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Improved Gang Plow.

Gang or combination plows are now frequently used, usurping the place of the single plow in large fields, and where the labor of horses can be more easily obtained than that of men. Of course, they require more power, but then the work is done much more rapidly, and where neither stumps nor stones present obstacles, there is a great advantage in their use over that of the single plow. The engraving herewith presented shows, in perspective, an arrangement of gang plows which, while they thoroughly turn up the soil, yet enable the driver to ride and turn three furrows, where the user of the single plow does one, and gives him the control of the plows by the devices which enable the driver to elevate one or more of the shares, or all, to accommodate the "lay of the land," or to use the contrivance as a vehicle.

HUTCHINSON'S PATENT GANG PLOW.

As seen in the engraving, the device is a rectangular frame, A, having two wheels in front, the axle of which is secured rigidly by forked bars extending down on each side the axle. To the frame, A, the driver's seat is fastened at any point most convenient. A frame, consisting of three longitudinal bars, secured in position by cross-bars, carries the plows, B. At the rear end this frame rests upon the cross piece of the main structure, and at the other is held by a chain passing over and secured to a roller furnished with a lifting cam, C. By means of the lever, D, the plow frame can be raised and held at any hight by the toothed segment, E. The lever, F, is employed to raise the main frame in a diagonal position, which will elevate the plows so they can be adapted to ground which is sloping instead of level. The turning of the vehicle is readily effected by the broad wheel, G, which acts as a common furniture truck or caster, turning freely in all directions.

The depth of the plowing can also be determined by means of bolts with nuts, seen at H, by which the nose of the share can be elevated or depressed. These bolts have a check-nut under the bars as well as a lifting nut on the top, so that the plowshares can be held rigidly in any required position. The engraving represents three horses abreast. In this case the "off" horse walks in the furrow last made, but by a peculiar arrangement of the whiffletrees—not clearly shown in the engraving—it is claimed there can be no side draft, each horse exerting an equal amount of power.

The plowshares are made of sheet steel, and can be readily removed and replaced by others, so that the machine may be called a "universal gang plow." Two, three or four horses may be used, as desired. It was patented through the Scientific American Patent Agency by Samuel Hutchinson, Aug. 7, 1866. For further particulars address Augustus Winchester, 706 Chestnut street, Philadelphia.

WATER-SPOUTS IN THE MOUNTAINS.

According to the writers on the subject, moisture exists in the atmosphere, in an invisible state, at all temperatures. It sustains itself there in the intervals that exist between the particles of air. These intervals are either partially or wholly filled with vapor, constantly arising from the earth. When they are wholly filled with vapor, the atmosphere is said to be saturated. An increase of temperature, by dilating the air, increases its capacity for moisture; while a diminution of temperature is followed by contrary effects. But the capacity increases at a faster rate than the temperature, so that the air, at thirty-two deg. Fah., can contain only the one-hundred-and-sixtieth part of its own weight of vapor; at one hundred and thirteen degrees it can contain the twentieth part of its weight. Thus it appears, that while the temperature advances in an arithmetical series, the capacity is accelerated in a geometrical progression. A considerable increase of temperature, therefore, will enable even a saturated atmosphere to receive a greatly augmented amount of vapor, and, as it were, to swallow the clouds that may pass into it, without any diminution of its own transparency. On the contrary, when the temperature is diminished by the rapid union of two currents of air, saturated with vapor, the one being warm and the other cool, the average temperature is so reduced that an excess of vapor exists, which is incapable of sustaining itself in the diminished capacity of the air, and is necessarily precipitated in the form of rain. But when two currents of air, not fully saturated with vapor, are brought into contact, the precipitation of moisture is slight, and mists, only, are produced. When the mists, thus precipitated, are near the earth, they are called *fogs*, but when they are high in the air they take the name of *clouds*.

Another fact must be noted. The temperature of the air diminishes with the altitude, but the law of decrease is very irregular, being affected by latitude, hours of the day, and a diversity of local circumstances. It may, however, be assumed as a general rule, that a loss of heat occurs to the extent of one degree, Fah., for every three hundred and forty-three feet of elevation. But this is an average result, for the rate of decrease is very rapid near the earth, after which it proceeds more slowly, and at the loftiest hights is again accelerated.

From this brief statement of the general principles governing the production of fogs and clouds, it will be apparent that the higher portions of mountains must be refreshed by frequent rains. At present we refer only to those of the western section of North Carolina. The more elevated portions of

these mountains, ever clad in mantles of cool air, stand, as so many custom-house officers, to exact tribute from all the currents of air laden with vapor, from the warmer regions below, which attempt to sail over their summits. These currents of air cannot but pause, when richly freighted, to divide their treasures with the thirsty soils and mountain-springs. And even when they are lightly burdened with vapor, and no rain can be condensed from them, these passing currents often yield copious clouds of fog, covering the vegetation, by contact, with moisture, and promoting its more vigorous growth. Nor are the mountain summits alone in the exactions they make upon the moving atmosphere for its vapors. The mountain bases, all along the rivers and larger creeks, cool the surrounding atmosphere during the night, while the waters of the streams, retaining their warmth, send up a plentiful evaporation. The vapor which is thus formed, rising into contact with the over-hanging colder air, is condensed into fog, and floats above the streams till the morning sun sets it in motion, or dissipates it by increasing the temperature of the air along the mountain sides.

But fog and rain are not the only meteorological phenomena occurring in mountain regions. Others of a less peaceful nature, and terrific in the extreme, have been witnessed.

Once in a generation or two, perhaps, a *water-spout*, so called, bursts upon some elevated portion of a mountain. Previously to its descent, the clouds are seen moving to and fro, and commingling in a confused manner, somewhat as the circling eddies of a vast whirlpool. When concentrated above or around the mountain's summit, the cloud acquires such a density as to wear the appearance of the blackness of darkness. The roll of the accompanying thunder is deafening, and almost continuous, shaking the eternal hills to their base; while the flashes of lightning, following each other in quick succession, afford a glare of glimmering light nearly as luminous as that of the sun. Then comes a river of waters, dashing down the mountain-side, and tearing up, in its resistless progress, earth, rocks, and trees, so as to create, in its course, a deep canal. The amount of water at times discharged from such clouds is enormous, swelling inconsiderable streams into great rivers.

Many years since, a water-spout burst upon the North Mountain, to the westward of Newville, Pennsylvania, carrying destruction in its course. Many cattle and hogs were drowned at the foot of the mountain, where they were confined within inclosures, preventing escape. The largest rocks were torn from their beds, and a deep chasm excavated from the top of the mountain to the valley. Its course can now be traced by the difference in the trees within the channel from those on either side —a growth of pines occupying it, instead of the oaks and hickories of the surrounding forest.

Another water-spout fell upon the western end of the Chilhowee Mountain, where it faces the Little Tennessee River, about the date of the first settlement of the country. Its course is marked, like the one at Newville, by a large growth of evergreen trees. Again, on the west side of the same mountain, not far from Tuckalechee Cove, and near Little River, a water-spout fell, not many years since, carrying away a distillery, around which, the day previous, being the Sabbath, the young men of the vicinity had met, in a frolic, and perpetrated some enormous blasphemies—in their drunken revelries undertaking to make a mock of religion, by the administration of its sacraments. Monday was ushered in by as clear a sun as ever shone. In the course of the day, however, the thunder pealed forth a signal, startling the neighborhood into fixed attention: there they beheld, gathering upon the mountain's brow, the ominous cloud, that soon burst out into one vast deluge of water, which, descending down the mountain side, laid desolate the very spot where the profanation of Heaven's ordinances had occurred. The terror created by this celestial phenomenon was such as to produce a religious revival, accompanied by the conversion of many of the thoughtless fellows who had taken part in the iniquities of the preceding Sabbath.

Having seen the traces of all the water-spouts noticed, and having heard the descriptions of eye witnesses to the accumulation of the cloud which produced the rain-fall, in one case so furious in its descent, I concluded, as usual, that there had been a concentration, to one point, of nearly all the water yielded by the cloud, through the agency, probably, of a whirlwind motion of the air controlling it; but this theory had to be abandoned, as soon as I had completed, for myself, the investigation of the facts connected with the great fall of water-spouts upon Tusquitta Mountain, on July 8, 1847.

An intelligent professional gentleman, who visited the locality soon after the storm, described to me the effects produced. The chasm excavated in the earth, he said, had a depth of several feet, with its sides cut out as vertical as if dug with a spade. The roots of the trees and plants beneath the surface, were cut off as squarely as if done with the knife. At the surface, close up to the sides of the chasm, nothing seemed to be disturbed. The shrubs and grass, and even the fallen leaves upon the soil, remained unmoved, as though no running water had come into contact with them. This was the condition of things where the water-spout first struck the ground; and as the excavation, at the point of origin, had a width of but a few yards, the whole volume of the descending water, he concluded, must have been concentrated within that space, and continued thus contracted till the contents of the cloud were exhausted. In descending the mountain, along the line of the widening chasm, evidences existed that the torrent produced had attained, in places, a depth of sixty feet, uprooting in its course the largest trees, and removing immense rocks from the gulch created in its descent to the valley below.

In all the descriptions given, I had inferred that but a single water-spout had fallen, at the same time, from any one cloud. Such seemed to have been the case in the old ones, grown up with ever greens. But very different indeed had been the result on Tusquitta Mountain, as I was forced to conclude, when I examined the facts for myself, in relation to the fearful character of the elemental strife accompanying the descent of its hundreds of water-spouts, which had fallen at the same moment.

In the month of May, 1859, I called upon Robert Martin, Esq., who resides in Tusquitta valley, near the spurs of the Tusquitta Mountain. He had resided there in 1847, when the water-spouts fell upon that mountain. From his statement, and that of Mr. Pierce, his neighbor, who also noticed the whole of the movements of the clouds, during the space of three hours, or from first to last, I make up my statement.

The clouds were some two hours in forming. One group gathered in the southeast, another in the southwest, and a third in the south. The unusual commotion among them, as they were forming, attracted the attention of these gentlemen, and riveted them to the spot, where each one stood, near their own doors, a half mile apart.

When nearly fully formed—a process which will be described in another article—the clouds commenced moving rapidly, in eddies of many whirls, toward Tusquitta Ball. Salutations of thunder, from the first, passed between them, as though cloud called to cloud, in organizing for the coming conflict. The play of the lightning, at first occasional, became almost continuous, as the constantly accumulating masses began to move swiftly toward a common center; while the thunder, increasing in equal frequency, soon became terrific. In addition to the thunder, and just before the rain began to fall, there came a succession of sharp, keen, cracking sounds, lasting for ten or fifteen minutes, which resembled a sharp crack of the electrical spark, and then came a crash as if ten thousand pieces of artillery had been discharged. The earth fairly trembled with the concussion. There was also a loud roaring sound, independent of all other sounds, for some minutes before the clouds came into contact; and when they did meet, they shot instantly upward, with great velocity, like an arrow shot from a bow—the forests, a few rods distant, becoming so dark that nothing could be seen.

The rain now began to fall in torrents. In a few minutes the small spring branch, at Mr. Martin's, having its rise a mile or so further up the mountain, was swollen into a river.

In an hour the rain was over, and the sun again appeared as bright as ever. The gentlemen named then commenced an examination of results. About three hundred feet above the head of the spring branch, a water-spout had fallen, which excavated a canal ten feet deep, and seventy-five feet wide at its head. The side-walls, at this point, were perpendicular, while further down, it varied both as to depth and width; the vast body of water, of course, obeying the general laws controlling the descent of that fluid down a steep inclination. This torrent, in rushing down toward the spring branch, at an angle with the line of that stream, could not make a sudden turn, but dashed across, rising on the opposite side to the top of a spur of the hill, thirty feet high, when, from the further side, it naturally fell into the channel of the branch, swelling it into the proportions of a river.

Upon more extensive examination, the water-spouts were found to have been very numerous, nearly a hundred canals existing within an irregular area, not exceeding three miles in extent. The largest one was eighty feet in width, and others not more than eight or ten feet.

But these excavations were not the only effects produced during this hour of awful sublimity. Many forest trees had been struck by the lightning, and explosions of electricity, from the earth, had thrown out large masses of clay and rock, in several places producing rounded excavations of sufficient depth and width, often, to bury a common hogshead; the vegetation all round these spots being scorched and withered by the electrical fluid.

The seat of these water-spouts lay about four miles from the summit of Tusquitta Mountain. Two gentlemen were upon its summit when the cloud reached that point. One of them—Mr. William M. Martin—described the rain-fall as so dense as to almost suffocate him. The sensation was such as is experienced when under water; and the only remedy was to lean the body over, so as to have a little space of air to breathe from, beneath the breast.

On the 23d of May, 1859, I commenced a personal examination of the area upon which the water-spouts had fallen; being accompanied by Dr. McCoy, of Fort Hembre. In ascending the mountain we could see, at one time, more than a dozen of the excavations. The first one measured about twenty-five feet in width at its head, and was from six to eight feet in depth. It was only twenty yards from the top of the mountain-spur, upon which the water had fallen. There was only a slight concavity where the spout first fell, and wholly insufficient to accumulate sufficient water to cut such a canal, within the space of twenty yards. Then, as there had been no washing away of the surface rubbish above the point of excavation, it would appear that the agency which produced the cutting must have begun its work at that spot.

The next excavation examined was where two spouts had fallen, close to each other, being separated, at the head, by about three rods of unbroken ground. Each of these canals measured forty feet in width, and when united, a few rods below, the channel was sixty feet in width. These two are not in a trough, or concave portion of the mountain, but naturally fall into one some distance below their junction. The heads of both are only twenty yards from the top of the mountain spur, and could only have been cut out by the force of a descending sheet of water.

The same general features were presented in the other excavations, and additional descriptions are, therefore, not necessary.

One remark only need be ventured, in relation to the agency which cut out these channels. That it was water, none can doubt. But that the water was concentrated to one point, by a whirlwind-like action of the cloud, compressing its falling rain-drops into one compact sheet, capable of cutting away all the mere clays and fragmentary rocks upon which it might fall, is disproved by the multiplicity of excavations upon Tusquitta Mountain. The only remaining solution of the mystery, then, in relation to the manner in which the rain becomes condensed, in what are called water-spouts, on land, is to be found in the statement of philosophical principles upon a preceding column. When two clouds meet, of different temperatures, the result is a more copious discharge of rain than either, separately, s

capable of yielding. The clouds at Tusquitta, upon meeting, were observed, at once, to ascend swiftly, as if doubling upon each other. This of course, brought more cloud surface into contact than would have been the case had the clouds, on meeting, blended together at once. May I not suggest, therefore, that this sudden folding of the clouds upon each other, by their upward motion, might have produced an almost solid sheet of water, at the main points of contact, which, upon descending to the earth, would be capable of cutting its way down through any extent of clays and decomposed rocks, so as to bear them away, and leave an open canal as the result? That the descending water sheet remained stationary for a few moments, so as to limit the excavations to the spot first struck, is supposable from the fact that the motion of the clouds may have been momentarily arrested by their collision with each other. But I must leave this whole question to the philosophers. D. C.

THE NEEDLE GUN.

The merits and defects of this celebrated breech-loader were detailed by Mr. Norman Wiard, before the Polytechnic Association, recently, in an interesting comparison between this weapon and those of this class more familiar to us.

The Prussian needle gun is not to be commended as a finished piece of mechanism, but, in the opinion of the speaker, it combined advantages that render it in many respects far superior to any weapon of like character heretofore constructed. The most noticeable peculiarities of this gun are its length and weight toward the muzzle. According to our received ideas, these features should be looked upon as disadvantages, but in reality great accuracy and steadiness of aim are thereby attained, and when pointed, the weight and length make it easier to hold, and the end of the muzzle is not deviated by the recoil.

The peculiarity of placing the charge nearer the muzzle of the gun than has been customary, is an advantage which the speaker believed might be still more improved upon, for the further forward the powder is placed the less force is wasted in overcoming the friction resulting from contact of the ball with the barrel, and by igniting the cartridge at the front end the whole power is employed simply in propelling the ball. In this gun all the expansive force of the powder, and also of the fulminating gases, are utilized, but in the Sharps rifle, the propulsive power that might have been obtained from this latter force is lost, and a portion of the other force escapes through the nipple orifice.

The breech of the Prussian gun is nearly on a line with the muzzle, while in the ordinary musket a considerable angle is formed, and, in consequence, a muscular effort is required to bring the gun into position for taking aim, and the force of the recoil is not so easily resisted. The certainty of becoming foul, after a number of charges have been fired, limits the capacity of the Springfield rifle to twenty rounds, hence the superiority of breech-loaders in this respect, for every ball acts as a swab in cleansing the barrel of the solid residue from the powder.

In conclusion, Mr. Wiard presented some curious statements furnished in an official report on the battle of Gettysburg, stating that 27,574 guns were picked up on the field after the engagement, 24,000 of which were loaded. Of this number one-half had two loads each remaining unfired, one-quarter had three loads, and the remaining six thousand contained over ten loads apiece. Many were found having from two to six bullets over one charge, in others the powder was placed above the ball, one gun had six cartridges with the paper untorn, in one Springfield rifle twenty-three separate charges were found, while one smooth-bore musket contained twenty-two bullets and sixty buckshot rammed in promiscuously.

Japan.

Dr. McGowan recently delivered a lecture in San Francisco, upon "Japan and the Japanese," in which he said: The geological formation of the mountains is generally igneous in character, with the superimposition of limestone, sandstone, and coal measures. Gold is found in abundance, and when the speaker went there it could be obtained for its weight in silver. The Japanese, however, soon saw that the gold was leaving their country in large quantities so rapidly that they increased its value. Japan is pre-eminently a copper country. So plentiful is it that the traveler will find their boats, inside and out, lined with it, as also the shutters and roofs of their houses. They have spades and cooking utensils made of it. There is one of these islands which contains nothing else but copper ore. Conversely iron is met with in only limited quantity. You will see the Japanese washing it out of the sand in the beds of rivers, after the fashion of the placer miners of California, who pan out their gold. Coal is found all over the country, though the mines are not much worked, nor is there a great deal of demand for it, as the people dress very warmly and use chafing dishes in their houses to keep them warm. But when one line of steamers gets established this will come in very conveniently, and the supply will be quite equal to the demand.

New Safe Lock.

The London *Engineer* gives the following account of a new lock which seems to be constructed upon new principles:—"It is composed of neither more nor less than steel wires—call them needles if you like—strung together on two stumps, attached to the running bolt upon which they revolve, and they require to be lifted by the key to a position to admit of their being passed through certain holes in a plate of brass, and thus passing, carry the running bolt with them, which carries the real bolt. The needles move obliquely, perpendicularly, laterally, and, indeed, in any direction; hence the difficulty in raising all the needles with an instrument, simultaneously, to their required positions to run through their own apertures, and escape the many traps set for them in the shape of a number of holes, pierced nearly half way through the fence plate, of the exact size to fit the needles. In the more expensive latches, as we have only been describing the cheapest ones, there are protectors and detectors."

Statistics of Photography.

The rapid growth of new and special industries, says the *British Quarterly Review*, is a fact so characteristic of the present day, that the statistics of photography can scarcely be regarded as wonderful, viewed merely as a question of economies. Nevertheless, some of the facts are sufficiently startling. Twenty years ago one person claimed the sole right to practice photography professionally in England. According to the census of 1861, the number of persons who entered their names as photographers was 2,534. There is reason, however, to believe that these figures fall short of the real number; since then it is probable the number has been doubled or trebled, and that including those collaterally associated with the art, it is even four or five times that number. But these figures fall far short of the number interested in photography as amateurs. We are informed that eight years ago, in establishing a periodical which has since become the leading photographic journal, a large publishing firm sent out twenty-five thousand circulars—not sown broadcast, but specially addressed to persons known to be interested in the new art-science. The number of professional photographers in the United States is said to be over fifteen thousand, and a proportionate number may with propriety be estimated as spread over continental Europe and other parts of the civilized globe.

But a more curious estimate of the ramifications of this industry may be formed by a glance at the consumption of some of the materials employed. A single firm in London consumes, on an average, the whites of two thousand eggs daily in the manufacture of albumenized paper for photographic printing, amounting to six hundred thousand annually. As it may be fairly assumed that this is but a tenth of the total amount consumed in this country, we obtain an average of six millions of inchoate fowls sacrificed annually in this new worship of the sun in the United Kingdom alone. When to this is added the far larger consumption of Europe and America, which we do not attempt to put in figures, the imagination is startled by the enormous total inevitably presented for its realization.

In the absence of exact data we hesitate to estimate the consumption of the precious metals, the mountains of silver and monuments of gold which follow as matters of necessity. A calculation based on facts enables us to state, however, that for every twenty thousand eggs employed, nearly one hundred weight of nitrate of silver is consumed. We arrive thus at an estimate of three hundred cwt. of nitrate of silver annually used in this country alone in the production of photographs. To descend to individual facts more easily grasped, we learn that the consumption of materials in the photographs of the International Exhibition of 1862, produced by Mr. England for the London Stereoscopic Company, amounted to twenty-four ounces of nitrate of silver, nearly fifty-four ounces of terchloride of gold, two hundred gallons of albumen, amounting to the whites of thirty-two thousand eggs, and seventy reams of paper; the issue of pictures approaching to nearly a million, the number of stereoscopic prints amounting to nearly eight hundred thousand copies.

The Breweries of Chicago.

The Chicago *Republican* has an article upon this subject, describing the process of brewing, and giving the history and statistics of the business in that city. Beer, porter, stout, and the numerous kinds of ale, are manufactured in nearly the same way, the difference lying in the malting and fermenting. The most approved grain is barley, of the species called "Rath." The grain must be full, and must contain a large proportion of starch. In malting, the first process is to steep the barley. This occupies about forty-eight hours. When taken out, the grain has increased in weight about forty-seven per cent. It is next dried, and "conched." This process is simply piling the grain upon the malt floor, in rectangular heaps, from twelve to sixteen feet in hight. After a short time the grain becomes moist and hot, and germination begins. This is checked as soon as the stem begins to grow, and the grain is spread on the floor and turned two or three times a day. In this process it becomes white and crumbly. It is then placed in the kiln, and is gradually heated, first to 90 deg., and then to 140 deg. This takes from two to three weeks. It is at this point the character of the liquor is determined, ale being made from the palest, and porter from the brownest malt.

The malt is next ground and thrown into water at 160 deg., where it is thoroughly soaked. At the end of half an hour more water is added, increasing the temperature to 167 deg. After a few hours the "sweet wort" is run off into the "undertack." This wort is a clear, sweet liquor, of the same color as the malt from which it was made. The same process is repeated, the second solution being mixed with the first. The third solution becomes small beer. The liquor is boiled in copper vessels, at 212 deg., strained through the "hop-buck," and cooled as rapidly as possible to prevent souring. Lager-beer is cooled by the application of ice water. The liquor is then let into the fermenting vats, cleansed by isinglass, and barreled for use.

Dundas Cultivator Reissue.

We publish on another page an important decision of the Examiners-in-Chief in the above case, which is one of great public interest. A petition, with some eleven thousand signatures, was presented to Congress last winter desiring it to prevent the grant of the reissue; and a resolution passed that body requesting the Commissioner of Patents to suspend action until the matter could be investigated. The application was consequently suspended, but as Congress adjourned without making the investigation, the Commissioner allowed the case to proceed. The Secretary of the Interior has received many letters since from Members of Congress, and others, asking that action be delayed until Congress meets again, but after mature deliberation, he decided to let the case go on. The report, therefore, is one of unusual interest.

ERRATA.—On page 320, article "Porcelain," fourth paragraph, for "oxide too" read oxide of tin. On page 335, article "Inclosing Electricity," thirteenth line from top, for "glue bottle" read glass bottle. These typographical errors provoke the editor much more than they do the reader. The poor printer often has a narrow escape of well-merited chastisement.

Improvement in the Snow Governor Valve.

Those who have used the Snow governor valve will recognize at once the value of the improvements herewith illustrated. They consist, first, in an outside adjustment of valve and governor combined. The adjustable nut, A (Fig. 1), screws on to the spindle, D, which passes through and is centered by the bar, B, and extends up through the head, C. When the top of the nut, A, strikes the bottom of the bar, B, it determines the highest plane in which the balls revolve, when the engine is running at the speed required—which is first determined by the size of the driving pulleys. The valve, being attached to the bottom of the nut by the small rod, is lifted up toward its closing point, till the nut strikes the bar, which determines the proper position of both valve and governor; the valve at this point being held open the fiftieth part of an inch, or enough to allow the engine to run nearly up to speed with the highest pressure of steam and no load upon the engine. Lowering the nut, A, upon the spindle allows the balls to rise to a higher plane of revolution, and it also drops the valve correspondingly, thus involving an increase of speed of the engine. Screwing the nut up on the spindle causes the engine to run slower, because it stops the governor in a lower plane, and raises the valve correspondingly. Thus it will be seen that the speed of the engine can be varied from the fraction of one revolution to ten or twenty, either faster or slower than the speed first arranged by the pulleys. The spindle does not revolve, and hence the engineer can change the speed of the engine as well while in motion as when at rest. Next in importance is the substitution of a locomotive slide valve, E, with lever and quadrant in place of the common wheel and screw. Third, flanging on of the elbow at I, in place of screwing it into the valve cylinder, as before; and, fourth, the flanging the yoke, F, on to the frame instead of the collar and set screw, as before used. The throttle valve is adjustable, so that the lever can be put in the most convenient position, as also the frame upon the valve cylinder, and the yoke upon the frame.

Fig. 2 is a cheaper modification with the same valve and cylinder, and an improved head, the spindle revolving with segments on the end of the arms working in a rack on top of the spindle with an adjustable screw, G, by which the governor is prevented from rising above the most available point, attaining a nicety by governing, so essential in all establishments driven by steam power, and a swivel, H, to prevent rotation of the valve spindle. When the segment touches the screw, it determines the highest plane the balls are allowed to assume when the valve is at or near its closing. This governor is fitted with a throttle like that represented in Fig. 1, or with pipe flange as seen in the engraving. Fig. 3 is the same, intended for portable and small stationary engines, with valve cylinder tapped to receive the pipe.

For further particulars address G. W. Lasell, 437 Broadway, New York, or H. D. Snow, Bennington, Vt.

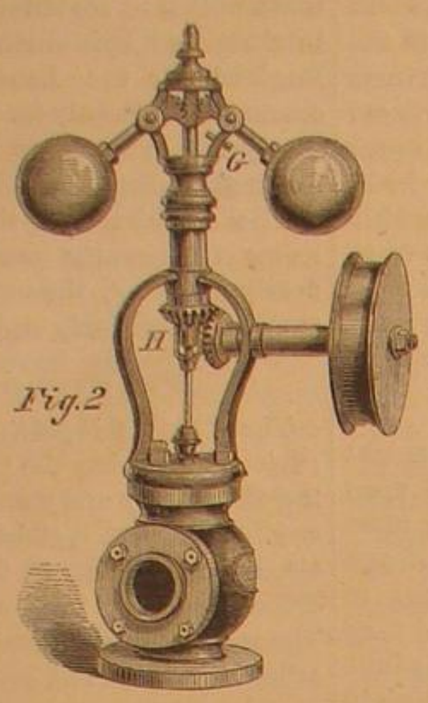


Fig. 2

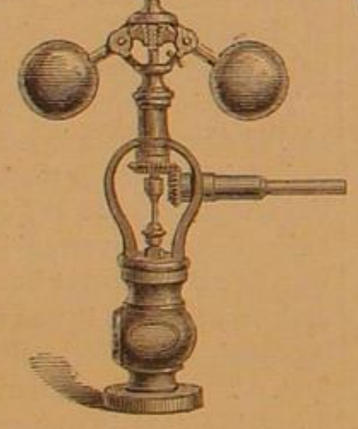


Fig. 3

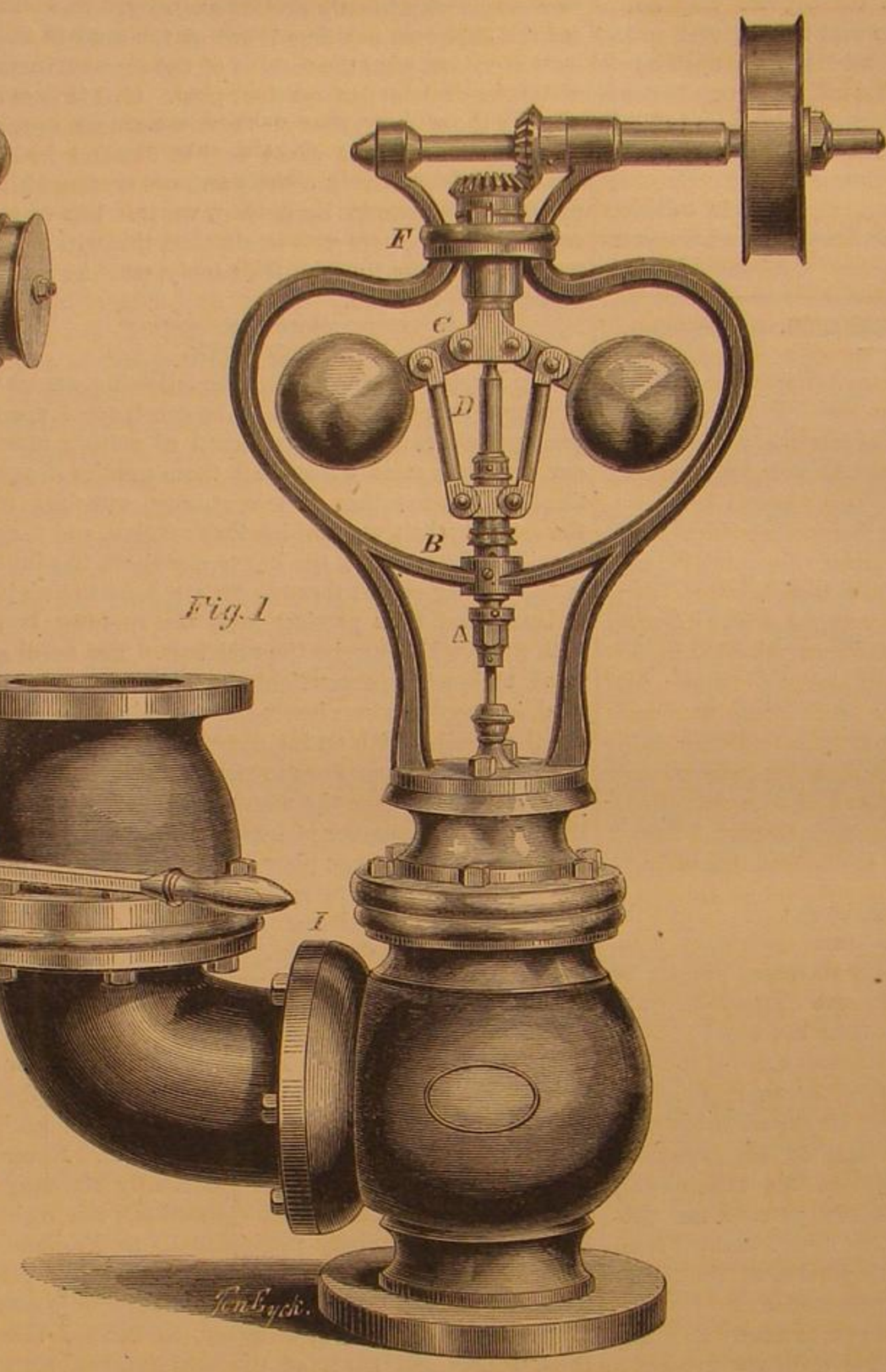


Fig. 1

SNOW'S GOVERNOR VALVE.

BANQUET TO CYRUS W. FIELD.

On the evening of the 15th inst., the New York Chamber of Commerce gave a grand testimonial banquet, at the Metropolitan Hotel, to our fellow citizen, Mr. Cyrus W. Field, in acknowledgment of the signal service rendered by him in bringing about the successful laying of the Atlantic cable. The large dining hall was artistically decorated by emblems of the science of telegraphy, and about three hundred gentlemen participated in the banquet. Among them were some of the most prominent men of the nation.

In response to a toast, Mr. Field gave a very interesting and graphic account of the history of the submarine telegraph, which was listened to with deep attention. In reference to the recovery of the lost cable, he remarked:—

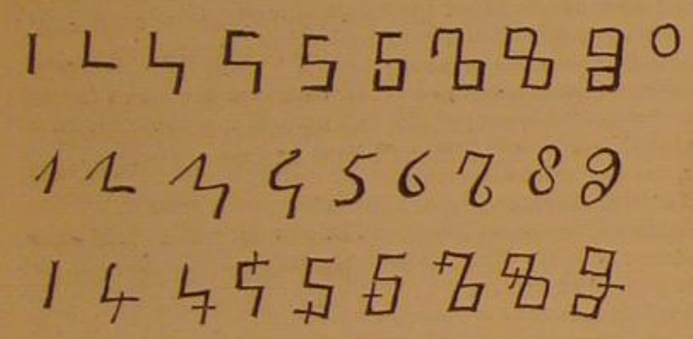
"After landing the cable safely at Newfoundland, we had another task—to return to mid-ocean and recover that lost in the expedition of last year. This achievement has perhaps excited more surprise than the other. Many, even now, 'don't understand it,' and every day I am asked 'how it was done?' Well, it does seem rather difficult to fish for a jewel at the bottom of the ocean 2½ miles deep. But it is not so *very* difficult when you know how. You may be sure we did not go a-fishing at random, nor was our success mere 'luck.' It was the triumph of the highest nautical and engineering skill. We had four ships, and on board of them some of the best seamen in England, men who knew the ocean as a hunter knows every trail in the forest. There was Capt. Moriarty, who was in the *Agamemnon* in 1857–8. He was in the *Great Eastern* last year, and saw the cable when it broke; and he and Capt. Anderson at once took their observations so exact that they could go right to the spot. After finding it, they marked the line of the cable by a row of buoys; for fogs would come down, and shut out sun and stars, so that no man could take an observation. These buoys were anchored a few miles apart. They were numbered, and each had a flagstaff on it, so that it could be seen by day, and a lantern by night. Thus having taken our bearings, we stood off three or four miles, so as to come broadside on, and then casting over the grapnel, drifted slowly down upon it, dragging the bottom of the ocean as we went. At first it was a little awkward to fish in such deep water, but our men got used to it, and soon could cast a grapnel almost as straight as an old whaler throws a harpoon. Our fishing line was of formidable size. It was made of rope, twisted with wires of steel, so as to bear a strain of 30 tuns. It took about two hours for the grapnel to reach bottom, but we could tell when it struck. I often went to the bow, and sat on the rope, and could feel by the quiver that the grapnel was dragging on the bottom two miles under us. But it was very slow business. We had storms and calms and fogs and squalls. Still we worked on day after day. Once, on the 17th of August, we got the cable up and had it in full sight for five minutes—a long, slimy monster, fresh from the ooze of the ocean's bed, but our men began to cheer so wildly, that it seemed to be frightened and suddenly broke away and went down into the sea. This accident kept us at work two weeks longer, but finally, on the last night of August we caught it. We had cast the grapnel thirty times. It was a little before midnight on Friday that we hooked the cable, and it was a little after midnight Sunday morning when we got it on board. What was the anxiety of those 26 hours! The strain on every man's life was like the strain on the cable itself. When finally it appeared, it was midnight; the lights of the ship, and in the boats around our bows, as they flashed in the faces of the men, showed them eagerly watching for the cable to appear on the water. At length it was brought to the surface. All who were allowed to approach crowded forward to see it. Yet not a word was spoken, only the voices of the officers in command were heard giving orders. All felt as if life and death hung on the issue. It was only when it was brought over the bow and on the deck that men dared to breathe. Even then they hardly believed their eyes. Some crept toward it to feel of it, to be sure it was there. Then we carried it along to the electricians' room to see if our long-sought-for treasure was alive or dead. A few minutes of suspense, and a flash told of the lightning current again set free. Then did the feeling long pent up burst forth. Some turned away their heads and wept. Others broke into cheers, and the cry ran from man to man, and was heard down in the engine rooms, deck below deck, and from the boats on the water, and the other ships, while rockets lighted up the darkness of the sea. Then with thankful hearts we turned our faces again to the west. But soon the wind rose, and for 36 hours we were exposed to all the dangers of a storm on the Atlantic. Yet, in the very hight and fury of the gale, as I sat in the electricians' room, a flash of light came up from the deep, which, having crossed to Ireland, came back

to me in mid-ocean, telling that those so dear to me, whom I had left on the banks of the Hudson, were well, and following us with their wishes and their prayers. This was like a whisper of God from the sea, bidding me keep heart and hope. The *Great Eastern* bore herself proudly through the storm, as if she knew that the vital cord which was to join two hemispheres, hung at her stern, and so, on Saturday, the 7th of September, we brought our second cable safely to the shore."

