the general idea—or as it is termed, the principle of an invention, has a right to employ the skill and experience of a mechanic to carry it out into practical operation. It sometimes happens that the inventor is not himself a practical mechanic, and is obliged to obtain the aid of others to perfect his improvement. It seldom happens that an invention springs at once complete from his mind. It is often a matter of gradual growth and assumes a variety of forms and shapes before the best one is obtained. New ideas are suggested as the construction progresses, unexpected difficulties are encountered and have to be overcome. The assistants become possessed of the inventor's ideas and have their minds directed to his difficulties. To allow them to patent their suggestions would render their employment dangerous to the inventor and obstruct the progress of improvement. Any application by them for a patent under such circumstances is justly regarded with great distrust and disfavor.

The present case seems to us to be clearly within this principle, and we have no hesitation in deciding that S.'s rights are unaffected by the suggestion referred to.

VARIATION IN FORM NOT PATENTABLE.

BEFORE THE EXAMINERS-IN-CHIEF ON APPEAL.

S. H. Hodges for the Board.

Application for a Patent for Manufacturing Boots.

The improvement proposed by the applicant is that of forming the upper leather of a boot in one piece, giving it such a shape, that when the different edges are properly united, the result is the upper of a boot, and does not require crimping. This has been attempted by similar means before, as appears from several references which have been furnished. A distinction is attempted between the method employed in those cases and this, upon the ground that a more perfect fit is secured, owing to the peculiar shape in which the leather is cut. After the idea of making a boot, in this method, has once been perfected, and reduced to practice, it requires something more than such modifications as merely improve the shape, to merit a patent. There must be some decided change, some marked step taken, introducing a new principle altogether. Otherwise every variation in the cutting of coats, which would make them sit better, would be made the ground of an application. The amount of what the applicant

has done is to adopt a feature, once very familiar to the trade, a tongue over the instep. He says he saves leather, also; but the piece in Chilcott & Snell's boots, to which he refers, may be dispensed with, and leave the boot as good as his.

Another objection to allowing this claim, is the very indefinite description of the shape which is to be given to the leather. There is no rule which will guide the public in using the discovery after the patent has expired, or enable others to know whether they are infringing it, or improving on the invention. In *McNamara vs. Hulse*, 41 C. L. Rep., 238, a patent was held void on the mere ground that an angle, which it was necessary to observe, was not given in the patent. The decision of the Examiner is affirmed. Washington, D. C., Oct. 22, 1892.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

COMPOSITION FOR PRESERVING MEAT.—J. J. HARRISON, St. Mitchell, Md.—This invention consists of a composition of 8 pounds of salt, 4 of alum, and 4 of saltpeter.

CHEESE CUTTER.—JOEL HAINES, Middleburgh, Ohio.—In this improvement, by means of a knife arranged in the cheese box and a graduated arc and pointer, any number of pounds can be cut from a cheese of any ordinary weight and size.

PREPARING CHARCOAL.—G. W. FERRIS, Quincy, Ill.—The object of this invention is to remove from charcoal all foreign matter, and prepare the same so as to be particularly fit for clarifying spirituous liquors and also for filtering purposes in general.

HEATING AND COOLING AIR.—LOFTUS PERKINS, London, Eng.—This invention consists in an apparatus composed of one or more tubes, sealed at both ends, and containing water or other volatile liquid, in such a manner that by alternately evaporating the water or other liquid in one end of the tube or tubes, and then condensing it in the opposite end, a heating or cooling effect can be produced on the atmospheric air or other aeriform bodies, and an apparatus is obtained which can be used with advantage for heating ovens, ventilating buildings, and for other similar purposes.

CULTIVATOR OR HORSE HOE.—ESEN STARR, Royal Oak, Mich.—his invention relates to a cultivator or horse hoe for cultivating crops which are grown in hills or drills. It consists in a peculiar construction of the implement, whereby the same is rendered very strong and durable, and made capable of operating in the most perfect and efficient manner.

TRANSMITTING MOTION.—JOHN BRIZEE, Alvarado, Cal.—This is a device for transmitting motion or power from a spring to machinery to be operated, and is more especially designed for operating portable or light machines, such, for instance, as washing machines, churns, sewing machines, etc. The object of the invention is to obtain a compact, simple, and efficient device for the purpose specified, one which will not be liable to get out of repair or become deranged by use.

RAILROAD SWEEPER.—EDWARD A. F. OLMSTEAD, New York City.—This invention consists principally in the combination of one or more brooms with the axles of the car, and in the combination of the arms, levers, blocks, screws, bolts, and bars, by means of which the brooms are raised or lowered to adjust them.

BEEHIVE.—JULES J. JUSTIN, Milwaukee, Wis.—This invention consists in the combination of two rectangular boxes or hives with each other, and with a moth protector or frame, provided with an inwardly and downwardly projecting zinc guard, which prevents the moth from crawling up the inner sides of the hive, while it does not interfere with the entrance of the bees.

COOKING APPARATUS.—A. C. KASSON, Milwaukee Wis.—The object of this invention is to provide an apparatus by means of which many of the operations in cooking and treating articles of food, may be performed with less labor and care than are commonly required, and in a more perfect manner.

RAT AND MOUSE TRAP.—WILLIAM HENRY CAMPBELL, Brooklyn, N. Y.—This invention relates to a self-setting rat and mouse trap; it consists in the employment of an apartment provided with one or more pivoted platforms arranged with inclined guards, and a bait drawer, and placed over a receptacle into which the animals are precipitated.

GRAIN SEPARATOR.—J. F. DUNHAM, West Union, Iowa.—This invention relates to a grain-separating device to be applied to thrashing machines, and is designed to separate, effectually, weeds, straw, etc., from the grain after passing through the thrashing mechanism. The invention is applied to the sieve of a thrashing machine.

DIAMOND HOLDER.—H. KARELSEN, New York City.—This invention consists of a tubular holder, which is provided with two sleeves, one of which is connected to the head into which a diamond is inserted, while the other connects with a notched tool intended to break off the glass, in combination with guide slots and lateral notches, in such a manner that both the diamond head and the glass breaker can be drawn in or pushed out, and that the same, when they are pushed out, by slightly turning the sleeves, are rendered rigid and prevented from receding spontaneously.

STOVE.—ROWLAND I. RATHBUN, Poplar Ridge, N. Y.—This invention consists in an attachment to a stove, so constructed and combined therewith that a shelf or place on which to set cooked victuals for keeping them warm is provided.

CULTIVATOR.—ANDERSON & EDWARDS, Princeton, Ill.—This invention consists in a novel arrangement of plows, whereby they may be adjusted with the greatest facility—all of them raised vertically out of the ground when necessary, and the two front plows adjusted laterally in order that they may be made to conform to the sinuosities of the rows of plants.

JOINT FOR RAILROAD RAILS.—J. W. SHIVELY, New York City.—This invention has for its object the constructing of a joint for railroad rails so that the rails will be firmly connected together, so that they cannot yield either in a lateral or vertical direction, and the hammering of the ends of the rails by the car wheels totally prevented, and the rails rendered equally as firm and solid as if they were constructed of a continuous bar of metal.

BARLEY FORK.—MARTIN C. REMINGTON, Auburn, N. Y.—This invention relates to the manner of attaching the bow to the fork whereby the former may be very readily applied to and detached from the fork.

ACCORDION.—CARL F. ZIMMERMANN, Philadelphia, Pa.—This invention consists in arranging the keys of the various octaves of an accordion so that the tones governed by the various keys are uniform throughout the entire range of the instrument, both in drawing and in compressing, and the operation of the instrument is thereby considerably facilitated; also in placing between the keys of the various octaves, severally, a distinguishing key, which gives the same tone in drawing and in compressing, so that the player is enabled to feel the various octaves with the greatest ease, and a uniform arrangement of the keys throughout the entire range of the instrument is rendered practicable.

SAFETY BRIDLE.—J. C. HAINES, Lewistown, Pa.—This application, relating to bridles, consists in attaching the reins with shifting bearings, which form the points of attachment between the reins and bit ring.

PLOW.—GEO. WATT, Richmond, Va.—This invention consists in constructing the plow frame of one piece of cast iron, and a curved beam, the hooked end of which infringes upon the frame in combination with the brace; adjustable clamps, slotted block and wheel between the handles.

TOBACCO PIPE AND CIGAR HOLDER.—G. M. ROSS, AND WM. H. WEST, New York City.—This invention consists in a tobacco pipe having a cigar holder combined therewith, so that either can be used, and also in a novel construction of stem to check the flow of the nicotine liquid.

CULTIVATOR.—E. M. SORLEY, Neenah, Wis.—This is a convenient and useful implement of husbandry for breaking up stiff clayey soils, which, by a simple adjustment, may be converted into a cultivator or a drag, for making drill furrows.

FLANGE.—DAVID PATERSON, Jersey City, N. J.—This invention consists in a flange which is cast with strengthening ribs, and with radiating slots to receive the bolts, in such a manner that all the time and labor of boring holes in the flanges is saved, and a flange is obtained of superior convenience, strength, and durability.

MANUFACTURE OF SPOONS, FORKS, ETC.—D. J. FLEETWOOD, Birmingham, Eng.—This invention relates to certain improvements in the operations of shaping, bowling, and finishing spoons, or of shaping, pronging, and finishing forks, and is also applicable for performing analogous operations upon other articles of similar character.

PENCIL HOLDER.—DR. L. B. MYERS, Elmore, Ohio.—This invention consists in an elastic socket, capable of receiving and holding a pencil of larger or smaller size, and provided with any suitable means for attaching it to the garments of a person.

STARTING HORSE-RAILROAD CARS.—R. F. M. WELLS, Roxbury, Mass.—This invention relates to means for facilitating the starting of horse cars. It has for its object the obtaining of a simple arrangement of parts to affect the result, and one which will be compact and not liable to interfere or come in contact with obstructions on the road.

PACKAGE CASE.—P. L. SWINE, Shirleysburg, Pa.—This invention relates to a package case, especially designed to be used for the transportation of plants, although it can be applied with advantage to the transportation of other and various articles.

OILER.—JOHN KING, Apsonia, Conn.—This invention relates to an oiler, the construction and arrangement of which is such that oil can be forced through its nozzle at whatever height it may be desired to use it, thus enabling machinery at heights above, being reached with the ordinary oiler to be oiled without the use of a stepladder.

QUILTING FRAME.—WILLIAM FREDERICK, Ashland, Pa.—This invention consists of a quilting frame formed by combining a set of rollers and nuts with each other and with the supports or legs of the frame, and in combination with the main part of the frame of a removable and adjustable part, for extending the quilt while being marked.

DITCHING MACHINE.—J. S. WEAVER, Dayton, Ohio.—This invention relates to a machine for opening ditches preparatory to putting in tile; and it consists in the combination and arrangement of the various parts by means of which the machine is adjusted and operated.

BURGLAR ALARM.—H. H. POTTER, Carthage, N. Y.—This invention consists in a novel and simple arrangement of mechanical devices for operating the striking hammer of the bell used in the burglar-alarm.

ARTIFICIAL LIMBS.—A. McOMBER AND D. WALSH, Schenectady, N. Y.—The object of this invention is to improve the construction of artificial limbs both for amputations below and above the knee.

WINDOW BLINDS.—A. P. SMITH, Sterling, Ill.—This invention consists in a novel attachment to the operating rod for the slats of window blinds, whereby the slats can be when either opened closed, secured and held in such position.

BLINDS.—W. F. REDDING, Saratoga Springs, N. Y.—This invention consists in so hanging the slats in the blind frame, that in case any one of their tenons should be broken, thus causing the slat to sag or drop down, such slat can be readily adjusted and brought to its proper position.

WASHING MACHINE.—P. H. HARDY, Terre Haute, Ind.—The object of this invention is economy in construction and ease in the management and operation of washing machines, and also the preventing of injury to clothes from too violent action of the rubbers or beaters.

WASHING MACHINE.—ROBERT M. YORKS, Schoolcraft, Mich.—The object of this improvement is to decrease the labor of washing clothes by enabling the operator to use a treadle for moving the board over the clothes, the board being brought back to its place by a spring.

MEAT SLICER AND VEGETABLE CUTTER.—E. P. WHITNEY, Stamford, Conn.—This invention consists in the arrangement of one, two or more knives, set with their blades in opposite directions to each other, and used in connection with set screws which enable them to be adjusted according as it may be desired to have the thickness of the slice, and in connection with lances or sharp points, which, while the knives are cutting the slice, serve to separate or cut the slice in an opposite direction.

SUMMER COOK OR BRAZIER.—N. O. BOND, Hyannis, Mass.—This invention consists of a cast-iron pan, having a perforated bottom, and sides tapering downward so as to adapt it to fit the holes of any common cooking stove or range. Suitable ribs cast on the inside of the brazier, at its upper part, to prevent the stove cover or any cooking vessel which may be placed therein, from excluding the draught. By this contrivance summer cooking can be performed with very little expenditure of fuel and with no more heat than is absolutely necessary for the purpose. The patent was granted February 13, 1896.



E. P. S., of N. Y.—If your chilled-iron box fitted the shaft and had a smooth surface, there would be no difficulty about its working if kept oiled.

T. S. M., of Pa.—You will find an article on the pressure on the slide valve on page 151, Vol. XII. The pressure in the cylinder at the time of cutting off, also at the end of the stroke, the area of the ports, the superficial area of the back of the valve, and the back pressure on the piston, are conditions that must be taken into account in deciding this question.

S. B. S., of Tenn.—Your "essay on man" is not exactly adapted to our columns. It would be more appropriate in a physiological or educational journal.

G. C. N., of N. Y.—Consult any book on chemistry for the method of making sulphureted hydrogen. To make a nearly saturated solution of nitrate of silver in alcohol, pulverize the nitrate, and add about 30 grains of it to each ounce of alcohol; shake well and you have a saturated solution. Pour off the clear solution and to each ounce of it add a few drops of alcohol and you have what you want.

B. R., of N. Y.—Gypsum is without doubt a valuable addition to some kinds of land. It contains sulphur, but of itself it has none of the peculiar properties of sulphur. Most manures are injured if they are thoroughly dried.

A. K., of Iowa.—Arnold's writing fluid contains indigo in addition to the ingredients found in the common ink.

A. H., of —.—Probably the precipitate in the case you mention is sulphate of potash. Why don't you test it?

O. C., of Mass.—It is well known that wood naphtha and concentrated alkaline solutions will cut gum shellac. You could not obtain a patent for the process.

S. T. H., of N. Y.—Common red or black ants are destroyed, and closets infested by them purified, in the following way: Take a sponge and sprinkle fine sugar over it. Set this where the ants most do congregate, and in a short time it will be full of them. Then throw the sponge into hot water. Repeat the process at will. You will find a recipe for metallic lining for machine boxes in the last volume.

W. A. L., of Ohio.—The steam siphon works on the same principle that an ordinary one does, the office of the steam being merely to exhaust the air from the tube. The pressure of steam required to do this varies with the conditions, it is not necessarily great so long as it will be above the atmospheric pressure. The nozzle need not be larger than the main pipe.

J. W. H., of Ga.—You cannot work a high pressure engine with a condenser as you propose, that is by having a pipe 35 feet long issuing from the bottom. Air would enter with the water and destroy the vacuum, besides there is uncondensed vapor in every condenser, which cannot be removed except by an air pump.

C. B. S., of Conn.—To find the distance to place your weight on the lever to get 80 pounds, you must, from the required weight on the valve in pounds, subtract the weight of the valve and the lever, multiply the remainder by the distance between the fulcrum and the valve, and divide by the weight in pounds on the lever, the quotient is the distance of the weight from the fulcrum.

O. P. H., of Mich.—The obstacle to easy draft in vehicles is friction of boxes on the axles. If any one says that a wooden axle runs easier than an iron one, they argue against known laws, which assert that the friction of two metallic surfaces is less than that of wood working on metal, both being well oiled.

J. W., of Ind.—You have neglected to cut off your decimals; the weight of water is 377.5 pounds, and the power exerted by this in issuing under a head of ten feet, is precisely the same as in falling ten feet, 377.5 pounds falling ten feet is 3775 foot-pounds of work, and if this amount of work is performed in each minute of time it gives 1.475-3000ths horse-power. We presume Mr. Emerson meant to say that the saw should run with a velocity at the periphery of 900 feet per second.