Correspondence

The Arabic Numerals.

MESSRS. EDITORS:—After reading a communication in your paper of the 20th of Oct., in relation to the probable original form of the Arabic numerals, I am disposed to adopt the writer's theory, that originally there were as many characters as the number intended to be represented. The writer is, I think, substantially correct in relation to the way in which these separate characters became merged into one by a gradual change. His general ideas in relation to the upward hair stroke, and as to the tendency of the right lines toward the curvilinear form, are quite satisfactory. His details, however, on the subject of the probable original form of these characters, and as to the *quo modo* of this change, I think, can be much improved upon. I therefore send you what seems to me a more probable conjecture as to these details, in order that "Dominus," or some one else, may improve upon my conjectures as much as it appears to me that I have upon those of "Dominus." After considerable reflection I have imagined that the following, in the first line of the diagram, were the original characters of the distinguished Arabian inventor.



I think that all the original characters used were right lines except that of the 0 or naught, and that the upward hair stroke became attached to the first three only because they were the only ones in the formation of which it would probably occur. Now let us see how, with those hair lines becoming attached and with the manifest tendency to convert a right line into a curved one, the change took place from the original to the present form of the figures. This is seen in the second line on the diagram.

The 4 may have been originally added to the 3 by a terminal or bottom line, and the 5 may have received also a bottom line; but I consider this less probable than that the fourth line was added to the top of the 3, although the continuity of motion would be broken; but as this continuity could not have been carried through the series, I have proposed to break it at the 4. The upper horizontal line of the 6 is placed on the left instead of the right of the 1. The 8 is the 7 with one added line, and the 9 the 8 with a line added. The changes from the 1 and from each succeeding character, as the work progressed, may be noted by the crossed lines in the third horizontal line of characters in the diagram.

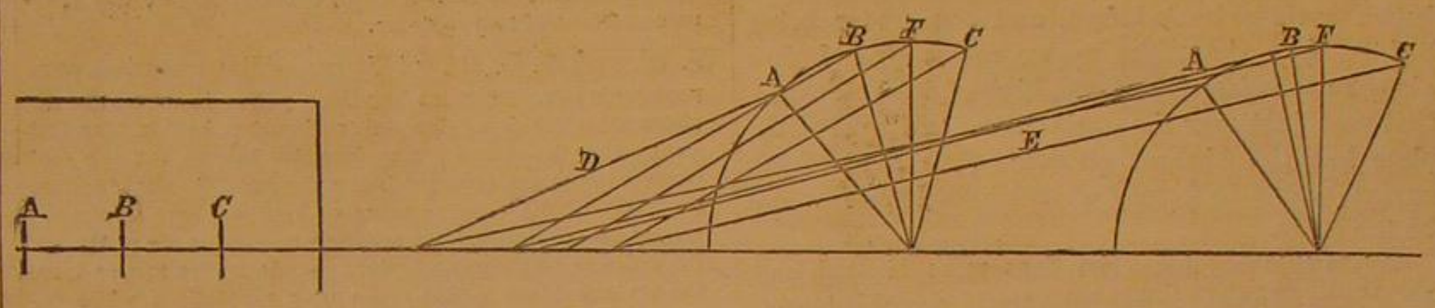
E. S. L.

Ottawa, Ill., Oct., 1866.

[We have also a communication on this subject from E. S. Weld, of Marathon, N. Y., which seems to give a clearer and more probable hypothesis than either that of "Dominus," or of any we have received; but having prepared the foregoing ingenious theory for our columns at some expense, and being pressed for room, we can do no more than allude to it. His idea is that the hair line of the 1 was originally one arm of an angle, and that each figure had as many angles as the number it was intended to represent.—EDS.

Position of the Piston when the Crank is Vertical.

MESSRS. EDITORS:—Your correspondent, P. H. Vander Weyde, M. D., in his article showing the error of a prior correspondent, A. S., in relation to the "Place of the Piston when the Crank is Vertical," has himself given a rule which is not correct. It is, take the length of stroke as 4, connecting rod, 8, and crank, 2. By his rule you will find the distance traversed by the piston, when the crank is vertical, to be 2·54. But by trigonometrical calculation it is 2·254. Again, take the length of connecting rod as 4, and the other measures same as before, the distance traversed by the piston when the crank is vertical will be found to be 2·536, or nearly 2·54, which is the same as by his rule—which only works right when the connecting rod and stroke of piston are of the same length. Again, take the extreme case he mentions: that is, take the connecting rod same length as the crank, 2. In this case the piston will have moved the whole length when the crank is vertical, as he truly says, and yet in all three cases his rule will give exactly the same result. The truth is, no formula can be given for all cases, but a diagram is easily made which will be practically as correct as a trigonometrical calculation. I have calculated the different angles at which the crank will stand, when the piston is at different definite parts of the stroke, and they are as follows:—Taking the stroke, 4; connecting rod, 8; crank, 2. When the piston is at one-quarter stroke, the angle is 54 degs., 11 min., 50 sec.; at one-half stroke, 82 degs., 49 min., 10 sec.; at three-quarter stroke, 112 degs., 8 min. When the crank is vertical the piston has moved 2·265.



Let A, in the diagram, represent the positions of the piston and crank at one-quarter stroke, B their positions at the half-stroke, and C at three-quarters. D represents the connecting rod equaling 4, and E the rod equaling 8. F is the vertical position of the crank. The reader can readily understand the diagram by a reference to the lettering and carefully tracing the lines.

H. W. S.

Cincinnati, Oct., 1866.

[The importance of a correct knowledge of the relative positions of the piston and crank of an engine will be conceded by those who have to set the valves on steam engines. We think our correspondent has thrown some light on the subject by his diagram. An old and experienced engineer told us, the other day, in speaking on this subject, that of several hundred engines he had indicated, the valves, in nine-tenths of them, were wrongly set to get the maximum amount of power for the steam used. In some cases the loss was nearly thirty-three per cent. It is, therefore, important to know the exact relative positions of piston and crank in different points of the stroke.—EDS.

Scientific Blasting---Nitro-Glycerin.

MESSRS. EDITORS:—In my letter of the 20th ult., I referred to a few conditions to be observed in using nitro-glycerin for blasting purposes. Since then I have received many letters asking for further details respecting my experiments at the Hoosac Tunnel, and in order to spread the information to the greatest number with a view to accomplish the most good, I address you further upon the subject.

When I visited the Hoosac Tunnel in August, I had not witnessed the explosion of nitro-glycerin in rock of the hardness of the Hoosac Mountain. The Tunnel is penetrating through solid massed mica and quartz. The strata lie against the progress, and there are but few seams and slips. It tears roughly and in no instance quarries. Every cubic inch must be blasted.

The "heading" is 6 feet high and 15 feet wide. Below is the "bench" or bottom enlargement, 4½ feet deep, the width of the heading. In the west shaft it was about 300 feet in the rear of the heading. The further enlargements are to be above and at the sides. My experiments were in the west shaft, "bench" and "heading," proceeding eastward.

Prior to my arrival, good miners had been making from 2 to 3 feet per day with the "bench." The holes had been set from 15 to 20 inches back, drilling 4 holes to make the width of the tunnel. These 4 holes were drilled 4 feet deep, charged with powder and well tamped. After blasting the 4 holes, about 5 short holes, averaging 15 inches, had to be drilled in order to make an even bottom. According to these figures the number of inches to be drilled to make $60\frac{7}{10}$ feet lineal, would be 9,612. Two men can drill about 100 inches per day of eight hours, and wages are $2 25 per day. The expense for miners, tools, and incidentals, amounts to about $6 per eight hours, for each 100 inches, making a total of $566 72 for drilling. The time required to make $60\frac{7}{10}$ would be at least 20 days. There would be about 144 long holes, 180 short holes, and at least 36 blasts. This is the rate of progress that had been made with gunpowder.

My first experiment was in the "bench" as above described, and within three days I advanced $60\frac{7}{10}$ feet. I used nitro-glycerin, exploded by the aid of electricity. If the rock could be removed after each blast, I can make 70 feet in that time. I had 9 blasts and 28 holes, five feet deep, total inches drilled, 1,680. The cost of the nitro-glycerin was less than the price of gunpowder for the same number of feet.

My next experiment was in the "heading" for a period of three days. The average speed per month with powder had been 64 feet, blasting every two hours holes 20 to 30 inches deep. When I commenced my experiment the rock was excessively hard and the trial was very severe against me. I blasted 15 holes every eight hours, holes 30 to 36 inches deep. Within the three days I made 14½ feet. The next three days the rock happened to be better for blasting, and powder was used, making $6\frac{4}{10}$ feet. Number of nitro-glycerin holes 132 and about 4,356 inches for the 14½ feet. Number of powder holes 180 and about 4,500 inches drilling, making $6\frac{4}{10}$ feet.

In the same class of rock I am of opinion that I can make at least 35 feet per week in the heading, and in a month of 27 days about 158 feet, making 94 feet per month more than can be accomplished with gunpowder.

From these figures the Hoosac Tunnel can be finished in less than half the time and for less than half the expense by using nitro-glycerin. From eight to ten years has been the estimated time for completing the work, and the expense, several millions of dollars. For these economic considerations the very able Chief Engineer of that great enterprise is encouraged to believe in the early completion of the work by his adopting nitro-glycerin.

Before closing my letter I wish to give a warning to the Nitro-Glycerin Company. It has the patented monopoly for its use for 17 years, and an evasion of the patent is not possible. To attain great success, large sales and small profits is mercantile practice. It is to be hoped that their present price, $1 75 per pound, will not be increased. I refer to this because the Company has, through its Board of Directors, on account of the great demand for nitro-glycerin, passed a resolution not to sell any more of the construction stock for a sum less than par.

In my next, I will give more important information in regard to charging and tamping nitro-glycerin blasts.

TAL. P. SHAFFNER.

Circulation in Steam Boilers.

MESSRS. EDITORS:—Permit me to submit for your consideration the results of a number of experiments

made a few months since, the objects of which were to increase the economic efficiency of steam boilers, and also to test the effect of circulation of the water in boilers on the generation of steam. My boiler was of about three horse-power and of plain cylinder form, the fire being applied under it in a brick-work furnace in the ordinary manner. The fuel was wood, about three pounds per horse-power per hour being the maximum consumption, and the pressure averaging 60 lbs. per square inch by the steam gage. In order to make the water circulate throughout the boiler, I conceived the idea of introducing an iron plate into the boiler, placed about two inches from the bottom sheet, and slightly depressed toward the rear end, where the products of combustion passed up the chimney; the plate being about three inches shorter than the boiler, that is, there were three inches of space between each end of the plate and the ends of the boiler, so that the water could pass between. The fundamental principle being that the water between the plate and the bottom of the boiler would be heated first, and the water being lighter than the colder water above, would flow along in the direction of the highest temperature—that part just over the grate bars, and where the plate has the highest altitude; thus a revolving current would be formed of which the plate would be the focus.

When this was done the fires were started, and, by means of a man-hole at the top, I was able to note the effect on the water, which had a temperature of 50 degs. As soon as the temperature began to rise, a movement in the water became perceptible, and as the temperature increased, became more and more forcible, forming a current flowing from end to end of the boiler with tremendous rapidity, and boiling furiously. In one minute the entire mass of water had acquired an equal temperature of 200 degs. throughout the boiler. In half a minute more steam began to evolve from the end of the plate over the grate bars (the water, of course, flowing away at right angles to the direction of the steam), and in a solid mass entirely free from bubbles of steam. I now shut down the man-hole and made fast steam; pressure quickly formed; all ebullition ceased, and in five minutes the gage gave 19 lbs. pressure per square inch! By the old method fifteen minutes were required to reach the boiling point. In ten minutes more the pressure was 60 lbs. per square inch, when the safety valve was thrown wide open and the steam, transparent and perfectly dry, rushed forth to a distance of three feet.

By the old way the steam was very wet, and drenched everything around for some distance. So rapidly was steam formed, the swiftly-flowing current constantly sweeping the bubbles of steam from the highly-heated surface of the boiler, that twice the usual quantity of water was evaporated in a given time, while the consumption of fuel—dry pine—came down to one pound per indicated horse-power per hour, by night, and the same rate of economy was obtained in the use of coal, when that fuel was subsequently used.

After having made this highly-satisfactory experiment I concluded to try tubular boilers on the same plan, the plate being placed just above the tubes and slightly inclined upward toward the fire-box end of the boiler, so as to send a constant stream of water through the tubes and maintain equal temperature throughout the boiler. The results obtained were still more satisfactory, steam being formed with astonishing rapidity. Under such circumstances I consider it as conclusive that circulating water in steam boilers is in every manner advantageous, yielding the maximum of economy with the minimum of fuel.

ALBERT J. HASTY.

Waterville, Me.

Small Electric Machine Wanted.

MESSRS. EDITORS:—The Lenoir Gas Engine Company is in want of a cheaper, but equally effective, electric apparatus, than the clumsy Ruhmkorff coil and acid battery now used. If a "thimble battery" will send a spark over the cable, why will it not give our little engines, with 20 feet of wire, a good spark?

I am prepared to contract to-day for one thousand suitable electric machines for the Lenoir Gas Engines. Cannot some of your host of inventors supply them?

We are indebted to the SCIENTIFIC AMERICAN for inquiries for our Engines from every nook and corner in the United States—the result of a very modest little advertisement, carried upon the wings of your industry and enterprise.

JOHN B. MURRAY, President, New York City.

Notes and Queries

O. K. L., of N. H.—Your question is hardly appropriate for our columns, but as you failed to give your name we cannot address you by mail. Naval apprentices are appointed by the Secretary of the Navy. The candidate must be sixteen years old, pass an examination in the ordinary English branches, spend two years in the school at Annapolis, and two as a cadet in the workshop, when, if competent, he can graduate as third assistant engineer.

W. W. and N. G. H., of Texas.—The question propounded is this. "Is there any more power in an engine, the piston of which is twelve inches diameter, having four feet stroke, than in one of the same diameter having but one foot stroke, the steam pressure being the same?" The question is not one of the relative value of long or short levers, but simply one of motion from pressure exerted on the piston. If the pressure on the piston is sixty pounds to the square inch, the six-inch crank would make four revolutions while the twenty-four inch crank made one. The amount of power exerted would be the same. But even if the question was confined to a part of one revolution, thus using the cranks as simple levers, the result would be the same. In one case the short lever would exert its force through a less distance than the long lever would have to travel in performing the same work. The reason for using different lengths of stroke for cylinders of a common diameter is adaptability to the kind of work to be performed

F. D., of Pa.—You say the grate bars of your boiler, twenty feet long, by thirty-six inches diameter with one fourteen-inch flue, are only ten inches from the boiler. The space is too little. Better be fifteen or eighteen inches if you wish to utilize the combustion of your fuel. For such a boiler we think a stack thirty inches diameter is full large. Two gage cocks, if properly placed, are as good as three; but for convenience and economy you should have a water indicator. It will save the time of the engineer, and the continual wear of the gage cocks. The direction the grate bars run, relatively to the boiler, will not effect its efficiency.

M. J. S., of Ill.—Polished iron will retain heat longer than if it be rough. If the iron of your apparatus is not to be subjected to a higher temperature than 250 deg. we suggest that you paint it or varnish it of a light color.

N. C. T., of Ill.—We are not aware of any composition used to coat polished steel, giving it a blue color which will not be removed by use. The blueing of steel is effected by exposing it to a charcoal fire, or to heated plates of iron, until the requisite color is obtained. The heat required is not sufficient to soften hardened steel. A transparent varnish can be applied hot, but will not last for your purpose. One part gum copal, one oil of rosemary, and two or three of alcohol is its composition.

J. O. M., of N. Y.—Refer to our reply to W. L. F. of Ill., in our issue of Oct. 27th. Or, if you prefer a cheap process of bronzing, paint your castings of the shade required and varnish. Before the varnish is quite dry, while "sticky," dust it with a copper or bronze dust and rub it on with a linen pad or a paint brush. Then varnish. Muriate of copper dissolved in water will give a copper coating to articles of cast iron, but they must be preserved with a coat of varnish.

D. M., of Pa.—You will see in this issue that we have published an article, illustrated with a diagram, which meets your ideas on the relative positions of the crank and piston.

EXTENSION NOTICES.

John James Greenough, of New York City, having petitioned for the extension of a patent granted to him the 17th day of January, 1854, for an improvement in machines for pegging boots and shoes, and reissued the 4th day of July, 1854, and again reissued on the 16th day of April, 1859, in six divisions, numbered 698, 699, 700, 701, 702, and 703, on which divisions extension is now prayed for for seven years from the expiration of said patent, which takes place on the 17th day of January, 1868, it is ordered that the said petition be heard on Monday, the 11th day of February, 1867.

George W. Brown, of Galesburg, Ill., having petitioned for the extension of a patent granted to him the 2d day of February, 1853, for an improvement in seed planters, and reissued Feb. 16th, 1858, and again reissued Sept. 11, 1860, in five divisions, on four of which extension is now prayed for, viz., numbers 1036, 1037, 1038, and 1039, for seven years from the expiration of said patent, which takes place on the 2d day of February, 1867, it is ordered that the said petition be heard on Monday, the 21st day of January next.

Harvey Murch, of Lebanon, N. H., having petitioned for the extension of a patent granted to him the 14th day of June, 1853, for an improvement in mop heads, for seven years from the expiration of said patent, which takes place on the 14th day of June, 1867, it is ordered that the said petition be heard on Monday, the 26th day of May next.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

BOX FOR FORMING METALLIC NUTS.—JOHN TURNER, Richmond, Va.—This invention has for its object to furnish an improved die or box for punching metallic nuts, which can be reduced or enlarged, to adapt it to nuts of different sizes; and by means of which the position of the center may be changed as desired within certain limits.

CORN PLANTER.—R. M. YORKS, Schoolcraft, Mich.—This invention relates to a portable device for planting or dropping corn, and it consists of a novel arrangement of parts, whereby two rows of corn may be dropped simultaneously, and with a greater or less number of grains or kernels in a hill, as may be desired.

COAL-OIL LANTERN.—J. O. HARRIS, Reading, Pa.—The object of this invention is to simplify the construction of the lantern render it more compact, especially as regards weight, and at the same time retain all the advantages of the original lantern.

BOOT JACK.—H. N. DEGRAW, Newburgh, N. Y.—This invention relates to a boot jack of that class which are provided with movable or pivoted jaws, and it consists in a novel and improved manner of applying the jaws to the foot piece and arranging certain parts therewith, whereby the jaws may, by the pressure of one foot on the foot piece, be made to grasp the heel of the boot on the other foot, so that it may be readily withdrawn.

INDICATOR FOR RAILWAY.—E. B. VAN WINKLE, New York City. This invention relates to an indicator for railways and is designed to indicate to the conductors of trains on arriving at a depot, or at any point on the line of the road where the invention is placed, the exact time a preceding train passed said depot or point, so that collisions which not unfrequently occur in consequence of the slow motion or delay of one train on a track and the rapid motion of a succeeding one, will be avoided.

HORSE HOLDER.—WM. B. CHAPMAN, La Salle, Ill.—This invention relates to a horse holder to be attached to the hub of a wheel of any vehicle, for the purpose of securing or making the lines or reins fast to it.

SPIKE-DRAWING MACHINE.—NATHAN ADAMS, Altoona, Pa.—This invention has for its object to improve the construction of the spike-drawing machine patented by the same inventor, September, 1865.

HOLLOW ARBORS.—JOHN BURT, Sturgis, Mich.—This invention consists in so constructing hollow arbors for rounding square sticks that only the knife or bolt which cuts the wood, shall touch the stick.

HORSE HAY FORK.—T. H. ARNOLD, Troy, Pa.—This invention relates to that class of horse hay forks which are provided with hooks or prongs connected with certain mechanism which admits of their being adjusted in line with a bar so that they may be readily thrust into the load or mats of hay to be elevated and then turned outward from the bar so as to catch into the hay and take up a quantity when the device is elevated.

DRILL.—NOTTINGHAM AND DUNCAN, Vinton, Iowa.—This invention relates to a tool or drill, for enlarging the bore of a well, at and about the lower end; for this purpose it is so connected to the lower end of a rod that by rotating which in any proper manner, the tool will be brought to bear against the sides of the well and cutting the same, produce the enlargement desired.

PULLEY SUSPENSION HOOK.—D. B. BAKER, and P. S. MILLER, Rollersville, Ohio.—This invention is designed to furnish an improved means by which the pulley of a horse hay fork may be suspended from a rafter or other support of difficult access, and for similar uses, without the inconvenience and danger of clambering to the desired point of suspension and suspending the pulley by a chain or rope.

SASH FASTENER.—DE LANCE COLE, Marshall, Ill.—This sash fastener and supporter is of such a construction that the sash can be fastened and supported at any desired hight.

GOVERNOR VALVE AND VARIABLE CUT-OFF.—J. L. DICKINSON, Dubuque, Iowa.—This invention relates to a steam engine and consists in certain improvements in governor valves and in the variable cut-off, whereby many of the obstacles which have been met with heretofore are overcome.

WRENCH.—W. EVANS, Forestville, Conn.—This invention consists in the manner employed for locking the movable jaws to the bar of the wrench which has the said movable jaw fitted to slide upon the bar, which latter has its back serrated or toothed.

TAG OR LABEL, G. W. STORER, Portland, Conn.—This invention relates to a tag or label especially intended to be used upon trees, shrubs, vines, and other plants, although it can be employed for other purposes; the invention consists in so forming the tag or label, made either of sheet metal or other suitable flexible material, that it can be secured to and around the tree, or other plant or article, without requiring the use of an additional or extra fastening device, and without the least injury to the article to which it is applied.

BEEHIVE.—MOSES GUTHRIE, Clifton, Iowa.—The nature of this invention consists in so constructing a beehive that the bees may be kept in different apartments or may be allowed to work in one apartment, as may be desired.

COMBINED STOVE AND FURNACE.—H. G. DAYTON, Maysville, Ky.—This improvement consists in the arrangement of a reverberating chamber directly above the fire box, in which the heated air is first received and wherein it serves to impart heat to the air contained in an annular surrounding chamber which is supplied with air at top, and serves in part to heat air in the main radiating chamber, which incloses both the reverberating and the secondary air heating subdivisions.

BAKING PAN.—STEPHEN WEST, Trenton, N. J.—This invention relates to an improved pan for baking fancy crackers, and it consists in forming the bottom of the pan with a series of semicircular corrugations, grooves or channels, to receive and hold the cracker material during the baking operation, thus preserving their round or cylindrical shape.

SORGHUM SKIMMER.—W. B. SEWARD, Bloomington, Ind.—This invention has for its object to furnish an improved skimmer, by the use of which the operator will be able to skim both sides of the pan with equal facility, and it consists of a skimmer open at both ends so as to permit either end to be used to lift or remove the scum.

COUPLING FOR CULTIVATORS.—SILAS M. WHITNEY, Galesburg,

Ill.—This invention consists of an adjustable rectangular frame, two eye bolts, and a connecting bar, in combination with each other and with the plow beam and frame or axletree of the cultivator, for the purpose of connecting two double or single plows to cultivate corn.

Corn Planter.—John Conrad, Centralia, Ill.—This invention relates to an implement for planting corn, and consists of an automatic device for dropping the seed and a novel arrangement of the shoes and parts applied thereto, whereby the shoes may be raised or lowered, to suit the depth required for the corn to be covered, and raised when not required for use.

Wheat Drill.—James F. Harcourt, Moscow, Ind.—This invention relates to a new and improved device for sowing wheat and other grain in drills, and it consists in a novel construction and arrangement of parts, whereby a very simple and efficient implement for the purpose is obtained, one that may be turned within a limited compass, and which will admit of having the seed planted at a greater or less depth, as may be desired.

Lock.—E. Lawshe, Atlanta, Ga.—By this invention a lock is produced which is especially applicable for use upon freight cars, although it can be applied to other and various purposes, the object being to combine with the lock a tablet or other suitable means in such a manner that by the locking of the lock such tablet will be so operated by the key used or through the locking mechanism, as to expose such portion of its face to view as is marked to correspond to the destination which the freight car is to have upon which the lock is used, as, for instance, whether its freight or load is "Way" or "Through," or for this or that station along the line of the railroad over which the car may be run.

Measure and Funnel.—E. Grattan, Williamstown, Mich.—This invention consists in a graduated measure and ventilating funnel; the body of the funnel, which is the measure, is provided with feet on which to rest it when used as a measure, and with a nozzle when it is to be used as a funnel; it is also provided with a valve at the bottom of the nozzle operated by a valve stem rising above the top of the apparatus, the valve stem having a spiral spring applied to it for keeping the valve always closed, and also with pins or graduated marks along its length to indicate the quantity of fluid contained in the body of the device.

Vehicle.—William Ashley Jones, Dubuque, Iowa.—This invention has for its object to furnish an improved means by which the brake may be applied to the wheels with exactly the necessary amount of force; by which the wheels may be locked upon an up or down grade; and by which the horses may be disengaged from the wagon whenever necessary.

Clothespin.—Geo. F. Barden, Dover, N. H.—This invention consists in a novel manner of arranging a rubber spring or cushion in connection with the clothespin.

Loading-rope Device.—John Gifford, Jr., Watertown, N. Y.—This improvement consists of a means of gripping the loading rope and fastening it to the tubular socket which is suspended from the rope which passes to the pulley.

Quartz Crusher and Pulverizer.—C. W. Stafford, New York City.—The principal object of this invention is to avoid the danger of clogging which results from the excessive motion imparted to the upper in comparison with the lower part of the reciprocating jaw, and for this purpose the inventor avoids the use of a fixed pivot or fulcrum for the moving jaw, and mounts it upon guides and imparts to it a reciprocating rectilinear motion by means of eccentrics.

Axle Box.—Caleb M. Oliver, Port Carbon, Pa.—In this case the weight of the car instead of devolving upon the lubricating axle box, is sustained directly by the axle; the axle box being thus prevented from wearing away and becoming leaky by use.

Churn.—Wm. M. Cook, Lyons, Iowa.—This improvement consists in the arrangement of the churn upon the pivoted arms which vibrate in vertical planes, a flat spring fastened to the frame and engaging with a block on the bottom of the churn, restoring the latter to its normal position after being vibrated in either direction.

Wrench.—Wm. M. Owen, Homer, Iowa.—In this wrench the shank of the movable jaw has holes, and the handle has a spring plug, which latter engages with such one of the holes as may secure the desired relative adjustment of the jaws. A lever placed conveniently for the thumb is the means for the withdrawal of the plug for readjustment.

Hide-fleshing and Stoning Machine.—Jesse S. Wheat, South Wheeling, West Va.—This invention has for its object to furnish an improved machine for fleshing hides, and which may also be used for stoning glazed paper.

Rolling Pin, Steak Hacker, etc.—A. Williamson and A. Richardson, Alleghany City, Pa.—This invention consists in the combination of a rolling pin, steak hacker, grater, beetle, and butter print into one instrument.

Curing and Packing Cheese.—Wm. B. Nickelson, Lowville, N. Y.—This invention consists in curing cheese within a wooden hoop, which may be removed at will for inspection and rubbing. The advantages are, that the cheese may be turned with greater ease and safety, the cost of cloth bandages is saved, the symmetry of the cheese is better preserved, and the excessive thickening and hardening of the rind on the sides and corners, by exposure to the atmosphere, is prevented, and when the cheese is cured the addition of covers to the top and bottom of the hoop completes the box for transportation to market.

Weather Boarding, Spacing, and Holding Clamp.—D. M. Mourland, Little York, Ill.—This invention relates to an instrument or device for the use of carpenters in putting up horizontal siding or weather boarding on houses, the object of it being to gage and set the spacing of the siding, mark the ends for fitting up against the "finish" or corner plate, and hold up the siding in place while it is fastened.

Pianoforte.—G. C. Manner, New York City.—This invention relates to certain improvements in the metal frame of a pianoforte, and it consists in filling the metal bridge which forms an integral part of the metal frame, with ivory from below, so that the strings bear against said ivory filling, and the disadvantages are avoided which arise if the strings bear against the bare metal. This metal frame is placed entirely in front of the tuning pins, whereby the wrest plank is firmly supported and the tuning pins are prevented from working loose. A slot in the metal frame allows of placing the damper lifters behind the point supporting the string, and the application of French damper levers over the bridge is rendered practicable. A bar extending parallel to the lower strings and under the upper strings serves to strengthen the metal frame.

Lantern.—Lewis F. Betts, New York City.—This invention relates to that class of lanterns designed for being used with a coal-oil lamp, and will admit of the glass globe being detached, whenever required for cleaning purposes, or when broken or cracked, so that a new one may be adjusted in its place.

Cultivator and Stalk Cutter.—W. W. Phillee, Port Byron, Ill.—This invention relates to a device for cutting corn-stalks, and cultivating or plowing corn, and marking the ground for planting the same. It consists in a novel construction and arrangement of parts, whereby the desired work may be done expeditiously and in a perfect manner.

Beehive.—T. Eisenhart, Doylestown, Pa.—This invention relates to an improved manner of hanging the comb frames in the body of the hive, whereby the frames are rendered perfectly accessible, and any one frame may be removed from the hive without disturbing the others.

Feed Apparatus for Thrashing Machine.—Geo. W. Carpenter, Medina, Mich.—This invention relates to improvements in a grain thrashing machine, and consists in a self-feeding apparatus to be attached to cylinder thrashing machines of ordinary construction, for the purpose of cutting the bands of the bundles and spreading the straw evenly, which is then conveyed and fed regularly to the thrashing cylinder.

Washing Machine.—J. Hindman, Olathe, Kansas.—The object of this invention is to construct a machine by which the labor is reduced and the operation of washing clothes is made more perfect.

Manufacture of Saltpeter.—Vincent E. Keegan, M. D., Roxbury, Mass.—This invention relates to a process for the manufacture of nitrate of potassa or saltpeter, wherein the process is imitated which is employed by nature in producing saltpeter in caves, and which consists in placing potassa under the influence of an abnormal condition of the atmosphere, produced by the absence of all electric power of the sun' rays.

Windmill.—Daniel Strunk, Janesville, Wis.—This invention consists in an improved mode of constructing windmills for regulating the motive power of the wings or sails, by means of self-acting apparatus connected with them, operated upon by a weight which rises and falls according to the strength of the wind, and opens and shuts the sails, thereby changing the angle at which the current of air passing through deflectors strikes them, and modifying their power of resistance.

Escapement for Timepieces.—S. W. Robinson, Detroit, Mich.—The object of this invention is to impart to the balance impulses which shall be equal to each other in the amount of force, a single impulse being given at each double vibration of the balance. This purpose is effected by a lever acted upon by a spring and applied in combination with the escape wheel, the balance, and two detents, in such a manner that the force required for unlocking the detents is derived entirely from the hair spring of the balance and lever, while the power of the hair spring acting on the lever imparts to the balance the desired impulse at each double vibration of said balance.

Churn.—J. D. Parrot, Morristown, N. J.—This invention relates to an improvement in that class of churns in which the tub is connected to a pendulum and suspended in such a manner that an oscillating motion can be imparted to it, whereby the churning operation is effected.

India-rubber Rollers.—James B. Forsyth, Roxbury, Mass.—This invention relates to a roller made of india-rubber or other vulcanizable material, the outside of which is soft and elastic, and the core or inside semi-elastic, said core being compounded of india-rubber, ground rubber rags, sulphur, oxide of zinc, calcined magnesia, and lampblack, in such a manner that the cost of the roller is reduced, and furthermore a core is obtained which will expand when warm and contract and become firm when cold, and which will give a firm hold to the roller on its shaft.

Horse Hoe.—John Gifford, Jr., Watertown, N. Y.—This improvement consists of a pair of wings applied to and extending laterally in the rear of the share, and made adjustable as to depth and breadth of furrow by means of braces, etc., extending from the standard beam and handles to the said wings.

Carriage.—G. H. and E. Morgan, Edgeware Road, London.—The claims for this invention were published in our last number, and are embraced in two patents obtained through this office. It is an English invention relating to improvements in pleasure carriages for raising and lowering the tops by means of a system of levers, all of which are hid out of sight within the frame and lining of the vehicle, and are operated readily by the driver while remaining in his seat, instead of the old-fashioned method of outside rods and knee-joints, which not only disfigure the carriage but often cause danger to the occupants by requiring the driver to leave his box and abandon control of the horses. Messrs. R. Hoe & Co., Printing-press Builders, No. 31 Gold street, N. Y., are agents for the Patentee.

Hat-blocking Machine.—Seth Boyden, Newark, N. J.—This invention relates to a machine for the blocking of hats, in which the "hat-cone," so called, is placed upon and over a block that is then of a shape or form corresponding thereto, but is so constructed that it can be changed or made to assume the ordinary form of a hat-block.

Polishing Machine.—John Moore, Gardiner, Me.—This invention relates to an improved polishing machine for smoothing the faces or flat sides of doors, and consists in the combination of a carriage for supporting a table on which the door is to be laid flat for polishing, with rails and rollers for moving the table longitudinally and transversely under a revolving rubber or polisher, so that every part of the face of a door may be brought under the polisher and be made smooth.

Sulky Plow.—J. J. Reed, Polo, Ill.—The nature of this invention consists in constructing a sulky plow, so as to straddle the rows of plants, and operate in such a manner that the driver can, by means of a walking beam pivoted to the rear end of the pole, impart a lateral motion to the plows, and by means of a lever can elevate the plows so as to pass over obstructions or move the machine from one place to another.

Shoe and Other Brushes.—F. M. Carnes, New York City.—This invention relates to brushes which are used for applying to articles a substance to be polished, and afterward polishing the substance by rubbing or friction produced by the brush, such as shoe brushes, stove brushes, etc.

Cider and Wine Mill.—John H. Williams, Sandusky, Ohio.—This invention relates to a mill for grinding or crushing fruit for the purpose of expressing the juice therefrom for the manufacture of wine. It consists of two rollers of iron, wood, or other hard material, in connection with a roller of india-rubber or other elastic material, so arranged that the juice will be expressed from the fruit, and the former separated from the crushed fruit or pomace.