A. S., of N. Y.—We publish the patent claims as they are sent to us from the Patent Office. Sometimes cases are suspended after they are ordered to issue, which may be the case with the one mentioned by you.

A. C., of D. C.—The idea of suspending a telegraphic cable in the air, and carrying it across the ocean, we consider wholly impracticable. The suggestion is an old one.

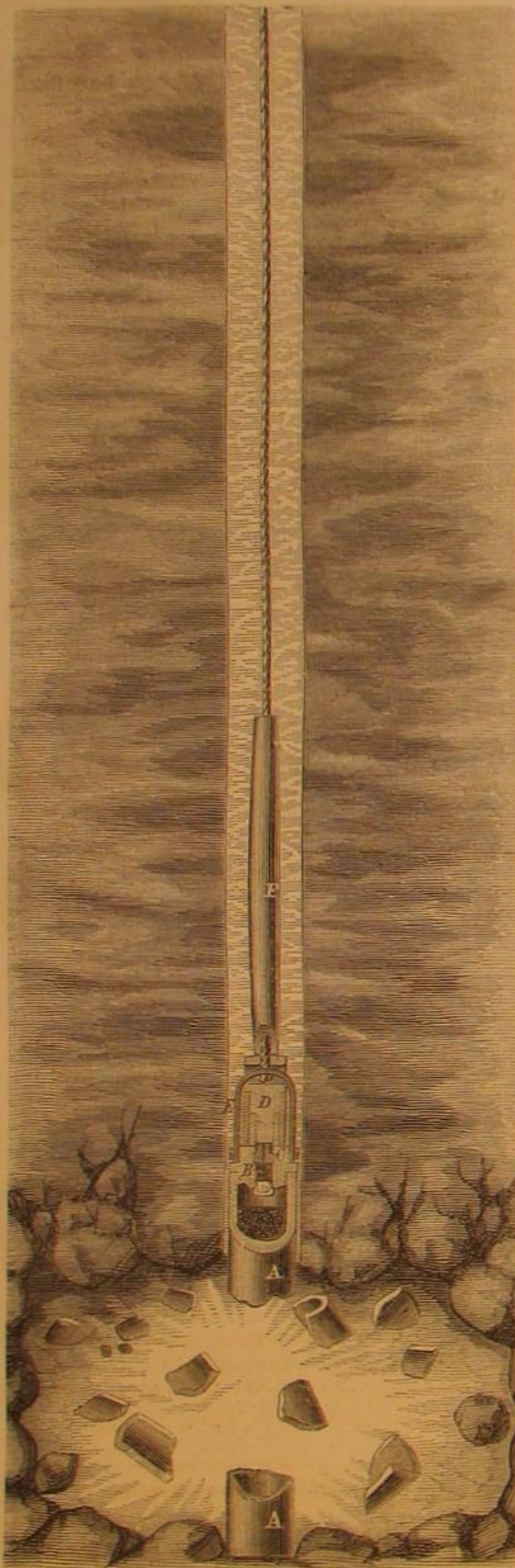
F. B. B., of N. Y.—Cannon fired over the water where persons have been drowned, cause a concussion which is generally successful in accomplishing the desired object.

J. J., of Mis.—H. C. Baird has the work you desire; we believe it was the "Practical Draughtsman."

Correspondents who write letters to us for information, are always required to sign their names to their letters. We insist upon the observance of this rule as an act of good faith.

THE ROBERTS PETROLEUM TORPEDO.

The importance, in a commercial point of view, of petroleum and its products, is so great, and the discovery of its uses is so recent, that although constantly employed in the arts and for domestic purposes, few persons have any adequate idea of its immense addition to the wealth of the country and world. Notwithstanding the amount of its production, the supply is hardly equal to the demand, and as its uses are extended by new discoveries of its value, the demand will correspondingly increase. In 1862 the production of petroleum in the United



States was 68,356,275 gallons, valued at \$14,670,358 53; in 1863, 98,495,003 gallons, valued at \$33,610,060 43; in 1864, 117,298,693 gallons, valued at \$57,268,458 02, and in 1865, 145,638,191 gallons, valued at \$77,073,605 71. Total value for four years, \$182,622,422 69. This does not include the value of any of the products or manufactures of petroleum. Every facility for increasing the yield of such a source of wealth as this, is of national importance.

Such is the claim of the invention herewith illustrated. Petroleum appears to be stored in pockets or veins in certain oil-bearing rocks, technically called "sand rocks," and found at varying depths below the surface. It not unfrequently happens that a well, after having reached one of these veins, and yielded the petroleum in paying quantities, gradually ceases

to yield, the passage leading into the well having become closed by the accumulation of paraffine or clogged by the deposition of other extraneous substances. Again, wells are sunk into the oil-bearing rocks at great expense, without striking a vein, and are abandoned as "dry holes." Col. E. A. L. Roberts conceived the idea of exploding a torpedo in such wells to fracture the rock and clear the closed passages or make artificial ones reaching the oil veins. The idea was acted upon, and was attended with such success that a company was formed with a capital of \$300,000 for the manufacture and operation of the torpedoes.

The engraving represents a section of an oil well with the torpedo in the act of explosion. The body of the torpedo is a cylindrical flask of cast iron, A, in size adapted to the bore of the well or the amount of powder, or other explosive material required to produce the desired effect. The cylinder being filled with gunpowder, nitro-glycerin, or other explosive, the cap or priming chamber, B, is screwed in and packed under the shoulder with white lead to make its contents impervious to moisture. This cap is furnished with a nipple, C, which receives a percussion cap to be exploded by the hammer, D, which slides in a hole bored through the projection of the cap. A bail, E, passes through a slot in the head of the hammer, D, and is secured by its ends to two sides of the cap, B. By this bail the torpedo is lowered into the well. A hollow rubber tube surrounds the cap and hammer inside the bail, and is secured by strong thread at top and bottom, thus insuring perfect isolation of the contents of the priming chamber and flask from moisture.

The operation is perfectly simple. The torpedo being lowered to the bottom of the well or the point where the explosion is desired, a cylindrical weight, F, having a hole longitudinally through its center, is allowed to fall, and, guided by the line or wire that suspends the torpedo, strikes with force upon the hammer, compressing the rubber spring and exploding the percussion cap. A fuse is generally used, passing from the fulminating powder in the cap, through the powder in the case, to insure an explosion through the whole body of the torpedo at the same instant. The water in the well—with which all oil wells are filled—serves as a packing or wad to prevent an upward explosion.

The success of this device is amply well attested by prominent oil men and others who have witnessed the results of the trials. The Woodin well which, in December, 1865, was a "dry hole," was made to yield from 60 to 80 barrels per day, by two explosions. The Devine well, on the Tarr Farm, which had been a flowing well of large capacity, but had diminished to a pumping well of only three or four barrels per day, was made by one explosion to flow 80 barrels. The Keystone well, at the same place, yielding only three barrels per day, was made to flow from 160 to 180 barrels per day.

It is asserted by competent judges that the use of these torpedoes has, within sixty days, increased the production of oil in the Pennsylvania oil regions 1,400 barrels per day, valued at \$1,400,000 per annum. Such results constitute a recommendation more valuable than individual testimonials.

Patented April 25, 1865. Several suits denying Col. Roberts's priority of invention have been brought, but decided by the Commissioner of Patents in his favor. For further particulars apply to Walter B. Roberts, Secretary of the Roberts Petroleum Torpedo Co., No. 47 Bond street, New York, or to Col. E. A. L. Roberts, Titusville, Pa.

BIGGS AND FLINN'S HYDRANT.

The labor and expense of digging up a hydrant to repair the stop-cock or pipe, is frequently a very onerous, and always an expensive and unpleasant job. The object of this invention is to obviate the necessity of this task, and to relieve the cock of the weight of the operating rod. This latter object is accomplished by placing the cock, A, in a horizontal position, and providing the projecting head with a yoke, B, to which the rod, C, is attached, the upper end being connected by a joint, D, to a lever, E, entering from the outside of the stock and carrying its own weight and that of the rods. By raising or depressing this handle, the key is turned so as to admit or stop off the water. For the better security and uni-

form operation of the cock, a spring, F, is inserted under the head of the screw, G. The nozzle, H, can be unscrewed whenever it is necessary to remove the pipe, I, for repairs. This removal is effected by a hook wrench fitting the hexagonal nut, J, by which the cock and pipe can be unscrewed from the feed pipe, K.

An extra cock may be fitted to the pipe, I, within the hydrant, to stop off the water for repairs, or it may be attached to the feed pipe, K. The waste pipe, L, may be closed in summer, when there is no danger of freezing, by a plug entered from above.

Fig. 1

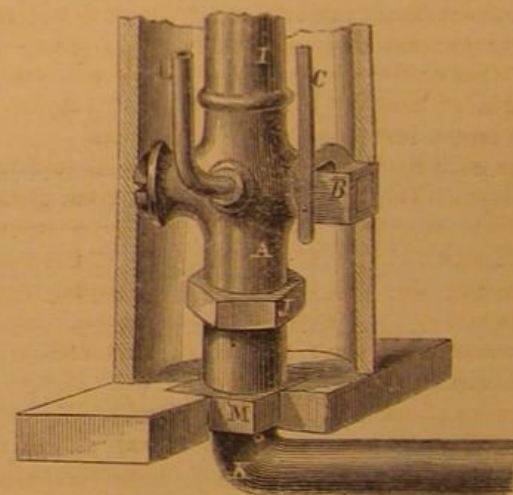
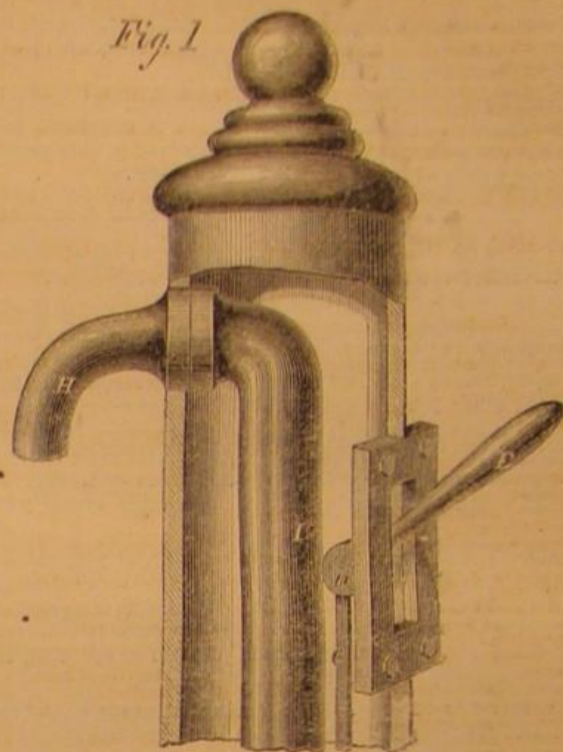
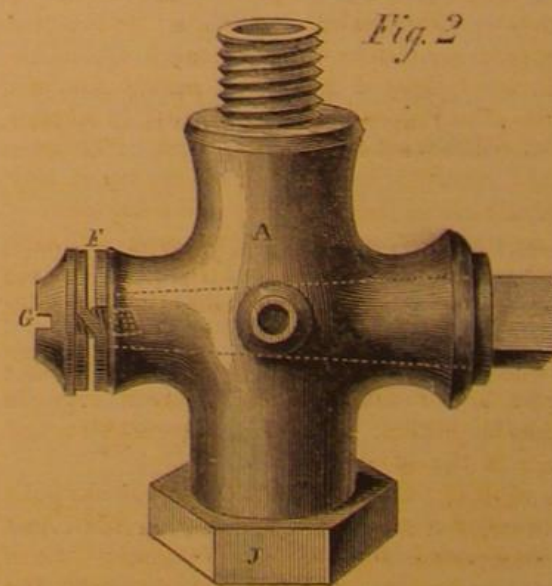


Fig. 2



The square projection, M, is firmly attached to the feed pipe, and bedded in the stone or plank foundation, to prevent any movement of the feed pipe in unscrewing the hydrant pipe. This constitutes a superior hydrant stop-cock, more durable than others, by the position of the key, and the constant pressure of the rod, and desirable for the facility it affords to repair the same at a great saving of expense and dirty drudgery.

Patented April 17, 1866. For further information and for rights to use or manufacture, address A. C. Flinn, Lancaster, Pa.

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ARE IRON SAFES SAFE?

In the ordinary transactions of life it is necessary that man should have confidence in man. It is true that confidence is frequently abused, yet the general law must be recognized, or there is an end to all proper business and social relations.

The good Book instructs us not to put confidence in princes. They have been a treacherous, plotting set since the days of the flood, and have wrought untold mischief upon the sacred rights of the people. Extending the idea to still more material things, we should say, in the light of experience, "put not your trust in fire-proof safes." In May, 1862, a terrible conflagration visited Troy, N. Y., destroying property valued at \$3,000,000, including 671 buildings. This fire was one of the largest that ever occurred on this continent, and demonstrated that iron safes, supposed to be fire-proof, could be burned up, together with their valuable contents. At that time we warned our readers that "too much dependence should not be placed upon the perfect fire-proof qualities of any safes," and advised that, in all cases, they should be inclosed in brick work. The great fire that occurred in Portland, on the 4th of July, has demonstrated the soundness of our advice.

It appears from reports that the most safe safes were the bank vaults, which, being built in the ground, proved to be entirely reliable, their valuable contents being uninjured.

Self-registering thermometers in Lowell & Senter's bank vaults, built fifty years ago, showed only 110 degs. at the highest point in the lower vault, and 130 degs. in the upper vault.

The vault of the Merchants' National Bank, built some twenty-five years ago, was exposed to the heat for a long period, there having been many tons of coal on fire in the cellar, but when opened the contents were found uninjured.

The ordinary fire-proof safes manufactured in this country are made of wrought or chilled iron. Space between the plating being left for the introduction of some good non-conducting substance, such as plaster, mica, asbestos, chalk, alum, fire clay, etc.

Prof. Eaton found by experiments that a perfectly dry filling was not so effective in withstanding heat as a mixture containing water. The reason for this is, that when the safe is exposed to intense heat, the imprisoned water is gradually liberated and converted into steam, and so long as this continues, the contents of the safe are protected. In a long-con-

tinued high heat, the safe gets red-hot, and its combustible contents becomes charred.

The good character of a safe depends, of course, upon its ability to resist heat, and in this particular the safes made in this country are as good as can be had in the world, but they are by no means perfect. It seems to us possible that inventive skill may yet succeed in producing a safe that will pass through the fiery ordeal, and deliver its contents unharmed. The subject is one that ought to receive a more careful study. Our present advice is, that, so far as practicable, iron safes should be placed upon a solid foundation, and inclosed in masonry, so as to prevent them from falling into the burning mass. Thus protected the ordinary fire-proof safe is quite sure to preserve its contents. If left unprotected, the losses at Troy and Portland are liable at any time to be repeated.

EXPERIMENTS WITH NITRO-GLYCERIN.

Col. Tal. P. Shaffner has lately made a report to the Secretaries of War and the Navy, of a series of experiments conducted by him at Washington, extending over a period of four days, designed mainly to demonstrate the use of nitro-glycerin—or nitro-leum, as the Colonel calls it—in the explosion of mines. These experiments were conducted with similar experiments made with gunpowder, as a means of comparison. The results seem to confirm the fact that the explosive qualities of the liquid are far in advance of those of gunpowder. Among other trials two open targets, six feet long and five feet high, were made of two thicknesses of two and a-half inch oak plank, and placed vertically four feet apart in a pit, the sides of which were of stiff clay, and extending two feet above the structures. The floor between was an iron plate resting on timbers, and one side of the targets was lined with a plate of iron one-fourth of an inch thick. Of course the top and ends of this two-sided box were open. In each of two similar structures was placed a tin canister of a capacity of 300 cubic inches, one filled with powder, and the other with about eight pounds of nitro-glycerin. Being exploded, the powder did not disfigure the structure except to color it with the deposit of carbon upon its sides and floor. The nitro-glycerin tore the wood-work to pieces and threw fragments very high in the air. The iron floor was removed from its place and thrown upon its end, and the earth around was very much torn.