Seeding Machine.—Henry Thomason, Lafayette, Ind.—This invention relates to a seeding machine, provided with adjustable or expanding bars, to which the seed boxes are attached for the purpose of planting the seed in drills at a greater or less distance apart, as may be desired.

Double-shovel Cultivator.—A. F. Grove, James Creek, Pa.—This invention consists in attaching the plow or shovel beams to the main beam of the implement, so that the plow may be moved longitudinally, and the two plows or shovels reversed in position, so that either plow may be placed foremost as occasion may require, and the implement thereby rendered capable of working back or returning in the same furrow with the foremost plow or shovel in both cases nearest the row of plants.

Fire Alarm.—Eugene Fontaine and Oscar Simons, Fort Wayne, Ind.—This invention relates to certain improvements in that class of fire alarms, the operation of which depends upon the expansion of a wire. This wire is stretched over a series of roller studs secured in a board or bed-plate, to which the entire mechanism is attached, and it is strained to such a degree that it retains a plunger which is exposed to the action of a spiral spring in a certain position. If the temperature rises, causing the wire to stretch, the plunger follows the action of the spring, and by pushing against a pair of toggle arms, throws them out of their balance, and allows a spring to act on a rod whereby an alarm is sounded.

Revolving Horse Hay Rake.—Curtis Satterlee, Paris, Ill.—This invention has for its object to furnish an improved revolving hay rake, so constructed that the rake may be operated from the driver's seat.

Magic Alphabet Blocks.—S. L. Hill, Williamsburgh, N. Y.—This invention consists in the use of triangular blocks, which, when properly combined, show on their faces different letters, in such a manner that when the blocks are separated and mixed up considerable skill and patience are required to put the appropriate blocks together, and when the blocks are put together they produce a novel and striking effect.

Spoke Driving Machine.—Eli Keith and Dell Bird, La Fontaine, Ind.—This invention consists of a very simple machine, in which the hub is keyed, gaged, and adjusted so that the spokes may be driven in with regularity and with any required dish.

Smoothing Attachment to Combs.—Theodore Schreiber, Wheeling, W. Va.—This invention consists in the arrangement of a vertically-sliding spring pad in combination with the teeth of a comb, in such a manner that by the action of the spring pad the hair in combing is pressed down smooth and in good condition, and the use of a hair-brush after the comb can be dispensed with.

Railroad Car Axle Box.—F. Leppeus, Hartford, Conn.—In axle boxes for railroad cars it is important to protect the contents of the oil chamber from dust, etc., which by this invention is secured.

Ribs for Umbrellas.—Wilhelm Hugo, Celle, Hanover.—This invention consists in a T-shaped rib for umbrellas, each rib being provided with a longitudinal groove or depression on its outer surface, in such a manner that the same, on account of its peculiar shape, combines strength and lightness, and by the longitudinal groove room is obtained for the seam to lodge in, so that the rib does not injure the fabric which constitutes the covering of the umbrella or parasol.

Needle Preserver.—G. L. Turney, London, England.—This invention relates to a novel mode of arranging needles for sale, the object being to dispose of them in packages of a more convenient construction than heretofore, so that the danger of spilling and loosing the needles will be removed, while at the same time said needles will be more easily accessible than at present, and they can be taken up one at a time for use without disturbing any of the other needles in the same package.

Construction of Buildings.—Andrew Tanner, Hoboken, N. J.—This invention relates to a building, the outer frame of which, as well as the internal partitions, is made of rough boards placed one on top of the other, in such a manner that recesses are formed on both sides of each wall, which serve to support the plaster, and suitable gutters in these recesses afford an additional hold for the plaster. The boards which compose the walls or partitions are provided with vertical and horizontal air channels, in such a manner that the air is free to circulate through said walls, and the formation of dry rot in the boards is prevented.

Soap Compound.—J. K. Andrews, Antrim, Ohio.—This invention relates to a soap compound which contains carbonate of ammonia, benzine, sal soda, saltpeter, ordinary soap or opodeldock, and fresh potatoes, mixed together in such a manner that a cheap soap is obtained of superior detergent qualities.

Spring Bedstead.—Daniel Punches, Plymouth, Mich.—This invention consists in a spring frame, one end of which is attached to the end of the slat, and the other to the end rail of the bedstead at both ends; the spring frame consisting in detail of a quadrilateral frame, around each of whose side strips a spiral spring is coiled, and a sliding frame working with the quadrilateral frame, and operating in such a manner that on depressing the slat of the bedstead the spiral springs will be contracted, and the slats receive the required springing motion.

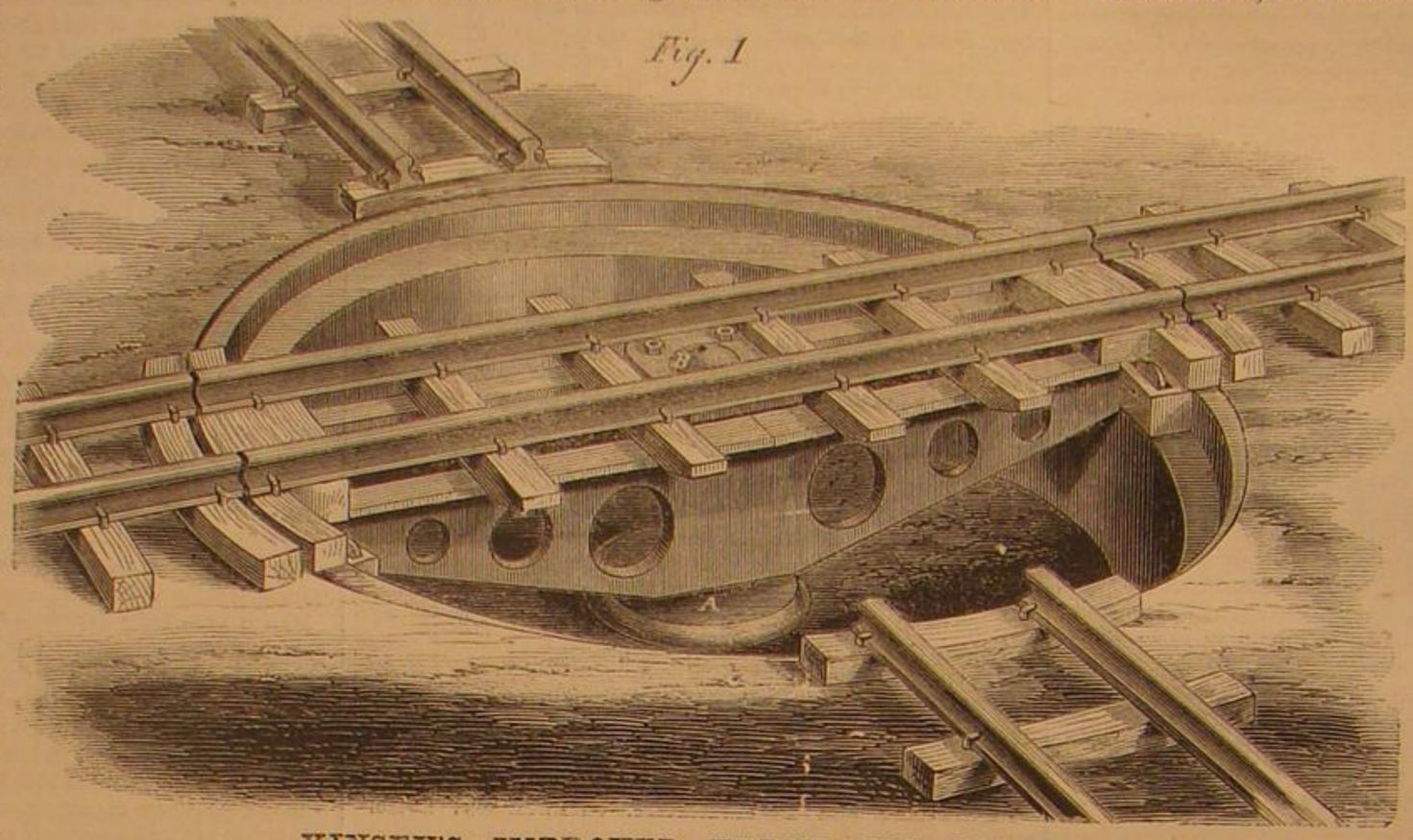
Window Sash.—J. E. Hood, Springfield, Mass.—This sash requires neither putty nor glazier, and has several important advantages. It is made in two sections, which are secured together on the inside, the glass being held firm by a thin packing of india-rubber between it and the outer half of the sash. It is but a few minutes' work to glaze an entire sash. The sash is handsomer than the old style, varnished or painted wood only being seen on the outside. The glass can readily be taken out for cleaning, or for painting or varnishing the sash, and the convenience of resetting when a pane is broken is obvious. With this sash every man may be his own glazier. It is peculiarly adapted to car windows and show cases, and in all dwelling houses making pretensions to elegance it must soon supersede the old style. Further information may be obtained of the patentee as above.

Improved Turntable Pivot.

The ordinary turntables for railroads, and the swing bridges for streams, usually have a central shaft embraced by a box, which guides the rotation of the frame, while the weight rests mainly on the circumferential trucks. Of course, when weight is on the turntable, as that of a locomotive and tender, it requires the expenditure of much power to move the mass. It is difficult, also, always to keep this central shaft properly lubricated, and to do this it is necessary to descend into the pit.

The improvement herewith illustrated is simply a device for transferring the weight from the circumference to the center, thereby greatly diminishing friction, and to insure perfect lubrication at all times. The pit for a railroad turntable is constructed in the usual manner. In the center is the pedestal, A, the top of which is hollowed to receive a sphere of solid metal. This is the pivot, and upon this rests the weight of the bridge. A cap, B, also hollowed, sits on this ball and is bolted to the bridge. Through its top is an oil hole which may be covered to keep out dirt and dust, and the under side of the cup is channeled to carry the oil to the cup-like receptacle at the top of the column, A. It will be seen that so long as any oil whatever remains in this receptacle, it occupies the proper place for effective lubrication. The weight of the bridge is concentered at the point of least resistance, and the friction is so little that the inventor states one man can turn the heaviest locomotive and tender with perfect ease. It seems to be equally applicable to swing bridges, which in many places are superseding the ordinary drawbridges. It has been in use on the Lehigh Valley Railroad two years with perfect success.

Fig. 1



KINSEY'S IMPROVED TURNTABLE PIVOT.

Patented tnrough the Scientific American Patent Agency, Nov. 28th, 1865, by John I. Kinsey, South Easton, Pa., to whom apply for additional facts.

ERIE BASIN DRY DOCK COMPANY.

It appears from English papers that the misfortunes of the *Great Eastern* have not yet ended. Returning from her cable trip, it was necessary to have her overhauled, but no dock could be found sufficiently large for her accommodation, and at last accounts she was idly lying in the river Mersey.

The length of the dry dock at Birkenhead, where the leviathan essayed to enter, is given as 600 feet, the width and depth corresponding. The dimensions here stated, according to the best information at hand, make this superior to any dock in this country—longer by some 240 feet than the granite dock at the Brooklyn Navy-yard, hitherto considered the largest in the country. The new dry dock lately finished in Brooklyn surpasses the Government dock in its dimensions, but cannot be ranked as a rival of the Albert basin at Birkenhe d.

The Erie Dry Dock Company, composed of Boston and New York capitalists, have obtained, by purchase, a large property situated on Elizabeth street, South Brooklyn, having a valuable water frontage on the Erie basin of fourteen hundred feet. The dry dock itself measures at the top 550 feet in length by 120 in width, and 476 by 61 feet at the bottom. The depth of water at the sill is eighteen feet, while inside a depth of twenty-four feet is secured. The gate is a caisson, built with keel and stern, and has all the appearance of a vessel in itself. The beveled edge is designed to fit into corresponding grooves on either side of the dock, and is sunk to close the opening by pumping water into the lower sections by a small engine on board.

The dock is emptied by two of Hibbard's centrifugal pumps driven by a horizontal engine of one hundred horse-power. The escape pipes are two in number, twenty-four inches diameter, each capable of discharging 30,000 gallons of water per minute.

When a ship needs repairing, she is warped into the dock, centered, and stayed with ropes to the shore; the caisson is then placed in position, and the donkey engine set to work. In the course of half an hour, the inclosed space is water-tight, and the water discharged by the large pumps in from two to three hours.

An inconvenience arises from having but one dock; for if several vessels, needing more or less repairs, are docked together, neither one can be discharged till all are finished. On this account the company contemplate the building of another basin, smaller in superficial area, but four feet deeper than the one just completed. The erection of an extensive range of warehouses, and other improvements are being carried forward and will add to the perfection of the enterprise. Connected with the dock-yard, the Erie Basin Iron Works furnish unsurpassed facilities for repairing and renovating disabled vessels and refitting them for active service.

WILLIAMS'S POTATO WASHER.

Devices for lightening the labors of the housewife form no insignificant part of the business of the Patent Office, and although, at times, it may seem as though the contrivance was too simple to be made the subject of a legal claim of proprietorship, yet many of our most valuable discoveries derive their merit from their simplicity.

The annexed engraving illustrates one of those simple improvements which appeal to the tidy housekeeper. Every one who has pared potatoes knows that the fingers acquire a dark tinge from contact with the tubers. This is to prevent in part the handling of the roots. A is an ordinary wooden pail, having a bar across its upper surface, with slats extending to a semi-diameter, which form a grate. In the center of the bar is an upright shaft, extending to the bottom, furnished with arms connected with a sweep that revolves by means of the crank, B.

The potatoes, or other vegetables, are placed in the pail with water enough to cover them, when the handle, B, is turned, which passes them rapidly through the water. The water is then drained off through the grating, and the potatoes can be emptied without the operator wetting his or her hands. No further description or recommendation is necessary for understanding and appreciating this improvement.

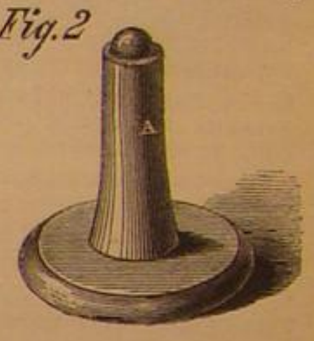
It was patented through the Scientific American Patent Agency by Joshua H. Williams, July 24, 1866. For territorial rights and other information apply as above at East Craftsbury, Vt.

"Time will Tell."

The interest, even enthusiasm, drawn forth by the predicted meteoric display of the past week, is worthy of being placed on record. The excitement was wide spread, and our local exchanges detail the arrangements universally made for witnessing the display.

The observatories had each a full corps of enthusiasts, and anxious star-gazers on watch-towers improvised on house tops and commanding points waited impatiently for the promised shower. In most of our cities the authorities had arranged for the heralding of its beginning by public signals. that all might witness the extraordinary phenomenon.

Fig. 2



That the fall was far from equalling anticipation, it is needless for us to say, but it is equally certain that the display, in the number and brilliancy of the meteors, surpassed those of previous years. Unfortunately for the astronomers, a storm gathering from the south caused some indistinctness toward the close of the second night, and in this section heavy clouds upon the following evening entirely precluded observation.

In a short time we shall know whether other lands have been favored with showers of greater magnitude, and from the data, theories and calculations may show how possible perturbations have caused unexpected variations in time and place.

Progress of the Pacific Railway.

The Central Pacific Railway, now in progress from Sacramento City to the California State line, is in course of rapid completion.

The iron horse now runs on this line a distance of 93 miles, and 10,000 laborers, chiefly Chinese, are now at work. This road has used up for their drills in this rocky path, over 100 tuns of cast steel, and have ordered 150 tuns more for this purpose. They use 250 to 300 kegs of powder per day for blasting rock—these two items show great work. There are now on the road 14 engines of the very first class, and two more of extra power now landing; they have over 200 freight cars and 100 more on the way. This company now own their road—already a good paying institution—and they own the Sacramento Valley Road, and also the adjoining roads, and by their liberal offers to purchasers of land and to shippers of freight, they are winning public favor every day.

The progress of the western divisions, which are intended to connect with the Central Pacific at the State line, are also progressing rapidly, and much sooner than many supposed it possible, the iron bands will stretch from the Atlantic to the Pacific.

A COMPANY has been organized in Milwaukee, Wis., with a capital of $100,000, for the purpose of starting a cotton mill. Several Massachusetts capitalists are interested in the enterprise. A monster woolen factory is also contemplated there.

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NEW YORK, SATURDAY, NOV. 24, 1866.

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ENLARGEMENT OF THE SCIENTIFIC AMERICAN FOR 1867.

On the first of January, 1867, the SCIENTIFIC AMERICAN completes its Twenty-First Year. The first number of this journal, a folio of four pages, appeared in the Summer of 1845, under the editorial management of Rufus Porter, a scientific enthusiast, who still lives in anticipation that, sooner or later, he may fly to the uttermost parts of the earth in a balloon. That volume abounded in the editor's peculiar scientific and spiritual theories and visions, and was adapted to a very narrow circle. It was, however, the basis upon which the present Editors and Proprietors entertained the notion that a Journal of Popular Science might be built up, which would supply a want seriously felt by the Mechanics, Manufacturers, and Inventors of this country. Upon assuming the management of the paper we determined, upon the commencement of a new volume, to enlarge it and change its form to eight pages. Our expectations were not disappointed. Our patrons responded generously, and the circulation of the paper rapidly increased, and from that time onward the SCIENTIFIC AMERICAN has been a recognized power in the development and extension of every interest bearing upon the Industrial Arts and Sciences.

In 1859, still further encouraged by the success that crowned our labors, and to meet the great pressure upon our columns, we felt obliged to double the size of the paper to sixteen pages. Even this enlargement, however, has proved inadequate to the wants of our readers and advertising patrons, and now, in spite of the greatly enhanced cost of paper and all other materials, we propose—now that the SCIENTIFIC AMERICAN has become of age—on the first of January to enlarge and improve it in every respect. The proposed enlargement will give our readers an increase equivalent to seven additional pages of reading of the present issue, and will enable us to enter more extensively into the important details of American and Foreign Industry, Art, Science, and Discovery, than our space, hitherto, has permitted.

This contemplated change will involve an additional cost for editorial talent, mechanical labor, paper, etc., of nearly twenty thousand dollars per year; but we have fully decided to undertake it without increasing the subscription price. The fact is indisputable that the SCIENTIFIC AMERICAN will be, by far, the cheapest and most valuable paper of the kind ever published. Its circulation is now more than the combined weekly issues of all similar journals in this country and Great Britain, which fact alone attests how it is appreciated by its intelligent readers. The position it now holds will not be relinquished if industry, talent, and a liberal expenditure of money can produce a journal worthy of public confidence and a wide-spread circulation.

Under the new arrangement the SCIENTIFIC AMERICAN will contain more reading matter, at one-half the cost, than the largest scientific journal published in England.

WROUGHT SCRAP IRON FOR FORGINGS.

The breaking of so many shafts of our sea-going steamers—instance those of the steamers *Atlantic* and *Pacific*, several years since, in the Collins Liverpool line, and, more recently, several shafts as well as cranks, of the Pacific Mail Company's ships—has led us to examine the subject, and inquire of what material these shafts, cranks, etc., were made.

From the most reliable information we have gathered, we find they were made of wrought scrap iron, of which it appears there are several kinds.

The first is the "common scrap of commerce," which is gathered from the thousands of smiths' shops throughout the country.

The second is what is known as "railroad scrap," which consists of old rails, bolts, plates, etc., that have been used in ordinary railway operations.

The third is "boiler scrap," which is composed of sheets and rivets from condemned steam boilers.

The fourth is what is called "selected scrap." This consists of old horseshoes, horseshoe nails, and the clippings from the tack-plate mills of the country.

The first two of the kinds of scrap iron above enumerated are made up of all and every kind of iron manufactured in this country and in England, from the most inferior of Welsh bars up to the best American brands in market. Russia, Swede, and Norway irons, are not generally used for ordinary purposes, on account of their high price.

The third class of scrap iron ought to be of the best iron that can be made; but unfortunately such is not the case; an evidence of which is the frequent boiler explosions from one end of the country to the other; consequently there is no certainty of getting a sound, uniform piece of forging, even if boiler scrap is used.

As for the fourth class—selected scrap—its quantity is so inconsiderable that any discussion of its merits or demerits will avail nothing in the object sought to be obtained by our remarks on the subject under consideration. As for old horseshoes and nails, they are scattered over such a vast extent of country, that to make them a specialty would cost more than their value, after re-manufacture into the kinds of forgings we refer to; and as for tack-plate scrap, we feel safe in saying, the very nature of the tack manufacture—the cutting the plates into articles so small as carpet tacks for instance—precludes the possibility of any large quantity of "scrap" remaining after the tack maker has used every delicate little piece that his machine will cut.

The results of our investigations convince us that at least ninety per cent, if not more, of all scrap forgings are made from the first three kinds of scrap mentioned; it is practically impossible to make, with certainty, any piece of forging, and more particularly large shafts, cranks, etc., which shall be reliable, and which can be depended upon for strength and tenacity, where scrap iron, composed of such great varieties and qualities as we have shown, is used. The various kinds of iron will not unite—will not weld thoroughly, heat and hammer them as much as you may.

From the examination we have given this subject, we are of the opinion that the only reliable and safe course for our forge-masters to pursue, is to make their forgings of one kind of iron. Let them test the various brands of foreign and American irons, and use only the strongest and most tenacious that can be procured; and we feel confident we shall hear no more of broken steamer shafts, endangering a loss of life and property.

We are well aware that a judicious mixture of cast irons often improves the quality, and gives a stronger and better casting than otherwise; but such is not the case with wrought iron. We would as soon think of making a railway bridge of oak, pine, and whitewood, and expect it to be as strong as though it were made exclusively of the best of white oak, as to suppose that a steamer shaft made of mixed scrap iron would be as strong and reliable as it would be if made of one quality, and that the best iron that can be manufactured.

CHANGE IN THE STYLE OF PATENTS.

But few are aware of the fact that all letters patent issuing from the United States Patent Office on and after the 20th of this month, will be in an entirely new dress, on different material, smaller, neater, and containing a printed specification. The patent proper, or grant, instead of containing the design of the Patent Office building, will have an engraving intended to show the progress of invention, the details being quite clever, and which, by way of comparison and contrast, will always appear fresh and pleasing to the eye. This beautiful design is original with Mr. Theaker, our present courteous and efficient Commissioner of Patents.

Place of the Counterbalance on Saw Mill Sashes.

A writer, G. W. P., Ogdensburgh, N. Y., doubts the propriety of placing the counterbalance of vertical saw mills opposite the crank. He says, the gate, brought to a stand-still at the extremity of its stroke, offers heavy resistance to the motion of the wheel, suddenly checking its velocity, the centripetal as well as the centrifugal force being instantly counteracted. Now, considering the wheel truly balanced and the counterbalance an adjustable weight, capable of exerting its force upon a given point on the wheel; and supposing the momentum of the wheel to be thus suddenly checked, the counterbalance will exert its power, not in a vertical line opposing the shock, but in the line of flight, should it then be detached from the wheel.

This shows that the counterbalance does not so much tend to counteract the vertical shock as to give a horizontal shock to the pillow blocks.

He recommends placing the counterbalance at a point in advance of the crank, as when the crank pin is at its lowest point, the counterbalance at a point a little above a line drawn through the axis of rotation, so that it precedes the crank's motion about one-third of the circumference. He thinks the subject is worthy the attention of scientific mechanics and practical men.

Practical Hints.

Under this title we shall communicate to our readers a series of short articles, containing such useful information as has been proved by experience of practical men to be reliable, and, therefore, desirable to be more universally known and applied. We ask contributions to this column from our readers.

No. 1. TO PREVENT RATS FROM DAMAGING LEATHER BELTING.—It is not an uncommon occurrence in factories where steam power is used, that during the night, or periods that the machinery is stationary and the shop abandoned, the rats will eat the leather belting, where it is accessible to them; for instance, where it passes through openings in the floor; cases have even happened that they gnawed holes in the floor just over the place where a belt was running horizontally in order to reach and eat pieces out of it.

Now, it is a singular fact that rats will not touch anything containing castor oil, or even only covered with it, and, therefore, to guard belting against

the voracity of these animals, all we have to do is to touch it at every place where belting is exposed to their attacks with a brush previously dipped in castor oil.

The antipathy of the rats against this useful oil is really strange. Probably their instinct teaches them that it is injurious to them; but it is useful for men to know this in order to guard many substances against their voracious appetite. V.

PATENT OFFICE DECISION---CULTIVATORS.

BEFORE THE EXAMINERS-IN-CHIEF ON APPEAL.

Application of James Dundas for a Reissue of the Patent for a Cultivator granted to him February 8, 1839.

The implement contemplated in this invention consists of the well-known straddle-row cultivator for corn, mounted upon wheels. There are two cultivator shares, or spades, on each side, and the inside one of each pair is attached to a stock which can be vibrated from side to side, and the two are so connected that they work together. A seat is provided upon the frame for the driver, who is thus enabled to guide the middle spades by means of a lever, so as to avoid such hills as are out of line in the row he is operating upon. A mechanism is also provided by which the plows can be raised from the ground and sustained.

The original application was filed Aug. 9, 1851. The specification was so framed as to monopolize the arrangement for giving the inside shovels a lateral movement, and nothing more. The patentee now asks for an amended grant, which shall vest in him the exclusive title to seven different combinations of devices, each to be embodied in a straddle-row cultivator. The first embraces the two wheels, the frame, and the plows arranged in two gangs, with a central space between them. The next five all include the same elements in combination with other devices. The second adds a seat for the driver. The third the arrangements for shifting the central plows laterally, the depth of the furrow being limited by the wheels. The fourth the movable stocks and the driver's seat. The fifth the driver's seat and the connection between the movable stocks. The sixth the mechanism for raising the plows. The seventh is for arranging the two inside plows in front of the axletree and of the driver.

The slightest glance at these claims will show their momentous bearing on the agricultural interests of the country. They have consequently received a long, most careful, and even anxious consideration on the part of the Board. After a thorough examination of all the references, and all the objections upon which it was rejected, it was sent back for a renewed investigation, and another independent search was instituted for examples of the previous employment of the devices. After a long delay, and the maturest reflection, the result is that we find the Board agreed that the applicant is legitimately entitled to all the combinations specified, except the first and last; and the majority are compelled to hold that he has made out his right to the first.

The first of the objections raised against this application is founded upon the long period which has elapsed since the patentee brought his invention before the Office. It derives great weight from the very extensive use, into which the machines have been introduced meanwhile, and the enormous tax to which a monopoly of it would subject the farming interests of the country. The applicant cannot be held responsible, however, for the entire delay which took place in the Patent Office from the 9th of August, 1851, till the 8th of February, 1859. There was no rule of law during all this time, which warranted the rejection of an application on account of any delay which occurred in the proceedings after it was filed. Nor has any case been known where a patent has been denied on account of the time the application had been pending, except under the provisions of the Act of March 3, 1861.

That the patentee should lie by for eight years, and see his machine going into almost universal use on every side, without making claim to it, and then rise up and lay a restriction upon it, must strike every one as an intolerable grievance, and one that should not be allowed. But it has been so distinctly decided in Stimpson *vs.* The West Chester R. Co., 4 How. 402, that no use of an invention, not claimed in an original patent, is a bar to a renewed one embracing it, and this has been so unqualifiedly affirmed in Battin *vs.* Taggert, 17 How. 74, that the objection cannot be sustained. The very inconvenience and mischiefs growing out of such a reissue as this, were strongly presented and urged in those cases, but did not avail in the mind of the court. Their decision is authoritative and binding on this tribunal, and must govern our conclusions.

It was insisted further that the applicant was anticipated as to some, at least, of the features of his invention, by the rejected application of H. H. Marsh, filed 7th July 1851. In reply to this, Dundas produced evidence of his having devised it complete in July, 1850, and commenced the construction of the machine in the following winter; and of his having completed the woodwork in April after, and the whole machine about the 1st June. He also introduced Marsh's own affidavit that he first invented it in January, or February, 1851. At the instance of the office, Marsh made a further statement, under oath, that he conceived the idea in June 1850, and "arranged and perfected it" in January or February 1851. He means, of course, in his mind merely, as he does not appear to have made any drawing or model of it, and no machine until some time afterward. His travails were all subsequent to those of Dundas, and cannot be regarded as an answer to what the latter had achieved.

Several patents granted by the office before that of Dundas, were also adduced in bar of his petition. But all of them were founded upon applications filed long after his original one. They have no bearing upon the case, therefore, save upon the question of abandonment, and that has been already disposed of.

Several English patents and foreign publications were also referred to. The only machines described, which existed before Dundas's invention, are those of Kirkwood's grubber, and perhaps Coleman's cultivator, mentioned in Stephens's Book of Farm Implements, etc. page 229, etc. The structure of these is so different from that of Dundas as to destroy all inference from the supposed analogy. It is perhaps enough to say that they are mounted on three wheels. Others of the machines alluded to, like that of John White's, which bear a resemblance to the one before us, are suspended from the axle, are attached to it by flexible connections, and are drawn behind it. All beside are posterior in date, such as Poitevine's French Cultivator and Paterson's, Rogers's and Billings's are none of them intended for growing crops, any more than Schemerhorn's, Porter's and other machines.

The first paragraph, in which the applicant specifies what he claims to be his invention, has been the particular subject of our consideration, and is couched in the following language: "The combination in a straddle-row cultivator of the following instrumentalities, viz., the two wheels, frame, and a series of plows arranged in two gangs, with a central space between the gangs, so as to till the soil simultaneously at both sides of a single row of plants which the machine straddles, all of these operating in the combination substantially as set forth." The exception taken to this claim is, that it does not expressly include any of the other mechanism described, without which the machine would never have effected any important results. For it was the addition of that, especially of the laterally adjustable shares, which has given it such remarkable usefulness and immense popularity. Without them it would serve little or no purpose, and would never have emerged from the obscurity in which it was originated. It is argued, therefore, that they are an indispensable appendage of the combination, and that it should not be monopolized in a patent without embracing them.

The question thus raised must not be confounded with that which was so fully considered and determined in Case *vs.* Brown, 2 Wallace, 320, and Burr *vs.* Duryee, 1 Id., 553, and which has been more than once before discussed in the courts. In those cases it has been settled that, where devices have been employed to accomplish a certain result, such as the dropping of corn in a peculiar manner when planting, the result cannot be monopolized, but the patent must be confined to the devices. In this proceeding no claim is set up to the result aimed at and supposed to be produced; that is, the improved method of cultivating a row of growing corn on each side. But what the applicant challenges as his invention is certain mechanism, which he employs in conjunction with others to produce the desired result. The language specifies expressly certain portions of the mechanism, and he asks for property in nothing more.

It may be said, however, that all the several parts were old, and that no invention was exercised in combining them. This is by no means clear. In order to adapt a cultivator to this service, three things at least were requisite. The axletree and frame must be shortened so as to pass between the adjacent rows on each side of the row under cultivation. The center tooth must be removed to make room for that row, and the position of the remaining teeth must be adjusted so as to touch neither of the rows, yet till the ground between them. These modifications altogether exceed those which were held to constitute novelty in Newton *vs.* Vaucher, 11 Eng. Law and Eq. R., 589, and Earle *vs.* Sawyer, 4 Mass. R., 1.

There are one or two cases, such as that of Saunders *vs.* Alston, 8 B and Ad., 881, where it seems to have been held that, if two devices cannot be made to co-operate without the intervention of a third, a patent for a combination of the two without the third cannot be sustained. It will hardly be contended, however, that a straddle-row cultivator on wheels could not be managed by handles, for instance, even though it had no adjustable shares, as well as a straddle-row cultivator without wheels.

The objection then can amount to no more than this, that when it is necessary, in order to render a certain combination of devices effective and advantageous, it must have other devices united and co-operating with it, the combination first named is not by itself patentable. To render the patent valid in the eye of the law, the combination monopolized must include these auxiliary devices; and this is so, notwithstanding the original combination was before unknown.

The rule has very generally been understood to be different. Where two things have been combined together for a useful purpose, which have never been so combined before, it has been supposed that this constituted patentable novelty, provided invention had been exercised in joining them and making them co-operate. Invention may also be employed in rendering the whole more effective by additional expedients, as in this case; but it does not follow that these expedients should be so embraced in the specification as to form an essential element of the patented combination. The practice of the office has been constantly against this. Without appealing to the instances of this which fill the records, it is better to cite adjudicated decisions, since they are more authoritative, and are sufficient to determine the question.

In Earle *vs.* Sawyer, above cited, the invention consisted in the adaptation of a circular saw to a shingle machine already known. The defendant assigned, as one of his grounds for a new trial, that the Court had given the jury these instructions: "If the plaintiff were the first to apply or combine a circular saw with his original shingle mill for the purpose of making shingles, although the shingle mill were in common use, and the circular saw were in use, and there were nothing new in the mode or machinery by which it was applied, still the plaintiff is entitled to a patent." And the learned Judge (Story) said he saw no error in this, provided it was understood that the circular saw and shingle mill had been in use only separately, and not in combination, and that the combination itself was new. In another part of the case the Judge remarked that an objection had been taken to the patent because the machinery required in substituting a circular saw for a reciprocating saw demanded no invention. To this the Judge replied that there were suggestions and proofs given to the jury of difficulties encountered in effecting the substitution, and impliedly of expedients for overcoming them. The patent is lost. But it is obvious from the statement that it did not monopolize the expedients resorted to, but the simple combination of the saw and old machine. There could have been no occasion, if those expedients had been described in the specification, of going to the jury with proof respecting them.

In Pitts *vs.* Whitman, 2 Stor., 609, the following specification of the plaintiff's invention was pronounced sufficient, viz: "We claim as our invention the construction and use of an endless apron, divided into troughs or cells, in a machine for cleaning grain, operating substantially in the way described." It was objected that the endless apron was old, and that there was nothing new in the new application of it. This was not denied, but was considered of no importance. If nothing was requisite to the operation of the machine except the simple application of the apron, then it would be an authority for patenting the combination of the wheels and frame with the straddle-row cultivator, for there is no more evidence of a useful result following in one case than in the other. It is pretty clear that there were several other devices which contributed to the efficiency of the machine, and which are described in connection with the apron, as the patentee's invention. In this respect, therefore, the patent is precisely like the application before us. In both cases a combination is monopolized exclusive of devices which are necessary to render it practically useful. It is true, the first specification in the patent closes with this language: "operating substantially in the way described;" and this may be construed to refer to the accompanying mechanism. But the claim under consideration is qualified by terms precisely equivalent, "all of these operating in the combination substantially as set forth."

In Washburn *vs.* Gould, 3 Stor., 122, Woodworth's well-known patent for a planing machine was adjudged to be valid, although the first device, which he challenged as his own, was thus defined: "The improvement and application of cutting or planing wheels to planing boards, plank, timber, or other material." Such wheels were by no means new. In order to render the machine effective, many other devices were necessary, yet the simple use of the wheels for the purpose was made the sole ground of an exclusive grant. The language is not even qualified as in Pitts *vs.* Whitman. No objection was taken to the claim on this ground; the discussion was upon questions wholly distinct.

It would be multiplying cases for no purpose to cite any more. The objection has never been sustained in this country. No instance of its ever having been raised in the courts is remembered. It may well be doubted whether the principle upon which it is supposed to rest is a sound one; i. e., that a patent for a new combination, which will not operate successfully without something more, is not valid. In Gray *vs.* James, 1 Pet. C. C., C. R. 376, it was shown that the plaintiff's machine, as patented, had failed entirely, and had been virtually given up; and that the defendant had made great improvements upon it, which had rendered it successful, and that he also had obtained a patent. He was held, nevertheless, to have infringed the plaintiff's patent; and this decision has never been questioned, although some strictures were afterward pronounced upon the ruling of the court as to damages. On the contrary, the universal understanding is, that he who improves another's patented machine must always be subordinate to him, no matter how useless the patented machine may have been in itself.