Two cast-iron pieces, weighing each about 300 pounds, had a hole an inch in diameter, and fifteen inches deep, bored in them, and after being charged, one with powder and the other with nitro-glycerin, they were closed by a screw plug one inch long. That containing the powder was uninjured, the powder discharging through the fuse vent, three-sixteenths of an inch diameter. The other was torn to pieces by the nitro-glycerin, the force extending downward from the bottom of the charge, leaving a cone with its apex at the bottom of the drill hole.

But one of the most remarkable of the experiments, or rather their results, was one with a wrought-iron piece, being a part of shaft, about five feet long, and twelve inches in diameter. In this was bored a hole 15 inches deep, one inch in diameter, and a plug one inch long screwed in the orifice. The plug was forced from the orifice, and the music of the air passing through the vent-hole lasted three minutes; it evidently reached a very high altitude. A second charge, tamped with loose earth, burst the iron into three pieces to the base of the drill. The pieces were subsequently examined, and they were found to be crystallized, and to a considerable extent restored to cast iron. Subsequently the bore was deepened to twenty inches and the aperture secured by a plug screwed in three inches. Twelve liquid ounces of nitro-glycerin were poured in and the charge ignited by electricity. The wrought-iron shaft was broken to pieces and the crystallized effect was clearly visible. This curious phenomenon is worthy of the most intelligent examination. Never before has wrought iron been made to change to a crystallized state by one blow. The chamber was greatly enlarged, indicating a compression of the metal. The broken pieces are at the War Department, and serve as monuments of a new scientific achievement.

Four musket barrels were placed in wrought-iron

cylinders, two filled with gunpowder and two filled one-third full with nitro-leum. The musket barrels charged with powder, were exploded by electricity. They burst open, tearing the iron to pieces. The barrels charged with nitro-glycerin were next exploded, and the effect was very different from that produced by the powder. The barrels were flattened, and not so much broken to pieces; the force was so sudden and great that after the barrel had irregularly broken up and down, the iron appeared like rolled plate, even and polished.

In testing other qualities of the nitro-glycerin, Col. Shaffner says:—

"Plaster of Paris was saturated with it, and it proved to be non-explosive and non-combustible. Sawdust was placed upon the anvil under the hammer, but there was no explosion except as particles of nitro-glycerin. Gun-cotton was placed upon the anvil covered with the liquid, and the explosion on the fall of the hammer failed to ignite the cotton. "During my experiments, Gen. Dellafield and other officers were not too timid to handle the nitro-glycerin in a tumbler, and those present saw me use it with as much freedom as though it was water. It is proper to state, however, that like all explosive compounds it should be handled with that degree of caution peculiar to its character. For example, when unconfined it may be stirred with a red hot iron containing some 600 deg. of heat; but if that heat was applied to it when confined it would explode. The explosive force of powder is estimated to be 13,000 pounds to the square inch, and by chemical formula the explosive force of nitro-glycerin is about 212,000 pounds to the square inch.

I also exhibited to the officers present the cause of the recent explosion at San Francisco. The nitro-glycerin had been shipped in bottles and packed in saw dust, four bottles in each case; one or more of the bottles had been broken, and the sawdust became saturated with the liquid; and in this manner a new substance was formed which is susceptible of being exploded at a lower temperature than nitro-glycerin, and possibly at blood heat. The agents were opening the package, and perhaps a heavy blow was given particles of saw dust, which caused the explosion. Nitro-glycerin explodes by a violent percussion, and by 360 deg. of heat."

Col. Shaffner does not attempt to account for the "compression" of the wrought iron, nor for its entire change of structure. Indeed, we do not ascertain from the report that the outside diameter of the wrought-iron shaft was not increased, as well as the capacity of the bore. In relation to the change of structure in the iron by percussion, the correctness of the theory has been fully established by experiments, but that a single impact of exploding gases will accomplish this result seems doubtful. There is so great a difference in the texture of wrought iron, that until we know the precise character of that used in the experiment, it will be difficult to form a reliable opinion as to the agency of the explosion in effecting the assumed change.

Fire Crackers Ought to be Prohibited.

It is reported in the newspapers that on the 4th inst., a boy, in the city of Portland, lighted a Chinese fire cracker and carelessly threw it among some shavings in a cooper shop. The consequence was that the greater part of the city was burned and upward of \$10,000,000 worth of property destroyed. The destruction of life and property in consequence of the free use of this mischievous explosive ought to cause stringent laws to be made, prohibiting its importation.

Cryptography—A Translation.

In the SCIENTIFIC AMERICAN No. 25, Vol. XIV., we published a cipher message from Geo. C. Round, of Conn., for which he requested a translation. It was probably too much of a puzzle, as none of our correspondents have succeeded in deciphering it. We append the author's translation.

"The signal code is the simplest and most difficult of all practicable ciphers. An entire change can be made after each word and not interrupt communication."

THE Postmaster General is making a stir about the abuse of the franking privilege. It is understood that some Members of Congress allow other parties to *fac simile* stamps of their names on envelopes for which a consideration is paid, and thus the postal revenue is defrauded. The great difficulty is to know how to put a check upon this despicable practice.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JULY 10, 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.

56,157.—CULTIVATOR.—Andrew P. Anderson and Byron Edwards, Princeton, Ill.:

We claim the beams, D, D, in combination with the plow-standards, H, H, and the plow-standards, E, E, substantially as and for the purposes set forth.

56,158.—FEEDING TROUGH FOR STOCK.—Benjamin Arnold, Arba, Ind.:

I claim the arrangement and combination of the various parts constituting the trough, platform, food-receptacle, and steps, all in the manner and for the purposes set forth.

56,159.—HARROW.—Jonathan Ayers, Canterbury, N. H.:

I claim the front tooth, B, as made with the inclined knife edge, f, and the two double curved wings, g, g, as set forth.

I also claim each lateral tooth as made with the knife-edge, b, and the curved furrow opening lip, c, and the curved furrow opening lip or part, d, arranged as specified.

56,160.—MODE OF HANGING BELLS.—George E. Baker, Waukegan, Ill.:

I claim attaching a bell to, or suspending it upon, its supports by means of elastic cushions, substantially as and for the purposes herein shown and described.

56,161.—HORSE-SHOE.—Halsey H. Baker, New Market, N. J.:

I claim, 1st, The attachment of the collar, D, to the shoe, A, by means of the tongues, f, on the said collar, and the pins or projections, d, in the socket, a, substantially as herein set forth for the purpose specified.

2d, The combination of the wood-block, E, with the collar, D, and shoe, A, substantially as herein set forth for the purpose specified.

3d, The combination of the hardened pins, spikes, or wedges, with the wood-block, E, secured in the collar, D, substantially as herein set forth for the purpose specified.

4th, The lips or ribs, r, formed on the collar, D, and fitted upon the beveled sides of the flange, b, of the shoe, substantially as herein set forth for the purpose specified.

56,162.—BROOM-HEAD.—Frederick G. Bakes, Vevay, Ind.:

I claim, 1st, A broom-head or clamp composed of the parts, C, C', D, D' and E, E', all combined, arranged, and operating substantially as set forth.

2d, In combination with the binding wires, H, H, I claim the screw-threaded hook, L, cylindrical nut, J, and washer, K, substantially as described and for the purpose set forth.

3d, In combination with the elements of the two foregoing claims, I also claim the barbed sheet-metal cylinder, B, for the purpose described and explained.

56,163.—ATTACHING TUBES TO OILERS.—S. V. Beckwith, Hamden, Conn.:

I claim the combination of the conically-formed tube, A, with its correspondingly formed seat in the neck, B, and secured therein so as to form a self-packing joint, by means of the spiral groove in the one and corresponding pins in the other, substantially as specified.

56,164.—TOOL FOR ADJUSTING LATHES TO TURN TAPERING SHAFTS.—William N. Berkeley, Cedar Rapids, Iowa:

I claim, 1st, The combination and arrangement of the plate, A, provided with a slot, a, and the arms, C, B, operating as and for the purposes herein set forth and described.

2d, In combination with the above, I claim the employment of the gauges or guides, E, arranged as and for the purposes specified.

56,165.—BLOWER.—H. B. Bigelow, New Haven, Conn., and George Murray, Cambridgeport, Mass.:

We claim the construction and arrangement of the fans, substantially as described, to operate so that one moves with a diminished velocity through a portion of its revolution, acting as a stop for the fan succeeding, it more rapidly revolving, substantially as herein described.

56,166.—TOOL.—Byron Boardman, Norwich, Conn.:

I claim, 1st, The combination of a cam, u, with the movable or fixed jaw-head of a monkey wrench, so applied as to form thereof a pipe wrench, substantially as described.

2d, The manner herein described of securing the pipe wrench cam within a recess, so that this cam will be firmly sustained by the solid metal surrounding it, during the operation of turning a cylindrical object, and allowed to play loosely when released, substantially as described.

3d, Securing the nut, g, within an oblong slot, i, in the handle, A, by means of the fixed pin, j, substantially as described.

4th, The combination of the permanently attached nut, g, and the screw-driver bit, h, formed on or applied to the shank, C', of a monkey wrench, substantially as described.

5th, Securing a steel bit, h, to the end of the softer metal shank, C', of the monkey wrench, substantially as described.

56,167.—FULMINATING COMPOSITION.—George Boldt, Chicago, Ill.:

I claim a fulminating substance to ignite cartridges by filling with it small cavities in the back part of conical projectiles, and using an igniting needle, said fulminating substance consisting of the ingredients above enumerated and prepared, and mixed as above described and specified.

56,168.—CARPET-BAG FRAME.—Peter Born, New York City. Ante-dated June 29, 1866:

I claim making the jaws and covers of frames of carpet-bags, valises, etc., of a series of veneers or layers of thin wood fastened together, in the manner herein specified.

56,169.—SHOVEL AND TONGS.—Robert D. Bradley, Preston, Md.:

I claim the combination of shovel and tongs, constructed and operating as described.

56,170.—HORSE HAY-FORK.—A. C. Briggs, North Easton, N. Y.:

I claim, 1st, The combination of the tine, C, with the bars, A and D, and catch, E, arranged and operating substantially as herein set forth.

2d, Constructing the tine, C, with a shoulder, as described, when used in combination with the bar, D, and slide, a, substantially as and for the purpose specified.

56,171.—DEVICE FOR TRANSMITTING MOTION.—John Brizee, Alvarado, Cal. Ante-dated July 3, 1866:

I claim, 1st, The combination of the oscillating frame, W, pendants, X, X, and spring, A', with the crank, M', all arranged to operate as and for the purposes specified.

2d, In combination with the parts above specified, I further claim the adjustable or rising and falling plate, Y, for the purpose explained.

56,172.—FEED-STOP FOR LATHES.—A. P. Brown, Worcester, Mass.:

I claim, 1st, The combination with the feed-rod of collar, J, and gear, I, and adjustable spline, K, substantially as set forth.

2d, The combination with feed-rod, C, of ears, G, G', spiral spring, d, clutch-collar, J, gear, I, and adjustable spline, K, substantially as set forth.

3d, The combination with the feed-rod of an engine lathe of a feed-stop device, constructed and arranged as described, whereby the feeding or forward motion of the cutter or tool-frame can be automatically stopped at any desired point without stopping the feed-rod, substantially as set forth.

56,173.—CULTIVATOR.—Robert Bullock, South Mills, N. C.:

I claim the combination of the stock with the weeding-shears, the iron rod braces, the eye-holes, and iron bolts, when these several parts are arranged, constructed, and adjusted substantially as described.

56,174.—GATE.—J. P. Cadman, Freeport, Ill.:

I claim, 1st, The ways, D, D, provided with cogs, o, o, when pivoted to the uprights, C, C, and beam, F, as and for the purposes specified.

2d, The posts, H, K, and H, provided with pulleys, F and t, cords, m and m', and rod, f, working the ways, D, D, arranged in the manner substantially as and for the purposes set forth.

3d, The treadle-rods, G, provided with semi-hoops, g, and weights, k, working the rod, f, as and for the purposes set forth.

4th, The gates, A and A, attached to the ways, D, D, by the strips and pulleys, e, secured by the posts, P, P, in combination with the posts, H, K and H, with pulleys, J and t, cords, m and m', lever, F, and rod, f, in the manner arranged, substantially as and for the purposes herein specified.

56,175.—ANIMAL TRAP.—William Henry Campbell, Brooklyn, N. Y.:

I claim the combination with the pivoted platform, F, and receptacle, A, of the guards, G, and plates, H, which prevent the rats from making their escape by jumping back after the platform has tilted, as described.

56,176.—CHEESE-VAT.—J. A. Carlisle and George A. Bowers, Elgin, Ill.:

We claim, 1st, Cavity or opening, T, in combination with valve, A, packing, U', levers, I, I', and rod, H, the whole constructed, arranged, and operated substantially in the manner and for the purpose set forth.

2d, Pipes, O, and a, a', when constructed, arranged, and operated with regard to its cavities or openings, substantially in the manner and for the purpose set forth.

3d, Pipe, h, packing, U, and nut, l, the whole constructed, arranged, and operated substantially in the manner and for the purpose set forth.

56,177.—GRAIN SEPARATOR.—John H. Chase and J. M. Tiffany, Montgomery, Ill.:

We claim in a grain-separating machine one or more hollow cylinders having narrow openings or passages in their convex surface, with V-shaped grooves upon the interior corresponding with the direction of said passages so as to keep the kernels of grain in the cylinder lengthwise over the said passages, substantially as and for the purposes herein shown and described.

56,178.—MICROSCOPE.—Otis N. Chase, Boston, Mass.:

I claim, 1st, A hollow transparent chamber, A, open at one or both ends, in combination with the lens, F, substantially as described.

2d, The projections, C, C, or their equivalents, in combination with the elastic band, D, for the purpose set forth, substantially as described.

56,179.—PURIFYING PETROLEUM, ETC.—Robert A. Chesebrough, New York City:

I claim the heating of bone-black by dry steam or otherwise, previous to using the same for filtering hydro-carbon oils.

56,180.—INDELIBLE PENCIL.—Edson P. Clark, Northampton, Mass.:

I claim the employment of the ingredients in combination with the nitrate of silver, substantially as and for the purpose set forth.

56,181.—HORSE-SHOE.—John N. Clarke, Cincinnati, Ohio:

I claim forming the sole of a horse-shoe substantially as described and shown, that is to say with transverse and diverging ridges, A, alternating with hollows, B, which are pierced at or near their crowns with the nail-holes, C.

56,182.—COFFIN.—Daniel Clarke, Ipswich, Mass.:

I claim the combination as well as the arrangement of the series of studs, b, b, b, and the series of notched catches, c, c, c, c, with the cover and case of the coffin.

56,183.—CORN PLANTER.—William Cogswell, Otawa, Ill.:

I claim, 1st, The provisions for adjusting the width of planting and for dividing the machine as described by means of the divided axles and the divided connections at the fore part, as described and represented.

2d, The piece, G, constructed substantially as shown, affording a bearing for the seat supports, sockets for the divided axles, and pivoted attachment for the tongue.

3d, The piece, H, constructed as described, affording adjustable connections to the forward seats and beams, the loop for the rising and falling tongue, and attachment for the rear seat supports.

4th, The combination of the hopper, m, with its lugs, n, n, and the cap, o, the latter holding in position the cut-off rubbers, p, and the journal-boxes, s, s, of the oscillating feed cylinder.

56,184.—DEVICE FOR HOLDING BOOKS AND MANUSCRIPTS.—J. E. D. Comstock, New York City:

I claim, 1st, The combination of the lazy-tongs, B, with the clip, A, or its equivalent, and strips, C, D, substantially as and for the purpose specified.

2d, The extension strips, C' and D', in combination with the strips, C, D, and the lazy-tongs, B, substantially as specified.

3d, The combination of the clip, A, and strips, D, substantially as described.

4th, The combination of the clip, A, lazy-tongs, B, and strips, C, substantially as specified.

5th, The clip, A, when constructed in the manner shown and described, being in itself a clip of a new construction.

56,185.—SORGHUM MILL.—Robert Conarroe, Camden, Ohio:

I claim the series of pivoted stripper-jaws, arranged in reference to the row of openings and provided with springs, substantially as and for the purpose described.