The majority of the Board see no way, therefore, in which the applicant can justly be denied the first combination to which he lays claim. As to the succeeding five, the Board are unanimous in conceding their patentability. After the full consideration the first has received, it can hardly be necessary to discuss them at length.

The decision of the Primary Examiner rejecting the first six claims is reversed; as to the last, it is affirmed.

(Signed) S. H. HODGES, } Examiners
SAML. C. FESSENDEN, } in chief.

I fully concur in the conclusions to which a majority of the Board have arrived in this case, with the exception of their allowance of the first claim.

Previous to Dundas's invention, cultivators on wheels were in common use for putting in wheat and other crops. For cultivating corn the instrument was made to straddle the rows and had to be guided by hand. Handles like those of a plow were attached to it for that purpose and wheels were dispensed with.

What Dundas did was to devise a mode by which a person riding upon the cultivator could guide it. And this he affected by so attaching the two front shovels that they could be vibrated laterally by means of a handle within reach of the driver. Wheels and a seat were provided and a great improvement was thus affected. The labor of following after the cultivator and guiding the whole instrument was avoided, and the same purposes effected by a person riding on a comfortable seat and easily guiding two only of the cultivator's shovels.

The testimony before us clearly shows that Dundas was the first inventor, and no valid or legal reason appears why he should not have the full benefit of it.

His second, third, fourth, fifth and sixth claims seem to me to fully cover his whole invention and to be all that he is entitled to. His first claim, I apprehend, extends his patent beyond the scope of his invention. It will reach any straddle-row cultivator on wheels, though not using Dundas's peculiar devices.

To merely put a straddle-row cultivator on wheels seems to me to have neither involved invention or to have been attended with any useful result. Simply omitting the front shovel of an ordinary wheel cultivator would have made the instrument that is now claimed, and we have no evidence that if made, it would have been desirable or useful for any purpose. On the contrary, the addition of wheels would evidently have made it difficult or impracticable to guide, and they were undoubtedly left off on that account. Wheels to cultivators being in common use, putting them on to one having a different number of plows, or a different arrangement of plows would hardly rise to the designation of mechanical skill and would not come within the objects or provisions of patent laws.

I am aware that many patents have been sustained for devices that, after they were made, seemed very obvious. But they were cases where important results were obtained by simple means. And the very simplicity of the devices afforded evidence of the highest grade of invention. It sometimes happens that a change of form or arrangement is attended with very important practical consequences, and such changes may have resulted from laborious and expensive experiments. Such improvements are undoubtedly entitled to protection. But no such features characterize this claim. It is for what no one wanted, and consequently no one used; but for what any one would have made if it had been desired.

The claim does not therefore appear to me to be adapted to protect what Dundas invented, but rather to extend his patent so as to cover what others may have devised. It seems to partake of what the Supreme Court have denominated and strongly condemned, "the enlarging process," by which a claim or reissue is expanded so as to embrace other inventions beyond the scope and object of the original device.

For these reasons I have been unable to agree with my associates in allowing the first claim.

(Signed) ELISHA FOOTE, Examiner-in-Chief.

ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING NOV. 13, 1866.

59,534.—LAMP EXTINGUISHER.—Charles E. Abbott, Malden, Mass.

I claim the tube, c, with its lid or cover, d, operated by the lever, h, substantially as set forth.

I also claim pivoting the lid, d, at a point above its upper surface so as to insure its falling by its own weight, substantially as set forth.

59,535.—MACHINE FOR DRAWING SPIKES.—Nathan Adams, Altoona, Pa.

I claim the combination of the lever, B, fulcrum post, I, and guide pin, J, with the stock, A, guide plate and rod, D, and jaws or nippers, F, substantially as described and for the purpose set forth.

59,536.—PUMP.—M. J. Althouse, Waupun, Wis.

First, I claim providing the apertures, e e, leading to chambers, b, containing an expansible packing, with valves, g g, substantially as described.

Second, The combination of means for regulating the inflow of water through apertures, e e, with the spring, c, and expansible rings, a a, substantially as and for the purposes described.

59,537.—DEVICE FOR ATTACHING THILLS TO CARRIAGES.—M. J. Althouse and P. Reifsnider, Waupun, Wis.

We claim the thill iron, A, provided with the cross head, e, in combination with the clip, B, provided with the eyes, b, one of which has the notch and hinged piece, a, arranged to operate as set forth.

59,538.—COFFEE HULLER.—Albert Angell, Newburgh, N. Y.

First, I claim the combination with the roughened or serrated hulling cylinder, B, of independent spring strippers, D, arranged within a hollow segment or trough partly encircling the cylinder, substantially as specified.

Second, The divided spring strippers, D, constructed with roughened or serrated fronts, arranged side by side and in a series one in advance of the other within a hollow segment or trough, C, to which they are secured at their one end, for operation in combination with a serrated or roughened hulling cylinder, B, essentially as shown and described.

59,539.—HORSE HAY FORK.—T. H. Arnold, Troy, Pa.

I claim the slotted prongs, E F, in combination with the bar, C, arm, D, slotted bar, A, and arms, G, arranged and operating in the manner and for the purpose specified.

59,540.—BREECH-LOADING FIRE-ARM.—Joseph N. Aronson, New York City.

I claim the sliding breech, E, in combination with the firing pin or needle, O, the cartridge shell discharger, H, and lever, I, operating in the manner substantially as and for the purposes described and set forth.

59,541.—MACHINE FOR STAMPING REED PLATES.—Charles Austin, Concord, N. H.

I claim the combination and arrangement of the gage, l, the two sets of male and female dies and the adjustable die carrier to a bed and plunger, so as to operate substantially as and for the purpose set forth.

I also claim the combination and arrangement of the three adjustable die carriers, E G H, with the bed and plunger and its fixed or larger die, such die carriers being provided with mechanism for adjusting them, substantially as set forth.

59,542.—PULLEY SUSPENSION HOOK.—D. B. Baker and P. S. Miller, Rollersville, Ohio.

We claim an improved pulley suspension hook formed by the combination of the double hook, A, arm, B, stop D, and socket, C, with each other, the said parts being constructed and combined substantially as herein shown and described and for the purpose set forth.

59,543.—CORN PLANTER.—W. R. Baldwin, Phila., Pa.

First, I claim the reciprocating plates, p, in combination with a plow, N, tubes, g, and with the within described devices or equivalents for measuring and discharging the grain, the whole being constructed and operating substantially as and for the purpose described.

Second, The boxes, K, with their openings, i i, in combination with the slides, m, and their openings, n, when the latter are of the form described for the purpose specified.

Third, The frame, F, with its boxes, K K, plows, N N, crank shaft, P, and pinion, u, in combination with the frame, C, and cog wheel, w, the whole being constructed and operating substantially as set forth.

59,544.—MOUTH PIECE FOR CIGARS.—Ira S. Barber, New York City.

I claim a cigar mouth piece composed of a paper socket and a wooden tube having its longitudinal orifice, c, terminate at its inner end in a recess or chamber, a, bound by a shoulder, b, substantially as and for the purpose herein set forth.

59,545.—CLOTHES PIN OR CLAMP.—George F. Barden, Dover, N. H.

I claim the combination of the rubber cushion D, and double-headed spindle, G, with the arms, B, arranged in the manner and for the purpose specified.

59,546.—SPRING BED BOTTOM.—Benjamin F. Bennett, Lockport, N. Y.

I claim the special arrangement of parts as herein set forth, viz. the cases, C, screwing to the bedstead and inclosing the springs, g, the shanks, f, resting therein upon the springs, and the hooks, d, and loops, b, connecting with the slats, the whole operating in the manner and for the purposes specified.

59,547.—COMBINED POKER AND TONGS.—John Blair, St. Louis, Mo.

First, I claim a combined poker and tongs made substantially as herein shown and described.

Second, The combination with the rigid bar, B, of the movable jaw, C, rod, D, and lever, E, substantially as herein shown and described and for the purpose specified.

Third, The combination of the spring catch, F, with the lever, E, and handle, A, substantially as and for the purpose herein shown and described.

59,548.—AWNING.—James C. Bowe, Urbana, Ohio.

I claim the combination of the adjustable frame, sign board

canvas, and roller with pulley and cords, constructed and working as herein described.

59,549.—Compound for Making Writing Ink.—A. D. Bowman, New York City.

I claim a compound for making writing ink composed of the ingredients substantially as herein specified.

59,550.—Device for Confining Cows while being Milked.—Levi Brown, Evans, N. Y.

I claim the stakes, D and D', placed and supported in suitable holes in the stable or stall floor, with or without the strap, F, and rope, G, for the purpose and substantially as described.

59,551.—Roofing Cement.—William H. H. Burnham, East Homer, N. Y.

I claim the within mentioned ingredients, coal tar, quick lime, quick sand and ashes, when mixed and used in the manner and for the purpose specified.

59,552.—Turning Lathe.—John Burt, Sturgis, Mich.

First, I claim a hollow arbor so constructed that only the cutter or bit comes in contact with the stick to be rounded.

Second, The hollow bearings, B and C, so arranged that one shall receive the square stick and hold it from turning while being rounded, while the other shall receive the stick after being rounded and hold it steady and true, substantially as herein shown and described.

59,553.—Doors and Shutters.—Samuel G. Cabell, Quincy, Ill.

I claim, First, The arrangement of slats in the panels of a door or shutter either stationary or pivoted, so that they may form a series of V's slightly overlapping each other, substantially as and for the purpose set forth.

Second, In combination with the V-shaped slats, c, I claim the arrangement of woven wire inserted on a plane with the frame of the door or shutter and intersecting the angles of the slats, substantially as herein specified.

59,554.—Lamp Burner.—George J. Capewell, West Cheshire, Conn.

I claim, First, The combination of the slot, a, door, b, one or more, with the ratchet shaft, C, wick, D, burner, A, and cylinder, B, substantially as described for the purpose specified.

Second, The spring, F, for holding the wick tube, D, when arranged so that its lower end catches under the lower end of the tube when the tube is raised to its highest point, substantially as and for the purpose specified.

59,555.—Feed Apparatus for Thrashing Machines.—George W. Carpenter, Medina, Mich.

I claim the roller, A, and its band cutters, a a, the cylinder, B, and its spreaders, b b, the roller, C, and its teeth, c c, the thrashing belt, D, and the wing gate, E, combined, arranged and connected with a thrashing machine for feeding the same, substantially as herein described.

59,556.—Pessary.—Herman C. Christie, Herkimer, N. Y.

I claim the curved pear-shaped tube, a b c d, perforated at the upper end, a, and opened at the lower end within the flange or rim, e e, by removing the handle, g h, constructed and used in the manner described in this specification.

59,557.—Plow for Cutting Bogs.—John Coffey, Monroe, N. Y.

I claim the sole plate, D, provided with the prongs, a a', with the cutters, F F, attached in connection with the beam, A, substantially as and for the purpose specified.

I also claim the mold board, E, in combination with the sole plate, D, cutter, F F, and either with or without the cutter or colter, G, for the purpose set forth.

59,558.—Sash Fastener.—De Lance Cole, Marshal, Ill.

I claim the slotted plate, H, when hung upon a pin or stud, D, of a sash frame, as and for the purpose described.

59,559.—Corn Planter.—John Conrad, Centralia, Ill.

I claim, First, Operating the perforated seed slide, F, from the axle, C, through the medium of the lever, L, cam, K, ratchet wheel, J, pawl, d', and spring, I, arranged substantially in the manner as set forth.

Second, The adjusting or raising and lowering of the shoes or furrow openers, M M, through the medium of the rods, N N, bar, O, and lever, P, all arranged substantially as shown and described.

59,560.—Churn.—William M. Cook, Lyons, Iowa.

I claim the churn vibrating upon an axis in combination with a vertical reacting spring planted upon the frame and engaging with the churn, substantially as described.

In combination with the above, I claim the deflecting surfaces, G, and the bolt, K.

59,561.—Machine for Rolling File Blanks.—Perley D. Cummings, Portland, Me.

First, I claim the combination and arrangement of the wheels, A B C, spring, a, bolt, b, rod, k, shaft, l, crank, l, connecting rod, m, and sliding rack, o, all constructed and operating as and for the purposes hereinbefore set forth.

Second, In combination with the subject of the first claim, the combination of the sliding rack, o, geared roller, g', tracks, k' l', with the inclined channel between the same, as and for the purposes set forth.

Third, The combination and arrangement of the wheels, A B C, and rod, k, operating as described, cams, 1 and 2, with thrusting beam, r, toggle, s, jaw, t, levers, b' x, bolt, w, spring, z, and spring, v, all operating as and for the purposes set forth.

Fourth, The combinaton and arrangement of the screw, e', in the projection, y, with the screw, d', on the toggle, s, as and for the purposes set forth.

Fifth, The combination of the part, h, sliding rack, o, geared roller, g', tracks, k' l', and projection, 3, on the roller, for the purpose of submitting the blank to the necessary pressure.

59,562.—Dental Anæsthetic Instrument.—Ephraim Cutter, Woburn, Mass.

I claim, in combination with the tube, a, having its orifice directly in the end thereof, the tube, b, having its orifice opening laterally directly from the tube, substantially as described.

Also the bifurcated construction or arrangement of the nebulizing tubes, a b, substantially as described, when the orifices are arranged in the manner set forth.

59,563.—Coal Stove.—Henry G. Dayton, Maysville, Ky.

I claim the arrangement above the fire box, K, and within the air-heating chamber, C, of the reverberating chamber, A, supported upon the plate, B, substantially as and for the purpose described.

59,564.—Lining for Journal Boxes.—P. S. Devlan, Jersey City, N. J.

I claim lining journal boxes and other rubbing surfaces with pasteboard saturated with lubricating oil and then compressed, substantially as and for the purpose described.

59,565.—Valve Device for Steam Engines.—J. L. Dickinson, Dubuque, Iowa.

I claim the follower, E, the thimble box, F, and the sliding arm, K, constructed and arranged substantially as herein set forth, in combination with the governor valve of a steam engine.

59,566.—Lamp Shade.—James V. Dunlap, Hartford, Conn.

I claim the shade holder formed with wire springs that are made in pairs united at their upper ends, in the manner and for the purposes set forth.

59,567.—Machine for Making Plugs for Barrels.—L. H. Dwelley, Dorchester, Mass.

I claim in combination with the reciprocating hollow arbor, G, the cutting-off saw, O, brought up automatically at the required time by the means substantially as described.

I also claim the combination of the reciprocating toothed bar, J, carriage, H, pawls, u v, and stationary toothed bar, I, when constructed and operating substantially as and for the purpose set forth.

I also claim the carriage, H, provided with the automatic feed, constructed substantially as set forth, in combination with the reciprocating cutting arbor, G, and the cutting-off saw, O, all operating substantially as described.

I also claim the combination of the hollow post, M, with its spring catch, b', lever, x, with its catch, a', and pawls, u v, all constructed and operating substantially as described for the purpose set forth.

I also claim the cutters, S, in combination with the reciprocating hollow arbor, G, and feeding device, when operating substantially as set forth.

59,568.—Compound for Coating Ships' Bottoms, etc.—Charles James Eames, New York City.

I claim a compound made of the ingredients herein named, for the purpose described, substantially as specified.

59,569.—Beehive.—William T. Eisenhart, Doylestown, Pa.

I claim a beehive constructed with two fixed and two hinged sides with the comb frames connected together by hinges and the outermost frame at one side attached by a hinge to one of the hinged sides of the case, substantially as and for the purpose herein set forth.

59,570.—Hay Fork.—W. H. Elliot, New York City.

First, I claim the employment of support, c, in combination with and arranged under the fork and resting upon the ground, substantially as described.

Second, I claim the arrangement of support, c, at an acute angle with the fork handle, substantially as and for the purpose specified

Third, I claim the fulcrum, e, when permanently fixed in relation to the fork, by means of support, c, and brace, d, or their equivalents, substantially as set forth.

59,571.—Wrench.—W. Evans, Forestville, Conn.

I claim the arrangement of the catch, E, lever, b, and spring, c, when said parts are combined with the movable jaw, D, the serrated shank, A, and stationary jaw, B, substantially as described and for the purpose specified.

59,572.—Clamp for Wash Basins.—James Ewing, New York City.

I claim, as a new article of manufacture, the clamp, c, of sheet metal stamped to receive the form, substantially as set forth, for the purpose of securing basins to marble slabs by the nut, d, as specified.

59,573.—Composition for Paint.—Alfred Ferris, Benville, Ind.

I claim an improved composition for paint consisting of the materials in substantially the proportions and compounded in the manner described.

59,574.—Low-water Detector.—Thomas Firth, Cincinnati, Ohio.

I claim the combination and arrangement of the float and needle mounted upon opposite ends of a single bent rod whose outer end is made of small diameter and inclosed in a stuffing box, all as herein specified and represented.

59,575.—Skate Fastening.—Moyer Fleisher, Philadelphia, Pa.

First, I claim the clamp, C, consisting of jaws, D, eyes, F, and arms, G, constructed in one piece and adjusted to the slotted connecting bar, B, so as to give a direct sliding motion to the clamps, substantially as and for the purpose specified.

Second, I claim the pivoted connecting bar, B, adapted to move the clamps, C, equally, thereby causing the center of the skate to be at the center of the foot, substantially as described for the purpose specified.

Third, The arrangement of the strap, c d, in combination with the eyes, F, of the clamp and guides, H, whereby they move in the same line with the clamps, as and for the purpose specified.

59,576.—Apparatus for Diffusing the Vapors of Medical or Aromatic Substances.—Anthony L. Fleury, New York City.

First, I claim the self-revolving retort, A, lid, E, pipes, I I, and strainer, K, when used in combination with the pin, C, and pin, G, and the lamp, I, or the flame of a gas burner, for the purposes specified.

Second, The apparatus, B, or its equivalent, when arranged and operating in the manner and for the purposes above specified.

Third, The combination of the lamp-shade supporter or gas-light shade supporter, v v, having the pin, c, with the apparatus, B, the thimble, F, pipes, E, stopper, D, the whole arranged and operating as set forth.

59,577.—Plow.—Frederic Fogelgesang, Canton, Ohio.

I claim the employment of two rods so bent and joined at the under side of the beam by a screw as to make them a continuous bolt through the beam and handle, and firmly fastened by nuts and washers on the outside of said handle, as hereinbefore described.

59,578.—Grouting Form for Wells.—W. S. Follensbee, Janesville, Wis.

I claim the combination and arrangement of the staves, a, ribs, b, hoops, f, and keys, d and e, substantially as and for the purpose set forth.

59,579.—Fire Alarm.—Eugene Fontaine and Oscar A. Simons, Fort Wayne, Ind.

First, We claim the toggle arms, C, and spring, D, in combination with the spring, c, rod, a, and wire, f, constructed and operating substantially as and for the purpose set forth.

Second, The studs, g, and tension device, h, in combination with the wire, f, bed plate, A, supporting the alarm mechanism, substantially as and for the purpose described.

59,580.—Manufacture of India-rubber Rollers.—James B. Forsyth, Roxbury, Mass.

I claim a roller for clothes wringers, etc., so made substantially as herein described, as a new article of manufacture.

59,581.—Hinge for Window Shutters.—William H. Foulds, Henderson, Ky.

I claim, in combination with a hinge so constructed that the weight of the shutter will close the same automatically, the arrangement of the recess, F, and catch, E, operating substantially as specified and for the purposes set forth.

59,582.—Pipe Tongs.—Moses H. Freeman, Somerville, Mass.

I claim the arrangement of the clasp, e, the tooth, c, and the series, d, of notches with the two levers, A B, and their jaws, a b, the whole being substantially as specified.

59,583.—Malt Kiln.—Joseph Geemen, Chicago, Ill.

First, I claim in a malt kiln the arrangement of a series of perforated floors, operating substantially as and for the purposes shown and described.

Second, I claim, in combination with the above, the employment of a vertical passage, C, a series of openings, D, and one or more slides, E, arranged and operating substantially as specified and for the purposes set forth.

59,584.—Horse Hoe.—John Gifford, Jr., Watertown, N. Y.

I claim the reversible wings, I I, attached to and following the share and adjustably supported from the frame, A B, substantially as described and represented.

59,585.—Hay Elevator.—John Gifford, Jr., Watertown, N. Y.

I claim the combination with the socket, C, of the ropes, A B, and the pivoted detaining tooth, E, operating substantially as described.

59,586.—Mop Wringer.—W. and W S. Gillett, Stowe, Vt.

We claim the arrangement and combination of the hinged perforated boards, C and E, when constructed with the side boards, B B, stays, H, and foot board, J, operated by the lever, G, as herein described and for the purposes set forth.

59,587.—Cigar Lighter.—Elliott P. Gleason, New York City.

I claim the self-adjusting gas cock, constructed substantially in the manner described for the purpose specified.

59,588.—Chimney Holder for Gas Burners.—Elliott P. Gleason, New York City.

I claim the equalizing spring for chimney holders, constructed substantially as described.

59,589.—Fog Signal.—George P. Goulding, Daniel Clark, and Thomas Dickinson, Buffalo, N. Y.

First, We claim the construction of an automatic air whistle in connection with an air pump or pumps and air reservoir, and the application and use thereof on ship board for the purpose of giving signals to indicate the course of the vessel and the "tack" she is sailing on, substantially as described.

Second, The combination of train of wheels, 1 2 3 4, levers, k1 k2 e3 f3, and connecting bar, g, or equivalents, with an air whistle, for the purpose of opening and closing the valves, E2 and F2, substantially as set forth.

Third, The combination of the wheels, o o', arm, p, levers, m and n, stop pins, j' and r', pawl, r, and ratchet bar, L (or equivalents), with a time piece and air whistle, for the purpose of regulating and controlling the intervals at which the signals shall be given, substantially as set forth.

Fourth, The cam, q', in combination with the dial plate, q, and bar, L, for the purpose of enabling the officer of the deck to set the mechanism so as to give any required signal.

59,590.—Combined Measure and Funnel.—E. Grattan, Williamstown, Mich.

First, I claim the funnel, A, having nozzle, a, feet, b, and cross piece, C, valve, c, lugs, d, the graduated perforated hollow stem, B, and spring, a, arranged and operating substantially as described and for the purpose specified.

Second, I claim the perforated graduated tubular stem, B, in combination with the funnel, A, herein described, as and for the purpose specified.

59,591.—Capping Wood Screws.—Charles T. Grilley, New Haven, Conn.

I claim, in the manufacture of capped screws, the method herein indicated, whereby the nicks in the cap and screw head are formed simultaneously, after the cap has been applied and closed upon the screw, as and for the purpose herein set forth.

59,592.—Cultivator.—A. F. Grove, James Creek, Pa.

I claim the sliding or adjustable plow or shovel beams, C C, applied to the main beam, A, of the implement, and arranged in connection with suitable levers, or their equivalents, to operate substantially as and for the purpose set forth.

59,593.—Beehive.—Moses Guthrie, Clifton, Iowa.

I claim the combination of the rabbeted sliding partition, B, perforated bottom, D, slats, E, perforated bottom, H, slide, F, and box, I, with box, A, substantially as described for the purpose specified.

59,594.—Step for Upright Shaft.—Abraham G. Hamaker, Eberly's Mills, Pa.

I claim the arrangement and combination of a round pointed spindle, revolving upon and with three balls as a revolving step, as herein described, and for the purposes set forth.

59,595.—Wheat Drill.—J. F. Harcourt, Moscow, Ind.

First, I claim the concave bottom, l, in hopper, E, provided with the holes or openings, m, in combination with the toothed wheels, n, fitted in inclosures, t, underneath the bottom, l, the yielding plates, u, and arms, v, attached to shaft, w, for adjusting the plates, u, substantially as and for the purpose set forth.

Second, The pivoted standard, c, in combination with the slotted arm, l, bearing the shaft, C, substantially as described for the purpose specified.

Third, The adjustable yielding plate, w, in combination with arms, v, shaft, w, and index arm, a', substantially as described for the purpose specified.

59,596.—Bridle.—S. B. Hartman, Millersville, Pa.

First, I claim the safety check lines, or reins, I, when such reins are arranged in connection with the bridle, and connected to the bit rings, or their equivalents, so as to operate upon the bit, substantially as and for the purpose described.

Second, I claim the double or looped check straps, A, in combination with the reins, I, substantially as described and for the purpose specified.

59,597.—Composition for Printers' Inking Rollers.—William Harvey, Portland, Me.

I claim the compound of ingredients for printers' rollers, substantially as herein set forth and described.

59,598.—Centrifugal Machine.—R. Hasket and W. B. Cox, West Milton, Ohio.

We claim the distributing device, E, when constructed with a plain concave surface as described and represented, or when wings, F, are attached in the manner as set forth, and arranged with reference to a centrifugal sugar mill, substantially as described.

59,599.—Coated Sheet Metal.—George H. Hazleton, Philadelphia, Pa.

I claim the use and manufacture of sheet copper, coated, substantially as herein set forth and described.

59,600.—Invalid Bedstead.—William Heath, Bath, Me.

I claim the combination for simultaneously operating or moving the leg and back portions, C and E, of the bed, the same consisting of the shaft, H, the gears, G G, the toothed sectors, F F, the arms, f f', and the spring or band, I, the whole being applied to the frame, A, and the said portions, C and E, and arranged therewith, substantially in manner and so as to operate as specified.

I also claim the combination and arrangement of the bands, K K, with the parts, B C D E, and the mechanism for operating the two parts, C E, substantially as described.

59,601.—Car Truck.—B. Heiderich, Brady's Bend, Pa.

I claim the supporting of the trucks from the bed or bottom of the car by means of the loops, F G, substantially as and for the purpose set forth.

59,602.—Injector.—Peter C. Heinz, Funkville, Pa.

First, I claim a gas injector for furnaces constructed and operating in the manner substantially as herein set forth.

Second, The valve, D', in combination with the steam pipe, E, and gas-supply pipe, A, for the purpose and substantially as described.

59,603.—Alphabet Blocks.—S. L. Hill, Williamsburgh, Mass.

I claim, First, The triangular blocks, A, having portions of a letter on the face near their apex, and words on their centers adapted to form a square with a complete letter and a complete sentence, retained together, and operating substantially as described for the purpose specified.

Second, The grooves, b, in the edges of the blocks, in combination with the spring, a, constructed and operated substantially as and for the purpose described.

59,604.—Washing Machine.—J. Hindman, Olathe, Kansas.

I claim the crank shaft, C, the vertical shaft, D, with its washer, J, the arm, E, and the rock shaft, F, in combination with the box, B, arranged substantially as described for the purposes specified.

59,605.—Machine for Tenoning Timber.—Hugo Hochholzer and Frank Denver, Virginia City, Nevada.

We claim clasping, or clamping and turning the timber or log by the means and in the manner described, substantially as set forth.

We also claim holding and presenting the timber or log to be tenoned to the cutters by the means and in the manner substantially as described.

59,606.—Machine for Cutting Off Cigars.—Frederick W. Hoffmann, Morrisania, N. Y.

First, I claim the construction of a plate, A, provided with a movable guide, B, and guides, C and D, at the forward end of said plate, in combination with a knife, G, fast to a rod or plunger, F, moving in an upright tube or pipe, E, attached to said plate, A, when the whole is arranged and combined in the manner and for the purpose substantially as described and specified.

Second, I claim the projecting piece, n, on the guide, D, acting in combination with the guide, C, on the flexible or feathering knife blade, G, in the manner and for the purpose substantially as set forth.

59,607.—Extinguisher for Lamps.—John N. Howe, Franklin, N. H.

I claim as an improvement in extinguishers for lamps, the tube, E, through which a current of air may be directed to the flame, substantially as set forth.

59,608.—Drill or Well Tube.—John Hutchins, Elmira, N. Y.

I claim the hollow conical drill point, A, of cast iron, provided with beveled holes or slots, a, with the spiral flange, c, flattened as described, the whole being constructed as described, and for the purposes set forth.

59,609.—Fastening Door Knobs to Shanks.—George Jones and Beverly E. Mead, Peekskill, N. Y.

We claim the fastening of a porcelain mineral or clay door or other knob upon its shank by means of a screw or rivet passing through the knob into the shank, substantially as set forth.

59,610.—Vehicle.—William Ashley Jones, Dubuque, Iowa.

First, I claim the combination of the jointed rod or bar, K, with the tongue, J, reach, H, and brake bar, N, when said bar, K, is constructed and arranged substantially as herein described and for the purpose set forth.

Second, The combination of the bolt or pin, V, spring, Z, lever, W, cord or strap, X, and pulley, Y, with each other, with the tongue, J, and with the jointed bar, K, substantially as herein described and for the purpose set forth.

Third, The combination of the lever, T, rack, U, connecting rod, S, lever, R, and connecting rods, P, with each other and with the box, I, axle, G, and brake bar, N, substantially as herein described and for the purpose set forth.

Fourth, The combination of the bent bars, D', hooked rods, C', springs, F' and E', cords or straps, G', and pulley, H', with each other and with the whiffletrees, B', substantially as herein described and for the purpose set forth.

59,611.—Manufacture of Saltpeter.—Vincent E. Keegan, Roxbury, Mass.

I claim the within described process of producing nitrate of potassa by treating potassa substantially in the manner set forth.

59,612.—Machine for Driving Spokes in Wagon Wheels.—Eli Keith and Dell Bird, La Fontaine, Ind.

We claim, First, The arrangement upon the standard, B, of the adjustable frame, K, and pivoted rest, I, operated substantially as described.

Second, The combination of the adjustable rests, I and D, lever, G, and mandrel, N, constructed and operating substantially as described.

59,613.—Narrow-ware Loom.—L. J. Knowles, Warren, Mass.

I claim the arrangement of the heddle-operating cams in circular disks, between which the levers extend, when the levers and pins, disks, cams and cam slots, have a relative disposition, substantially as described.

59,614.—Beehive.—Edward Kretchmer, Pleasant Grove, Iowa.

First, I claim the reversible entrance protector, C, provided with swinging bars, V, supports, y y, and front, G, all arranged and operating substantially as and for the purpose set forth.

Second, Constructing and operating the moth trap, substantially in the manner and for the purpose set forth.

Third, Constructing and operating the sectional adjustable sliding swarming guard and entrammel regulator, substantially in the manner and for the purpose as above set forth.

59,615.—Lock.—E. Lawshe, Atlanta, Geo.

First, I claim the bolts, C and M, in combination with the pawl, S, springs, P and F, guide plates, a a, and lever, I, all constructed arranged and operating in the manner and for the purpose specified.

Second, The combination with a lock constructed as described of a tablet or plate or its equivalent when arranged with regard to the locking mechanism of the lock so as to be operated by the key or keys for the lock, substantially in the manner and for the purposes specified.

59,616.—Axle Box.—F. Leppeus, Hartford, Ct.

I claim the combination of the sections, G H, extension piece, I, and spring, L, with the axle, B, with the ring, O, shrunk thereon, substantially as described, as and for the purpose specified.

59,617.—Combined Gasalier and Cigar Lighter.—William C. Lesster, New York City.

First, I claim the combination with a gasalier of a cigar lighter, the fonts of which are supplied with combustible fluid or spirit from a reservoir arranged within the stem of the gasalier, substantially as specified.

Second, I claim the arrangement within the stem of the gasalier of a close combustible fluid or spirit reservoir, leaving the gas pipe pass through a sleeve in it and communicating with the exterior by a supply pipe and font tubes, essentially as herein set forth.

Third, I claim the combination of the gasalier cigar lighter with its reservoir and jet cup, constructed and arranged substantially as shown and described and for the purpose specified.

59,618.—Ticket Holder.—Charles Mahon, Macon, Ga.

I claim a pocket case for postage stamps composed of the cylinder, c c', feed opening, o, guide plates, p p', and cutters, l l', the several parts being combined and arranged as and for the purpose herein described and represented.

59,619.—Piano Forte.—G. C. Manner, New York City.

I claim placing the damper lifters in a slot of the metal frame behind the point supporting the strings, substantially as and for the purpose described.

59,620.—Fire Place.—Thomas McCleary, Blairsville, Pa.

First, I claim the construction of a grate, B, with open front and ends and with an open elevated back, having air spaces surrounding when such grate is supported by journals in such a manner that it can be upset at pleasure, or secured firmly in an elevated position, substantially as described.

Second, The construction of the oblong bearings, c c, for the flattened journals, b b, of the grate, substantially as described.

Third, Arranging the swinging concave reflector and damper, C, above the open grate, B, substantially as described.

Fourth, So constructing a grate and arranging it in a fire place that it can be upset at pleasure and at the same time, so that it can be locked in an upright position, by means substantially as described.

59,621.—Farm Gate.—Robert W. McFarland, Monticello, Wis.

I claim the V-shaped frame lever, H, pulleys, K, rope, T, sliding rail, N, when constructed and arranged in combination with the adjustable gate, as herein described, and for the purposes set forth.

59,622.—Cask, Barrel, etc.—Joshua Merrill, Boston, Mass.

I claim the improved cask, substantially as described, having its joints made by matched grooves in the staves, and a separate tongue or key strip of wood driven in to fill the said matched grooves, substantially in the way and for the purposes described.

In combination with the joints of a cask made with matched grooved joints and a separate tongue or key strip, a coating or stuffing of glue, or similar gelatinous cement, between the members of said joints, applied substantially in the way and for the purposes described.

In combination with the joints of a cask made with matched grooved joints and a separate tongue or key strip, a coating or stuffing of shellac, rosin, or other similar resinous cement, between the members of said joint, applied substantially in the way and for the purposes described.

59,623.—Tree Protector.—Benjamin Merritt, Jr., Newton, Mass., assignor to American Tree Protector Company.

I claim the combination of two or more grooves of unequal size, when arranged in the segments of a tree protector, substantially as described.

Also, in combination with the segments, a, the outwardly projecting flange, f, arranged as and for the purpose specified.

And the bead, g, on the segments, a, when combined with a corresponding formation of the clamp, c, as seen at h, for the purpose of securely holding the parts of the protector together.

59,624.—Stump Extractor.—Alexander Monroe, Watkins, N. Y.

I claim the arrangement of the clevis, D, constructed as described, moving vertically in the grooves, i i, with the lever, C, working through it, said parts being used in combination with the double sets of holes, m n, and pins, p p, the whole operating substantially as and for the purpose herein specified.

59,625.—Machine for Polishing Wood.—John Moore, Gardiner, Maine.

I claim the combination and arrangement of the carriage, C, mounted on the wheels, b b, upon the transverse rails, a a, with the table, D, mounted on the wheels, d d, upon the longitudinal rails, c c, or its reversed equivalent arrangement, when used in connection with a revolving rubber, G, supported by a sliding arm, F, for polishing doors, constructed and operated substantially as herein described.

59,626.—Clamps and Gages for Weather Boarding.—D. M. Mourland, Little York, Ill.

First, I claim the within-described clamp, consisting of the adjustable gage and spacing rest, C, gage block, B, guide bar, A, the clamps, c c, and the marker, D, arranged and operating in the manner and for the purpose herein specified.

Second, I claim also the clamps, c' c', in combination with the adjustable spacing bar and rest, C', for fastening to the studding of the heading of the siding, constructed and operating substantially as and for the purpose herein specified.

59,627.—Softening Dry Hides.—John M. Miller, North Becket, Mass.

I claim treating hides before tanning in a liquor which is composed of the within-described ingredients mixed together in about the proportions mentioned.

59,628.—Lock.—A. B. Mullett, Washington, D. C.

I claim the plate, Fig. 4, and its corresponding key, Figs. 2 and 8, made and combined, substantially as herein set forth.

59,629.—Revolving Fire-arm.—Albert L. Munson, New Haven, Conn.

First, I claim the reversible cylinder, C, in combination with the detached ratchet, e, and plate or collar, o, or its equivalent, substantially as and for the purpose described.

Second, The center pin, d, in connection with the pin, m, operating substantially as and for the purpose described.

59,630.—Hoop for Curing and Packing Cheese.—William B. Nickelson, Lowville, N. Y.

I claim the hoop as a covering for the circumference of the cheese, in lieu of bandages, in curing, and in connection with covers, serving as a box for the cheese during turning, storage, and transportation, substantially as described.

59,631.—Drills.—Morgan Nottingham and William Duncan, Vinton, Iowa.

We claim the rod, A, having fixed collar, C, and sliding collar, G, connected together through arms, E and F, with the latter, F, provided with cutting blades, H, substantially as and for the purpose described.

59,632.—Axle Box.—Caleb M. Oliver, Port Carbon, Pa.

I claim the bearing, B, and follower, E, in combination with the axle box, C, the former being arranged in relation to the latter so as to relieve the box of pressure, substantially as described.

59,633.—Horse Hay Fork.—John K. O'Neil, Kingston, N. Y.

I claim suspending the lifting bar, D, and opening bars, C C, by the same straight or direct lever, B, all operating in combination, substantially as and for the purpose herein specified.

I also claim the tripping hook, H, provided with the tripper, k, pivoted thereto at their points, i, constructed and operating substantially as and for the purpose herein set forth.

59,634.—Wrench.—William M. Owen, Homer, Iowa.

I claim the combination of the handle, A, the spring lever, G, and plug, F, with the perforated shank, D, of the movable jaw, substantially as described.

59,635.—Shirt Stud.—Charles Padmore, Philadelphia, Pa. Antedated Oct. 27, 1866.

I claim the grouping together of three, four, or more, studs or buttons, as hereinbefore mentioned, and for the purpose described.

59,636.—Cheese Hoop.—Edwin A. Palmer, Clayville, N. Y.

First, I claim the corner taken off the follower, as described in Figs. 3 and 6, at D and e.

Second, The little ring, D, Fig. 4, or an equivalent, substantially as described and for the purpose therein set forth.

59,637.—Churn.—J. D. Parrot, Morristown, N. J.

I claim the combination of the tube, C, stirrup, B, pendulum, D, bulkheads, E, and frame, A, when arranged and operating in the manner and for the purpose herein described.

59,638.—Wheat Drill.—Charles W. Patton, Exeter, Ill.

First, I claim the shaft, Y, operated by the foot lever, Q, to press the spring, P, upon the drag bars, D, substantially in the manner set forth.

Second, In combination with the shaft, Y, lever, Q, and springs, P, I claim the hinged drag bars, D, teeth and cutters, U or G, substantially as set forth.

Third, I claim the agitator, N, when constructed as described.

Fourth, I claim the slide, H', operated by spring, P', and a lever, B, in combination with the bottom, H, when constructed substantially as and for the purpose set forth.

59,639.—Seeding Machine.—Worden P. Penn, Belleville, Ill.

First, I claim sustaining the forward end of the coute, f, upon the brace, g', of the tooth, E, when said brace is arranged above the drag bar, F, substantially as described.

Second, The combination of the brace, g', with the drag bar, F, and tooth, E, said brace being located above the drag bar and pivoted to it and the upper end of the tooth, substantially as described.

Third, The bottom of the seed box or hopper, C, when this plate is moved back or forward, as the case may be, beneath said openings. The slide, c, serves the purpose of a cut-off for said openings, and it may be adjusted in any convenient manner. By means of the above-described combination of fixed and movable plates, constructed as shown, and applied to the bottom of the seed box, C, I can obtain a small square or rectangular opening, or an oblong opening with one part of such opening wider than the other part, and by this means I am enabled to vary the width as well as the length of the openings of the plate, a, according to the size of the seed or the flow required. The holes of plate, a, are so disposed or arranged that the decreasing offsets of the holes alternately come on opposite sides of the vertical axis of the hopper. The arrangement of the plates and form of the holes therein, enable me to exercise full control over the discharging mechanism for the seed, and to effect a rapid or slow flow of the seed.

59,640.—Ladies' Skirt Supporter.—L. C. Pennell, Portland, Maine.

I claim the attachment to the hoop skirt of tags to the tapes thereof and the cords as described, all constructed, arranged and operating as and for the purposes indicated.

In combination with the subject of the first claim, the arrangement of the rings, i i, on the skirt of the dress, as and for the purposes set forth.

59,641.—Sewing Machine.—Stuart Perry, Newport, N. Y.

I claim making one or both of the feeding disks or wheels adjustable upon the shaft by which it is turned, by means of a series of grooves of varied lengths, and a stud or pin, substantially as and for the purpose described.

59,642.—Kingbolt for Carriage.—James Phelps, Red Creek, N. Y.

I claim the projecting shoulders or bearings, B B, resting on the axle at the fork of the kingbolt, for the purpose herein specified.

59,643.—Cultivators.—W. W. Philler, Port Byron, Ill.

First, I claim the pivoted draft pole, C, provided at its rear end with a curved or segment bar, D, having friction rollers or wheels, c, inserted within it, and working or resting upon a semi-circular way or track, E, on the frame, A, substantially as and for the purpose set forth.

Second, The bar or lever, Q, attached to the rear end of the draft pole, C, substantially in the manner as and for the purpose set forth.

59,644.—Manufacture of Bars and Articles of Iron and Steel Combined.—William M. Pickslay, Philadelphia, Pa.

I claim the manufacture of bars, and other articles, of iron and steel combined, by applying the steel in a molten state to the iron while the latter is at a welding heat, and subsequently rolling or otherwise working the combined mass.

59,645.—Comb.—Leonce Picot, Hoboken, N. J.

First, I claim strengthening the back and sides of a comb, by forming in the top of said comb a groove, and placing therein and upon said back a metallic brace, substantially as herein shown and described.

Second, As a new article of manufacture, I claim a comb to and in the top of which a T-shaped brace of metal or other suitable material for strengthening the same is fitted and held, substantially as herein described and set forth.

59,646.—Collar and Necktie Attachment.—Charles W. Powell, Milford, Conn.

I claim a band, having clasps, loops, and spurs for the attachment of a collar and necktie, all arranged substantially as described.

59,647.—Horse Collar.—Isaac A. Powell, Morrison, Ill.

I claim a horse collar when constructed with the lock, D, and plate, C, for securing the same when said parts are respectively constructed, attached and combined, substantially as set forth.

59,648.—Case for Medallions.—James Powell, Cincinnati, Ohio.

First, I claim the hermetically sealed medallion case, constructed substantially as herein described.

Second, In combination with a medallion case constructed as specified, I further claim the flock or cloth dust coating of the face side of the back plate.

Third, I claim the combination and arrangement of concave convex back plate, A, groove, C, glass front, D, and ears, E, as and for the purposes specified.

59,649.—Bed-bottom Spring.—Daniel Punchies, Plymouth, Mich.

I claim the combination of the frames, E F, with the springs, a a, when said frames are constructed as herein described, and attached to the ends of the slats and end rails of the bedstead, so as to be free to move in the direction of the slats under extension and contraction, as described and for the purpose specified.

59,650.—Locomotive Head Lights.—James Radley, New York City.

First, I claim the method of cooling the burning fluid as it passes from the tank to the lamp, by inclosing the connecting oil tube or tubes in a pipe or pipes, through which a current of air is made to pass around such oil pipe or pipes, substantially in the manner herein described.

Second, The method of cooling the body of the lamp within the reflector by means of vents adjacent thereto, in the air passages, substantially as herein described.

Third, The receiving aperture in front of the head-light case and the air passages inclosing the oil tubes, in combination with a locomotive engine, when so arranged and constructed as to cause the air entering said aperture to pass through said passages when the locomotive is in forward movement, substantially as herein described.

Fourth, The scattering vents through which the air escapes, in combination with the air passages and receiving apertures, substantially as herein described.

59,651.—Cart-harness Saddle.—Henry A. Rains, Nashville, Tenn.

First, I claim the wooden housing, constructed and arranged as described, in combination with a metallic covering, with the molding rolled or wrought upon it, as set forth.

Second, Grooved framework for attaching the pads to the tree bars, constructed substantially as described.

Third, A belly-band fastening, constructed and attached as hereinabove set forth.

59,652.—Railroad Car.—John R. Reader, New York City.

First, I claim the guard or fender, constructed with a frame, D, supported on the axles of the wheels, C, substantially as and for the purpose set forth.

Second, The combination with such guard or fender of the suspended supplemental plates, I, hinged to the bottom of the body, A, substantially as herein set forth for the purpose specified.

Third, So arranging the opposite parallel sides of the guard or fender that the upper edges thereof will be situated outside of the body, A, substantially as herein set forth for the purpose specified.

Fourth, The roller, n, combined with the brushes, s, and with the frame, D, wheels and body of the car, substantially as herein set forth for the purpose specified.

59,653.—Door Fastening.—Frank Reed, Brattleboro, Vt.

I claim the combination of the cap piece, c, and coupling pieces, c c, with the shaft of the door knob, and with the arms, a a, rods.

d d, and springs, e e, constructed and arranged as and for the purpose herein specified.

59,654.—SULKY PLOW.—John J. Reed, Polo, Ill.

First, I claim the walking beam, G, pivoted to the rear end of the tongue or pole, G, in combination with the stirrups, e e, yoke, J, and plow standards, K K, substantially as herein shown and described and for the purposes set forth.

S cond, I claim the pivoted pendent bars, e2 e2, and bars, R R, in combination with the frame, c, substantially as shown and described and for the purposes set forth.

Third, I also claim the projecting bars, D D, in combination with the frame, substantially as herein shown and described.

59,655.—FRUIT PICKER.—L. Richards and D. Lincoln, Orangeville, N. Y.

We claim, First, A hollow cylindrical fruit picker, A, made conical at its upper end, and a large hole or opening and tapering slit near its upper end, with or without the removable bottom, B, substantially as described.

Second, The combination of a flexible bag or hose, C, with said cylindrical picker, for the purposes and substantially as described.

Third, Attaching the handle to the cylinder, A, by means of the staples, E, wedge, F, and notch, f', substantially as set forth.

59,656.—METHOD OF SECURING SHOE TIPS.—Philip Riley, New Bedford, Mass.

I claim securing tips to the toes of boots and shoes by stitching around and through the margins of the tips a loop or chain stitch, and sewing the upper side of the loop or chain stitch to the sole, as herein set forth and described.

59,657.—TOOL FOR DRAWING NAILS.—Daniel T. Robinson, Boston, Mass.

I claim constructing a nail-pulling device in the manner described, so that the jaws will clamp the nail by the action of applying force to the lifting lever in raising the nail from its position, substantially as described.

59,658.—ESCAPEMENT FOR TIMEPIECES.—S. W. Robinson, Detroit, Mich.

I claim the lever, B, and hair spring, H, in combination with the detents, I J, escape wheel, A, and balance, C, constructed and operating substantially as and for the purpose described.

59,659.—LOOP CHECK FOR SEWING MACHINES.—Peter Rodier, Springfield, Mass.

I claim the loop or thread check, C, constructed as described, when combined with and operated by a spring, B or B', and used in combination with the parts of a sewing machine, substantially as and for the purpose herein set forth.

59,660.—DEVICE FOR HITCHING HORSES.—Charles Roger, Bergen, N. J.

I claim the combination of the case, A, center pin, B, cap, c, spring, D, strap, E, rollers, G, staple, L, and hook, H, when these several parts are constructed and arranged substantially as herein shown and described and for the purposes set forth.

59,661.—PAPER-MAKING MACHINERY.—Stephen G. and George S. Rogers, Thetford, Vt.

We claim the arrangement as well as the combination of the auxiliary roller, D, with the rollers, A B, and the delivery apron or blanket, C, of a paper-making machine, the purpose of such auxiliary roller being as set forth.

59,662.—STANCHION.—Larkin S. Safford, Hope, Maine.

I claim the construction, arrangement, and combination of the parts, B F C D and E, so as to allow them to swing in toward or out from the crib on said pins or pivots, F, at the pleasure of the animal, when fastened as herein described. I claim nothing as my invention but the construction and arrangements of the parts which hold the animal, when tied up so that they may swing as before described on said pins or pivots, F, at the pleasure of the animal. The tie up is for horned cattle, and when they stand up fastened in the foregoing manner, they can easily turn their heads round to the right or left, as the case may be, and when lying down it allows them to turn the head round at pleasure, which gives them more ease, comfort, and freedom, which are the advantages and improvements I claim. When the aforesaid combination of parts which are to swing is made so as to swing the other way, as it is the design they may, the foregoing specification would need to be renewed or changed in some parts to meet the case. It is my design that the combination of parts, B F C D and E, may be made to swing either way, as the situation of the tie up or convenience may require.

59,663.—HORSE RAKE.—Curtis Satterlee, Paris, Ill.

I claim the combination of the pivoted lever, J, with its arm, K, pivoted lever, I, rake-head shaft, F, and bar, L, strap, T, lever, S, and post, P, constructed as described, and arranged to operate substantially as and for the purpose specified.

59,664.—COMB.—Theodore Schreiber, Wheeling, W. Va.

I claim the spring pad, B, in combination with the comb, A, constructed and operating substantially as and for the purpose described.

59,665.—SORGHUM SKIMMER.—W. B. Seward, Bloomington, Ind.

I claim an improved skimmer, A, open at both ends, a1 and a2, so as to operate when moving back and forth, substantially as herein shown and described and for the purpose set forth.

59,666.—FRUIT EXTENSION LADDER.—Erastus Slater, Girard, Pa.

I claim the arrangement of the sections, A B C, and clasps, D, as described, in combination with the windlass, F, pulleys, C H I, rope, J, and catches, K and L, and springs, K' and L', the several parts being constructed, and arranged, and operating as and for the purpose specified.

59,667.—MECHANISM FOR CLOSING DOORS.—Henry Smith, Salem, Mass.

The combination of a coiled spring, the power of which is equalized by a movable pinion working in a scroll gear, with the mechanism for closing a door or gate, all constructed and arranged substantially as described.

59,668.—EQUALIZING SPRINGS FOR CLOCK MOVEMENTS.—Henry Smith, Salem, Mass.

I claim the combination with a watch or clock movement of a coiled spring, the power of which is equalized by a scroll rack and movable pinion, substantially in the manner and for the purpose described.

59,669.—FOOT PRESS.—J. Nottingham Smith, Jersey City, N. J.

I claim the combination of two or more wedge drivers, operating at right angles or transverse to each other, substantially as and for the purpose herein specified.

I also claim either simple or compound levers in combination with two or more wedges acting at right angles or transverse to each other, substantially as herein specified.

I also claim such a combination of wedge power or of wedge powers and lever powers combined as to produce the final action in either direction for the purpose set forth.

I also claim a wedge or wedges adjustable in any direction, when applied substantially as and for the purpose herein specified.

59,670.—HYDRANT.—J. Nottingham Smith, Jersey City, N. J.

I claim the combination and arrangement of the spiral grooves, P P, projections, N N, and horizontal guide opening, v, substantially as and for the purpose herein specified.

I also claim the guide plate or disk, f, in combination with the hydrant body and discharge pipe, for the purpose set forth.

I also claim the arrangement of the duplicate valves, L and M, so as both to close fully against their seats, in combination with the hydrant reservoir and the discharge pipe thereof, substantially as and for the purpose herein specified.

I also claim the arrangement of the reservoir lining, I, in connection with the removable reservoir bottom, i, substantially as herein set forth.

I also claim the combination of the concave valve, the annular soft valve seat, and the ring metallic lining thereof, substantially as and for the purpose herein specified.

59,671.—HYDRANT.—J. Nottingham Smith, Jersey City, N. J.

I claim the combination and arrangement of the spout, G, weighted as described, reservoir, B, and valve, I, so that the water when flowing is conducted through said spout without communicating with the reservoir, but when the valve is closed and the water ceases to flow, a communication is opened between the spout and reservoir, substantially as and for the purpose herein specified.

59,672.—FAUCET.—J. Nottingham Smith, Jersey City, N. J.

I claim the spout, B, closing around the end of the barrel, A, and provided with a packing disk, d, in combination with the barrel, substantially as and for the purpose herein specified.

I also claim the wedge, c, either with or without the spring, l, in combination with the spout, B, substantially as and for the purpose herein set forth.

59,673.—BOLT CUTTER.—Othniel J. Smith, Wauwatosa, Wis.

I claim the combination of the lever, the eccentric, the adjustable slide, moved by a screw, the chisels, one stationary and the other movable, secured by bolts to the respective blocks, one chisel, with sharp shoulders, near edge, the spring, and the movable chisel block, all constructed and arranged as described.

59,674.—GRINDING MILL.—Thomas F. Smith, Elm Grove, W. Va.

I claim the employment of an air obstructor, substantially as described, in connection with the tube, n, hopper, o, and revolving upper millstone, a, by means of which a vacuum or partial vacuum is obtained between the upper and lower millstones, in the manner and for the purposes described.

59,675.—NUMBERING MACHINE.—Samuel W. Soule and C. Latham Sholes, Milwaukee, Wis.

First, I claim the application of the numerals, 1 2 3 4 5 6 7 8 9 0, to a series of plane reverse traveling columns or bars, the ten figures being arranged consecutively on each as described, for the purpose of producing by their combination any desired number.

Second, The construction and combination of the set dogs, g, and the slides, s s, by means of which the set dogs and moving dogs are raised from their ratchets, as described.

Third, The combination of a series of moving columns containing the numerals, 1 2 3 4 5 6 7 8 9 0, in numerical order with the slides, s s, moving dog, f, and set dog, g, by which they are operated to produce any combination of numbers as described.

Fourth, The attachment of the lug, o, whereby the moving dog, f1, is made to carry the other dogs, f2 f3, etc., for the purpose described.

Fifth, The construction of the moving colums, a b c, and ratchet bar, x, with the flange to keep the moving dogs from impinging on their ratchets, as described.

59,676.—ORE CRUSHER.—Charles W. Stafford, Saybrook, Conn.

I claim the reciprocating jaw, H, guided in a rectilinear path by the plate, a, and actuated by eccentric, G, and lever, D D', substantially as and for the purpose herein specified.

59,677.—BAG HOLDER.—W. H. Starry, Middletown, Ohio.

First, I claim the clamping jaws, E G, in combination with ratchet and pawl, b, co-operating for holding sacks and bags, when constructed and arranged in the manner substantially as described.

Second, The combination of the treadle mechanism for settling the contents of the sack or bag with the clamping jaws and ratchet and pawl, operating conjointly, when constructed and arranged substantially as described for the purpose specified.

59,678.—TAG OR LABEL.—George W. Storer, Portland, Conn.

I claim an improved tag or label, made and applied substantially in the manner described and for the purpose specified.

59,679.—ELASTIC BUTTONHOLE FOR CARRIAGE CURTAINS.—S. C. Talcott, Ashtabula, Ohio.

I claim the tin, A, or its equivalent, and the rubber, B, so arranged and in combination with the curtain, E, and lining, F, for the purpose and in the manner herein set forth.

59,680.—APPARATUS FOR CREASING PAPER COLLARS.—Temple Tebbetts, New York City.

First, I claim a curved gage, in combination with a curved creasing knife, constructed and operating substantially as and for the purpose herein fully described.

Second, I claim a dotter in combination with a creasing knife and gage, constructed and operating substantially as and for the purpose set forth.

59,681.—SEEDING MACHINE.—Henry Thomason, Lafayette, Ind.

First, I claim the lever, K, provided with the taper bar, L, at its lower end, in connection with the pendent elastic bar, F, having the bearing, a, of the shaft, E, at its lower end, the arm or rod, f, projecting from the inner side of the bearing, a, and the spring, J, all arranged substantially as shown, to admit of the bevel pinion, D, being thrown in and out of gear with the wheel, c.

Second, I claim the seed box, P, attached to bar, I, and cross piece, v, and notched bar, I*, so as to be independent of beam, A, in the manner specified.

Third, I claim the two bars, T T, in connection with the beams, S S, and seed boxes, R R, and bar, G.

Fourth, I claim the seed cups, u, in connection with seed boxes, R R P, arranged in the manner described.

Fifth, I claim the attaching of the seed-conveying tubes, W, to the beams, S S, by means of the pins, w, and clamps, w*, passing through blocks, a*, substantially as and for the purpose set forth.

59,682.—COMPOSITION FOR ROOFING.—J. P. Thompson, Kirkville, Iowa.

I claim a composition for roofing, compounded from the ingredients named, and substantially as set forth.

59,683.—WHEELWRIGHT'S MACHINE.—David S. Trout, Arcola, Ill.

I claim the arrangement of the adjustable reciprocating table, D, of a wheelright's boring machine, the plate, E, plates, b b, and segments, g g, when operated as and for the purposes described.

59,684.—VENTING CORE FOR FOUNDERY PURPOSES.—Hiram Tucker, Newton, Mass., assignor to the Tucker Manufacturing Company.

I claim the described improvement in the art of casting molten metals, by which the cores are better and more easily vented than heretofore.

59,685.—STATION INDICATOR FOR RAILWAYS.—Edgar B. Van Winkle, New York City.

I claim a train of wheels for operating or giving the proper movement to an index or pointer, K, which works over a graduated dial plate, L, a weight, V, or its equivalent, applied to said wheels and to the pulley, G, link or rod, F, and lever, D, for connecting the train of wheels with the lever, B, applied to one of the rails, A, all arranged to operate substantially in the manner as and for the purpose set forth.

59,686.—STEAM PROPELLER FOR BOATS.—Allexey W. Von Schmidt, San Francisco, Cal.

I claim, in combination with a propeller pipe, arranged either inside or outside the vessel, but below the water line, and one or more stationary steam pipes, the ends or nozzles of which are within, and point respectively towards the openings of the propeller pipe, one or more valves or cocks arranged so that a column of steam may be projected at pleasure through either nozzle, thus inducing a current of water through the propeller pipe, as and for the purpose shown and described.

59,687.—VESSEL FOR COOLING LIQUIDS.—H. Waldstein and M. Fauski, New York City.

We claim, as a new article of manufacture, a bottle or pitcher, provided with a hollow or chamber in its bottom for holding a refrigerating material, the chamber to be closed by a suitable cover or stopper, substantially as specified.

59,688.—APPARATUS TO BE ATTACHED TO STILLS TO PREVENT FRAUD ON THE REVENUE.—W. J. Walker, Baltimore, Md.

I claim the connecting of an inclosed vessel, having one or more transparent sides, to the worm of the still, into which the liquor passes, and where its proof is tested by one inclosed hydrometer and thermometer, and from thence passing into the high or low wine tank, as the case may be, so that no one can have access to the liquor from its passage from the worm to its respective tank.

59,689.—SUSPENSION DEVICE FOR LAMPS, ETC.—Harrison Weed, New Haven, Conn.

I claim retaining a lamp or burner, which ascends automatically in any position to which it may be adjusted, by the means and in the manner substantially as described.

59,690.—PRESERVING BEER WHILE ON DRAFT.—David Wernz, New York City.

I claim the combination of a flexible bag with a bung, provided with air passages, as described, where said bung and bag are applied at the underside of the cask or barrel, so as to cause the air to enter at the bottom, operating in the manner and for the purpose substantially as described.

59,691.—CHURN.—Henry P. Westcott, Seneca Falls, N. Y.

First, I claim affixing the adjustable dasher firmly to its own standard, which is separated from the standard which supports the lower dasher, substantially as and for the purpose described.

Second, Fastening the standards of the two dashers together, by a fastening located above the top of the churn, substantially as and for the purpose described.

Third, Providing a removable standard for the support of the outer end of the lever, substantially as described.

Fourth, So arranging and attaching the spiral spring as that it will hold the standard which supports the outer end of the lever in place, substantially as described.

Fifth, The combination of the spiral spring with the attachment, h, when said attachment is so formed and arranged as to allow the operator to vary the upper end of said spring at pleasure, and thereby to increase or diminish the length of the lever by which said spring is drawn out, substantially as and for the purpose described.

59,692.—APPARATUS FOR FLESHING AND STONING HIDES AND SKINS.—Jesse Wheat, South Wheeling, W. Va.

First, I claim the combination of the arm, M, pins, O, pitman, P, trap, R, and roller, S, with each other, with the sliding arm, G, with the treadle, T, and with the frame, A, of the machine, substantially as described and for the purpose set forth.

Second, The combination of the drop, U, with the treadle, T, substantially as described and for the purpose set forth.

Third, The combination of the strap, V, or equivalent, with the drop, U, and with the pivoted arm, M, substantially as described and for the purpose set forth.

Fourth, The combination of the screw, W, or equivalent, with the strap, V, and pivoted arm, M, substantially as described and for the purpose set forth.

Fifth, The combination of the line, Z, with the drop, U, substantially as described and for the purpose set forth.

Sixth, The combination of the cam, D, working beam, c', and slotted upright bar, I, with each other, with the treadle, T, crank shaft, c, and with the knife beam, H, substantially as described and for the purpose set forth.

Seventh, The combination of the set screw rod, D', or equivalent, with the working beam, G', and with the knife beam, H substantially as described and for the purpose set forth.

Eighth, Attaching the knife to a stationary, rigid, head shank, substantially as described and for the purpose set forth.

Ninth, The combination of the holding bar, J', constructed and operating as herein described, with the grooved edge of the table, E', and with the holding cam, K, substantially as and for the purpose set forth.

59,693.—PROCESS OF TREATING SULPHUROUS ORES OF COPPER.—J. D. Whelpley and J. J. Storer, Boston, Mass.

First, We claim the seven manipulations above set forth, in their order, and with the variations described, as a process for treating sulphuret of copper.

Second, The first, second, third and sixth manipulations and the variations described, as a process for treating sulphurous ores of copper.

Third, The first six manipulations and the variations described, as a process for treating copper sulphurets.

Fourth, The first, second, third, fifth, and sixth manipulations, and the variations thereof caused by omitting the third and sixth, and employing the method described after "seventh," as a process for treating copper sulphurets.

Fifth, The rearrangement of the equivalents of the ore by the heat generated by its own combustion, in presence of oxygen and without other fuel than that contained in itself, substantially as described.

Sixth, The employment for the lixiviation of minerals of the centrifugal drying machine, as described, and the arrangement of the felt lining upon its interior, substantially as described.

Seventh, The revival of iron from iron oxides, by diffusion of gases between carbon and the oxides, at a low degree of heat, and without currents of air, substantially as described.

59,694.—METHOD OF TREATING THE MIXED SULPHURETS OF ZINC AND LEAD.—J. D. Whelpley and J. J. Storer, Boston, Mass.

We claim, First, The first, third, and fourth manipulations, in their order, as a means or method of treating zinc blende.

Second, The first, third, and fourth manipulations, in their order, with the addition of the second, as a method or means of treating associated blende and galena.

59,695.—APPARATUS FOR FEEDING FUEL TO FURNACES.—J. D. Whelpley and J. J. Storer, Boston, Mass.

We claim, First, The construction of a machine containing a comminuting apparatus for fibrous fuel, substantially as described, in combination with the fan blower of an air blast, as and for the purpose described.

Second, The arrangement of cutting blades, O, and air wheel paddles, P, upon one or more revolving disks, L, in the cutting chamber, substantially as described, and the same in combination with crushing cylinder, N, substantially as described and for the purpose stated.

Third, The combination of a register, F F', with the air or fuel feed of the fan blower, as and for the purpose described.

59,696.—PROCESS AND MACHINERY FOR OBTAINING METALS AND OTHER PRODUCTS FROM ORES AND MINERALS.—J. D. Whelpley and J. J. Storer, Boston, Mass.

We claim, First, The construction of the tower in the form of a hollow truncated cone, for the purpose of securing perfect combustion and the exposure of all the materials, especially the fuel, to heat and oxygen.

Second, The construction of the head of the furnace dome and arched flues above the fire boxes, forming groins at their springs, substantially as described, for the purpose of forming a focus of combustion near the head of the furnace.

Third, The arrangement of the chimney, F, and telescope slide, G, with its counterpoise and flanges as drawn, substantially as and for the purpose described.

Fourth, The arrangement of the feed apparatus so as to discharge the ore and coal to be supplied to the air blast, on the side of the fan blower, A, away from the furnace, as and for the purpose described.

Fifth, The division of the horizontal flue into chambers, substantially as described, to secure more perfectly the hot lixiviation of the ores, and the similar division of the conductor, L, into chambers, n, as and for the purpose described.

Sixth, The arrangement and combination of the settling tank, U, with the water bottom and pool by means of water exit and water entrance, and the further arrangement of the propeller or conveyer, M, in combination with said water bottom and pool as and for the purpose described.

Seventh, The employment of a wetting wheel, succeeded by a chemical wheel, to remove dust and gases from air, when said wheels are sufficiently separated to allow the effect of the first to be complete, before the air to be purified comes under the action of the second, and the arrangement of a trap or valve in the intermediate conductor to balance the draft and projection of the two wheels.

Eighth, The arrangement of the inclined floor, b, of the spray chamber, in combination with the overflow, a, settling tubs, and their overflows, b, etc., and with the water chamber of the spray wheel, substantially as described.

Ninth, The employment of oxide of copper, or other reducible protoxides, fed into the head of the furnace, substantially as described and for the purpose stated.

Tenth, The means of brightening gold, herein described, by the employment of heat and instantaneous plunging in water or dilute acid.

Eleventh, The evaporating apparatus, substantially as described, consisting of shallow tanks or vats, forming the bottom of an air flue, through which is drawn or forced an artificial current of air, when employed to evaporate a heated solution of sulphate of copper, which cools as the operation proceeds, in order to effect the crystallization of the salt to its greatest practical extent.

Twelfth, As a manufacturing process, to effect, from a solution of sulphate or chloride of copper or other metal, the precipitation of pure metal in quantity as distinguished from assay, by the substitution of another metal, such as iron, in the solution; the employment of heat and relative motion between the solution and the precipitating metal, and with or without auxiliary galvanic currents distinct from those of local action, substantially as described.

Thirteenth, The employment of heat and relative motion between the solution and the poles of a battery, to accelerate the action of the galvanic current in electro precipitation of metals, substantially as described.

59,697.—Rope-driving Machine.—Stephen B. Whiting, Pottsville, Pa.

I claim the use of two drums, inclined and arranged laterally in respect to each other substantially as and for the purpose described.

59,698.—Coupling for Cultivators.—Silas M. Whitney, Galesburg, Ill.

I claim the adjustable rectangular frame C, eye bolts D and E, and connecting bar B, when said parts are constructed substantially as herein shown and described, in combination with the plow beam, A, and axletree or frame, G, as and for the purpose set forth.

59,699.—Fruit Jar.—G. Williams, West Middleburg, Ohio.

I claim the combination of the can, B, socket, A, and screw, d, with the cap, C, tongues, b and c, and nut, e, for the purpose shown, and operating substantially in the manner herein set forth.

59,700.—Cider Mill.—J. H. Williams, Sandusky, Ohio.

I claim the combination of the two metallic or wooden rollers with the india-rubber or elastic roller, all arranged to operate substantially as and for the purpose set forth.

59,701.—Rolling Pin, etc.—Theodore A. Williamson and Charles A. Richardson, Alleghany City, Pa.

I claim, First, A combined rolling pin, beetle, grater, steak hacker, and butter print, substantially as herein shown and described.

Second, The combination with the rolling pin, of a beetle, a grater, and steak hacker, all constructed and arranged in the manner and for the purpose specified.

59,702.—Gas-pipe Joints.—Richard Wilson, Cold Spring, N. Y. Antedated November 1, 1866.

First, I claim the hinge, E, spiral spring, D, elastic sleeve, C, and swinging pipe, A, in combination with the pipe, B, substantially as and for the purpose set forth.

Second, I claim the rubber sleeve, C, spiral spring, D, and swinging pipe, A, in combination with the fixed gas pipe, B, substantially in the manner and for the purpose specified.

59,703.—Corn Planter.—Robert M. York, Schoolcraft, Mich.

I claim, First, The rods, G G, applied to the seed boxes, A A, in combination with the cylinders, F, straps, e H, and springs, J, all arranged to operate substantially in the manner as and for the purpose set forth.

Second, The disks or bottoms, h, in the holes or seed cells, g, in the cylinder, F, arranged in connection with the springs, J, and straps, K, substantially as and for the purpose specified.

Third, The straps, M, applied to the bars, I, when used in combination with the cylinders, F, and rods, G, substantially as and for the purpose set forth.

59,704.—Lamp Burner.—John K. Andrews, Antrim, Ohio, assignor to Joseph C. Tilton, Pittsburgh, Pa.

I claim a lamp burner composed of two perforated tubes, B C, with caps, G H, in combination with the perforated chamber, D, wick tube, F, and vent tube, I, constructed and operating substantially as and for the purpose set forth.

59,705.—Lantern.—Lewis F. Betts (asignor to himself and L. G. Huntington), New York City.

I claim the loose or detachable hand, F, arranged in connection with the globe, G, the annular base, C, and the lamp, D, substantially as shown and described.

59,706.—Breech-loading Fire-arm.—Pierre Bourdereaux, New York City, assignor to Joseph Merwin and Edward R. Bray.

I claim the breech, B, provided with a fixed center fire nipple, f, and a sliding firing pin or pins, e, in combination with the adjustable face piece, E, of the hammer, substantially as and for the purpose specified.

59,707.—Hat-blocking Machine.—Seth Boyden (assignor to Henry H. Jaques), Newark, N. J.

I claim, First, A block for the blocking of hats, so constructed that from a form, corresponding, or nearly so, to that of the hat previous to being blocked, it can be changed, or made to assume, or brought to the form of an ordinary hat block, by means substantially as herein described and for the purpose specified.

Second, In combination with the above, I claim a presser so constructed that when brought to bear upon the said block on which the hat has been placed to be blocked, it will change the form of such block, substantially as and for the purpose described.

Third, The movable block, E, having a double series of ribs, M and O, hung upon and around the same, one series above the other, in combination with the surrounding stationary or fixed flange or rest, L, for the outer ends of the lower ribs, M, and the center fixed cap or head, D, substantially as described and for the purpose specified.

Fourth, The presser, S, formed of two concentric rings, T U, connected together through a series of ribs, V, hung to the inner ring and passing through the outer ring, substantially as and for the purpose described.

Fifth, The weight or block, H2, in combination with the presser, S, when arranged and combined together, substantially as and for the purpose specified.

Sixth, The combination of the double-ribbed hat block, E, surrounded by a fixed raised flange, L, and pivoted with a fixed center cap or head, D, with the ribbed presser, S, having block or weight, H2, when combined and arranged together so as to operate substantially in the manner and for the purpose described.

59,708.—Pump.—James W. Cahill, Madison, Ind., assignor to himself and A. S. Davison, Cincinnati, Ohio.

I claim the arrangement of the plungers, L M, on the shaft, K, provided with valves and operating as described in the cylinder, A, which has its induction openings at its mid-length, and eduction openings at its ends, as described and represented.

59,709.—Shoe and Stove Brush.—F. M. Carnes (assignor to himself and B. F. S. Logendyke), New York City.