56,186.—GOVERNOR STOP VALVE.—John Crawley, Perrysville, Ind.:

I claim, 1st, The divided pipe, A, a, globe, C, and pipe, B, tubular valve, J, J, and stem, P, arranged and operating substantially as herein shown and described.

2d, The valve-stem, p, with cams, h, h, k, k, the fixed cams, f, f, stop-lever, L, and detachable governor rod, n, arranged and operating as and for the purpose set forth.

56,187.—COMPOSITION FOR MOLDER'S MATCH-PLATES.—George P. Darrow, Cincinnati, Ohio:

I claim the manufacture of molder's match-plates and follow-boards, by the use of plaster of Paris, iron dust, and sal-ammonia in solution, substantially as and for the purpose set forth.

56,188.—MACHINE FOR HOLDING SHEEP FOR SHEARING.—Justus Day, Murray, N. Y.:

I claim, 1st, The forked arms, C and D, operating for the purpose and in the manner set forth.

2d, The revolving table in combination with the buckles and straps, I, I, and the pins, J, J, J and C, operating in the manner and for the purpose described.

56,189.—HORSE RAKE.—George Deal, Wayne Township, Ohio:

I claim the combination and arrangement of the forwardly projecting hinged arms, I, I, adjusting screws or their equivalent, H, H, tooth roller, D, and teeth, L, L, substantially as and for the purpose herein specified.

56,190.—BUTTON-HOLE.—E. F. Dieterichs, Philadelphia, Pa.:

I claim a metal binding for button holes, said binding consisting of a number of plates arranged adjacent to each other and compressed to the fabric, all substantially as set forth.

56,191.—NAIL HAMMER.—Christopher G. Dodge, Jr., Providence, R. I.:

I claim a hammer, Fig. 1, constructed with a sheath, D, in the handle thereof for a screw-driver, so that when the hammer and the screw-driver are united, as shown in said Fig. 1, the handle of the latter will form a continuation of the handle of the former, and when the two tools are not so connected each can be used separately, the whole article being substantially as specified.

56,192.—WAGON-JACK.—William M. Doty, Janesville, Wis.:

I claim the arrangement of the sliding-bar, C, and lever-arm, F, clasp, E, and standard, A, combined and operating in the manner and for the purpose herein described.

56,193.—FILTER.—Nicholas Downes, Syracuse, N. Y.:

I claim the combination of the cover, F, having the collar, F', the reservoir, B, and cleansing-tube, C, and with or without the perforated disk, D, when severally constructed and arranged for use, substantially in the manner and for the purpose set forth.

56,194.—GRAIN-SEPARATOR.—J. F. Dunham, Fayette, Iowa:

I claim, 1st, The perforated plates, E, G, fitted in a shoe, A, of a thrashing machine, at the outer end of its screen, B, in connection with the spout, D, and inclined parts, b, c, of the bottom of the shoe, substantially as and for the purpose set forth.

2d, The rotating frame or discharger, I, in combination with the perforated plates, E, G, arranged and applied to the shoe, A, and in relation with the screen, B, substantially as and for the purpose specified.

56,195.—WOOD-BORING MACHINE.—Seth C. Ellis, Jersey City, N. J.:

I claim the jointed frame, F, G, bit-stock, m, pulleys, e, k, l, r, belts, u, a, and handle, H, the whole combined and arranged in relation with each other, and the driving-shaft, E, and table, B, substantially as and for the purpose herein specified.

56,196.—NECKTIE-HOLDER.—J. Albert, Eshleman, Philadelphia, Pa.:

I claim, 1st, A plate secured to a neck-band and adapted for the reception and retention of a detachable tie, substantially as described.

2d, The combination of the socket, A, or its equivalent, and a stud, a, as and for the purpose specified.

3d, The socket, A, with its projections, i, i, and the spring-catch, B, with its recesses, e, e, when constructed and adapted for attachment to each other and to a neck-band, substantially as set forth.

56,197.—REFINING SPIRITUOUS LIQUORS.—G. W. Ferris, Quincy, Ill.:

I claim, 1st, The within-described process of refining spirituous liquors, by passing the same under pressure through a series of filtering tanks, substantially as set forth.

Also, the arrangement of a series of filtering tanks placed gradually lower and lower, and provided with tightly-fitting covers and with connecting pipes, substantially as and for the purpose described.

56,198.—PREPARING CHARCOAL FOR FILTERING.—G. W. Ferris, of Quincy, Ill.:

I claim the within-described process of preparing charcoal by treating the same with corn meal, substantially as and for the purpose set forth.

56,199.—BELLOWS.—Edward Field, Cincinnati, Ohio:

I claim the arrangement of shaft, R, rod, S, lever, T, rod, U, crank, V, pulley, W, lever, X, treadle, Y, and handle, X, combined and operating substantially as and for the purpose specified.

56,200.—SPRING SEAT.—Luther W. Fillebrown, Jr., Wayne, Me.:

I claim the improved elastic seat made as described, viz., of the adjustable frame, C, the series of bow or arch springs, D, D, D, the frame, A, and the flexible covering, E, arranged and combined together, substantially as set forth.

56,201.—LIFE-RAFT.—L. F. Frazee, South Amboy, N. J.:

I claim the combinations of the drums, E, and casings, C, as described, cross-bars, D, and hinged rails, G, all constructed and arranged in the manner and for the purpose herein specified.

56,202.—QUILTING-FRAME.—William Frederick, Ashland, Pa.:

I claim, 1st, An improved quilting-frame formed by combining and arranging a set of rollers, G, H, and nuts, I, J, K, L, with each other, and with the legs or supports, A, B, C, D, of the frame, substantially as described and for the purpose set forth.

2d, The combination with the main part of the frame of the removable and adjustable part, M, N, O, constructed and arranged substantially as herein described and for the purpose set forth.

56,203.—ILLUMINATING APPARATUS.—Charles Geisse, Taycheedah, Wis.:

I claim, 1st, The combination and arrangement of the central tube, D, with the burner, C, substantially in the manner described and for the purpose set forth.

2d, Combining and arranging the movable branch pipe, E, with the burner, C, for starting the generation of gas in the latter, substantially as described.

3d, The sliding sockets, I, J, arranged and operating substantially as and for the purposes set forth.

4th, The combination and arrangement of the globular radiator, F, with the central tube, D, substantially in the manner described and for the purpose set forth.

5th, The combination of the pipe, G, with the burner, C, substantially as and for the purpose set forth.

56,204.—GAS HEATER.—Charles Geisse, Taycheedah, Wis.:

I claim, 1st, The combination and arrangement of the central tube, D, with the heater, C, substantially in the manner described and for the purposes set forth.

2d, The combination of the movable branch-pipe, E, with the heater, C, for starting the generation of gas in the latter, substantially as described.

3d, The combination and arrangement of the globular radiator, F, with the central tube, D, of the heater, C, substantially in the manner described.

4th, The combination of the conical mouth-piece, a, with the branch-pipe, B, when constructed and arranged to operate in relation to the heater, C, substantially as described.

5th, Constructing the central tube, D, with cog-teeth, as represented, when used in connection with a pinion for elevating and depressing said tube, substantially as described and for the purpose specified.

56,205.—PRESS FOR THE MANUFACTURE OF SUGAR.—Philo M. Gilbert, Kewanee, Ill.:

I claim the arrangement of the head, G, with its rollers, H, H, the screw, D, the press box, F, the disks, I, a, and c, block, J, slide, k, and frame, A, for forming a press, substantially as and for the purpose set forth.

56,206.—PEAT MACHINE.—Samuel D. and Samuel Gilson, Oswego Falls, N. Y.:

We claim, 1st, The combination of the curved arms, d, of the manipulator, C, with the rectangular grates, g', for the purpose specified.

2d, The construction of the grates, g', with one part vertical and the other part horizontal, for the purpose specified.

3d, The case, D, constructed of elongated shape to allow the lever or arm, F, to revolve unobstructed, substantially as described.

4th, The revolving press, E, with the sliding lever, F, working through it, when made, arranged, and operated substantially as specified.

5th, The mode of relieving the journals of the press, E, by extending the shaft of the press at V, beyond the slot through which the lever, F, works, substantially as described.

6th, The safety-chamber, G, arranged below the discharge, g', and so constructed that the lever, F, may slide over it on its side walls and allow a part of the peat while under the greatest pressure to pass back below the end of the lever, in order to avoid accidents, substantially as described.

7th, The revolving mold, I, when so made, arranged, and operated as to form logs by uniform length and angular in their cross sections, for the purpose substantially as specified.

8th, The machine for mixing, pressing, and molding peat and other plastic substances, consisting of the mixing apparatus, the revolving press, E, with its sliding arm, F, and the revolving mold, constructed, arranged, and operated substantially as described.

56,207.—COUPLING FOR VEHICLES.—N. W. Gordon, Waupun, Wis.:

I claim, 1st, The combination of the plate, C, with the bolster, B.

2d, The combination of the plate, D, with the axle, A.

3d, The combination of plates, C and D, constructed and operating substantially as described and for the purpose set forth.

56,208.—MACHINE FOR PRINTING TEXTILE FABRICS.—John Green, Lowell, Mass.:

I claim, 1st, The use and application of two or more furnishing cams, D and E, or their equivalent, to the working or printing surface of a printing cylinder, said cams being constructed with one, two, or more furnishing surfaces, substantially as and for the purpose specified.

2d, Printing two or more colors with one cylinder, each color being deposited upon the printing surface of the cylinder, by a separate furnishing cam or its equivalent, substantially in the manner set forth.

3d, The arrangement of the cams, D and E, and cylinder, C, whereby two or more colors may be printed on the same piece of cloth or other material, substantially as herein set forth.

4th, The arrangement of the cams, D and E, and the cylinder, C, when used separately or in conjunction with the common printing rolls, 10, 11, 12, as set forth.

5th, In combination with the furnishing cams, D and E, for furnishing more than one color to the printing cylinder, C, I claim the detachable sections of such cylinder, arranged and made to operate substantially as and for the purpose specified.

6th, Printing textile or other fabrics, or yarns, to be knit or woven into fabrics in two or more colors by passing them between the cylinder, C, and the cams, D, E, substantially as set forth.

56,209.—WEATHER-STRIP FOR DOORS.—F. C. Gridley, Hudson, Wis.:

I claim the elevator shown at 2, when constructed as described and secured by means of the plate, H, substantially as set forth.

56,210.—SKIRT-SUPPORTING CORSET.—Catherine A. Griswold, Williamantic, Conn.:

I claim a bodice made upon a metallic form, opening before and behind, adjustable in the rear, and having shoulder-straps and fastenings for the support of the skirts, all substantially as shown and described.

56,211.—INVALID BEDSTEAD.—William A. Guyer, New York City. Ante-dated May 1, 1866:

I claim the combination of the three parts, B, C, D, adjustable shaft, E, and slotted strips, K, K, constructed and arranged to operate substantially as and for the purposes set forth.

56,212.—CHEESE-CUTTER.—Joel Haines, Middleburg, Ohio:

I claim the combination of the rotating platform, provided with the adjustable indicator-point, and the series of graduated arcs around the margin of the platform, substantially as and for the purpose described.

56,213.—BRIDLE.—Joseph C. Haines, Lewistown, Pa.:

I claim providing the driving rein with a shifting bearing, H, arranged and operating substantially as and for the purposes herein set forth.

56,214.—COMBINED CHAIR AND FAN.—Frederick Handschuh, Allentown, Pa.:

I claim, 1st, The levers, B and C, as constructed, the cords, D and E, and the rod, F, with fan attached, the several parts being combined and used as and for the purpose specified.

2d, The bar, K, and the shaft, c, when used with the rod, F, substantially in the manner and for the purpose herein specified.

56,215.—WASHING MACHINE.—P. H. Hardy, Terre Haute, Ind.:

I claim the combination of the corrugated false bottom, G, the movable side pieces, E, E, set in angular grooves, and the beaters, D, movable from a point in the cover, B, substantially as described.

56,216.—SPRING BED.—B. D. Harrington, Boston, Mass.:

I claim a spring bed, the springs of which are fastened to the sides of the bars, b, b, and are operated upon by bent levers in such a way that the bed-bottom presses upon one arm of the levers, causing the other arm of said levers to press upon the springs, substantially in the manner and for the purpose set forth.

56,217.—COMPOSITION FOR PRESERVING MEAT.—James J. Harrison, St. Michael, Md.:

I claim the composition consisting of the ingredients in about the proportions and for the purpose described.

56,218.—PUMP.—Roger Hartley, Pittsburg, Pa.:

I claim, in double-acting plug-plunger pumps, the combination of the cylinder, A, having a stuffing-box, B, with the cylinder, N, and the gland, T, constructed and arranged as described and for the purpose specified.

56,219.—BEE-HIVE.—Thomas Hawkins, Auburn, N. Y.:

I claim the arrangement chambers, C, box, E, chambers, C', the base, H, and the tie, M, the whole constructed in the manner and for the purpose herein specified.

56,220.—MACHINERY FOR WEAVING WIRE ROPE.—F. Hazard, Mauch Chunk, Pa.:

I claim, 1st, The flanges, B, B', B'', in combination with the axle, A, spool frames, C, C', cranks, c, c', and ring, E, constructed and operating substantially as and for the purpose described.

2d, The joints, b, b', in combination with the flanges, B, B', frames, C, C', cranks, c, c', and ring, E, constructed and operating substantially as and for the purpose set forth.

3d, The arm, j, and set-screw, h, in combination with the eccentric disk, d, cranks, c, c', frames, C, C', and shaft, A, constructed and operating substantially as and for the purpose described.

56,221.—PANTALON-PROTECTOR.—C. W. S. Heaton, Belleville, Ill.:

I claim, 1st, The use of separate metallic strips, or their equivalents, in connection with a pliable band, or when attached directly to the garment, when such metallic strips are placed perpendicular with the leg of the wearer, substantially as described and for the purpose set forth.

2d, The use of separate metallic strips, or their equivalents, when attached as described, or in any other way substantially the same, either by passing the pliable band through the strips of metal, the metal strips being made like buckles, or in any other way, substantially in the manner and for the purpose set forth.

56,222.—HORSE RAKE.—George L. Heidler, York, Pa.:

I claim the arrangement of the independent teeth attached to the head in front of the axle, and the pressure-board to guide and press the teeth to the ground, constructed and operating as herein described.

56,223.—HOSE-COUPING.—Robert Heneage, Buffalo, N. Y.:

I claim, in combination with the several parts of the coupling, constructed and arranged substantially as described, the stops, P, P, as and for the purposes set forth.

56,224.—ROTATING-HOOK OF WHEELER & WILSON'S SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim chamerling the Wheeler & Wilson sewing-machine hook, substantially in the manner and for the purpose set forth.

56,225.—CULINARY SINK.—Zebulon Hunt, Hudson, N. Y.:

I claim, 1st, The combination of the corrugated or fluted drainer, A, and removable slotted piece, B, with and forming part of the bottom of the sink, substantially as and for the purpose set forth.

2d, The flaring or flannel-shaped strainer, C, in combination with the drop partition or curtain, a, a, substantially in the manner set forth.

56,226.—FRUIT-JAR.—Josée Johnson, New York City:

I claim, 1st, The semi-ring, C, and cross-strap, C', arranged to operate relatively to the body and cover of a self-sealing can or jar, substantially as herein specified.

2d, The partial spirals, b1, b2, arranged opposite to each other on the cover, in combination with a securing piece, C, C', substantially as and for the purpose herein set forth.

56,227.—HORSE-RAKE.—E. O. Jones, Oakwood, Mich.:

I claim, 1st, The standards, C, C, grooved, as described, to receive the slotted ends of the levers, F, F, when used with the said levers and the rake-shaft, as and for the purpose specified.

2d, The levers, F, F, provided with the slotted arms, G, G, when used to catch the ends of the rake-teeth, as and for the purpose specified.

56,228.—WATER ELEVATOR.—Samuel F. Jones, St. Paul, Ind.:

I claim, 1st, Operating the valve, S, through the medium of the standard, o, and pendant, g, when constructed and arranged substantially as shown and described for the purpose set forth.

2d, In combination with the foregoing standard, o, and pendant, g, I claim the spouts, x and D, and the screen, T, when constructed and arranged as shown and described for the purpose set forth.

56,229.—EXCAVATOR.—Daniel Judd, Hinsdale, N. Y.:

I claim, 1st, The combination of the excavator, E, with side supports, d, and frame, A, substantially as described.