First, I claim the rotary brush, D, in combination with the polishing brush, A, arranged or applied substantially as and for the purpose herein set forth.

Second, I claim the movable plate, F, adjusted or operated by the screw, b, and nut, G, or their equivalents, in combination with the rotary brush, D, and cake of blacking, E, substantially as and for the purpose specified.

59,710.—Horse Holder.—William B. Chapman (assignor to himself, Davis L. Hough, and Wm. F. Keeler), La Salle, Ill.

I claim the arrangement and combination of the toothed collar, A, surrounding collar, B, having arm, c, and spring pawl, G, and ring, E, the whole being constructed and operated in the manner and for the purpose set forth.

59,711.—Hoop-skirt Wire.—T. B. De Forest, Derby, Conn., assignor to J. N. McIntire, Brooklyn, N. Y.

I claim wire coated with flocks and then "braided" with yarn, either with or without being afterward glazed, or sized and finished.

59,712.—Bootjack.—Henry N. Degraw, Newburgh, N. Y., assignor to himself and Henry Wright.

I claim the pendent frame, D, firmly secured to the foot rest, A, to which spring jaws, F, provided with pendants, H, are pivoted, operating with the slotted sliding frame, E, with its inclined bars, d, in the manner described for the purpose specified.

59,713.—Cement for Roofing, Pavements, etc.—Louis De l'Homme and Angelo Lazzaro (assignors to Joseph Arata), New York City.

We claim the preparation of the metallic lava, as above described, and its practical use in paving halls, hall-ways, basements, cellars, stables, coach houses, bath houses, yards, piazzas, sidewalks, garden pathways, terraces, etc., etc.

59,714.—Treating Sponge for Stuffing Mattresses, etc.—R. Ogden Doremus (assignor to the Elastic Sponge Manufacturing Company), New York City.

I claim the preparation of sponge by moistening it with a solution of the chloride of magnesium, or equivalent therefor, substantially as and for the purpose specified.

59,715.—Sewing Machine for Sewing Together the Soles and Uppers of Shoes.—William Duchemin (assignor to himself and Sullivan E. Clough), Lynn, Mass.

I claim, in combination with the machinery for sewing, as described, or its equivalent, the shoe supporter or arm, B, provided with mechanism for operating it, substantially as described, such arm being to be used in connection with the bottom piece of the last, in manner and for the purpose as hereinbefore explained.

I also claim the combination of mechanism for extracting the tacks, substantially as explained.

I also claim the combination of the loop advancer, M, and the loop twister, N, with the hooked needle, L, the feeder, O, and the thread carrier, K, each being constructed and provided with mechanism for operating it, substantially as described.

I also claim the combination of the loop advancer, M, the loop twister, N, the hooked needle, L, the awl, P, the feeder, O, and the thread carrier, K, each being provided with mechanism for operating it, substantially as specified.

I also claim the combination of the main and auxiliary gages, H and I, with the arm, B, and mechanism for sewing, substantially as described.

59,716.—Hollow Pressure Plate.—John B. Fontaine, Philadelphia, Pa., assignor to Hoff, Fontaine, and Abbott.

I claim a hollow cast-iron die or plate, stayed and riveted in the manner and for the purpose described.

59,717.—Lantern.—John O. Harris (assignor to himself and Isreal S. Ritter), Reading, Pa.

I claim a square or quadrilateral lantern having a square base, A, with perforated sides and a perforated top with a conical chamber, B, attached, in combination with a top piece or cap composed of a cylindrical chamber, D, perforated with holes or openings, e, and a jacket, E, encompassing D, and perforated at its upper and lower parts, substantially as and for the purpose set forth.

59,718.—Knob Hole for Carriage Curtains.—Charles W. Holland, Fredonia, N. Y., assignor to hmself and H. L. Taylor.

I claim the application and use of the metallic ring, D, and strengthening piece, C, in combination with knob holes in carriage trimmings, in the manner and for the purpose substantially as herein described.

59,719.—Picture Frame.—A. J. Holmes (assignor to Wells L. Robbins), Saratoga Springs, N. Y.

I claim a new article of manufacture consisting of picture and similar frames, constructed substantially as herein described.

59,720.—Cultivator.—H. C. Hunt (assignor to himself and C. D. Vaughn), Amboy, Ill.

First, I claim the combination of the circular frame, A, and rectangular frame, C, when constructed and arranged substantially as and for the purpose specified.

Second, I claim constructing the two beams of a single piece of wrought iron or wood, bent in the form of the letter, U, or any equivalent form, provided with the draw loops, as and for the purposes shown.

Third, I claim the employment of the cams, P, arranged with respect to the plow beams and frame of a cultivator, substantially as and for the purposes specified.

Fourth, I claim the employment of the rollers, h h, when arranged with the cam, P, and beams, D, and operating as and for the purposes described.

Fifth, I claim the crank shaft, Q, arranged and operating with the cams, D, substantially as specified and shown.

Sixth, I claim the employment of a transformed spindle constructed and operating as herein shown and set forth.

Seventh, I claim in combination with said transformed spindles the arrangment of the arms, J, extending parallel with each other forward, so that the connecting bar, K, will not obstruct the view of the operator as and for the purposes described.

Eighth, I claim the employment of the hooks, r, or their equivalent, for the purposes specified in the manner described.

59,721.—Gage for Determining Angles.—E. C. C. Kellogg, Hartford, Conn., assignor to himself S. F. Bennett and D. H. Burrill, Little Falls. Antedated Nov. 4, 1866.

I claim, First, The construction of a slide gage with scales such as are represented in Fig. 1, and herein described, for slabbing polygonal prisms.

Second, A slide gage with the several scales on its link, A, and fixed and movable arms, B and C, with points, g g, on the said arms and with a hexagon gage on its movable arm, all substantially as herein specified.

59,722.—Manufacture of Wash Boilers, Kettles, and other Vessels Made of Sheet Metal.—Edward M. Manigle (assignor to G. H. Hazelton), Philadelphia, Pa.

I claim the manufacture and use of bottoms for wash boilers, and other similar vessels made of sheet copper, sheet brass, or of other equivalent sheet metal, and coated substantially in the manner and for the purpose herein set forth and described.

59,723.—Breech-loading Fire-arm.—Wm. H Miller (assignor to Meriden Manufacturing Company), West Meriden, Conn.

I claim, First, The lever, M, constructed and arranged with the projections, d, in combination with a corresponding recess, f, and the latch, L, so as to operate substantially in the manner herein set forth.

Second, The vertical bar, R, in combination with the bolt, P, and the lever, M, constructed and arranged to operate substantially in the manner and for the purpose herein set forth.

Third, The combination and arrangement described of the lever, N, with the bar, R, and the barrel of the arm, substantially as and for the purpose described.

59,724.—Manufacture of Soap.—William B Milne (assignor to himself and Wm. Brophy), Chicago, Ill.

I claim, First, The mode of introducing the farinaceous materials by dissolving or saponifying them with the fats or oils without a separate alkaline treatment, substantially as specified.

Second, I claim as a new article of manufacture a soap made by dissolving or saponifying farinaceous substances and fats or oils with an alkali having a potassium base and mixed with a soap having its fats or oils saponified with an alkali having a sodium base, substantially as herein set forth and specified.

59,725.—Horse Shoe.—J. J. Peyton (assignor to J. P. Torbert), Washington, D. C.

I claim, First, Securing india-rubber or its equivalent, and the wearing portion of the shoe, in a groove in the main plate, substantially as described.

Second, Constructing a horse shoe substantially in the manner described, for the purpose of rendering the shoe elastic, and removing or replacing the wearing surface without removing the shoe from the foot of the horse.

Third, The combination of the shoe with the rubber, the yielding blocks or bar, and the screws, substantially in the manner and for the purpose set forth.

59,726.—Machine for Filling Horse Collars.—A. Schrick and H. Hildenbrand (assignors to themselves, F. C. Krayer, and C. R. Schrick), St. Louis, Mo.

First, We claim the combination of the bed plate, D, with the hopper, C, and also with the straining shaft, E, as described and set forth.

Second, We claim the nippers, G and E', when constructed and employed substantially as described and set forth.

Third, We claim giving to the hopper, C, a vertical motion for the purpose of enabling the plunger to reach new material at each successive stroke.

59,727.—Machine for Stretching Horse Collars.—A. Schrick and H. Hildenbrand (assignors to themselves, F. Krayer, and C. R. Schrick), St. Louis, Mo.

We claim the combination of the block, B, the stretching slide, C, the lever, E, and its pawl, E', and rack, e2, and the screw, D, when constructed and employed substantially as set forth.

59,728.—Carriage Shackle.—T. S. Smith (assignor to himself, S. A. Smith, and Henry Lines), New Haven, Conn.

I claim the combination of the ball and socket joint, provided with a packing, E, with a strap, H, or its equivalent, and constructed with a plate, B, so as to be attached to the axle, substantially as and for the purpose herein set forth.

59,729.—Windmill.—Daniel Strunk (assignor to himself and Franklin Strunk), Janesville, Wis.

First, I claim the ring governor or weight, B, in combination with the vertical shaft, A, and the connecting rods, e and g, the bent levers, f, and the brackets, h, fastened to the wings, b, constructed and arranged substantially in the manner and for the purpose herein described.

Second, I claim the combination of the weights, B, with the lever brake, k, the friction fly-wheel, l, lever, q, and check rope, o, substantially as described for the purpose speceified.

59,730.—Mode of Constructing Buildings.—A. Tanner (assignor to himself and Henry J. Phillips), Hoboken, N. J.

First, I claim a building, the walls of which are produced by a series of boards placed one on top of the other, so as to form a zig-zag pile, substantially in the manner and for the purpose set forth.

Second, The gutters, b, in the recesses, a, substantially as and or the purpose described.

Third, The air channels, c d, in the boards, B, substantially as and for the purpose set forth.

59,731.—Adjustable Nut Box.—John Turner (assignor to himself and John G. Hunter), Richmond, Va.

First, I claim the angular slides, A, in combination with each other and with the block or frame, C, constructed and arranged substantially as herein described and for the purpose set forth.

Second, The combination of the steel slides, D, with each other, with the angular slides, A, and with the block or frame, C, constructed and arranged substantially as described and for the purpose set forth.

59,732.—Baking Pan.—Stephen West, Trenton, N. J., assignor to West and Thorn.

I claim a baking pan having a grooved or corrugated bottom, B, and notched end pieces, C, as and for the purpose herein described and represented.

59,733.—Broom.—Thomas Wright (assignor to himself and R. Vose), New York City.

I claim, as an article of manufacture, a wire broom, made substantially in the manner herein set forth.

59,734.—Metallizing Mirrors.—Edward Dode, Paris, France.

First, I claim the peculiar processes or modes of preparing a product to be employed in metallizing glass, with a view to the manufacture or production of looking-glasses, mirrors, and other reflecting surfaces, as hereinbefore described.

Second, The peculiar processes for extracting or removing the salts and acids from the metallizing product, as hereinbefore described.

Third, As a new article of manufacture, I claim a glass or mirror, metallized on its face by the application of platinum, in the manner substantially as hereinbefore described and set forth.

59,735.—Umbrella.—Wilhelm Hugo, Celle, Kingdom of Hanover.

First, I claim a T-shaped rib for umbrellas or parasols, as a new article of manufacture.

Second, Providing the T-shaped rib with a longitudinal gutter or cavity, substantially as and for the purpose described.

59,736.—Mode of Rendering Leather more Durable and Flexible.—Louis Gustave Sourzac and Louis Bombail, Bordeaux, Gironde, France.

We claim the improved process herein described for rendering leather more durable and flexible.

59,737.—Needle Case.—G. L. Turney, London, England, assignor to Samuel A. Harshaw, New York City.

I claim the method herein described of putting up needles, by wrapping them up in a paper or tinfoil, b, leaving their heads exposed, and inclosing said paper or tinfoil in a box, a, substantially as set forth.

59,738.—Magneto-electric Machines.—Henry Wilde, Manchester, England.

I claim, First, The method of constructing magnet cylinders

for magneto-electric and electro-magnetic machines, by making them of segmental iron concaves, with intervening strips of wood, brass, or other non-electric material, substantially as set forth.

Second, The combination of a magneto-electric and electro-magnetic machine, constructed and operating substantially as and for the purpose set forth.

59,739.—Method of Receiving and Delivering Letters, Parcels, etc.—A. Ely Beach, Stratford, Conn.

First, I claim the method, substantially as herein described, of automatically collecting letters, parcels, and other freight.

Second, I claim the method, substantially as herein described, of automatically delivering letters, parcels, and other freight.

Third, I claim the employment of the studs and rods, or their substantial equivalents, to operate the delivering and receiving mechanism, substantially as herein shown and described.

Fourth, I claim the employment of an electro-magnetic apparatus in combination with the receiving and delivering mechanism, substantially as and for the purpose herein set forth.

Fifth, I claim the means herein described, or their equivalents, for reducing the speed, substantially as described.

Sixth, I claim, in the collection of letters, parcels, and other freight, the employment of a moving box or receiver, U, or its equivalent, operating substantially as described.

Seventh, I claim the employment of the adjustable nose, or its equivalent, with the ear, substantially as and for the purpose herein shown and described.

Eighth, I claim the combination of a swinging valve with the freight receptacle, substantially as herein shown and described.

Ninth, I claim, in the collection and delivery of letters, parcels, and other freight, the employment of the several mechanisms herein shown and described, or their substantial equivalents, operating respectively or otherwise, substantially as herein shown and described.

REISSUES.

2,393.—Straw Cutter.—Warren Gale, Chicopee Falls, Mass. Patented September 12, 1854.

First, I claim the automatic mouth of a feed box, constructed by any means substantially the same as described, when used in combination with a revolving cutting cylinder armed with one knife, or with several knives, so arranged that one knife shall release its hold upon the material being cut before the following knife shall grasp it sufficiently to hold it, substantially as and for the purposes set forth.

Second, I claim the adjustable bottom mouth piece, M, or its equivalent, constructed and operating substantially as and for the purposes set forth.

Third, I claim combining a revolving cutting cylinder, armed with one knife, or with several knives, so arranged that one knife shall release its hold upon the material being cut before the following knife shall grasp it sufficiently to hold it, with a hinged bottom mouth piece of a feed box, substantially as and for the purposes described.

Fourth, I claim an automatically operating mouth piece to a feed box, in combination with a revolving knife cylinder, armed with one knife, or with several knives, so arranged that one knife shall release its hold upon the material being cut before the following knife shall grasp it sufficiently to hold it, when this cylinder is geared to a revolving pressure cylinder, substantially as and for the purposes set forth.

Fifth, I claim making those parts of the pressure cylinder, against which the knife or knives are made to cut, by having their edges brought into actual contact therewith, in sections or strips separate from the body of the cylinder, substantially as and for the purposes set forth.

Sixth, I claim a revolving cutting cylinder having one or more knives, in combination with a pressure cylinder, having one or more radial flanges, arms, or projections, so arranged that the knife or knives shall, as they revolve, meet the flange, arm, or projection, or either of them, in actual contact, so that the material to be cut is caught between the two, drawn forward, and cut off by the pressure between the knife on one cylinder and the flange on the other, substantially as and for the purposes set forth.

Seventh, I claim the flanged pressure cylinder, arranged and operated substantially as described, when the face of the flange is covered with suitable soft material, to protect the edge of the knife, when used in combination with a revolving cutter cylinder, substantially as and for the purposes set forth.

Eighth, I claim an automatically operating mouth of a feed box, or an adjustable mouth of a feed box, substantially as described, in combination with a revolving cutting cylinder armed with one knife (or with several knives so arranged that one knife shall release its hold upon the material being cut before the following knife shall grasp it), and with a revolving pressure cylinder armed with one or more radial arms, flanges, or projections, substantially as and for the purposes set forth.

Ninth, I claim a pressure cylinder provided with one or more radial flanges, arms, or projections, and a revolving cutting cylinder armed with one knife (or with several knives so arranged that one knife shall release its hold upon the material being cut before the following knife shall grasp it sufficiently to hold it), when these cylinders are used in combination with a hinged bottom mouth piece of a feed box, substantially as and for the purposes set forth.

2,394.—Riding Saddle.—Lacey, Meeker & Co., of New York City, assignees of George H. Meeker. Patented May 16, 1865.

We claim the forming of the projections or calf and thigh supports on the skirts of a riding saddle by meads of swaging, striking up, or embossing, substantially in the manner as herein shown and described.

DESIGNS.

2,504.—Oil Can.—Charles J. Hauck, Williamsburgh, N. Y.

2,505.—Tobacco Pipe.—Joseph Harvey (assignor to Harvey & Ford), Philadelphia, Pa.

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Quartermaster General's Office,
Washington, D. C., Oct. 31st, 1866.

1. Sealed Proposals will be received at the Office of the Quartermaster General, Washington, D. C., until November 30th, 1866, for furnishing Cast-iron Head Blocks for National Cemeteries, delivered in quantities about as follows, viz:—At

				Head Blocks
Boston, Mass.	from	300	to	500 "
Providence, R. I.	from	300	to	500 "
New Haven, Conn.	from	300	to	500 "
New York City, N. Y.	from	4,000	to	6,000 "
Philadelphia, Pa.	from	3,000	to	3,500 "
Pittsburgh, "	from	100	to	200 "
Frederick, Md.	from	1,000	to	1,500 "
Cumberland, "	from	500	to	600 "
Baltimore, "	from	1,500	to	2,000 "
Annapolis, "	from	2,500	to	2,700 "
Point Lookout "	from	2,500	to	4,000 "
Antietam, "	from	4,000	to	7,500 "
Wheeling, W. Va.	from	100	to	200 "
Charleston (Kanawha C. H.)	from	200	to	500 "
Washington, D. C.	from	20,000	to	25,000 "
Alexandria, Va.	from	3 000	to	4,000 "
Fredericksburg, "	from	12,000	to	16,000 "
Winchester, "	from	5,000	to	8,000 "
Harper's Ferry, "	from	1,000	to	1,500 "
Richmond, "	from	8,000	to	11,000 "
Hampton, "	from	3,000	to	4,000 "
Norfolk, "	from	700	to	1,500 "
City Point or Petersburg, "	from	15,000	to	20,000 "
Newbern, N. C.	from	1,000	to	1,500 "
Wilmington, "	from	2,500	to	3,000 "
Salisbury, "	from	500	to	600 "
Goldsborough "	from	1,500	to	2,000 "
Charleston, S. C.	from	500	to	1,000 "
Florence, "	from	500	to	3,500 "
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Beaufort, "	from	1,000	to	1,500 "
Savannah, Ga.	from	1,000	to	1,500 "
Marietta, "	from	4,000	to	7,000 "
Andersonville "	from	12,000	to	13,000 "
Millen, "	from	1,500	to	2,000 "
Mobile, Ala.	from	700	to	1,000 "
Selma or Montgomery, Ala.	from	2,000	to	3,000 "
Barrancas, Fla.	from	500	to	1,000 "
New Orleans, La.	from	3,000	to	4,000 "
Baton Rouge, "	from	2,000	to	2,500 "
Port Hudson, "	from	500	to	600 "
Brownsville, Texas.	from	500	to	600 "
Branzos Santiago "	from	200	to	300 "
Natchez, Miss.	from	1,200	to	2,000 "
Vicksburg, "	from	15,000	to	25,000 "
Corinth, "	from	4,000	to	6,500 "
Memphis, Tenn.	from	8,000	to	12,000 "
Fort Donelson, "	from	2,000	to	3,000 "
Nashville, "	from	15,000	to	20,000 "
Pittsburg Landing "	from	3,000	to	4,500 "
Stone River, "	from	4,000	to	5,000 "
Chattanooga, "	from	8,000	to	10,000 "
Knoxville, "	from	2,500	to	3,000 "
Columbia, "	from	1,200	to	1,500 "
Louisville, Ky.	from	4,000	to	5,000 "
Camp Nelson, "	from	2,000	to	2,500 "
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Cairo, Ill.	from	6,000	to	8,000 "
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Springfield, "	from	600	to	1,200 "
Quincy, "	from	200	to	300 "
Rock Island "	from	1,200	to	2,000 "
Jeffersonville, Ind.	from	800	to	1,000 "
Indianapolis, "	from	1,200	to	3,000 "
Jackson, Mich.	from	100	to	200 "
Cincinnati, Ohio.	from	700	to	1,000 "
Columbus, "	from	300	to	2,400 "
Camp Dennison, "	from	300	to	400 "
Johnson's Island, "	from	200	to	300 "
St. Louis, Mo.	from	4,000	to	5,000 "
Jefferson Barracks, "	from	3,000	to	4,000 "
Fort Leavenworth, "	from	1,000	to	1,500 "
Davenport, Iowa.	from	100	to	200 "
Keokuk, "	from	800	to	1,000 "
Little Rock, Ark.	from	2,000	to	2,500 "
Fort Smith, "	from	1,200	to	1,500 "
Omaha, N. T.	from	1,400	to	2,000 "
San Francisco, Cal.	from	200	to	1,000 "

2. The head blocks to be made in accordance with the specifications, and to conform strictly to the samples, both of which may be seen at the Offices of the Depot or Chief Quartermasters at Boston, New York, Philadelphia, Pittsburgh, Baltimore, Washington, Fortress Monroe, Richmond, Raleigh, Newbern, Fayetteville, Charleston, Savannah, Augusta (Ga.), Tallahassee, Mobile, New Orleans, Galveston, Vicksburg, Memphis, Nashville, Chattanooga, Murfreesboro', Louisville, Cairo, Chicago, Jefferson ille, Columbus (Ohio), Cincinnati, Detroit, St. Louis, Fort Leavenworth, Omaha, Little Rock, and San Francisco. (Bids for San Francisco will be received until December 31, 1866.)

3. They will be about nine (9) inches high, from ten (10) to twelve (12) inches long, and from three and a half (3½) to four and a half (4½) inches wide, with a flange around the bottom. They will be hollow, and will have a number cast on the back, and an inscription of the name, rank, regiment, arm, company, or corps, and date of death of the deceased, cast in raised letters on the top. They must be cast of good stove-plate iron, weight not less than twenty (20) lbs. each, and be coated thoroughly by dipping in melted zinc.

4. Separate bids are invited for delivery at each place; and in case the same parties offer to supply more than one locality, it should be stated at what reduced price the articles would be furnished in the increased number.

5. Each bid must be accompanied by a good and sufficient guarantee of at least two responsible parties that the contract, if awarded, will be faithfully and promptly executed. (The responsibility of the guarantors must be shown by the official certificate of the clerk of the nearest District Court, or of the United States District Attorney.)

6. The Government reserves to itself the right to reject all bids, if unsatisfactory; and to delay the award not later than the first of January, 1867; and also, in some instances, to change the points of delivery of a portion of the head blocks, in which case a reasonable allowance for increased, or deduction for diminished transportation will be made.

7. The time of delivery to be subject to future arrangement, sufficient time being allowed after the lists of names are furnished to the contractor.

8. The articles must conform rigidly to the sample, and will be subject to such inspection, at the point of delivery, as the Chief of the Bureau may direct.

9. The full name and post office address of the bidder should appear in the proposal.

10. Proposals should be plainly endorsed "Proposals for Iron Head Blocks," and be addressed "To the Quartermaster General U. S. A., Washington, D. C."

M. C. MEIGS,
Quartermaster General,
Brevet Major General, U. S. A.

21 3]

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Improved Saw-mill Trestle.

The engravings represent an exceedingly simple, but thoroughly efficient means to prevent the "jumping" of a long log, or piece of timber, while in process of being sawed by the sash saw. It seems as though it might be equally effective in a circular saw mill. The heating and breaking of saws, and the uneven sawing of lumber, are to be attributed more to this sudden and unequal movement of the stock than to any other one cause.

As before remarked, the device is very simple. It consists of two uprights, into which is framed a

Fig. 1

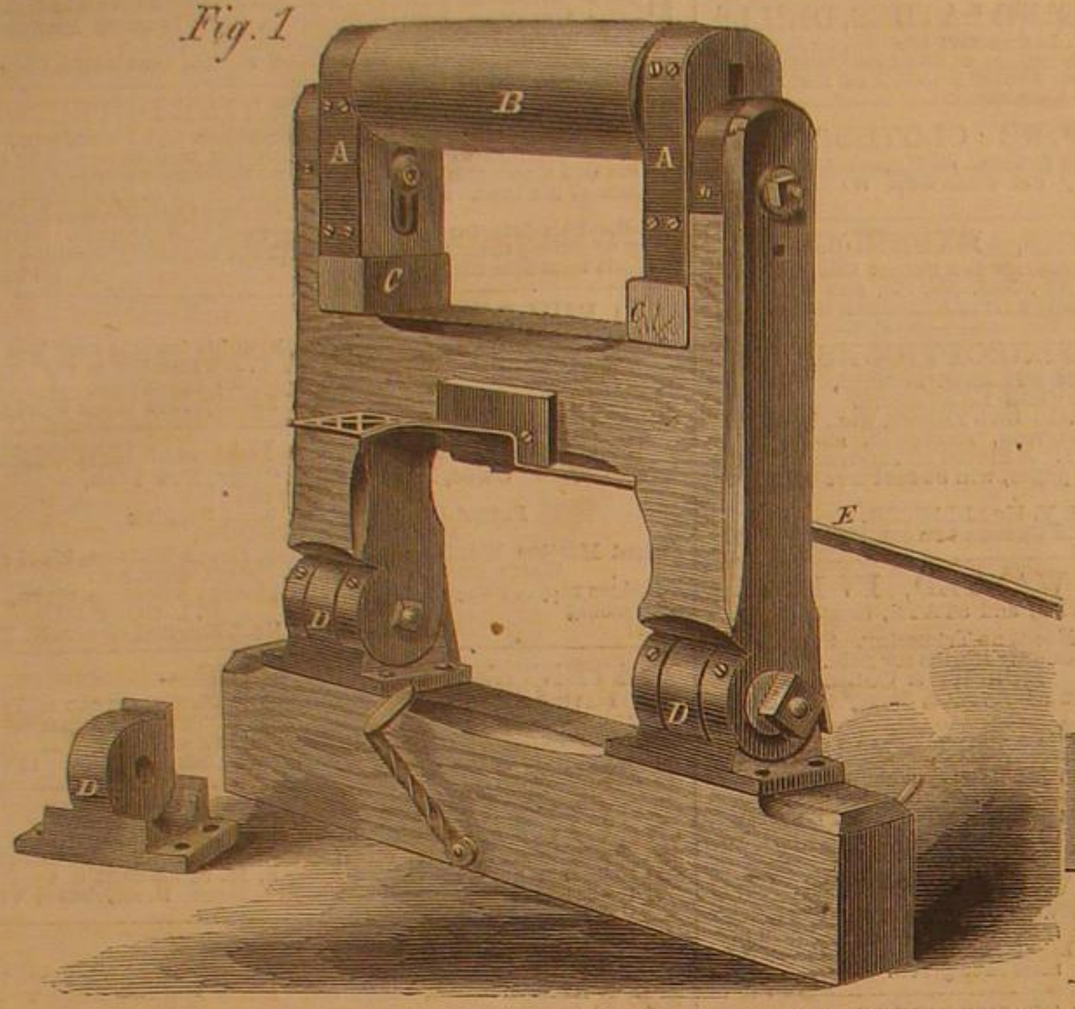
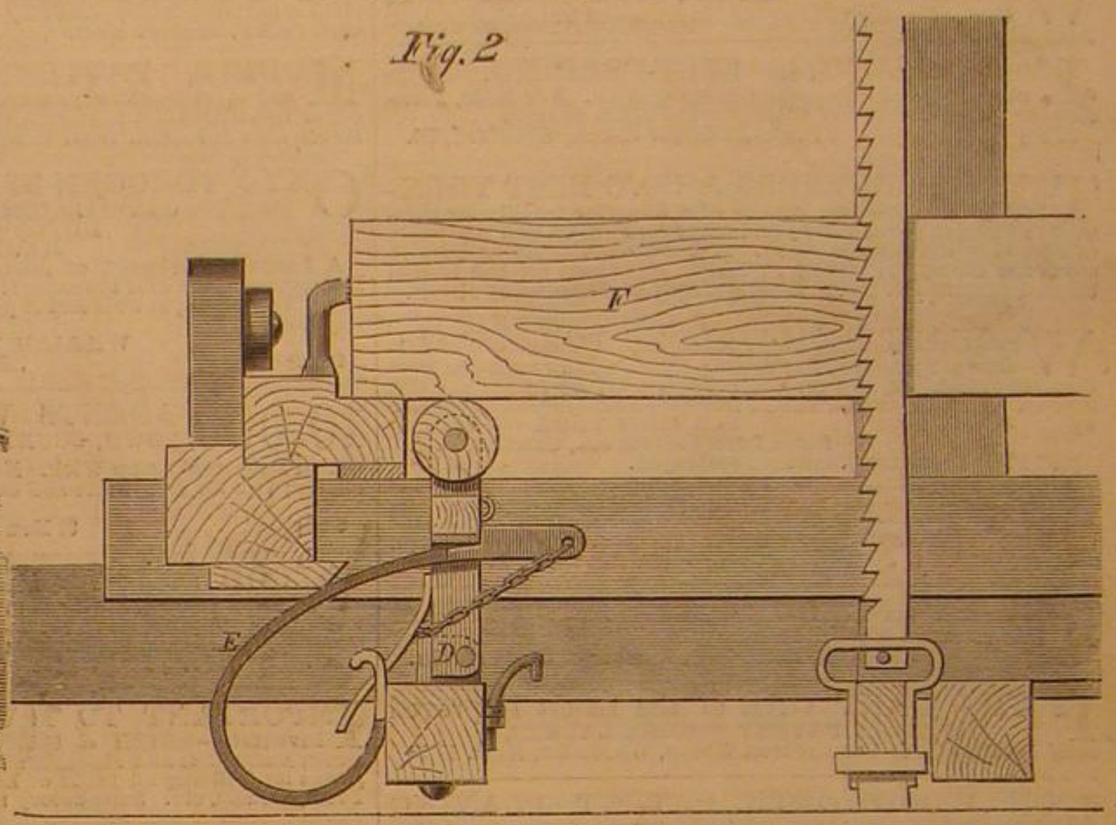


Fig. 2



CODDINGTON'S PATENT SAW-MILL TRESTLE.

cross bar. Inside the uprights are two bearing pieces, A, which receive the journals of the roller, B. These bearings can be elevated or depressed, by means of slots through which pass bolts that secure them in any position. Greater security can be afforded by blocks or wedges, C, under their ends. The lower ends of the uprights are provided with rule joints of iron, D, which allow the frame to be thrown into a horizontal position, but secure it from passing the perpendicular in the other direction. A strong spring, E, is used to keep the frame upright, and yet allow it to be depressed by the automatic action of the head and tail blocks of the carriage.

The *modus operandi* is as follows: The frame is secured beneath the log carriage, just in front of the saw, and is readily adjusted to allow the roller, B, to come in contact with the log, F, sustaining a portion of its weight. The log is thus held as firmly as the mill itself, and is not affected by the vibration of the saw. As the tail block approaches the frame it engages with one end of the spring, E, depressing it and allowing the trestle frame to be thrown from its perpendicular. When the pressure is released, the tension of the spring raises the trestle, and thus the operation is continued indefinitely.

This device took the first prize at the late State Fair at Dayton, Ohio, and is claimed to have given perfect satisfaction in all cases. It was patented through the Scientific American Patent Agency Sept. 18, 1866, by Geo. W. Coddington. For further particulars address Coddington & Doty, Middletown, Butler county, Ohio, or Dayton, Ohio.

Chilled Railway Wheels.

The practice with Major Palliser's shot against armor has shown what are the qualities of chilled cast iron, the chill, in this case, extending quite through the casting. It has been demonstrated that it is equal in hardness to hardened steel, and that it requires even greater force to break or deform it. It may be that the startling results obtained at Shoeburyness will serve, in some measure, to account for the universal use of chilled railway wheels in America, and for the leading wheels of engines, and often for the driving wheels themselves as well. It has always been the belief in this country that these wheels were used because they were cheap, and because the Americans could afford nothing better. These wheels, before the war, cost about 1½d. per pound, or rather less than £14 per tun, and one favorite pattern of 2 ft. 6 in. wheel, weighing nearly 4 cwt., was sold, ready for boring, for £2 10s. each. But so far from their cheapness having alone maintained them in use, they were long ago adopted, on the Grand Trunk Railway of Canada, because they were found, upon the whole, better than wrought iron. We have before us a letter, written in 1859, by the late Mr. A. M. Ross, engineer to the Victoria Bridge at Montreal, upon this subject, and which contains this statement, a statement which we know to have been confirmed by the subsequent experience of the engineers of the Grand Trunk Railway. In the International Exhibition of 1862 were a pair of chilled wheels, 2 ft. 9 in. in diameter, which had run upward of 150,000 miles under a heavy post-office van on the Grand Trunk Railway, and, although worn, they were still in good condition. We need not dwell upon the severity of a Canadian winter, nor explain how for months together the road bed—and there is seldom much ballast—is frozen as hard as rock. This, if anything, would be expected to try chilled wheels, yet they are regularly employed for the leading wheels of passenger engines, and breakages, although not absolutely unknown, are at least as infrequent as those of the best makes of English railway carriage tires.

It requires good iron for chilled wheels. That used in America for this branch of manufacture is mostly cold-blast charcoal iron, and it has to be selected and mixed with care, to obtain the proper qualities of strength and hardness of chill. The chill should be from ⅜ in. to ⅝ in. deep, and should cover the whole tread and the wearing face of the flange. Chilled wheels require especial provision for cooling, after being cast, so as to avoid internal strain from contraction. The wheels do not come out all of exactly the same diameter, but there is no difficulty in mating them in pairs of equal diameter, the greatest variation in the diameters of a thousand 2 ft. 9 in. wheels hardly exceeding ⅛ in. The machinery employed for boring is such that the hole is necessarily in the center, so that no eccentricity is possible. The wheels wear evenly and very slowly, until their diameter has been reduced by nearly ½ in. American iron, of choice quality for chilled wheels, is now being taken to St. Petersburg for casting here the wheels of all the carriage and wagon stock of the St. Petersburg and Moscow Railway. Heretofore the wheels for that line have been imported largely from the States. Our own size of wheel has never been adopted there, and as the weight of disk wheels increases in a higher ratio than that of the increase of diameter simply, we presume that a 3 ft. 6 in. wheel, instead of weighing but 5 cwt., as in English practice, would reach 6 cwt. We learn that iron of the proper quality for chilled wheels is likely to be introduced into this country, and that they will probably receive a fair trial.—*Engineering.*

American Railway Wheels in England.

The *Engineering* says:—We believe that five American chilled railway wheels have arrived in London, and that they will be broken experimentally, and that further wheels of this kind will be sent over for trial under English rolling stock. We have samples of the iron from which these wheels are cast, and it is of magnificent quality. The fracture is a rich dark gray, medium-grained, and shows great toughness, the particles appearing to have been irregularly torn, rather than broken short off. The specific gravity ranges from 7·25 to 7·3185, and the tensile strength from 32,000 to 35,102 lbs., or, say, 14½ to 16 tuns per square inch. The iron is that known as the Salisbury cold-blast charcoal iron, and is worth about £10 per tun in New York.

A CORRESPONDENT calls our attention to the fact that the Woodhead Tunnel, on the line of the Manchester and Sheffield Railroad, is 18,000 feet long, and, no doubt, the longest in England.

MECHANICS

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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.

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Vol. XV.—No. 23. [NEW SERIES.] NEW YORK, DECEMBER 1, 1866. $3 per Annum, [ADVANCE.]

Improved Automatic Churn.

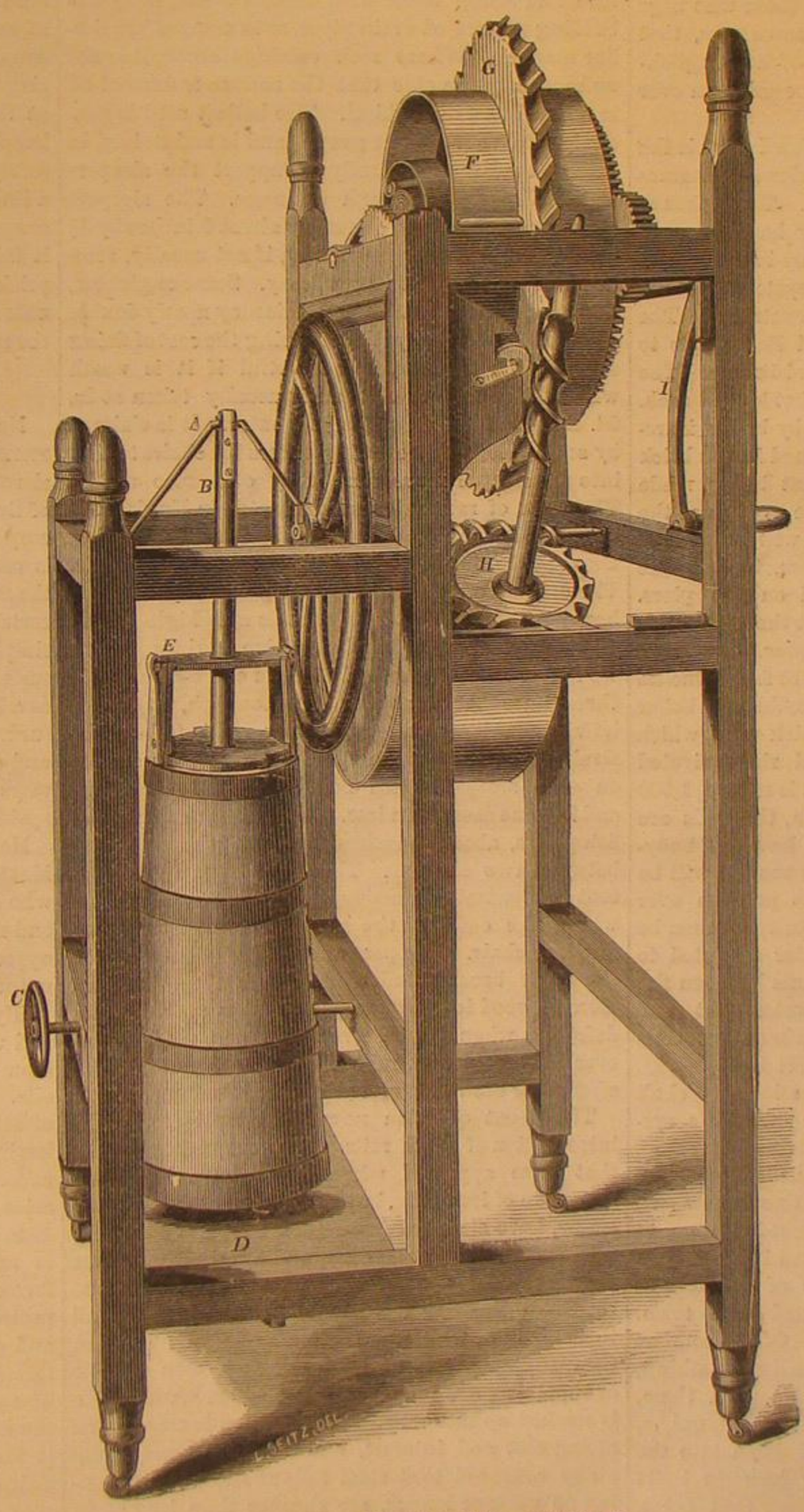
There is no household labor on the farm more exhausting than that of churning. It is usually regarded as belonging to the housewife's department, and while it cannot come under the denomination of "light labor," which is considered as the labor best fitted for feminine muscles, it nevertheless is done almost exclusively by the fairer sex. Many devices have been patented looking to a diminution of this work, but most of them aim merely to shorten the time employed, and do not materially make the work, while it lasts, less onerous. The invention herewith illustrated is, however, intended to do the work itself, requiring only oversight.

As may be seen in the engraving, it consists of a common churn, suspended on centers in a frame, and worked by simple machinery, driven by a coiled spring, similar to but more powerful than a clock spring. As the crank, A, revolves, it not only works the dasher, but, at the same time oscillates the churn itself, thereby giving a double motion and hastening the breaking of the butter vesicles. The stem, B, of the dasher is attached to the crank, A, by a spring cap, which can be instantly removed, and the churn, by unscrewing the pivot wheel, C, be allowed to rest upon the hinged platform, D. When the churn is at work, one end of the platform is allowed to drop to the floor to allow the churn to swing. It is secured in place by a spring bolt. The pivots which suspend the churn fit into depressions in strips of metal on the sides of the churn; these depressions being placed in a vertical row, so that the equilibrium of the churn can be assured to correspond with the amount of milk or cream it contains. By this means the churn itself becomes a nicely-poised pendulum, reducing the friction, and consequently the amount of power necessary to drive it. The dasher handle is guided by a yoke, E, which is held in place by a spring latch.

The motive machinery, however, is the principal peculiarity in this device. The cap that covers it, and part of the box containing it, are removed in the engraving, to show a portion of the working parts. Inside the drum, F, is a coiled spring which gives motion to the machine. The wheel itself, G, is a modification of the worm gear, the teeth, however, being cut at an angle of about forty-five degrees, and curved on their working faces.

They engage with a very coarse screw, or rather a twist similar to that of an auger. As the drum revolves, the teeth of the wheel act as cams on the incline of the screw thread, giving for each tooth just one-half a revolution to the screw. On the screw spindle is a smaller worm gear, H, which runs the shaft that drives the crank by another screw. The spring is wound by means of the crank, I, and a pinion and gear.

These churns are made of different sizes, containing, six, ten, and sixteen gallons. The machinery can be wound up in a few seconds, when it will run from twenty-two to thirty minutes, sufficiently long to churn butter from either cream or milk. There is no heavy lifting to be done, as the churn need never be removed from the machine when it contains cream or butter, but only when empty to clean it. No particular knowledge of mechanics is necessary in the operator, as the contrivance is really self-operating.



WILSON'S AUTOMATIC CHURN.

This device was patented May 8, 1866, by N. E. Wilson. Rights to manufacture for districts and States can be obtained of J. J. Burns, Fairmount, West Virginia, or Kenyon & Co., 151 Broadway, New York City.

THE high specific heat of water enables it to heat over three thousand times its own bulk of air, in cooling through one degree of temperature.

Effect of the Removal of Forests.

At one season the earth parts with its warmth by radiation to an open sky—receives, at another, an immoderate heat from the unobstructed rays of the sun. Hence the climate becomes excessive, and the soil is alternately parched by the rigors of winter. Bleak winds sweep unresisted over its surface, drift away the snow that sheltered it from the frost, and dry up its scanty moisture. The precipitation becomes as irregular as the temperature. The melting snows and vernal rains, no longer absorbed by a loose and bibulous and vegetable mold, rush over the frozen surface and pour down the valleys seaward, instead of filling a retentive bed of absorbent earth, and storing up a supply of moisture to feed perennial springs. The soil is bared of its covering of leaves, broken and loosened by the plow, deprived of the fibrous rootlets which held it together, dried and pulverized by sun and wind, and at last exhausted by new combinations. The face of the earth is no longer a sponge, but a dust heap, and the floods which the waters of the sky pour over it hurry swiftly along its slopes, carrying in suspension vast quantities of earthy particles, which increase the abrading power and mechanical force of the current, and, augmented by the sand and gravel of falling banks, fill the beds of the streams, divert them into new channels, and obstruct their outlets. The rivulets, wanting their former regularity of supply, and deprived of the protecting shade of the woods, are heated, evaporated, and thus reduced in their summer currents, but swollen to raging torrents in autumn and in spring. From these causes there is a constant degradation of the uplands, and consequent elevation of the beds of water courses and of lakes by the deposition of the mineral and vegetable matter carried down by the waters. The channels of great rivers become unnavigable, their estuaries are choked up, and harbors which once sheltered large navies are shoaled by dangerous sandbars. The earth, stripped of its vegetable glebe, grows less and less productive, and consequently less able to protect itself by weaving a new network of roots to bind its particles together, a new carpeting of turf to shield it from wind and sun and scourging rain. Gradually it becomes altogether barren. The washing of the soil from the mountains leaves bare ridges of sterile rock, and the rich organic mold which covered them, now swept down into the dark low grounds, promotes a luxuriance of aquatic vegetation that breeds fever, and more insidious forms of mortal disease by its decay, and thus the earth is rendered no longer fit for the habitation of man.—*Marsh.*

THE total mechanical force developed by changing one cubic inch of water into 1,700 cubic inches of steam is nearly one ton.

[From our Foreign Correspondent.]

RAILWAY ENGINEERING IN LONDON.

Transportation by Pneumatic Tubes—River Steamers —Railway Systems—Steel Rails.

LONDON, Nov. 1, 1866.

In my last letter I endeavored to describe two of the means of metropolitan intercommunication in use here, and to complete the account, it is proper that I should allude briefly to two others. Before doing so, however, I will correct an error made in my statement that the station at Charing Cross belonged to the London, Chatham and Dover Railway Company. Both that and the Cannon street station are the property of the Southeastern Railway Company. They were built, with the line of railway connecting them, by a distinct company, simply for metropolitan traffic, and were afterward purchased by the above-mentioned company. The expense of carrying out this undertaking, including purchase of property, removal of buildings, and construction of the works, was, of course, something enormous, but it is worth while for us to note, as an answer to those who urge the impossibility of similar works among us, that this expense is readily met by matter-of-fact Englishmen in view of the immense traffic carried on over such lines.

One of the other systems to which I refer is the pneumatic—works for a short line under the Thames on this principle being in progress. The tubes of the Pneumatic Dispatch Company have been in operation for more than three years in conveying parcels, and the applicability of the system to carrying passengers has been amply demonstrated. The line of the Waterloo and Whitehall Railway is to cross the river just above Hungerford Bridge. The tube is made in four sections of 230 feet length each. The ends of these will be connected by being introduced into junction chambers formed in the brick piers on which they rest, the joint being made water-tight. These piers do not rise as high as the present river bottom, and a channel will be dredged across the river to receive the tubes, though the principal weight will be supported on the piers. One of the tubes is now completed at the ship-building yard of Messrs. Samuda, at Poplar, five miles below its intended situation. It is 12 feet 9 inches in diameter, inside, and is of three-fourths-inch boiler plate, surrounded by four rings of brick work, which is firmly held by cement and flanged rings riveted to the plates. Its weight as it lies is nearly 1,000 tuns. To convey it to its destination, the ends are to be closed by bulkheads, and then, having a buoyancy when in the water of about 300 tuns, it will be floated up the river and brought into position over its piers. An inner ring of brick work will then be built inside it, and just enough water admitted to sink it upon its foundation. The joints between the tubes and piers will then be made water-tight, and the bulkheads removed from the ends of the tubes. The clear span of each tube will be 221 feet.

When this line is got into operation, we shall know more about the merits of the pneumatic system, but the experience already obtained leaves no doubt of the success of the plan. The last means of getting about that I will mention is not a new one, but it is one which it has often appeared strange to me that we had not long ago adopted in New York to shorten the daily inconvenience of the half or three-quarters of an hour's ride up and down town. It is by very fast boats on the river. Of the comfort of these boats as they exist here I shall say nothing, for there is no such thing in connection with them, not even a cabin to shield one from the rain, unless, indeed, he choses, as few do, to crawl down into the hold for shelter. But as we know how to build boats in America, we need not consider that point, but look at the advantages of the system, supposing it properly carried out. The boats on the Thames are, say, 100 feet long by 12 or 13 feet beam, are fitted with a pair of low-pressure oscillating engines, and paddle wheels with feathering floats. The smoke pipes are provided with a hinge joint, enabling them to be lowered in passing under the bridges at high-tide. They run at a very high speed, stopping about every half mile, and conveying passengers within the usual city limits for 1d., and as far as Greenwich and Woolwich for 6d. Despite their defects they are a very great convenience, and I see no reason why a line of boats, like the *Sylvan Stream*, starting from the extreme end of the business portion of New York, and landing passengers at convenient intervals up town, would not be far more convenient than the present crowded horse cars, and be patronized accordingly.

The railway system of England is one of the best creations of her engineering genius, and presents a striking contrast to our own in stability and efficiency. The nature of the soil in many cases adds greatly to the necessity for, as well as the expense of, the most thorough system of drainage, and requires great care to be taken in forming cuttings and embankments. But aside from this, in all cases, the works are carried out in the most complete and finished manner. All slopes of earth are carefully sodded, which, of course, helps greatly to prevent slides and washing away. Preparatory to this, however, provision is made for allowing the water that may find its way beneath the surface, freely to escape, by, for instance, digging channel ways in various directions, where the soil is of a clayey nature, and filling them with broken stone, or by imbedding perforated drain pipes, or in some other similar manner. Where rock cuttings occur, it is not unfrequently the case that the surface is dressed off to a fair face with a chisel. The ballast used is generally broken stone, or gravel, and is maintained in such a condition as firmly to support the sleepers and to allow of thorough drainage. The sleepers are of dressed timber, generally about 9 inches by 4½ inches, and are very frequently, if not usually, creosoted to preserve them from decay. Some engineers, however, contend that though this may nearly double the life of a sleeper, yet considering the cost of doing so, with the interest, it is doubtful if it is worth while. The cost of sleepers is usually taken at 2s. 6d. each, and for creosoting 1s. extra. It is claimed by some, also, that creosoting causes the chairs to sink into the sleeper more than they otherwise would. The form of rail universally adopted in England is the double-headed, 5 inches high, and weighing about 80 lbs. to the yard. A usual length is 7 yards. The opinion of engineers is that this rail is none too heavy for the present heavy traffic and high speeds with large and therefore destructive engines. When we reflect that the vertical stiffness of a 5-inch rail is three times that of one only 3½ inches high, we can see how much better adapted such a rail is to bear the strains that come upon it. The rails rest in a chair on each sleeper, these being placed 3 feet apart, and in some cases even less. The joints are secured by fish plates, about 14 inches long, the joint occurring between two sleepers. This reduces to a great extent the hammering action of the wheels that occurs where the ends of the rail rest, as with us, on an anvil, or chair. The portions of the rail resting on the chair become indented after a time (unless a piece of wood is interposed), and this makes them defective when turned over. On some roads, moreover, it is held that rails that have been reversed after wear are much more liable to breakage.

The great question now being considered is the introduction of steel rails. The surprising results that have appeared where these have been laid alongside of iron rails, in places subject to very heavy traffic, have already caused their adoption on nearly all lines for use near stations, and at all places where the way is liable to great deterioration. The Great Northern Railway has adopted them for use on all their inclines, while the London and North Western Company have erected works of their own capable of supplying 350 tuns of steel per week, 300 of which is worked up into rails. The question is merely one of first cost and interest, and it is now pretty generally conceded that steel rails at £15 per tun, lasting 40 years or longer, are cheaper than iron at £7 10s., lasting 8 years, especially when it is considered that, on account of its superior strength and stiffness, a steel rail weighing 70 lbs. to the yard is more than equal to an iron rail weighing 80 lbs.

At first it was urged that steel rails, when worn out, would be useless from the impossibility of piling and re-rolling them, while old iron rails could easily be re-worked in any desired manner. All fears on this ground have, however, proved quite unnecessary, as numberless uses have been found for which the old steel rails, as well as the crop ends formed in their manufacture, are desired, so that these bring readily from £7 to £8 per tun. Among these uses may be mentioned rolling into plates, to be used in making kettles, by stamping, instead of charcoal plate; plates for nail cutting, telegraph wire manufacture, and hundreds of other purposes for which the metal is extremely valuable. Or it may be remelted in the converter or otherwise, and be again produced as rails. As stated in my last letter, the production of steel rails in England already amounts to 1,000 tuns per week.

The form of rail in vogue on the Continent is the single headed, but, like the English, 5 inches deep. Here, also, steel is taking the place of iron on many lines, with a corresponding decrease in the expenses for renewals.

No railway line in England is allowed to cross another, on the same level, and even branch lines of the same road cross the main line by a bridge. The network of viaducts near large cities, and especially London, required for this purpose, is something bewildering, it being not at all unusual to see roads crossing each other three deep. It is difficult to see how traffic would be even possible, to say nothing of safe, without this arrangement, in places where from 600 to 700 trains pass daily. Also at all carriage roads on the line, if not provided with a bridge, as the principal ones are, a suitable gate and gate keeper are employed, and everything is done to insure safety. Passengers are in no case allowed to cross a line of rails at the stations, but bridges or tunnels are provided for this purpose, all of which precautions it would be well to introduce into our own enterprising but unsystematic country. Increasing business and experience, however, will, no doubt, produce the same results there as they have here. SLADE.

Practical Hints.

No. 2. TO KEEP MERCURIAL STEAM GAGES PERFECTLY CLEAN INSIDE.—General experience has shown that the mercurial steam gages in the course of time often become dirty in their interior by mercury and its oxide adhering to the glass, so that it is very difficult to see the position of the surface of the mercury. The consequence is, of course, an uncertainty as to the amount of steam pressure. A simple and very effective remedy is, to bring on the surface of the mercury a little glycerin; this serves as a lubricator for glass and mercury, covering the surface of both, preventing their immediate contact, and consequently all adhesion, and keeping it always clean and bright. This simple remedy is spoken very highly of by all who have tried it.

No. 3. WHAT IS THIS GLYCERIN, AND WHAT IS IT MADE OF?—This question being often asked by those who observe that glycerin is now-a-days coming more and more in use for different purposes, we take this opportunity to give a short explanation about its nature and origin.

Glycerin is one of the constituents of all animal and vegetable fats and oils; it is not found in petroleum nor other oils of mineral origin, nor in ethereal oils. A very large number of compounds consist of acids, which are combined with other substances having the opposite qualities of an acid, and are called bases; these bases commonly neutralize the acids; that means, they destroy the acid properties, form a compound which is called a salt, and which is usually neutral; for instance, so is green vitriol formed of sulphuric acid, neutralized by the base protoxide of iron. In the same manner the animal and vegetable fats and oils are formed by the so-called fatty acids, neutralized by the base, glycerin. The principal fatty acids are stearic and oleic acid; the first is solid and hard like white wax, and from it the so-called stearin candles are made; the last is fluid and now extensively used to grease wool when weaving it into flannels, cloths, etc., as it is more easily removed by washing than the oils themselves.

The art of making soaps consists in combining these acids, contained in the fats and oils, with other bases stronger than glycerin; these bases are potash and soda; the first forms a soft, the last a harder soap; the glycerin is separated or set free in this process, part of it remains mixed with the soap, and the other part is lost during the manufacture, being washed away; the saving of it would be a most important economy, and several chemists have lately occupied themselves to accomplish so desirable a result.

V.

THE ORIGIN AND COMPOSITION OF PEAT.

Whatever dispute there may be as to the origin of coal, there can be no valid question that the composition of peat is mainly vegetable. The evidence of this is of a *prima facia* character; for even those varieties which appear to the unaided eye but masses of smooth, oily muck, show, under the microscope, the remains of minute mosses, which flourished and died through countless generations, and sank below the water which sustained and supported them while living.

On many a plain, on lofty table lands, in gorges and valleys, wherever water gathers, from a thousand sources miniature pools or extensive morasses are formed by the water being held stagnant and imprisoned by the solid clay or hard rock beneath.

On the surface of these silent waters confervæ, so minute as to be visible only as a green scum, appear, live their brief life, and sink to the bottom. Others immediately take their places, live and die, until film after film is deposited. In time this very gradual accumulation becomes a palpable mass; not, indeed, until countless generations of these confervæ have lived and died. Particles of sand and stones gather and are held; the decaying roots of adjacent plants, killed by the sluggishness of these waters of death, help the accretion of the mass. It rises year by year until it affords a foothold for water fowl, which add their qualities of guano, and at last it covers the dark waters and forms a peaty mold extending to the surface.

These changes have been passive; but the water still accumulates, and at length becomes aggressive, breaking through the felt-like mass and destroying the daring vegetation that attempts to procure a foothold over the treacherous slime. Below all is the water; next, the black peat, composed of these almost invisible confervæ; then the closely interwoven mummies of roots, which make the surface turf, or peat.

Vast regions of the globe, called by geographers "solid land," are covered by these peat bogs, or treacherous morasses. The table lands of the South American Cordilleras; the immense plains of frozen Siberia; about one-tenth of the island of Ireland; large parts of Scotland, Germany, Jutland, Norway; the gorges and valleys of the Alps, and innumerable localities on this continent, are occupied with these moors. Within the limits of the polar circle and under the burning sun of the tropics they exist and increase. They do not rest. Their quiet is only apparent. The slow but sure progression of the moor is insured by the increase of water and the accumulation of decayed and dying vegetation; so that at times the air and gases, imprisioned beneath the tangled network of roots and fibres and the coat of deceptive turf, assert their right and burst all restraints, sending forth streams of black, liquid mire, which overwhelm or destroy all within their reach.

But the silent and almost unobserved action of these peat marshes is not less remarkable. Quietly, gradually, but irresistibly as fate itself, wherever they exist, they exist but to destroy. They undermine the roots of proud forest trees and sink them, still upright, in their miry depths, beyond the reach of sunlight and air. Or, they cut them down and swallow roots, branches, and foliage beneath their insatiable waters.

Water either in motion or at rest is a great destroyer. Where the solid land or dense vegetation does not offer a bar to its aggressions, it comes in to usurp and reign. We have in our recollection one notable instance. In provincial times a large tract in the little State of Rhode Island was a thick cypress or cedar swamp, the resort of innumerable animals as wild as their habitation. The trees were cut down, the vegetation killed by fire, and the waters came in, and now the tract of salt water, called "Hundred Acre Cove," covers thousands of acres and affords fine fishing grounds, rendezvous of water fowl, and a magazine of fuel and fencing material by its wealth of stumps and roots.

What are commonly known as salt marshes are now or are becoming beds of peat. The accumulation is very gradual, the growth of one season forming a thin layer to be succeeded by another. The rank grasses, rushes, and other water plants and the shrubery, which retains a precarious foothold on the surface, add to the mass year by year. In time what was a treacherous morass becomes apparently *terra firma*, and more advanced forms of vegetation take the place of the aquatic growth; a forest rises over a marsh. The marsh, however, is still there, and below the roots of the trees is a spongy bed of peat. The sea itself holds in its relentless grasp vast deposits of this substance, destined perhaps hundreds of thousands of years hence, to furnish fuel and light to other races of man. The sea in many places is making encroachments on the land, or rather the land is sinking below the sea level. Where, as in the case of the "Hundred Acre Cove," the barrier to the sea has been removed by human agencies, the ocean has usurped and held dominion.

Even beneath the shade of forests growing on solid ground, peat has formed and is in process of formation. The foliage of the trees, with the countless shrubs that grow in dank luxuriance in the impenetrable shade, decay and form layer after layer of soft, slimy substance which becomes in time concreted into genuine peat. Thinning the forest dries the soil, and in time the peat is a dry, fibrous substance, naturally prepared for the use of fuel.

MISCELLANEOUS SUMMARY.

THE New York *Sun*, in a series of articles describing how the city is fed, gives some interesting statistics. The estimate is made that 5,525,000 pounds of beef, 112,500 of mutton, 72,000 of veal, and 2,400,000 of pork, are sold every week in Washington Market. The consumption is less during the months of March and April, owing to the abundant supply of fish. The daily quantity of milk used amounts to 125,000 quarts; of butter, 62,500 pounds; of cheese, 8,944 pounds. The actual table expenses for each day for every man, woman, and child of the population, averages 37 cents a head, divided as follows: meat supply, about 16 cents, fish supply, 2 cents, eggs and poultry, 2½ cents, vegetables, 3 cents, fruit, 1½ cents, bread, 7 cents, tea, coffee, and sugar, 5 cents; the total sum expended daily by the city in eating, $370,000.

A VETERAN CRANK.—A cast-iron three-throw crank had, until last week, worked in Messrs. Combe, Delafield and Co.'s brewery for nearly one hundred years, the father of the present manager having known it as "the old crank" early in the present century. It was 3 inches in diameter in the necks, and worked three single-acting pumps of about 6 inches barrel and 2 feet stroke. When the sluices have been accidentally closed, the pumps have brought up the 35-horse engine on more than one occasion. Last week, however, the old crank suddenly gave way in its ordinary work. The fractured parts are now at Messrs. Morland's factory, St Luke's. Such cast iron is not often to be had now-a-days.—*Engineering.*

CHILLED SHOT.—It appears a little singular that while the London *Engineer* denies that chilling or casting in metal molds gives the superior hardness to the Palliser projectile, and says that it is due entirely to the use of hard white iron, which would be the same if cast in sand, the *Engineering*, on the other hand, states "authoritatively that no specific brand or mixture is employed to the exclusion of others. The softest gray iron, although it will not chill when first cast in iron molds, will, on being then re-melted, chill deeply." When doctors disagree, etc.

HUMAN ELECTRICITY.—In looking over a volume of the "Quarterly Journal of Science," published in London in 1820, mention is made of the fact that Dr. Hartman, of Frankfort, had published a statement that he was able to produce at pleasure, an efflux of electrical matter from himself toward other persons. He also asserted that he had acquired this faculty to so high a degree that he could make a spark issue from his finger. The editor of the "Quarterly Journal of Science" regards the announcement of this now well-known phenomenon as very strange, fit only to be classed with the reveries of animal magnetism.

PATENTS IN AUSTRALIA.—We have established an agency at Melbourne, Australia, for taking out patents in that colony. Parties wishing information on the subject can obtain it by addressing the proprietors of this journal.

THE New York *Herald* is certainly a great paper. In a recent number, in discussing the meteoric showers that occurred in 1833, and about which so much has been said of late, the editor states that he was in the city of Washington sound asleep at the time, and was aroused from his slumbers by a colored person who informed him that the "Kingdom of heaven was coming." The editor then goes on to show what remarkable occurrences took place afterward, and draws therefrom the inference that following the appearance of these meteors, old political parties would be broken up, that His Holiness the Pope would migrate to this country and here establish the headship of the church, and wound up his observations with the pious hope that President Johnson and the Southern States would derive great spiritual comfort from these celestial visitors.

CAPT. J. NORTON, in a letter to the Dublin *Irish Times*, says he is the inventor of the elongated shot shell, and that the late experiments in America at Fortress Monroe, with Rodman's 12-inch rifled cannon, throwing elongated shot of 620 lbs., as recorded in the SCIENTIFIC AMERICAN, speak well for his invention. The report in this journal which the writer refers to, designates the elongated shot used in the experiments as the "Dyer projectile, constructed on the expanding principle, and quite recently brought to a state of perfection by Mr. Thomas Taylor of the Washington arsenal." Possibly the two claims may be entirely reconcilable.

CHROMO-LITHOGRAPHY.—This beautiful art is making a rapid progress in this country, a fact we are most happy to record. Messrs. L. Prang & Co., of Boston, by a great deal of conscientious labor, have succeeded in producing a great variety of the most elegant specimens of this art. We have now before us four specimens of their most recent chromos, copied from French water colors. These pictures, The Linnet, The Bullfinch, The Sisters, and The Baby, are so skillfully done, that a practiced eye would scarcely detect that they were not genuine oil paintings.

THE manufacture of knit goods, although a new branch of industry in this country, employs at the present time not less than 400 sets of machinery, and 40,000 hands, furnishing goods valued at $20,000,000 per year. One of the peculiarities of this branch of business lies in the fact that it furnishes remunerative employment to women at their own homes. In the manufacture of all-wool socks, for instance, the finishing of heels and toes is all done outside the wall, giving constant work for one hundred and five women for every set of machinery.

BREECH-LOADERS.—The British Secretary of State for War has invited proposals for breech-loading rifles, to replace the present service rifles. The various conditions of the arm are minutely specified. Rewards of £1,000, £600, £500 and £400 are offered for the best cartridge. If the rifle to which the first prize is awarded is adopted into the service it will bear the inventor's name. There will be a trial of the arms accepted for competition, and £300 will be paid to each accepted competitor.

PEAT.—A correspondent desires the views of other correspondents on peat, its properties, value as a fuel, best method of manufacture, etc. We give in this issue some facts in regard to its production, which will be followed by an article on its value, manufacture, and use. As to deciding on the best means or machinery for preparing it for the market, our advertising columns are open to the proprietors and makers of rival machines.

AN English statistician calculates that the annual earnings of the working classes in Great Britian and Ireland amount to £418,000,000, of which the laborers of England receive nearly three-fourths, those of Scotland one-tenth, those of Ireland two-thirteenths. Taking the average weekly wages, and assuming that there are two earners in each laborer's family, the income may be estimated in our money at $8 in England, $7 25 in Scotland, and $7 75 in Ireland, per week.

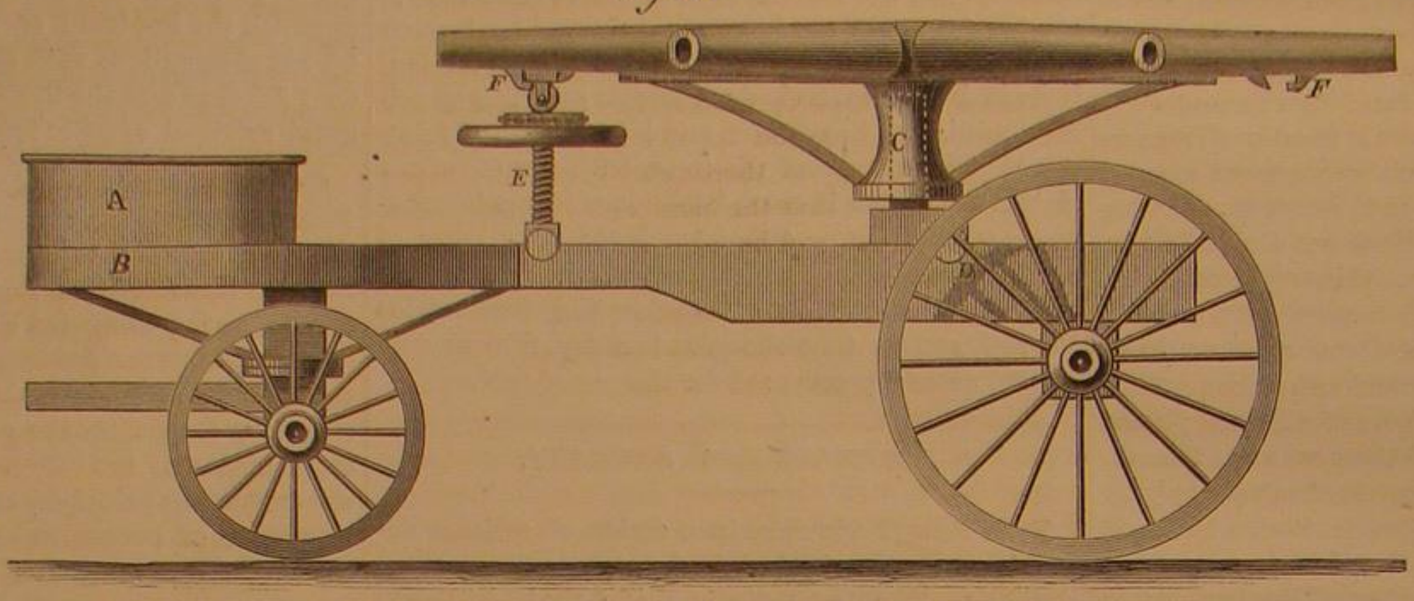
AT Lyons silk and linen goods are exhibited for sale having names and devices photographed upon them. The process is said to be easily and rapidly effected, and the picture is not at all injured by washing.

Improved Revolving Gun.

While the Gatling gun is a series of barrels clustered around a longitudinal axis, like the chambers of revolving pistols, other alterations in the build of combination guns have been made giving this species of weapon an entirely different character. The one represented in the engravings is a group of six barrels, the breech being a common center-block, and the muzzles radiating like the spokes of a wheel, the whole revolving in the same horizontal plane.

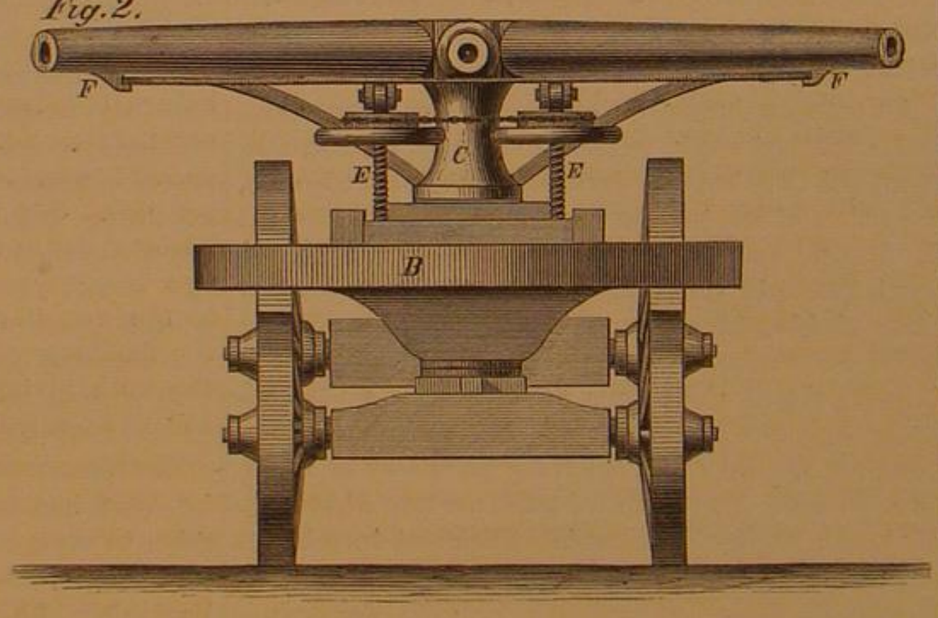
Fig. 1 is a vertical side elevation of the gun, carriage, and caisson, and Fig. 2 is an end elevation. The caisson, A, is semicircular, mounted on the platform in the rear of the gun, the platform here being circular, as seen at B. The barrels are loaded from this point. The guns are sustained on the block, C, which envelops an upright stud that is pivoted to the platform, at D, to allow for raising or depressing the muzzles. A semicircular rest receives the weight of the three rear barrels, and has two rollers which bear on the heads of the elevating screws, E, which are connected by a machine chain, so that operating one hand-wheel moves the other. The barrels have lugs, F, on their lower sides, which, when brought to the rear successively as the gun is rotated, engage with the semicircular rest and retain the barrel in line. The elevating screws are pivoted at their lower ends, securing always direct action on the weight of the gun, whatever the position of the barrels. The cooling of the barrels and the process of constant loading in action, which are claimed for this gun, would make it superior in these respects to some other devices for rapidly-firing arms.

Fig. 1.



MILBURN'S PATENT REVOLVING GUN.

Fig. 2.