2d, Constructing the ends of the excavators with gudgeons, c, c, and stops, e, e, substantially as described.

3d, The forked guides, h, h, applied to the excavator, in combination with the flanged pulleys, j, j, applied to the winding-shafts, G, substantially as described.

4th, The combination of the pawl and pinion applied to a vibrating arm with the excavator, E, spur-wheel, K, and shaft, G, substantially in the manner and for the purpose described.

56,230.—BEE-HIVE.—Julius J. Justin, Milwaukee, Wis.:

I claim the combination of the boxes, A, B, slotted as described, slats, G, and projecting guards, H, arranged and operating in the manner and for the purpose herein specified.

56,231.—DIAMOND-HOLDER.—J. E. Karselen, New York City:

I claim a diamond-holder composed of a tube, A, provided with two sleeves, b, f, moving in notched slots, d, g, and containing the head, B, and the glass breaker, C, as a new article of manufacture.

56,232.—COOKING APPARATUS.—A. C. Kasson, Milwaukee, Wis.:

I claim, 1st, A cooking apparatus composed of a close box, capable of being thrown open as above shown, having openings in its bottom which are provided with flanges that fit in the boiler-holes of a stove or range, substantially as described.

2d, The box, A, made substantially as described with flanged openings on its bottom and with a hinged cover at its top, in combination with the perforated plate, H, substantially as shown.

3d, The combination of the box, A, the perforated plate, H, and the clock-work which gives rotary motion to said plate, substantially as above described.

4th, The adjustable bearing-bar, L, in combination with the roughened hub, J, of the revolving plate, H, substantially as described, for the purpose of supporting and revolving a coffee-roaster or other cylindrical article.

56,233.—OILER.—John King, Ansonia, Conn.:

I claim the combination of the oil vessel, A, tube, E, having plunger or piston, H, and discharge-spout, F, when said plunger is connected to a lever, M, or its equivalent, and the whole together is constructed and arranged as to operate substantially in the manner described and for the purpose specified.

56,234.—OIL WELL TUBE.—Obadiah B. Latham, Seneca Falls, N. Y.:

I claim, 1st, The cylinder, C, and band, I, varying from a true circle and arranged in relation to the cylinder, H, and an external packing device, substantially as and for the purpose described.

2d, The sac, f, when used in combination with the parts, H, F, G, E, D and d, as and for the purpose set forth.

3d, The chisel, G, when used in combination with the described apparatus, for the purpose set forth.

4th, The whole apparatus arranged as described.

56,235.—PARING KNIFE.—Jacob Lebeau, Cincinnati, Ohio:

I claim, 1st, The combination of the handle, A, B, and blade, E, when the latter is adjustable on the former in its own plane, substantially as and for the purposes set forth.

2d, The combination of the gauge-piece, D, with the handle, A, B, and blade, E, substantially as and for the purposes set forth.

3d, The scoop, G, in combination with the blade, E, and handle, A, B, as and for the purposes specified.

56,236.—CORN HARVESTER.—C. M. Lightner, Harrisburg, Pa.:

I claim, 1st, The platform provided with openings as shown, and having the knives, e, attached, in combination with the centrally located revolving knives, f, arranged and operating as shown and described.

2d, The combination and arrangement of the pivoted-bar, D, having the bent bars, o, attached as shown with the hook, m, all arranged to operate as set forth.

56,237.—GRAIN SEPARATOR.—Andrew J. and Henry Linebarger, Jackson, Ill.:

We claim the shaker, a, in combination with the rake-heads, g, constructed and operating substantially as described.

56,238.—WASHING MACHINE.—James Lochridge, Danville, Ind.:

I claim the combination of the rubbing-board resting upon springs, the movable rubber, 9, with the rollers, 1, 2, 3, and springs, 8, 8, and strips, 6, 6, for the purpose and in the manner specified.

56,239.—MACHINE FOR DRILLING AND COUNTER-SINKING UMBRELLA-TIPS.—James W. Lyon, Brooklyn, N. Y.:

I claim, 1st, The stationary pusher and the hopper with its rear entrance, bottom groove, and short tube in front, in combination with the sliding-frame and main-frame, or shears, substantially as described.

2d, The combination of the holding mechanism with the feeding mechanism and the sliding-bed of a lathe, the mechanism and combination being such, substantially as herein described, as to grip and hold the blank, during the forward movement of the sliding-bed, to release and discharge the finished blank, and feed a new blank during the back motion of the sliding-bed.

3d, In combination with the socket-drill on the main-frame, or shears, I claim the cross-drill for drilling and countersinking the cross holes, when combined with the sliding-bed and operated by cams on the main frame, substantially in the manner described.

4th, In combination with the socket-drill on the main frame, I claim the feeding mechanism and the transverse or cross-drilling mechanism, the whole being arranged and combined substantially as herein-before described to feed, hold, drill, countersink, and discharge blanks supplied to the machine by the back and forward motions of the sliding bed, substantially as set forth.

56,240.—AUTOMATIC GAS COCK.—Charles MacRae, New York City:

I claim, 1st, Operating an ordinary gas cock by means of a spring, or its equivalent, applied directly to the cock, substantially as and for the purpose set forth.

2d, In combination with a gas cock, operated as above described, I claim the stop-wheel, G, and pawl, f, so arranged as to be released by the movements of the clock-work, substantially as herein described.

3d, In combination with a gas cock operated as described, I claim the hands, b and c, arranged to operate as and for the purpose set forth.

4th, The stationary dial provided with the two graduated circles in combination with the hands, b, c and d, when said parts are arranged to operate in connection with a gas cock, operated as herein described.

56,241.—CORN-CAKE MACHINE.—William Manning, Chelmsford, Mass.:

I claim, 1st, The stationary knives, c, and adjustable clearers or hoops, e, as herein described and for the purpose set forth.

Also, the former, I, in combination with the adjustable clearers or hoops, e, and knives, c, for the purpose specified and in the manner set forth.

56,242.—STEAM ENGINE.—James R. Maxwell and Ezra Cope, Cincinnati, Ohio:

We claim, 1st, The piston-head of a steam engine longer than its stroke, in the manner and for the purpose herein described.

2d, The piston-head of a steam engine longer than its stroke, with channels and ports in its sides, in combination with a cylinder having corresponding added length and ports leading to and from the main steam valve, in the manner and for the purpose substantially as described.

3d, The cylindrical piston-valve, C, with closed ends, and steam openings through its sides and bottom whereby to operate within the main piston, substantially as described.

4th, The independent steam pipe and valve, P, P, for admitting steam to the main piston, B, in cylinder, A, in the manner and for the purpose herein described.

56,243.—ARTIFICIAL LIMB.—Abner McOmber, Schenectady, N. Y.:

I claim, 1st, Giving a yielding bearing to the lower end of cord, U, by means of the elastic band, g, and vibrating bar, substantially as above set forth.

2d, Placing the elastic band, g, and vibrating bar, e, in a movable frame, d, and also fitting said frame in a cavity, G, in the ottom of the foot, substantially as shown.

3d, Bushing the hinges of artificial limbs with divided bushings, Y, of lignum vitae or other hard wood, and taking up the wear of the bushing by means of a wedge, Z, operated substantially as above described.

56,244.—EMBOSSING PRESS.—J. C. Merriam and W. N. Weeden, Boston, Mass.:

We claim, 1st, The combination and arrangement of the channeled guide-arm, F, and its adjusting screws, with the dies, A, B, and their stationary and movable arms, C, D, applied together substantially as specified.

Also, the arrangement of the elevating screw, a, of the movable die-arm, viz., in the guide-arm, combined and arranged with the stationary and movable arms of the two dies, as set forth.

Also, the arrangement of the sheet-receiving recess or space, G, with the guide-arm, the dies, and their supporting arms, arranged and combined substantially as specified.

56,245.—LAMP BURNER.—Rufus S. Merrill, Boston, Mass.:

I claim, 1st, The combination in a fluid-burner, and with a collecting chamber surrounding the wick-tube, of an extinguisher or cap under the arrangement, and for operation substantially as herein-before set forth.

2d, Forming the collecting chambers of a conical jacket secured to a concentric sleeve adjustable by friction upon the wick-tube by means of an annular partition-plate, substantially as and for the purposes herein set forth.

56,246.—GRINDING MILL.—James W. Miles, Hubbardston Village, Mich. Ante-dated July 3, 1866:

I claim transmitting motion from the driving power through the mill-spindle to the runner by means of jointed driving-bars, F, operating tangentially against elastic bearings, D, or their equivalent, substantially in the manner and for the purpose as herein described and set forth.

56,247.—BOLT HEADING MACHINE.—James Minter, Lowell, Mass.:

What I claim as new is the notches, s, n, on the carrier, H.

operating in conjunction with the driver, D, or their equivalents whereby the same end is accomplished, substantially as above set forth and described.

56,248.—SAFETY POCKET.—George A. Mitchell, Turner, Maine:

I claim, 1st, A pocket made capable of expansion and contraction by the provision of folds in its sides and bottom and provided with metallic protectors as defensive armor, constructed and arranged substantially as and for the purpose specified.

2d, In combination therewith I claim the yielding cover, constructed and arranged substantially as described.

56,249.—STOCK-YARD.—Alvan Morley, Delaware township, Iowa:

What I claim as my invention is the construction of a stock-yard or grazing-pen, constructed substantially as and for the purpose specified, and named a "self-moving stock-yard."

56,250.—LAMP-WICK REGULATOR.—Hermann Mund and Erdmann Hoffmann, Chicago, Ill.:

We claim the wick-controller, g, constructed and applied to the burner, in the manner and for the purpose herein set forth.

56,251.—PENCIL-HOLDER.—L. B. Myers, Elmore, Ohio:

I claim an elastic socket capable of receiving and adjusting itself to hold a lead-pencil of larger or smaller size, and having a hook or suitable device or means for securing it to the garments of a person, constructed and operating substantially as specified.

56,252.—APPARATUS FOR CLEANING BOOTS AND SHOES.—S. M. Newbury, Sparta, Wis.:

I claim an apparatus for cleaning boots and shoes, formed by combining the hinged clasp, A, C, D, with the brush, H, the whole being constructed and arranged substantially as described and for the purpose set forth.

56,253.—NECK-TIE.—James W. Navman, Boston, Mass.:

I claim, 1st, The neck-tie consisting of the parts, A, B, D, D', and B'', in combination with the supporter, C, secured together by the parts, D, D', substantially as described.

2d, In combination therewith, I claim the elastic-loop, F, applied substantially as described.

56,254.—PLANING MACHINE.—Daniel Niles, Fly Creek, N. Y.:

I claim planing tapering shingles on one side by means of the revolving-cutter in fixed bearings, and feeding the shingles to such cutter upon a hinged adjustable frame, with feed-rollers that are in yielding bearings, and arranged to operate substantially as described and for the purpose set forth.

56,255.—GRAIN-DRYER.—Joshua Norton, 3d, Chicago, Ill.:

I claim, 1st, The concentric, now perforated, cylinders, C and c, having the ribs or flanges, F, attached thereto, as shown and described.

2d, In combination with the cylinder constructed as described, I claim the stationary-head, I, constructed and operating as set forth.

56,256.—RAILROAD-SWEEPER.—Edward A. F. Olmstead, New York City:

I claim, 1st, The arrangement of the brush-bars, in combination with the arms, S, and shaft, O, as described.

2d, The combination of the brush-bars, arms, U, and shaft, P, in the manner and for the purpose herein represented and described.

3d, The arrangement of the rods, W, levers, X, and screw-block, B, in combination with the shaft, P, bearing in the slotted arms, M, N, in the manner and for the purpose herein described.

4th, The combination of the scraper, F, rods, G, H, arm, I, lever, M, in the manner and for the purpose herein described.

5th, The arrangement of the brooms, B, T, gearing, O', P', R', S', brooms, V, W, pulleys, A2, B2, in combination with the frame, A, and wheels, E, F, G, H, constructed and operating in the manner and for the purpose herein specified.

56,257.—BURR BOX FOR BURNING MACHINES.—Ziba Parkhurst, Milford, Mass.:

I claim the improved burr-receiver or box, as provided with one or more guards, B, C, D, whether stationary or adjustable, and arranged substantially as herein-before described, the same being to arrest the waste filaments of fibrous material, so that they may be caused to fall back upon the burning machine, while the burrs or foreign matters are in the act of being discharged into the box.

I also claim the combination and arrangement of the lip, E, with the box and its guard or guards, as specified.

56,258.—MACHINE FOR TWISTING AND WINDING FIBERS.—Homer Parmelee, Philadelphia, Pa.:

I claim, 1st, The two rollers, E and E', arranged to revolve on their own axes, and around a given center, in combination with a trough, D, or its equivalent, for receiving the fiber, the whole being arranged and operating substantially as and for the purpose herein set forth.

2d, The rollers, E and E', each being composed of a block, w, with a central cavity, x, and a tube, y, of gum elastic, or equivalent material, substantially in the manner and for the purpose described.

3d, The combination of the rollers, E and E', and the levers, 4 and 4', or their equivalents, whereby the simultaneous inward and outward adjustment of the two rollers is attained.

4th, The said rollers, E and E', and levers, 4 and 4', in combination with the tubular shaft, F.

5th, The combination of the barrel for winding the strand of twisted fibers, with the wheels, M, the latter being arranged to guide the strand in a direct course, all substantially as and for the purpose described.

6th, The said wheels, M, and the train of wheels, L, I, I' and I'', or any equivalent train of wheels, in combination with the arm, J.

7th, A barrel arranged to revolve on and to traverse longitudinally an axis situated obliquely to the course taken by the guided strand, all substantially as and for the purpose described.

8th, The shaft, R, on which the barrel turns and traverses and the levers, q and q', or their equivalents, in combination with the cam, R', on the said barrel and the stops, R'' and R''', the whole being arranged and operating substantially as and for the purpose specified.

9th, The barrel composed of the tube, P, cut longitudinally, and the heads, Q, Q, on applying which to the tube the latter is expanded, the contraction of the tube taking place on detaching the heads, all substantially as and for the purpose herein set forth.

56,259.—SOAP.—C. C. Parsons, Boston, Mass.:

I claim, as a new manufacture, soap in which the described petroleum residuum is one of the ingredients.

56,260.—MACHINE FOR DIGGING POTATOES.—Hollis M. Peavey, Swanville, Me.:

I claim the combination as well as the arrangement of the compound hoe, G, and its operative mechanism, with the scoop, E, and the vibratory separator, F, applied to a wheel-carriage and provided with mechanism for operating the said separator, as explained.

56,261.—BUTTON.—Clark M. Platt, Waterbury, Conn.:

I claim the button formed of a single piece of metal with the edge turned over and with one central hole as a new article of manufacture, as specified.

56,262.—BURLAP ALARM.—H. H. Potter, Carthage, N. Y.:

I claim the bell, C, or its equivalent, lever, I, having toothed arm, L, bell-hammer, D, and springs, G and K, when arranged

and combined together substantially as described and for the purpose specified.

I also claim the slotted upright, M of the bed-plate, A, as and for the purpose described.

56,263.—MANUFACTURE OF CRUET BOTTLES.—William Pountney, Brooklyn, N. Y.:

I claim, 1st, Combining the plunger, E, and lip and mouth former, G (made or united in one piece), with the jaws, B, B, the said part, G, having a rotatory motion with the cruet bottle back and forth, arranged and operating substantially in the manner and for the purposes described.

2d, The combining and uniting the lip and mouth-former with the neck-former or plunger in one piece.

3d, The construction of the stopper-mold with a sliding bottom, plunger, or plug to push up the stopper by pressing with a lever, combined and operating in the manner and for the purposes described.

56,264.—KNIFE-SHARPENER.—Joel B. Pratt, Corn-ing, N. Y.:

I claim the arrangement of the wheel with the standard, the bevel-wheel resting by its axle on a wooden frame and lapping two upright metallic posts, all arranged and combined as set forth.

56,265.—SNAP-HOOK.—J. Quinn and C. Summers, Columbus, Ohio:

We claim as a new article of manufacture the within-described snap-hook, constructed, arranged, and operating substantially as set forth.

56,266.—ATTACHMENT TO COOKING-STOVES.—Rowland I. Rathbun, Poplar Ridge, N. Y.:

I claim the combination with the stove of a shelf, G, constructed and arranged so as to accomplish the purposes specified.

56,267.—WINDOW-BLIND.—W. F. Redding, Saratoga Springs, N. Y.:

I claim the combination of the spindle, G, having collar, H, and spiral spring, F, when arranged in and connected to the slat and frame of a blind, substantially as and for the purpose described.

56,268.—MACHINE FOR CAPPING TACKS.—John C. Rhodes, East Bridgewater, Mass.:

I claim the combination of the rotary frame, A, and its dies, C, plungers, D, their springs, E, E, and clearers, G, and their operative mechanism with the stationary cam, G, the whole being arranged substantially in manner and so as to operate as and for the purpose herein-before described.

I also claim the combination of the rotary frame, A, and its dies, C, plunger, D, and clearers, G, with the stationary cam, G, and the spring, h, and stud, i, to operate as specified.

56,269.—TIRE MACHINE.—George T. Ridings, Shelbyville, Mo.:

I claim the combination of the block, A, B, with the eccentric clamp, C, when employed as and for the purpose set forth.

56,270.—ROTARY TIRE-HEATER.—George T. Ridings, Shelbyville, Mo.:

I claim, 1st, The arrangement of the above described tire-holder and drum in a vertical position, the tire-holder turning on a horizontal axis, and the whole operating in combination with a common force-fire, substantially as set forth.

2d, The combination and arrangement of the adjustable tire-holder with the drum by means of the pillow-blocks, D2, and pawls, t, and the adjustable plates, g, as and for the purpose set forth.

3d, The combination and arrangement of the epodes, a1 and a3, and the segmental plate, b, with the endless screw, c1, and wheel, c2, as and for the purpose set forth.

56,271.—RAILWAY-FROG.—Addison Robbins, Orange, Mass.:

I claim the combination as well as the arrangement of the movable angle piece, G, and auxiliary rails, C, D, and their stopping devices applied together, substantially as described, with the crossing rails of the main and turnout tracks, as specified.

56,272.—TOBACCO-PIPE AND CIGAR-HOLDER.—G. M. Ross and Wm. H. West, New York City:

We claim, 1st, The combination of the pipe, A, and cigar-socket or holder, E, substantially in the manner and for the purpose specified.

2d, The enlargement, b, of the bore or smoke passage, c, c, c', the stem, B, as and for the purpose herein specified.

56,273.—HAY-STACKER.—C. Rundell, Chicago, Ill.:

I claim, 1st, The herein described tubular stack-pole, consisting of the sections, A, A', D, the same being constructed and operating as and for the purpose set forth.

2d, The plate, B, in combination with the sections, A and D, as and for the purpose specified.

56,274.—COTTON-SEED PLANTER.—John L. Russell, Pella, Iowa:

I claim, 1st, The wedge-shaped furrow-opener, F, suspended in an adjustable manner by steady-stands, e, e', and adjusting screws, H, H, and having a rotating trash-cutter, f, substantially in the manner and for the purpose set forth.

2d, The teeth or small shovels, m, in connection with and occupying a position between the furrow-opener, F, and the closing-roller, N, substantially as and for the purpose described.

3d, The tooth-rollers, C and D, with or without the flaring ends, c', c', d', d', arranged one above the other in the seed-box, and operating as shown and explained, substantially in the manner and for the purpose specified.

4th, The sliding-roller and frame, N, n, scraper, p, elevating-lever, q', and stop-chain, e, arranged and operating as shown and explained.

56,275.—WATER-ELEVATOR.—Jonas Rymond, Erwinna, Pa.:

I claim the combination of the crank, D, with the ratchet-wheel, B, the hub, E, and the spiral-brake spring, C, constructed and arranged as and for the purpose herein described.

56,276.—DISTILLING PETROLEUM.—Wm. H. Sangster and Theo. C. Spencer, Buffalo, N. Y.:

We claim, 1st, The combination of the tank, Fig. 2, or its equivalent the tube, C, and faucet, E, with a still for distilling petroleum, when constructed as and for the purposes herein substantially set forth.

2d, We claim the method herein described of condensing the vapor of petroleum by passing it directly through the water.

56,277.—HARNES BELL.—Rudolph Schmidt, New York City. Ante-dated June 26, 1866:

I claim, 1st, Forming the spring for the clapper of flat pieces of metal, in the manner and for the purposes specified.

2d, Constructing the clapper with three or more radiating arms, in combination with the spring carrying such clapper, as specified.

56,278.—BED-BOTTOM.—Heber G. Seekins, Elyria, Ohio:

I claim the rollers, B, provided with mortises, a, arranged in an ascending and descending series, as and for the purpose described, in combination with cords, C, and pawl and ratchet, D, all substantially as described.

56,279.—RAILROAD RAIL.—J. W. Shiveley, New York City:

I claim, 1st, Providing the rail-ends with angular tongues, a, a, a, and angular recesses, b, b, b, when fitted and operating together as herein shown and described.

2d, The combination with the above-mentioned tongues and recesses of the double-check and lock-bar, C, substantially as herein shown and described.

3d, The combination of the said tongues, recesses, and check-bar with the chair, A, substantially as herein shown and described.

4th, The recesses, h, h1, h2, in combination with the rails, the check-pieces, and the chair, substantially as and for the purpose herein shown and described.

56,280.—HORSE-SHCE MACHINE.—Jacob Shinneller and John Brislin, Temperanceville, Pa.:

We claim, 1st, The revolving disk, w, provided with die, s, and clamp, y, when used in combination with the adjustable guide, J, or its equivalent, as herein described and for the purpose set forth.

2d, The lever, g, provided with the swedging and punching die, 8, and cutter, 6, when used in combination with the revolving disk, w, die, s, clamp, y, and guide, J, as herein described and for the purpose set forth.

3d, The cam, l, provided with the leg, 11, when used in connection with the lever, g, and the press tool, 4, as herein described and for the purpose set forth.

4th, The disk, o, and spring, p, when used in combination with the wheels or gear, m and n, as herein described and for the purpose set forth.

5th, The feeding-guide, l, provided with friction roller, X, when used in combination with the cam, k, spring, u, and disk, w, provided with die, s, and clamp, y, as herein described and for the purpose set forth.

56,281.—MODE OF SECURING AXES ON THEIR HAN-DLES.—George W. Simonds, Lynnfield, Mass.:

I claim the combination of the expander, C, the screw, D, and the step, E, applied to the tapering-chamber, B, of the axe helve, the whole being arranged and so as to operate substantially as specified.

56,282.—WINDOW BLIND.—A. P. Smith, Sterling, Ill.:

I claim connecting the slat-rod, D, to the blind-frame, through a catch and rack or notched bar, when all are arranged together, and so as to operate substantially in the manner described and for the purpose specified.

56,283.—HARNES FOR HORSES.—Hector Craig Smith, Dublin, Ind.:

I claim, 1st, The hitching device consisting of a link composed of the following members, to wit, the horizontal bar, E, vertical end rods, F, G, and hitching-pin, H, together with their accessories or devices, substantially equivalent, all arranged to operate in the manner and for the purpose herein described.

2d, In combination with the elements of the preceding clause, I also claim the cross-head, K, and springs, i, j, or their mechanical equivalents, for the object explained and set forth.

56,284.—REVOLVING HOSE NOZZLE.—Isaac Smith and W. D. Tewksbury, New York City:

We claim the double oblique swivel-joint, so constructed that the tip is susceptible of arrangement at an acute or other angle, or in a right line with the body, or that it may be adjusted tangentially to the circumference of the body, in combination with the revolving collar, F, on the body of the nozzle, substantially as and for the purposes specified.

56,285.—STREET-SCRAPER.—Mathias Smith, Lake, Ill.:

I claim, 1st, The combination of the adjustable scraper, H, the guides, F, and lever, J, arranged and operating substantially as and for the purposes set forth.

2d, In combination with the said adjustable scraper, H, I claim the employment of the adjustable side-boards, L, arranged as and for the purposes described.

56,286.—CULTIVATOR.—E. M. Sorley, Neenah, Wis.:

I claim, 1st, The jointed adjustable cross-bar, B, with arms, b, b, in combination with the shifting braces, c, c, c, c, and the side frame, A, constructed and arranged substantially as and for the purposes herein described.

2d, The construction and arrangement of the shifting screw-headed and saber-shaped harrow teeth or cultivators with hollow backs, in combination with the frame, A, and the adjustable center cross-bar, B, with its draught-arms, b, b, applied and operated as herein stated.

56,287.—COFFIN.—Henry D. Sprague, Portland, Maine:

I claim, 1st, The attachment of a mirror to the lower side of the described kind of coffin-lids, as and for the purposes set forth.

2d, The combination of the jointed lid, brace, and mirror, in the manner and for the purpose set forth.

56,288.—CULTIVATOR.—Esen Starr, Royal Oak, Mich.:

I claim, 1st, The curved or segment-bar, B, at the rear end of the beam, A, in combination with the curved standards, J, J, provided with upper bent ends, a', to abut or fit snugly against the rear side of said bar, B, and to which they are secured by bolts, substantially as shown and described.

2d, The standard, F, bent or curved as shown and secured in position by a brace rod or bar, H, from the beam, A, substantially as and for the purpose specified.

56,289.—CULTIVATOR.—D. C. Stover, Lanark, Ill.:

I claim the arrangement of the uprights, c, c, and bar, d, with the pendant bars, J, J, and plow-beams, D, D, L, L.

56,290.—PACKAGE-CASE FOR PLANTS.—P. L. Swine, Shirleysburg, Pa.:

I claim a package-case made substantially as herein described for the purposes specified.

56,291.—PROCESS FOR REMOVING VEGETABLE MAT-TER FROM WOOL.—William Sykes, Glenham, N. Y.:

I claim the described process consisting in plunging the wool into an acidulous solution, followed by treatment of lime-water and subsequent drying.

56,292.—MANUFACTURE OF BELTING, HOSE, ETC.—William A. Torrey, Mont Clare, N. J.:

I claim the combining and applying of the india-rubber and gutta-percha compounds, substantially in the manner and for the purposes above set forth.

56,293.—CANDLE-HOLDER.—Julius Verch, Albany, N. Y.:

I claim, 1st, The suspension of the candle-holder, E, with its apparatus by the chains, a, a, and the bands, c, c, with their springs, e, e, as described.

2d, The candle-tube, H, entirely closed on the sides and bottom, with its basin, h, serving to prevent the access of grease dripping to the spring, S, as described.

3d, The method of securing the cap, M, to the candle-tube, H, by the screw-collar, f and k, in the manner and for the purpose described.

4th, The combination of the outer tube, E, the candle-tube, H and the cap, M, with the globe, T, and its attachments to the candle-holder, in the manner and for the purpose described.

56,294.—BALING HAY.—Roswell Wakeman and Jas. L. Ballance, Port Deposit, Md.:

We claim putting up short cut hay or straw into compact bales for feed, substantially in the manner herein described and for the purposes set forth.

56,295.—CULTIVATOR.—G. W. Warren, Macomb, Ill.:

I claim, 1st, The inner frame, pivoted at its rear end to the main frame having the two rear plows attached permanently thereto, and having the pivoted bars, F, secured to it in the manner shown.

2d, The long standards, I, having the front shovel attached

thereto secured to the pivoted bars, T, underneath the axle and frame, and arranged as set forth.

34. The screw, e, arranged to adjust the depth of the plow, in the manner shown and described.

56,296.—PLOW-CLEANER.—Oscar F. Warren, Pembroke, N. Y.:

I claim, 1st, The adjustable levers, O, G, F, so connected and arranged that the clearing lever may be operated either in front of a cutter or in front of the plow standard, for the purpose and substantially as set forth.

2d, Connecting the operating lever, O, to the plow-handle, and within easy and convenient grasp of the hand of the plowman, so that the said operating lever will also serve as a handle to guide and hold the plow, substantially as set forth.

56,297.—WIND WHEEL.—Joseph C. Wate, Wilton Junction, Iowa:

I claim the wind doors, A, in combination with the springs, D, and brake, K, substantially as herein specified.

56,298.—PLOW.—George Watt, Richmond, Va.:

I claim, 1st, The frame, a, b, c, cast in one piece, and constructed as described, in combination with the mold-board, e, land-side, g, and point, k, the whole being constructed and operating in the manner and for the purposes set forth.

2d, The curved beam, c, which is constructed to impinge upon the frame behind the central point of resistance of the mold-board, substantially as described.

3d, The beam, c, in combination with the brace, m, and adjustable clamps, n, for affording lateral adjustment to throw the plow in and out of land, substantially as described.

4th, In combination with the curved beam, c, I claim the slotted block, b', key, e', and wheel journaled to and between the plow-handles, substantially as described.

5th, The wheel, d', journaled to and between the plow-handles, substantially as described.

56,299.—DITCHING MACHINE.—J. S. Weaver, Dayton, Ohio:

I claim, 1st, The combination of the arch or frame, E, with the shaft, F, G, the forward axle, C, the king-bolt, I, and friction-wheel, H, the parts being constructed and arranged substantially as described and for the purpose set forth.

2d, The combination of the guide-wheel, L, standard, K, and lever, M, with each other, with the frame of the machine, and with the forward axle, C, substantially as described and for the purpose set forth.

3d, The combination of the cog-wheel, X, with the rear axle, D, and with the elevator-belt, W, constructed and arranged substantially as described and for the purpose set forth.

4th, The combination of the crank-wheel, C', and pinion-wheels, B', with the toothed side-bars, S and T, of the elevator, substantially as described and for the purpose set forth.

5th, The combination of the guide and stiffening-bars, P and R, with the side-bars, S and T, of the elevator, and with the inclined grooved side-bars, N and O, of the frame of the machine, substantially as described and for the purpose set forth.

6th, The combination of the index, G, dial, H', and cog-wheel, D', with the pinion-wheel, B', substantially as described and for the purpose set forth.

7th, The combination of the spring, F', and catch, E', with the cog-wheel, D', substantially as described and for the purpose set forth.

8th, The shovel or cutter, V, constructed as described, in combination with the side-bars, S and T, of the elevator, substantially as described and for the purpose set forth.

56,300.—SHEEP RACK.—Allen A. Webster, Fremont, Ind.:

I claim, as my invention and improvement in a sheep rack and cattle-feeding rack, the rack-plus denoted in the accompanying drawing and referred to in the foregoing specification by the letters E, E, E, E, E, E, E, E, and these rack-plus meeting and constructing shelter-tables, B, appearing in draught and specification, and also feed-drawers, denoted in the accompanying drawing and referred to in the foregoing specification by the letters A, A.

56,301.—RAILROAD CAR.—R. T. M. Wells, Roxbury, Mass.:

I claim the ratchet, D, keyed on the front axle, B, of the truck and encompassed by a segment, F, placed loosely on said axle, in combination with the pin or pawl, b, slide-bar, H, springs, J, J', one or more, and the chains, I, I', all arranged to operate in the manner substantially as and for the purpose set forth.

56,302.—CAR-BRAKE.—Edward Whitehead, Cincinnati, Ohio:

I claim a car-brake adapted to embrace the rails of the track, constructed substantially as described, of clamps, E, F, G, H, hinged as shown, and operated simultaneously by means of nut, M, and screw, N, as set forth.

56,303.—PAVEMENT.—Edward Whitehead, Cincinnati, Ohio:

I claim, 1st, The combination of the wooden paving-blocks, constructed as herein described, with upper members, A, lower members, A', shoulders, C, and ledges, B, all arranged and adapted to operate as and for the purposes specified.

2d, The arrangement of conglomerates of wooden blocks, A, A', C, B, with the metallic frame-curb or casing, D, D', d, as set forth.

56,304.—PITMAN-HEAD AND CRANK-WRIST BOX FOR HARVESTING MACHINES.—Wm. M. Whitely, Jr., Springfield, Ohio:

I claim, 1st, The chilled box pitman-head, K, constructed with the internal screw, k, in combination with the jam-nut, L, and pitman-rod, M, substantially as described.

2d, The pitman-head, K, when cast in one piece over a taper chilled pin and provided with the internal screw, k, in combination with the jam-nut, L, pitman-rod, M, and chilled hollow spindle, A, substantially as described.

56,305.—MEAT AND VEGETABLE CUTTER.—E. P. Whitney, Stamford, Conn.:

I claim the arrangement of the knives, D, with slots, d, screws e, lances, E, in combination with the disk, A, constructed and operating in the manner and for the purpose herein specified.

56,306.—LUBRICATING APPARATUS.—J. L. Wiggin and E. Folsom, South New Market, N. H.:

We claim the shaft lubricating apparatus, made in manner and for application to a shaft bearing or box, substantially as hereinbefore described.

56,307.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim, 1st, Hinging the bar, C, to the bar, A, by means of the tapering rivet, g, and washer, f, let into the upper surface of the bar, C, all substantially as described and indicated in sheet 1 of drawings.

2d, The combination of the bar-clips, d, d', with a toe clip, a, heel clips, e, e', and one or more hinge joints, g, g', substantially in the manner and for the purpose set forth.

56,308.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim, 1st, The method herein described for protecting the expanding screw, e, from injury, viz.: the attaching of the expanding screw to the clips above the shoe, and also the locating of said screw in between the heel clips, substantially in the manner and for the purpose specified.

2d, The combination of the shoe, A, heel clips, C, C, bar clips, D, expanding-screw, e, jam-nuts, f, f', in the manner and for the purpose represented and described.

3d, The combination of the curved heel clips, C, C, and bar clips, D, D, substantially in the manner and for the purpose set forth.

56,309.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim a continuous clip, B, B', b, constructed as described,

in combination with the notched bar, A, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,310.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim, 1st, The combination of the toe-calks, b and b3, with the plate, B, when connected with and attached to the shoe, in the manner described.

2d, Locating the toe-calk at the inner edge of the shoe, when constructed and applied in the manner described.

56,311.—ANVIL FOR MAKING HORSE-SHOES.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim the shaping anvil, A, a, in combination with the studs or projections, B, b, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,312.—MACHINE FOR LABELING SPOOLS.—Aaron W. C. Williams, Hartford, Conn.:

I claim, 1st, The recesses, *, in the carrier, B, arranged relatively to the feeder, C, and the roller, D, substantially as and for the purpose herein set forth.

2d, The combination of the carrier, B, carrying the spools in succession, as specified, with the labeling device, G, adapted to present the labels thereto, substantially as and for the purpose herein set forth.

3d, The label-holder, G, in combination with the mechanism represented, or its equivalent, for rendering its action automatic, substantially as herein specified.

4th, The pressing-roller, I, in combination with the spool-carrier, B, labeling device, G, sizer, D, and spool-feeder, C, substantially as and for the purpose herein specified.

5th, The inclined surface, J, on the vibrating-arm, J, in combination with the label-carrier, G, spool-carrier, B, and recesses, b, arranged as represented, so as to hold the spool-carrier firmly in position while the label is applied, and liberate it by the retreat of the label-carrier to allow the succeeding spool to be presented, substantially as herein specified.

6th, The catch, K, in combination with the spool-carrier, B, lever, J, and label-carrier, G, adapted to operate substantially as and for the purpose herein specified.

56,313.—DIE FOR FORMING BEADS ON THE EDGE OF SHEET-METAL VESSELS.—Samuel R. Wilmot, Bridgeport, Conn.:

I claim, 1st, The dies, A, B, constructed, arranged, and operating substantially as specified.

2d, The groove, c, in the die, B, formed as described, and acting in connection with the recess, a, of the die, A, for turning the edge of the blank, substantially as set forth.

3d, The combination of the elastic presser, C, with the dies, B and A, substantially as herein set forth for the purpose specified.

56,314.—PUMP PISTON.—David S. Wood, Delavan, Wis.:

I claim the two part loose packing, D, in combination with the channel, L, J, M, and the piston-head, B, substantially as and for the purpose specified.

56,315.—WHEEL VEHICLE.—G. B. Woodward, Bolivar, N. Y., and M. L. Smith, Scio, N. Y.:

I claim, 1st, The combination of the box, C, cast with the end-pieces, b, central-piece, a, end-piece, b', and nut, B, both end-pieces being provided with a flange, d, all constructed and operating in the manner and for the purpose herein specified.

2d, The spokes, C, secured to the felloes and part, a, of the hub as shown, when used in combination with the flanges, d, at the inner ends of the parts, b, b', substantially as and for the purpose specified.

56,316.—GRAIN SEPARATOR.—James Woolener, Peoria, Ill.:

I claim, 1st, Opening the side of the shaking shoe like a door hung on hinges, and closing it and holding it firmly by means of the two rods at the top and bottom with nuts and screws as shown at m, m, Fig. 1, the rods and nuts are shown at k, k and l, l, Fig. 1, the section of which is shown at k, l, m, Fig. 1, thus holding the screens when inserted firmly in any desired position without slides or wedges or grooves.

2d, The metallic strip connecting the screens together as shown at a, Fig. 9, allowing the screens to change their relative position as shown by the dotted lines, a, b and a, c, Fig. 9, and allowing one or more of the screens to be removed by passing the head of the screw through the slot, as shown at a, Fig. 9.

3d, The arrangement of the two elevators, C and D, with the shoe, N, and box, E, as constructed for the purpose of more effectually separating and conveying away from the machine the different grades of seed, as is herein fully set forth.

4th, The flange roller shown at Fig. 10, to support and carry the shaking shoe, A, Fig. 1, as shown at c, d, Fig. 1.

5th, The position of the screens in the lower shaking shoe, N, as indicated by the dotted lines, the lower screen, L, being pushed down as far as the dotted line, g, and delivering its grain into the box, E, and the upper screen, K, being pushed down as far as shown by the dotted line, f, and delivering the superior grade of grain at the front of the mill, the screens being held in their position by a rod and nut as shown at n, Fig. 1.

56,317.—FLOUR-SIFTER.—K. F. Worcester, Nashua, N. H., and J. P. Perkins, Hollis, N. H.:

We claim the combination with the fingers, c, and brushes, d, secured to the shaft of the machine as herein set forth, of the cams and pins and spring or equivalent mechanism for giving a constant up and down motion to the same, the whole being constructed and arranged for operation substantially as and for the purposes herein shown and described.

56,318.—WASHING MACHINE.—Robert M. Yorks, Schoolcraft, Mich.:

I claim, 1st, The combination of the wash-board, G, the treadle, J, and the springs, K, connected to each other by ropes, I, I', substantially as described.

2d, The cross-bar, M, working in grooves formed by the yielding bars, L, L, and the upper edges of the frame, B, substantially as described.

56,319.—ACCORDION.—Carl Friedrich Zimmerman, Philadelphia, Pa.:

I claim the distinguishing keys, K*, giving the same tone both in drawing and compressing, and arranged in combination with the keys, K, substantially as and for the purpose set forth.

56,320.—HARVESTER.—Francis C. Coppage, assignor to himself and Wm. Coppage, Terre Haute, Ind.:

I claim the zig-zag wheel, F, situated on the axle of the wheels, B, B, as described, in combination with the frame, H, pallets, J, J, levers, I, I, link, K, pitman, L, and cutter-bar, N, the whole being constructed, arranged, and operated in the manner and for the purpose set forth.

56,321.—SHOE FOR STAMPING MACHINERY.—P. W. Gates, assignor to himself and D. R. Fraser, Chicago, Ill.:

I claim as a new article of manufacture a solid shoe for stamping machinery produced by casting hard and soft metal together while both are in a molten state, the soft metal forming the stem of the shoe, while the hard metal forms the body of the shoe, substantially as described.

56,322.—PAINT.—J. Lewis Geroldsek, assignor to Henry W. Livingston, Livingston, N. Y.:

I claim the composition of material and the process of compounding the same, substantially as set forth in the foregoing specification.

56,323.—PROCESS OF MAKING CALLIPERS OR DIVIDERS.—James B. Gooding, assignor to Sullman White, Waltham, Mass.:

I claim the hereinbefore described new or improved process of making spring dividers, callipers, or other like articles, the same being accomplished by sawing, boring, sawing, and

bending open the blank preparatory to further finishing and hardening it, as specified.

I also claim the improved article of manufacture as so made.

56,324.—HOSE-COUPLING.—John B. Mitchell, assignor to himself and C. M. Plummer, Portland, Me.:

I claim the combination in a hose-coupling of the swivel, 2, back-screw, f, nipple, 1, having shoulders, a, the center clutch, 8, with spaces, d, and projections, c, channels, i, and steady-plus, l, all substantially as and for the purpose set forth.

56,325.—ENVELOP MACHINE.—Robert Parks, assignor to E. J. Spangler, W. E. Lockwood, and E. D. Lockwood, Philadelphia, Pa.:

I claim, 1st, The cross-head, F, carrying knives and creasers, arranged substantially as described, and having a uniform reciprocating motion imparted to it, substantially as set forth for the purpose specified.

2d, The combination of the cross-heads, F, guide-rods, D, or their equivalents, yoke, C, and crank-shaft, B.

3d, The plate, G, made detachable from the cross-head, and having cutters and creasing plates, arranged substantially as set forth.

4th, The plate, G', with its knives, the whole being made detachable from the cross-head, for the purpose specified.

5th, The plate, H, with its grooves and openings, the whole being made detachable from the stationary plate, E, of the machine, for the purpose described.

6th, The combination of the detachable plate, I, and its cutting edges, q, q', with the detachable plate, J, and its knife, r.

7th, The bars, P and P', arranged and operating substantially as described.

8th, The stationary folders, R, constructed, arranged, and operating substantially as set forth.

9th, The adjustable connecting-rod, M', rendered adjustable on the crank, substantially as and for the purpose described.

56,326.—FLANGE.—David Paterson, assignor to Austin R. Pardee, Jersey City, N. J.:

I claim a flange provided with radiating slots, b, and ribs, c, rising from the edges of said slots, to a level with a central hub, a, substantially as and for the purpose described.

56,327.—FURROWING PLOW.—Samuel Perry, Troy, N. Y., assignor to Charles H. Fort, West Troy, N. Y.:

I claim the adjustable standard, C, having the flat share, E, attached to its lower end, in combination with the mold-boards, D, D, attached to said standards by links or joints, and provided with arms, E, E, which pass through the beam and are secured by a set-screw, F, the whole being constructed and operated in the manner and for the purpose set forth.

56,328.—GRAIN-FORK.—Martin C. Remington, Auburn, N. Y., assignor to himself and A. O. Remington, Weedsport, N. Y.:

I claim the construction and combination of the bow, C, and brace-rod, D, applied to the fork, substantially as and for the purpose specified.

56,329.—CHUCK.—Isaac Smith, assignor to himself and W. H. Haight, New York City:

I claim the conical screw and sliding threaded gripping jaws, D, arranged with reference to each other and with the conical body, B, and case, C, substantially as herein set forth for the purpose specified.

56,330.—CHUCK.—Isaac Smith, assignor to himself and Wm. H. Haight, New York City:

I claim, 1st, The combination of the screw-collar, c, sliding collar, D, inclined planes, E, and levers, I, substantially as herein set forth for the purpose specified.

2d, The arrangement of the rotating collar, C, sliding collar, D, and levers, I, with reference to each other and to the sliding gripping dog, B, and body, A, substantially as herein set forth for the purpose specified.

3d, The internally conical centering device, F, applied within the body, A, of the chuck, in the manner substantially as herein specified.

56,331.—MACHINE FOR RAKING AND LOADING HAY.—John P. Smith, Hudson, N. Y., assignor to himself, John B. Longley, Hudson, N. Y., and W. H. Sheets, Claverack, N. Y.:

I claim, 1st, The guards, N, in combination with the rake and endless elevating apron, substantially as herein set forth for the purpose specified.

2d, The elastic plates, n, arranged between the teeth and with regard to the endless elevating apron, substantially as herein set forth for the purpose specified.

56,332.—MACHINE FOR DRAWING CARTRIDGE SHELLS.—Amaziah S. Warner, Springfield, Mass., assignor to himself and Henry Reynolds, New Haven, Conn.:

I claim, 1st, The combination of the means substantially such as herein described, for moving and feeding the forms with the die and punch, substantially as and for the purpose specified.

I also claim, in combination, the disk or wheel for moving the forms, the guides for directing the forms, the carrier, or equivalent therefor, and the punch and die, substantially as and for the purpose specified.

56,333.—PUDDLING FURNACE.—George A. Whipple, assignor to himself and Jacob Painter, West Pittsburg, Pa.:

I claim constructing puddling, boiling, and heating furnaces with a chamber or space under the bottom plates or hearth, so constructed and arranged substantially as hereinbefore described as that steam may be generated or introduced therein, and come in contact with the under side of the bottom plates and interior surface of the boshes or chills so as to withdraw from them a portion of their heat, and thus aid in protecting them from the destructive action of the heat of the furnace.

56,334.—SLEIGH-KNEE.—Mary E. Francisco, Lake Mills, Wis., administratrix of the estate of Henry Francisco:

I claim a hollow cast metal sleigh-knee, which is constructed with bracket bearings on its ends, having closed sides adapted to receive the frame-work of a sleigh, substantially as herein described.

56,335.—BELLOWS.—John Bowden, Mitcham, England:

I claim the combination and arrangement of the chambers, diaphragms, valves, rock-shaft, and connections, substantially as herein described and shown in the drawings annexed.

56,336.—METHOD OF PRODUCING LIGHT.—Prosper Carlevaris, Turin, Italy:

I claim the employment of chloride of magnesium and of the carbonate and other salts in general of magnesium reduced to an indecomposable state, as and for the purposes herein described, by being introduced in a flame composed of oxygen in combination with hydrogen, or of such other gaseous compounds as are hereinabove set forth.

56,337.—MANUFACTURE OF SPOONS, FORKS, ETC.—Daniel Joseph Fleetwood, Birmingham, England:

I claim, 1st, The employment or use in the manufacture of spoons, forks, and other articles of tools, B, each of which is partly die and partly matrix, substantially as and for the purpose described.

2d, The die-holder, C, with set screws, a, t, and wedges, n, in combination with tools, B, constructed and operating substantially as and for the purpose set forth.

56,338.—APPARATUS FOR HEATING AND COOLING AIR, ETC.—Loftus Perkins, London, England:

I claim the use of tubes sealed at both ends and containing water or other volatile liquid in heating and cooling atmospheric air and other aeriform bodies, and in heating ovens and in heating and ventilating buildings, as herein described.

56,339.—LATHE FOR CUTTING SCREWS.—Joseph Tenge, Birmingham, England:

I claim, 1st, The combination in a screw-cutting lathe of a single slide-rest, with two or more tools or cutters, which operate simultaneously upon two or more different screw-blanks, all constructed and arranged substantially as described.

2d, The combination in a screw-cutting lathe of a head-stock and poppet-head, each provided with two or more centers, when constructed and arranged substantially as described.

3d, In a screw-cutting lathe constructed and arranged as herein described, I claim the special gearing actuated by the driving-pulleys for the purpose of rotating two or more screw-blanks simultaneously in the same direction as herein-before described.

56,340.—CHURN.—John Cooper, Dublin, Indiana:

I claim the bowed or bent beaters, F, when constructed and arranged substantially as and for the purpose set forth.

56,341.—LADY'S DRESS SKIRT-ELEVATOR.—Thomas V. Phelps, Worcester, Mass.:

I claim, 1st, The combination of rings, C, D and B, with the tape, A, substantially as set forth.

2d, The combination of the looping device above described with the bottom of the skirt of a dress, substantially as set forth.

56,342.—MEASURING FAUCET.—John G. Baker, Philadelphia, Pa.:

I claim, 1st, The revolving cylinder, D, when arranged eccentrically to the cylinder, A, and inclosing the feed-port, I, and in combination with the rotary-piston, G, when constructed and arranged as a measuring-faucet, substantially as described.

2d, The cylinder, D, when inclosing feed-port, I, and provided with a wide slot, A, for the escape of the fluid from the center outward, substantially as described.

3d, The graduated dial-plate, Q, in combination with the reversible index, P, worm-wheel, O, and worm, N, as arranged in relation to a measuring-faucet, all substantially as and for the purposes set forth.

RE-ISSUES.

2,299.—COMBINED SHOULDER-BRACE AND SUSPENDER.—David W. Canfield, New York City. Patented December 16, 1862:

I claim a combined shoulder-brace and suspenders in which the ends of the strap, A, united in the rear, at which point of junction the back-straps are secured, substantially as described and for the purpose specified.

2,300.—WRISTBAND.—P. Tenney Gates, Plattsburg, N. Y. Patented March 13, 1866:

I claim, 1st, An elastic wristlet or adjuster, in combination with a pendent cuff of any description connected to the wristlet by elastic cord or otherwise.

2d, A wristband or cuff having both ends finished and button-holed, and thus adapted for reversing, when unattached to any other garment, and arranged substantially as described and for the purpose set forth.

3d, A cuff pendent from an attachment of the arm, substantially as and for the purpose set forth.

2,301.—NAIL PLATE-FEEDING MACHINE.—John C. Gould, Boonton, N. J. Patented May 12, 1857:

I claim, 1st, The feed or nipper-rod, Z, and the feeding-device, S, S', in combination with the rod, T, and nose-piece, V, as and for the purposes specified.

2d, Fixing the bar, F2, on which the rack, F3, is formed upon a shaft, Y, journaled within and supported by a vibrating box or bearing, L, substantially as and for the purpose set forth.

3d, Supporting the nose-piece, and feeding-devices upon a hinged or pivoted shaft, M, to adapt them to be turned back to render the cutters accessible, as described.

4th, Connecting the nose-piece with the driving-shaft by means of the two rods, V, V', adapted to be disconnected as described to admit of the turning back of the nose-piece.

5th, The combination of the rock-shaft, G, vibrating-box, L, rock-shaft, Y, bar, F2, cogged rim, d, and nose-piece, U, substantially as and for the purpose specified.

2,302.—CENTRIFUGAL MACHINE.—Geo. B. Hartson, and E. J. Woolsey, New York City. Patented Feb. 13, 1866:

We claim, 1st, Supporting and driving the centrifugal separator from below, substantially as and for the purpose herein shown and described.

We also claim the method of constructing the centrifugal separator with a hollow hub in the center of the lower hub thereof as described, the said hub being provided with a pulley for the driving-belt below the bottom plate, and fitted to run on and combined with the steel of the base-plate, in the manner and for the purpose specified.

We also claim the said centrifugal separator in combination with the cap or cover provided with holes or channels covered with funnel-shaped hoods, as described, to force currents of air in and through the said apparatus to aid in effecting the separation as described.

2,303.—MACHINE FOR DRESSING AND FINISHING THREADS, ETC.—William Kiefer, assignor to E. Burg and Louis Guillemin, New York City. Patented Feb. 7, 1865:

I claim, 1st, The arrangement of the gum or size-bath, e, wiper, g, and flat heater or heaters, h, i, and a winding frame, constructed and operating substantially in the manner and for the purpose described.

2d, In combination with the gumming device and heater, I claim the winding frame, constructed and operating substantially as and for the purpose described.

2,304.—ASH-PAN DRAWER FOR STOVES.—James A. Lawson, Troy, N. Y. Patented June 16, 1863. Ante-dated April 7, 1863:

I claim, 1st, The ash-pan drawer, A, for cooking or other stoves, or for furnaces, having the ball, B, and the handle, C, thereto attached, and arranged within an inclosed ash-pit or chamber, and in combination with the fire-grate or fire-chamber thereof, in the manner and for the purposes substantially as herein described and set forth.

2d, The arrangement of an ash-pan drawer, having the ball, B, combined therewith, within an inclosed ash-pit or ash-chamber of a stove or furnace, and in combination with the fire-grate or fire-chamber thereof, in such manner as to receive the ashes and other material falling therefrom and thereafter be removed in the manner substantially as herein described and set forth.

3d, The employment of an ash-pan for cooking or other stoves or for furnaces, constructed in the manner substantially as herein shown and described, in combination with a surrounding or inclosed ash-chamber or ash-pit, so that no dust or other matter shall escape from or by reason of the falling of ashes or other material from the burning of fuel upon the fire-grate into the room where such stove or furnace is used, in the manner substantially as herein described and set forth.

4th, The ball, B, in combination with the ash-pan drawer, A, and with the tops, a, a, and handle, c, in the manner substantially as and for the purpose herein described and set forth.

2,305.—ASH SIFTING PAN FOR STOVES.—James Spear, Philadelphia, Pa. Patented April 15, 1862:

I claim the application of a sifting-pan capable of being vibrated to the hearth of a stove or range, substantially in the manner and for the purpose herein described.

2,306.—SHIRT-COLLAR.—(Div. A.)—The Union Paper Collar Company, assignees by mesne-assignments of Walter Hunt. Patented July 25, 1854; re-issued April 4, 1865:

We claim a shirt-collar, or wristband or bosom, made of a fabric composed of paper and muslin, or an equivalent fabric, having a surface covered with enamel, substantially as and for the purpose above specified.

2,307.—SHIRT-COLLAR.—(Div. B.)—The Union Paper Collar Company, assignees by mesne-assignments of Walter Hunt. Patented July 25, 1854; re-issued April 4, 1865:

We claim a shirt-collar, bosom, or wristband, made of a fabric composed of paper and muslin, or an equivalent fabric, having a smooth white surface coated with transparent varnish, for the purpose specified.

2,308.—PLATING, TEMPERING, AND HARDENING IRON AND STEEL.—The American Metal Company, assignees by mesne-assignments of Elliot Savage. Patented December 26, 1865:

I claim, 1st, Heating the metal by immersing it in a bath of melted cyanide of potassium, substantially as described.

2d, Cooling the metal by immersing it in a cooling liquid, substantially as described, after it has been heated in a bath of melted cyanide of potassium, substantially as described.

2,309.—PAPER SHIRT-COLLAR.—(Div. A.)—James A. Woodbury, assignee of Andrew A. Evans, Boston, Mass. Patented May 26, 1863:

I claim as a new article of manufacture a collar made of long fiber paper, substantially such as is above described.

2,310.—PAPER SHIRT-COLLAR.—(Div. B.)—James A. Woodbury, assignee of Andrew A. Evans, Boston, Mass. Patented May 26, 1863:

I claim as a new article of manufacture a collar made of long fiber paper, substantially such as above described, and coated or varnished, as and for the purposes above set forth.

2,311.—SOLAR CAMERA.—David A. Woodward, Baltimore, Md. Patented Feb. 24, 1857:

I claim, 1st, Adapting to the camera obscura a lens, or lenses, and reflector, in rear of the object glass, in such manner that it is made to answer the two-fold purpose of a camera obscura and a camera lucida, substantially as and for the purpose specified.

2d, The arrangement and combination of the condensing lens, H, or lenses, D' and H, negative slide or holder, N, and achromatic lens or lenses, E, made adjustable with regard to each other, for condensing the sun's rays upon and through the negative, and focusing them upon prepared paper, canvas, or other suitable material for photographic purposes, substantially as described.

2,312.—WHIFFLE-TREE ATTACHMENT.—John C. Garner, Ashland, Pa. Patented Dec. 26, 1865:

I claim the plate, C, provided with the lips, as shown, and secured to the bar, A, by the bolt, D, in combination with the tube, E, fitted in the whiffle-tree, and the plate, F, at the front side of the latter, the bolt, D, passing through the tube, E, and all arranged to operate in the manner substantially as and for the purpose herein set forth.

DESIGNS.

2,353.—STATUETTE.—Samuel Conkey, New York City.

2,354.—CLOCK-CASE FRONT.—Nicholas Muller, New York City.

2,355.—TRADE-MARK.—Charles A. Perry, assignor to himself and Thomas Perry, Chicago, Ill.

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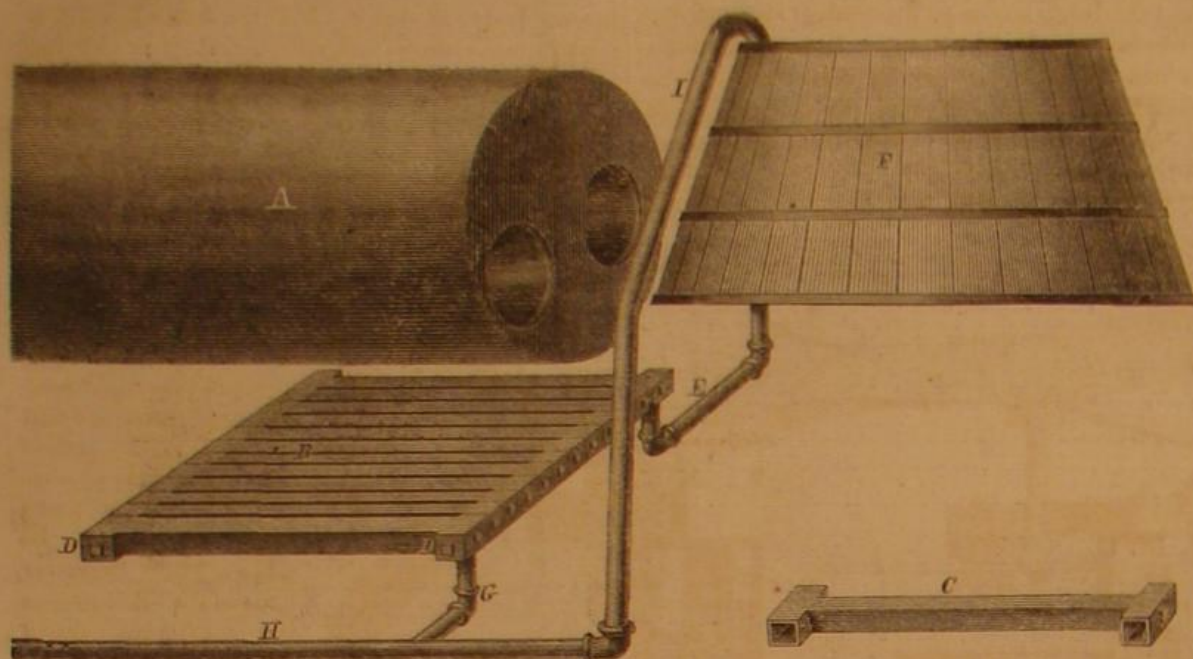
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Improved Grate for Steam Boiler Furnaces.

Every engineer and fireman knows the annoyances and vexation attending the burning-out of his grate bars, and the unpleasant labor attending the removal of the clinkers. Proprietors, also, are aware of the loss caused by the coal falling through bent bars, and the increased consumption of coal rendered necessary by frequent cleaning of the grate. The object of this improvement is to obviate these difficulties.

A represents a boiler under which is the grate, B, formed of sections, as shown at C. These are cored, or cast hollow, and have square transverse projections

**NEVIUS'S HOLLOW GRATE BARS.**

at each end, also cast hollow. The grate portion of the bars are beveled from the top, or are narrower on the bottom than on the face, in the manner of ordinary bars. These bars are placed together, as shown in the engraving—the ends of the projections being planed and a packing, of copper or other suitable material, being introduced between their faces. A bolt (head shown at D) passes through the grate on each end, from side to side, and is secured by a nut, binding the whole firmly together. Every alternate packing has an aperture only large enough to admit the bolt, D, and the others are cut to allow the full caliber of the bar, so that the passages in the grate, from one side to the other, pursue a serpentine course.

Water is introduced by the pipe, E, from the tank, F, and, following the line of these passages, arrives at the pipe, G, having traversed the length of each bar. The grate thus becomes a heater, and prepares the water for the boiler, which it reaches by means of the pipe, H, which conducts it to the force pump. In case of steam forming in the grate, a blow-off pipe, I, conducts it to the tank, thus avoiding back pressure.

It is claimed that this grate is very durable, and that while the bars are kept cool and prevented from warping, the heat is utilized in warming the water. They have been in use about a year and given perfect satisfaction.

Patented through the Scientific American Patent Agency, January 23, 1866, by G. S. Nevius, Bushnell, Ill., to whom apply for further information.

The Monitor Engines.

Mr. John Bourne says:—"That the monitor type of engine is incapable of improvement I by no means assert, but that it is marked by many features of excellence and originality, and in every respect a better type of engine than that generally adopted in our navy, I am prepared to maintain. Perhaps the double piston-rod type of screw engine is preferable to the monitor type; but that engine we also owe to the genius of Ericsson and his assistants, for it was by Count Rosen—Ericsson's representative in England—that this species of engine was first introduced in the *Amphion*, the first screw vessel constructed in this country with the engines below the water line. It is an easy thing to raise captious objections against any form of engine, but much less easy to

originate a better; and I do not know that Mr. Isherwood or any one else has succeeded in doing this in the case of the monitor engine, taking all the conditions of the problem into account."

Wrought-iron Drums for Pulleys.

Messrs. Hudswell & Clarke, of England, are now making a number of drums of wrought iron. The drums are only of about half the weight of those of cast iron, and by their use, the weight upon the bearings of the shafting is much reduced, belts also are found not to slip on them, as they do on cast-iron drums, and last much longer; in fact, at Messrs.

swivel is secured by the end of the lever, I, which slips over it. This bridge the long arm of the lever, I, across the opening or passage, so that the animal, in attempting to pass through, pushes it toward the side of the opening, which frees the latch, or swivel, and the spring brings the jaw up with great force, transfixing the game. The trap will work equally well in all positions and can be set in hollows, bogs, and along water courses frequented by mink, muskrats, beaver, or other animals valuable for their fur. It can be so easily concealed that it is not necessary to place it under water for mink, who, at times, will not step into the water for the most tempting bait.

Patented through the Scientific American Patent Agency, June 4, 1861, by Decatur Pitman, Fort Madison, Iowa, whom address for State or county rights.

KNOEPKE'S WASH BASIN.

This is designed to prevent the annoyance of having the soap in a separate dish from the water, and is one of those small and apparently unimportant improvements which sometimes prove to be just what was needed.



It is simply a common wash bowl, A, struck up from a sheet of tin or other metal, or made in parts and soldered. It differs from the ordinary bowl in having a soap cup, B, firmly attached to the inside of the rim and having a strainer at the bottom for draining the soap. The wash stand or table can be kept free from soap stains and water by its use. Its advantages can be seen at a glance.

Patented May 15, 1866, by J. C. Knoepke, No. 910 North Second street, Philadelphia, whom address for further information.

EUROPEAN capitalists are planning to build a railroad through Central America, connecting the Atlantic with the Pacific, and surveyors to be employed upon the route are soon to arrive at Honduras.

**INVENTORS, MANUFACTURERS.**

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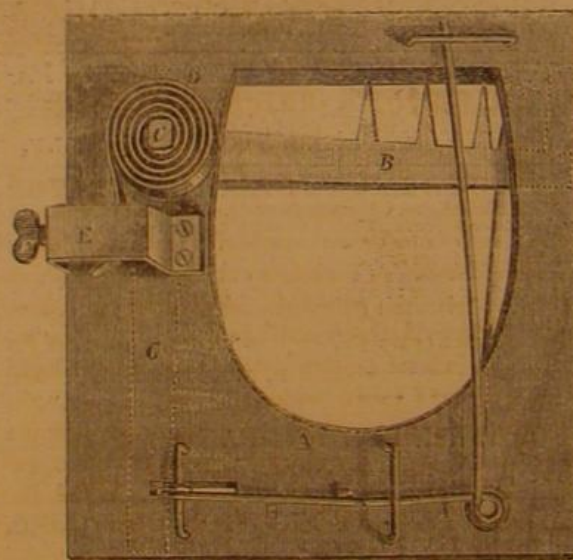
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PITMAN'S ANIMAL TRAP.

It is a well-known fact that most of the fur-bearing animals are extremely shy and suspicious of danger. The sight of a trap is frequently sufficient to alarm them, and the concealment of the apparatus



is sometimes impossible. For those who make a business of insnaring this game, and who are compelled to take long tramps, carrying their traps, lightness and portability are essential qualities in good traps.

The contrivance illustrated by the annexed engraving claims to be a trap possessing the requisites of efficiency, lightness, strength, certainty of operation, and facility of concealment.

The trap, A, is a piece of wood, having a hole through which the animal must pass to reach the bait, or in traveling its accustomed paths. B is a jaw armed with teeth, having a pivot, C, passing through the wood, to which is attached a powerful coiled spring, D. The end of this spring is held in the clamp, E, by the thumb-screw, F, which can be tightened to give the requisite tension. The dotted lines, at G, show the position of the jaw when the trap is set. It is held in position by a wire swivel, H, passing through the wood. The other end of the