This device was patented through the Scientific American Patent Agency on Sept. 4, 1866, by N. L. Milburn, of St. Louis, Mo. Address as above for further information.

Exports of the World.

France exports wines, brandies, silks, fancy articles, jewelry, clocks, watches, paper, perfumery, and fancy goods generally.

Italy exports corn, oil, flax, wines, essence, dyestuffs, drugs, fine marble, soap, paintings, engravings, mosaics and salt.

Prussia exports linen, woolen, zinc, articles of iron, copper, and brass, indigo, wax, hams, musical instruments, tobacco, wines, and porcelain.

Germany exports wool, woolen goods, linens, rags, corn, timber, iron, lead, flax, hemp, wines, wax, tallow and cattle.

Austria exports minerals, raw and manufactured, silk thread, glass, grain, wax, tar, nut-gall, wines, honey, and mathematical instruments.

England exports woolen, glass, hardware, earthenware, cutlery, iron, metallic wares, salt, coal, watches, tin, silks and linens.

Russia exports tallow, flax, hemp, flour, iron, copper, linseed, lard, hides, wax, duck, cordage, bristles, fur, potash and tar.

Spain exports wine, brandy, oil, fresh and dried fruits, quicksilver, sulphur, salt, cork, saffron, anchovies, silks, and woolens.

China exports tea, rhubarb, musk, ginger, zinc, borax, silks, cassia, filagree works, ivory-ware, lacquered-ware and porcelain.

Turkey exports coffee, opium, silks, drugs, gums, dried fruits, tobacco, wines, camel's hair, carpets, camlets, shawls and morocco.

Hindostan exports silks, shawls, carpets, opium, saltpeter, pepper, gum, indigo, cinnamon, cochineal, diamonds, pearls and drugs.

Mexico exports gold and silver, cochineal, indigo, sarsaparilla, vanilla, jalap, fustic, campeachy wood, pimento, drugs and dyestuffs.

Brazil exports coffee, indigo, sugar, rice, hides, dried meats, tallow, gold, diamonds and other precious stones, gums, mahogany and india-rubber.

East Indies export cloves, nutmegs, mace, pepper, rice, indigo, gold dust, camphor, benzoin, sulphur, ivory, ratans, sandalwood, zinc, and nuts.

Switzerland exports cattle, cheese, butter, tallow, dried fruit, limes, silks, velvets, laces, jewelry, paper and gunpowder.

Japan exports tea, leather, silks, lacquered ware, gold, silver, and fancy ornaments.

West Indies export sugar, molasses, rum, tobacco, cigars, mahogany, dye-wood, coffee, pimento, fresh fruits and preserves, rubber, wax, ginger, and other spices.

United States export principally agricultural produce, cotton, tobacco, flour, provisions of all kinds, lumber, turpentine, the precious metals, whale oil, fish, wearing apparel, machinery, and many other manufactures.

Colors in their Relation to Artificial Light.

Never select colors in the evening, is an old maxim, whose value can be attested by many a disappointed purchaser, who, ignorant or disregarding this advice, and deeming himself the favored possessor of some tint of rare excellence, discovers on the return of daylight a color far from equalling his anticipations. The artist, overtaken by darkness, hastens to apply the last touches to some masterpiece, but the morning light reveals how poorly his intentions have been realized. The cause of this inconstancy is explained, and a remedy suggested, in a late article in the *Photographic News*.

From the spectral analysis, we learn that the flames of our lamps or gas lights contain sodium, which, in burning, yields a yellow flame, as strontium gives a red, and iridium a blue flame. Now when the color blue is illuminated by the yellow light it appears green, but if the flame strikes a color complementary to yellow it will appear white or black, according as the body has, or has not, the power of reflection; which is equivalent to saying that this flame alters the nature of colors, deepening the hues of some and extinguishing others.

Take a spirit lamp and put into it a piece of common salt, the wick will soon become saturated with sodium in solution, the flame, in consequence, will be yellow, and all colors will assume a monotonous white, black, or gray. It is only when this substance is in excess that we have the total extinction of colors, but a flame less rich will produce a partial extinction, and this is the reason why colors are at all visible by gas light. It may be asked, where does illuminating gas derive this sodium? From the coal, from the water with which the gas was washed; it comes also from matters employed in its purification, and probably even from the atmosphere.

The only hues which resist only slightly the yellow flame, are furnished by the blue; all the other colors are profoundly modified. Fortunately the flames which serve as sources of light are never saturated with sodium, hence the effects are greatly modified.

The light from the burning of magnesium alone brings out the various colors, both natural and artificial, in the same hues as they appear by day light. The services of chemistry render, then, to painting not only colors more or less rich, but also it has endowed it with a mode of lighting, whereby the painter may be able to work at night without incurring mistakes or illusions.

Producing Printing Surfaces by the Aid of Photography.

Mr. Winstanley, of Manchester, England, has secured a patent for an improved mode of producing printing surfaces by the aid of photography. The following description from his specification may prove interesting to our readers.

"In my process of printing by the aid of photography, lights and shades are represented by accumulation of dots, equal in number, but differing in magnitude, or equal in magnitude but differing in number. The method of producing the gradations in the former way I will now proceed to describe.

"It is well known in photography, that when a layer of bichromated gelatin, or other suitable material or mixture, is exposed in a proper manner under a negative photograph to the chemical action of light, its parts are rendered more or less insoluble in proportion to the extent in which they have been acted upon; those portions that have not been acted upon by light are dissolved out, and a relief picture is thereby obtained. According to my invention I take a framework of metal, filled with a number of short vertical wires having uniform conical ends, all held together and secured by suitable means.

"A photo-relievo having been obtained as above, the frame is placed upon the gelatin, and by a gentle vibration, the wires are pressed down on the uneven surface of the relief, and the whole is then secured in this position. By this means a reverse of such picture in a series of points is obtained.

"The back of the wires is now to be leveled, and from this surface, pictures in ink may be obtained precisely as in block printing. The resulting picture will possess gradations of tone or shade produced by dots of greater or less diameter, and will be positive and correct, or negative and reverse, according as an intaglio or relief was used in the former process."

In Illinois lately a number of horses grazing had their tongues bitten by the grasshoppers, making them so sore that the animals refused to eat, and died from starvation.

A dose of half a grain of bromide of cadmium dissolved in warm water, is a powerful emetic, three times more so than tartar-emetic, and twelve times more effective than sulphate of zinc.

Correspondence

Practical Surgery in Cases of Accident.

MESSRS EDITORS:—I beg leave to call attention, through your columns, to a matter which, although not within your immediate province, must concern many of your readers. The utmost care and skill in the management of railroads, machine-shops, and factories, cannot always avert accidents, often so grave as to imperil or destroy life. Very often, however, these accidents prove fatal, or the subjects of them experience much suffering, because those who are on the spot and uninjured do not know of some simple measures to be taken at once, before regular surgical assistance can be had. Such cases occur within the observation of all hospital surgeons. I have seen many of them, and one which came under my notice last summer, and proved fatal, especially impressed me with the importance of preventing them, if it can be done. I have, therefore, prepared the following set of brief and simple directions in the plainest terms, as to the course to be pursued under such circumstances. The dangers to be feared in these cases are, shock or collapse, loss of blood, and unnecessary suffering in the moving of the patient.

In shock the injured person lies pale, faint, cold, sometimes insensible, with labored pulse and breathing.

Apply external warmth, by wrapping him up (not merely covering him over) in blankets, quilts, or extra clothes. Bottles of hot water, hot bricks (not too hot) may also be wrapped up in cloths and put to the armpits, along the sides, and between the feet, if they are uninjured.

If the patient has not been drinking, give brandy or whisky in tablespoonful doses every fifteen or twenty minutes—less frequently as he gets better. Food (strong soup is the best) should also be given now and then.

If the patient is not bleeding, do not apply any constriction to the limb, but cover the wounded part lightly with the softest rags to be had (linen is the best).

If there is bleeding do not try to stop it by binding up the wound. The current of blood to the part must be checked. To do this, find the artery, by its beating; lay a firm and even compress or pad (made of cloth, or rags, rolled up, or a round stone, or piece of wood, well wrapped), over the artery, tie a handkerchief around the limb and compress; put a bit of stick through the handkerchief, and twist the latter up until it is just tight enough to stop the bleeding; then put one end of the stick under the handkerchief to prevent untwisting.

The artery in the thigh runs along the inner side of the muscle in front near the bone. A little above the knee, it passes to the back of the bone. In injuries at, or above the knee, apply the compress high up, on the inner side of the thigh, with the knot on the outer side of the thigh. When the leg is injured below the knee, apply the compress at the back of the thigh, just above the knee, the knot in front.

The artery in the arm runs down the inner side of the large muscle in front, quite close to the bone; low down it gets further forward toward the bend of the elbow. It is most easily found and compressed a little above the middle.

Care should be taken to examine the limb from time to time, and to lessen the compression, if it becomes very cold, or purple; tighten up the handkerchief again if the bleeding begins afresh.

To transport a wounded person comfortably, make a soft and even bed for the injured part, of straw, folded blankets, quilts, or pillows, laid on a board, with side-pieces of board nailed on, where this can be done. If possible, let the patient be laid on a door, shutter, settee, or some firm support, properly covered. Have sufficient force to lift him steadily, and let those who bear him not keep step.

JOHN H. PACKARD, M. D.
1,415 Spruce street, Philadelphia.

[Dr. Packard has published the above rules with illustrations, which he furnishes at cost of publication.—EDS.

Preserving Meat.

MESSRS EDITORS:—In an article in one of your late papers speaking of "Three Processes of Preserving Meat," you mention Morgan's, Liebig's, and McCall and Sloper's, and leave it to be inferred that they are the only ones. I desire to state, and hope that you will make the correction, that Dr. N. B. Marsh, of Cincinnati, Ohio, obtained a patent for an "Improvement in Curing Flesh for Food," Nov. 30, 1858, by sending a strong solution of brine through the natural channels of circulation, thereby impregnating the whole animal at once with salt, removing the animal heat and salting him thoroughly.

Dr. Morgan's patent was obtained in England, in 1863, and he cannot, therefore, be considered the first inventor. Dr. Marsh's process has been and is now in successful operation in this country. I myself have salted a hog so thoroughly in eight minutes in warm weather that the hams and shoulders could be smoked at once, and have kept a long time exposed to the weather. WM. C. ALBERGER

Buffalo, N. Y., Nov. 15, 1866.

Soluble Glass.

MESSRS. EDITORS:—In your valuable paper of the 17th inst., you state that the silicates of soda and potash have been known for more than a century. I beg to differ with you in opinion. Although it is known that as early as 1640 it was observed by von Helmont, that a compound consisting of quartz, sand, and a surplus of alkali was liquefied when exposed to the air, yet those definite combinations of silica with soda or potassa, which we call soluble glass, were not prepared until 1825; they were discovered by the German chemist Fuchs. There are four kinds of soluble glass:—1. The silicate of soda; 2. Silicate of potassa; 3. Silicate of soda and potassa, and 4. Soluble glass for fixing colors, mainly a combination with silica saturated double silicate. For the preparation of these various kinds of silicates, Fuchs has given the following prescription:—

Silicate of potassa, 45 parts quartz, 30 parts potassa, 3 parts charcoal. Silicate of soda, 45 quartz, 23 calcined soda, 3 charcoal, or 100 quartz, 60 calcined glauber salt, 15 charcoal. Double silicate, 100 quartz, 28 potassa, 22 soda, 6 charcoal. The ingredients here named are to be ground, thoroughly mixed, and then melted together, which operation is conducted best in a glass furnace; the melted mass is at last boiled in water and the thereby-obtained liquor forms the soluble glass. The last of the above named kinds is obtained by melting together 30 parts of calcined soda with 20 parts of quartz, and mixing the liquid obtained with silicate of potassa.

Soluble glass has since its discovery been proposed for quite a number of applications, both in industry and arts. Many of these, not being practical, have been abandoned, but its applicability for making inflammable bodies fire-proof, when coated or impregnated with it, is of real value; it may for this purpose previously be mixed with ground clay, chalk, blast-furnace slags, feldspar or other similar substances.

Soluble glass may also be mixed with colors, forming fire-proof paints. We hear that this manufacture is carried on by the "Atlantic Quartz Company," in West Philadelphia, on quite a large plan.

The soluble glass has also given birth to a new kind of fresco painting, named by Fuchs "stereochromy." In this kind of painting the soluble glass forms the ground and also the binding of the colors, which are really silicified with it, and stand, therefore, the atmospheric influences, which destroy so easily common frescoes. For stereochromic colors these are recommended: fine white, chrome green, cobalt green, chrome red, the American vermilion, iron minium, sulphide of cadmium, ultra marine, ocher, terra di sienna, and umber. Sulphide of mercury, the old vermilion, cannot be used, getting brown, and, finally, black, by exposure to light.

If wished, I shall give a full description of this interesting mode of painting in another issue.

ADOLPHUS OTT.

Philadelphia, Nov., 1866.

[We shall be pleased to receive the description mentioned by our correspondent—EDS.

The Usefulness of Salt.

MESSRS. EDITORS:—Salt is one of those substances which is not only in relation to mankind of the greatest influence, but decidedly necessary to life, both animal and vegetable. Without iron or coal we might live, but not without salt, the latter forming, in the composition of the blood, a necessary substance. Not only does it serve as a condiment to all our food, but also as a preservative. Meat, fish, vegetables and butter are kept through the use of salt from being spoiled, which thus enables sea-faring men and all those at a great distance from all sources of alimentary supplies, to enjoy the benefit of proper and wholesome food.

Farmers well know how beneficial salt is to cattle, and consequently mix it with their food. Neither can agriculture flourish without it, for the soil also requires a certain quantity to render it fertile. *Ut supra*, we find no end to the various uses of salt, and its extreme utility is apparent even to a child. But not less important we find its use in all branches of manufacture based on chemistry. For instance, in the preparation of hydrochloric acid, of chlorine, and of bleaching powder, of glauber salt, soda, sal ammoniac, and many other products. For the making of soap and glass, salt is indispensable. Besides this, it serves in tanning, the glazing of pottery ware, in extracting silver and copper from their ores, and for such purposes as the freezing of ice cream.

In fact, we are reminded everywhere and every day of the usefulness of salt. The linen we put on betrays in its snowy purity the chlorine bleaching performed by salt the shoes which we wear; needed salt for their tanning; for washing we hold in the soap we are about to use only another form of salt; the tumbler out of which we drink hides in its material the principal substance of salt. The copper kettle steaming on the fire is at different places soldered by borax, which is indirectly made from salt by soda; by the aid of salt our teaspoon obtained its whiteness, and so has all that highly esteemed metal on the table, being extracted from the mineral by salt. Silver, glass and crockery ware all needed it in their manufacture, and so did the cook in the preparation of breakfast. Did he put salt in the milk? No, but it contains chloride of sodium or salt. Breakfast over, we put on our spectacles to read the news; again the clear glass through which we see has its origin partly from salt, and the paper in our hands owes its whiteness to that wonderful element, chlorine of salt. The bell rings, a patient has come to solicit medical advice, we think, then write a prescription, and among ten medicines which come to our mind, at least five, either in their composition or the manner in which they are prepared, needed salt.

In fact, we scarcely can keep our thoughts away from that wonderful, in thousand-forms-appearing substance—salt. A. O.

AMERICAN INSTITUTE---POLYTECHNIC BRANCH.

Our reports of the last three meetings of this association, though duly prepared have not regularly appeared, owing to the press of other matter which has accumulated on our hands. In our contemplated enlargement on the opening year we shall find an agreeable relief for our now over-crowded columns. Prefaced with this explanation, we present a general résumé of proceedings at the meetings refered to.

IMPROVED MODE OF OBTAINING OXYGEN.

A French patent has lately been issued for obtaining this gas by means of any metallic oxides or acids which form superoxidized compounds, and possess the power of giving off particles of oxygen, and on being heated of regaining the same. Any one of this class may be placed in a retort, and exposed to the action of steam, the oxygen given off is collected in a gas holder. When the gas ceases to be eliminated, the flow of steam is stopped, and the oxygen is again absorbed from the air to be driven off by a fresh supply of steam.

TO DETECT SULPHURIC ACID IN VINEGAR.

If into pure vinegar starch is introduced, then the adding of a minute portion of iodine will change its color to a blue tint; but if sulphuric acid is present, no such reaction will take place, for the resultant of starch in its presence is glucose, a substance not affected by iodine.

AVERY STEAM ENGINE.

The first engine ever built upon this plan was pre-

sented to the institute for preservation. The principle by which motion is obtained is that of the well-known Barker mill. Two long and hollow metallic arms or vanes are hung so as to revolve in a vertical plane; steam enters by the axis and escapes through orifices at the ends of the arms; the reaction causes the vanes to revolve with great velocity.

BURGLAR-ALARM WHISTLE.

Prof. Vander Weyde, conducting a series of experiments on the management of the Argand gas burner, explained how by a simple contrivance the supply of air to the inner and outer flame can be regulated so that the maximum amount of light can be obtained at a great saving of gas, and thus this favorite burner may be economically employed. The alarm whistle, introduced in this connection, consists of a short metallic cylinder terminated in a tube of perforated zinc; this is to be placed between two gas burners, the upper one is lighted, and a small flame is kept burning as a night lamp. By a suitable connection, the opening of a door or window turns on a supply from the lower gas burner; this, mingling in its ascent with the air, forms an explosive mixture which, ignited, burns upon a piece of wire gauze placed in the tube, causing a low, shrill whistle.

This principle the Prof. had employed in building a small organ, but as each tube produced two notes, the effect was not pleasing, and the plan was abandoned.

BUNSEN BURNER.

The more light produced from a flame, the less heat, and *vice versa*. The white flame is used when artificial light is needed, but when we require from the same amount of gas, heat rather than light, we have a blue flame, as in the Bunsen burner.

When the temperature is raised to a white heat, the particles of carbon are entirely consumed, but in the blue flame portions of the carbon are driven off before they are burned; hence when the blue flame is seen escaping from the smoke pipe of a steamer, we may be assured that the fuel is not all utilized.

The report of the French Commissioners, published in 1852, showed that the greatest amount of light is obtained at the expense of twenty-seven per cent of carbon.

Concerning the relative heating power, it was stated that a given quantity of water, held one foot from the flame of a Bunsen burner, boiled in fifteen minutes, the other conditions being the same, and placed over a yellow flame, it required thirty-five minutes to boil. In a second series of experiments the flames were inclosed in a cylinder, and every precaution was taken to do away with radiation; the general result then showed a gain in heating power of one-half of the blue over the yellow flame.

PETROLEUM.

It is a singular fact that in boring for oil, the heaviest are first found, generally at a depth varying from eighty to one hundred feet, while the lighter petroleum is seldom reached at less than eight hundred or one thousand feet depth. The oils nearest the surface were undoubtedly once light, but by absorbing oxygen, their nature has been changed. Possibly to these deposits of oil earthquakes may be due. The vapors given off at great depths exert an immense pressure, as shown by the hight to which a column of oil is projected when an opening is artificially made. If for any reason spontaneous combustion takes place, this irresistible power opens a fissure through which the gases expend themselves.

Prof. Vander Weyde, in an explanation of the products of the distillation, stated that at a temperature of 70 deg. Fah., chimogene was given off; at 120 degs., rhigolene; at 170 degs., gasoline; at 250 deg., naphtha; at 300 degs., benzine; at 400 degs., light kerosene; at 500 degs., kerosene; at 600 deg., heavy kerosene, and at 700 degs., paraffine.

FOUR years ago, an agriculturist on the Isle of Man, planted a single grain of barley, producing the same year 300 grains. These were sown, and the second year's product was about half a pint, which were again sown, and yielded fourteen pounds, and on being sown again last spring realized this year seven bushels.

Notes and Queries

C. R., of ——.—To produce the imitation twist on gun barrels, stripe the barrel, when quite clean, with a varnish made of white wax, two oz.; Burgundy pitch and common black pitch one-half ounce each; melt and add gradually powdered asphaltum two ounces. Boil until well mixed, and dilute for use with spirits of turpentine. Apply it with a camel's hair pencil according to the pattern required. Then use a mixture of one part nitric, one part sulphuric acid, and two parts water. Wash the barrel with this and in a few hours the exposed parts will be etched sufficiently, when the resisting varnish can be removed with turpentine and the barrel, while warm, rubbed with beeswax.

R. H. S., of Mass.—Multiply the number of feet traveled by the piston per minute by the total pressure on the piston and divide by 33,000. This will give you, approximately, the nominal horse-power of the engine. Better get some manual on the steam engine, or on mechanics, and study.

W. P., of C. W.—Henry C. Baird, 406 Walnut st., Philadelphia, publishes the "Miller, Millwright and Engineer," which will probably give you the information you require. In No. 11, current volume, SCIENTIFIC AMERICAN, you will find a recipe for a millstone cement. . . . The power of engines is not tested by raising weights, but by calculating the pressure on the piston with its speed of motion.

H. C., of Ct.—By mixing some copperas with your whitewash, sufficient to give it a clear yellow hue, and applying it to the timbers in your cellar, you will stop the progress of the dry rot.

T. P., of Ind.—Sand is silicic acid, and lime is of an alkaline nature. The chemical change in common mortar (sand, lime, and water) consists in the union of the acid with the base. The change takes place slowly, but eventually the sand and lime combine, and the new product is silicate of lime. . . . The name kerosene is sometimes applied to petroleum oil, but it properly belongs only to coal oil.

T. J. F., of ——.—Oxygen is best prepared by heating in a glass, copper, or cast-iron vessel, a mixture of 2 parts of chlorate of potash and 1 part of oxide of manganese. The heat required is a low red heat, and the process needs only ordinary care.

J. V. C., of N. Y.—A gas jet burning in a stove gives out no more heat than if it were not confined. Why should it? If the steam of steam pipes and other heaters were let into the room, the air would be heated as much as in the present system. . . . The temperatures at which metals take fire, and the heat that their burning produces, vary greatly, and consequently your third question is indefinite.

H. W. S., of Ohio.—If you will read any treatise on the conversion of iron into steel or the manufacture of cast steel, you will readily see why remelting cast steel injures it. The reasons why, and *modus operandi* of working steel, are too lengthy to reproduce in our columns. You are mistaken in stating that lead, cast-iron, and other metals are not injured by remelting; if not *injured* they are greatly changed in quality.

P. F. M., of Md.—Best pale African copal gum, 2 lbs. Melt it in one pint of boiled linseed oil with heat. When cool, thin it with turpentine spirits three pints. The process is dangerous on account of its inflammability, unless you have proper apparatus and possess experience of manipulation. Better purchase your varnish from a reliable dealer.

A. K. P., of Pa., referring to a statement that a ball weighing 1,000 lbs. at the sea level would lose 2 lbs. of its weight at the top of a mountain four miles high, asks whether the ball has actually *lost* 2 lbs. by the subtraction of some of its atoms, or only *appears* to weigh less in consequence of the diminished density of the atmosphere; and whether the ball would weigh the same if detached from the earth's surface? The term weight means simply the pressure exerted by a given mass due to the force of gravity; hence it varies as gravity is increased or diminished. On top of the mountain, four miles high, in the paragraph referred to, this force of gravity would be so much less than at the sea level, that the weights as shown by the *spring balance* would be diminished two pounds. 1st. The ball actually loses in weight. The density of the atmosphere exercises no influence. 2d. If the ball could be suspended in the atmosphere at a like elevation, then its weight, i. e., the resistance to falling by the attraction of gravitation, would be the same.

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 the reception of their funds.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

VIBRATING GOVERNOR.—ELSON TOWNS, Morland's Grove, Ill.—This invention has for its object to furnish an improved governor for regulating the velocity of machines driven by steam, wind, or water power.

OYSTER DREDGER.—WILLIAM BELBIN, Baltimore, Md.—Patented November 20, 1866.—This machine or apparatus consists of a bag formed by a number of iron rings linked together and attached to a rake-like device which gathers the oysters into the bag as it is drawn along the bottom of the river or creek. The device is attached to a boat, and the present improvement has special reference to a novel and simple davit and lever arrangement, which greatly facilitates the boarding of the dredger when loaded with oysters.

BOTTLE STOPPER AND MEDICINE GAGE.—SAMUEL C. TIMMONS, Lafayette, Ind.—This improvement consists of a hollow stopper whose inside holds a certain quantity, or has graduations to indicate its capacity at given points. The stopper either slips into the mouth of the bottle or upon the neck thereof. It may be used to drink from, but is chiefly designed to constitute a convenient measure to avoid the discrepancy of spoons in taking medicine.

PEAT MACHINE.—THOMAS J. WELLS, New York City.—The object of this invention is to produce a simple and economical machine for breaking up, condensing, and preparing peat for fuel.

INDIA-RUBBER ROLLER.—CHARLES V. MEAD, Trenton, N. J.—This invention relates to a roller, the shaft of which is made in two or more sections, which are clamped together by wrapping through and around them cloth, wire, or other suitable material to which the rubber will readily adhere, in such a manner that a roller is obtained which is not liable to work loose from or turn on its shaft.

FAN BINDER.—ROSWELL T. SMITH, Nashua, N. H.—This invention relates to an instrument to be employed in the manufacture of paper or other fans, and consists in a simple and convenient arrangement for holding the sides of a fan for binding the edges.

CHURN.—E. H. BECKWITH, Westernville, N. Y.—This invention relates to the construction of a rotary vertical churn, and consists in the peculiar form and arrangement of the arms supporting the dashers or flutter wheels and their connections, and also of ribs placed on the bottom of the churn, by which the churn is rendered more efficient, cleanly, and convenient in its management.

MACHINE FOR CHANNELING STONE.—ANDREW T. MERRIMAN and THOMAS ROSS, Middlebury, Vt.—This invention consists principally in the combination of a steam boiler, or a steam cylinder, with a gang of cutters and a suitable feed mechanism, in such a manner that said cutters are operated by the direct application of the steam, and the machine is complete as a whole, ready to be put up in any desired locality, and to be operated independent of any other mechanism or apparatus.

CAR COUPLING.—H. L. OGDEN, Atkinson, Ill.—This invention consists of a circular link attached to an arbor which passes through the draw head, and a vertically sliding rod having a pin passing through it, and a chain or cord attached which passes around the arbor, the lower end of the rod being curved and bent upward and passing through the rear part of a sliding bar in the draw head, whereby the draw heads of two adjoining cars will couple or connect themselves as they come in contact, and also be capable of being disconnected or uncoupled by a very simple manipulation, and without the necessity of a person passing between the cars.

FISH HOOK AND TRAP.—JACOB KING, JR., Fort Wayne, Ind.—This invention consists in having a series of hooks arranged or applied to a tube, and connected with a rod and springs in such a manner that when the device is baited and set, and a fish or animal seizes the bait, the hooks will be freed and forced down by the spring, so as to catch or seize the fish or animal and hold it securely.

MILK STRAINER.—N. A. WRIGHT, Prairie du Chien, Wis.—This invention relates to an improved device for straining milk or other liquids, and consists in a detached spout made with a rubber or other yielding lining to fit close around the edge of a pail or bucket, to which it may be attached by means of springs which are slipped readily over the side of the pail, and press the lining against it while the milk is poured out and strained.

SMOKE FURNACE.—JOHN I. BARINGER, Germantown, N. Y.—This invention has for its object to furnish an improved smoke furnace for smoking meat, fish, etc., by the use of which all danger from fire may be avoided.

BRAN DUSTER.—GEORGE H. REYNOLDS, Peoria, Ill.—This invention has for its object to furnish an improved apparatus by means of which the flour adhering to the bran may be readily and thoroughly separated therefrom.

CLEANER FOR LAMP CHIMNEYS, BOTTLES, ETC.—F. ASHLEY, New York City.—This invention consists in so securing the sponge or other pad used in lamp-chimney cleaners to their holders that it can be attached and detached at pleasure, thus enabling one material to be substituted for another, or the materials used to be washed or cleansed when so desired, and again used.

SPIRAL HAY FORK.—HENRY NEUMEYER, Millerstown, Pa.—This invention has for its object to furnish an improved hay fork, simple in construction, easily operated, and effective in its operation.

PULLEY.—JONATHAN S. TIBBETTS, Terra Haute, Ind.—This invention has for its object to furnish an improved means for fastening clothes lines and for other purposes.

FIRE-PROOF BUILDING.—CHARLES ALDEN, Newburgh, N. Y.—Patented October 30, 1866.—This building is of brick and iron, and its peculiarity consists in its being composed of a series of air tight compartments, separated from each other by two walls, between which is an air space. There is also a space between the ceiling of each compartment and the floor of the compartment above it, which space is filled with a non-conductor of heat. A pipe leads into each compartment from a main, and by this means any of the compartments may be filled with either air, water, or steam, almost instantaneously. In each compartment is placed an electric fire alarm, so adjusted as to make known in any desired part of the building the existence of any undue degree of heat in either of the compartments. It is a well-known fact that fire cannot exist without air, and that steam is an efficient agent in extinguishing fires. Should a fire occur while the door of a compartment is open, it will, by means of the fire alarm, be made known immediately to those in charge of the building; and fire in one compartment can work no damage to any other compartment, as they are entirely separate and independent of each other. We understand that grounds have been secured, and arrangements are being made by capitalists, to build an extentive warehouse on the plans embraced in Mr. Alden's patent, and there can be hardly a doubt that this must work an entire revolution in the manner of constructing buildings for storing

merchandise. The saving in the item of insurance alone, it is claimed, would in a short time pay the cost of a building. The necessity for buildings proof against internal as well as external fires is admitted by every one interested in the welfare of our city.

MEDICAL COMPOUND.—GEORGE H. BAUGH, Oskaloosa, Iowa.—Patented November 20, 1866.—This compound is for the cure of hogs when attacked with the disease known as hog cholera, and when given in full doses effects a speedy and radical cure. Occasional small doses, when the animals are in apparent health, will prevent attacks.

GRAIN DRILL.—ELIJAH WAGONER, Westminster, Md.—Patented November 20, 1866.—This invention relates to the class of drills in which a spring is employed to restore the drill to its operating position when thrown backward by an immovable obstacle. In this case, however, the drill will not yield till a maximum amount of resistance is offered, and hence, under ordinary circumstances, the drill does not vibrate or yield, but is held firmly to its work.

FLUTING MACHINE.—MRS. SUSAN R. KNOX, New York City.—Patented November 20, 1866.—This invention relates to a machine for fluting ruffles, and the improvement provides means whereby the operation is conducted and the rollers changed with a degree of convenience and facility not hitherto attained in machines of this class.

BINDER FOR SEWING MACHINES.—GEORGE VINCENT, Stockton, Cal.—This invention relates to an improvement in binders for sewing machines, and consists of a plate of metal with openings, through which moves a plate so arranged as to form a gage which can be regulated to suit any width of binding, while a curve in the plate serves as a guide to the lower edge of the binding.

DOOR BELL AND BURGLAR ALARM.—D. L. COLLINS, Antwerp, N. Y.—This invention consists in a novel arrangement of devices, whereby one and the same bell may not only be used for the ordinary purposes of a door bell, but at night also made to answer as a burglar alarm.

PAINT BRUSH.—JOHN MARCHBANK, Lansingburgh, N. Y.—This invention consists in securing the bristles of a brush to its handle by using a ferrule of an enlarged shape between its two ends.

GANG PLOW.—D. BEQUERET and E. DUMOULIN, Jamestown, Ill.—This invention relates to a gang plow of that class in which two or more plowshares are employed, which are adjustable up and down by hand levers from the driver's seat.

FARM GATE.—LAFAYETTE F. TERRY, Port Gibson, N. Y.—This invention relates particularly to the manner of hanging a gate, made to slide upon a roller arranged between the rear posts, so that it can quickly be entirely removed from the fence in winter time, when snow might clog it, or at any time when it is not requisite to have the gateway closed.

CHEMICAL LIGHTING COMPOUND.—CHARLES J. M. SOHET and HENRI C. T. MOLVAUT, New York City.—This powder is intended to be a tobacco lighter, which, by its simple contact with or application to the tobacco, will ignite it instantly without flame.

DISTRIBUTING TABLE.—GEORGE WHITAKER, Lewistown, Ill.—This invention consists in constructing the table of a box form, and with a series of boxes or spouts along its sides or edges, whether one or more, made with a hopper at their upper ends, and at their lower ends provided with hooks or other suitable means for hanging upon them a bag or sack, or other receptacle, to receive and hold the mail or other matter which may be thrown into them.

TREADLE.—A. P. TORRENCE, Columbus, Ga.—This invention relates to the hanging and arranging of treadles to sewing and other machines, whereby in operating the treadle, in lieu of the smaller and weaker mucles of the foot and ankle of the person being called into action, it is transferred to the larger and more powerful muscles of the thigh and leg, thereby enabling a much greater amount of force to be exerted upon the treadle, and with less fatigue to the operator, than by the ordinary and usual mode of hanging treadles.

RAILROAD SPITTOON.—AMBROSE H. WELLS, Waterbury, Ct.—This spittoon is so constructed that when opened upon the inside of the car, its discharge orifice upon the outside will be then closed, and vice versa, thereby preventing any draft of air up through the spittoon to the interior of the car.

PUMP.—WILLIAM P. SQUIRE, Paris, Ill.—This invention consists in a novel construction of a pump, whereby many advantages are obtained.

HARNESS REINS.—REV. WILLIAM CLARK, Valatie, N. Y.—This invention relates to that class of harness reins which are passed through the bit and gag rings, and thence to the check hook, and it consists in so combining with such reins a stop as to regulate the amount to which the horse may be checked by drawing or pulling upon the reins, while, at the same time, it will not interfere with the freedom with which horses, having such a system of harness and check reins, can lower their heads to drink, etc.

ELECTRO-MAGNETIC CAR BRAKE—F. F. A. ACHARD, Paris, France.—The object of this invention is to use the force which is developed by the rotation of the wheels for putting on the brakes, and particularly to apply two sets of electro-magnets in combination with the mechanism for transmitting the power from the axle of the wheels to the brakes, in such a manner that by closing the circuit through one set of electro-magnets, the brakes are applied, and by closing the circuit through the other set the brakes are taken off.

MACHINE FOR PEELING GRAIN.—FR. HENKEL and WM. SECK, Munich, Bavaria.—The object of this invention is to remove the peel from grain by the centrifugal force, said peel, which consists of fibrous and silicious material, being of no value for nutriment.

BALANCE SLIDE VALVE.—JOHN LOCKHEAD, San Francisco, Cal.—This invention consists in a metal ring fitted into an opening in the valve, and made of such a shape that said ring is kept up tight against the inner surface of the steam chest cover by the pressure of the steam alone, and without the aid of springs or other mechanical means.

HAND SCREW.—WILLIAM ORMSBY, Boston, Mass.—This invention has for its object to furnish an improved hand screw, so constructed and arranged that the jaws may be set at any required distance apart easily and quickly.

FLOUR PACKER.—LEWIS W. TEETER, Hagerstown, Ind.—This invention has for its object to furnish an improved flour packer, by means of which flour may be packed more evenly than it can be with the packers now in use.

POCKET MATCH SAFE.—CHARLES E. FOWLER, Carmel, N. Y.—This invention has for its object to furnish a match safe, so constructed that it may be readily opened and the matches removed therefrom, and that when closed, the part upon which the matches are rubbed to ignite them may be covered to prevent the clothing from being impregnated by the odor developed by igniting the matches.

FIRE ANNIHILATOR.—JAMES R. LAURENT, Milford, Pa.—This fire annihilator belongs to that class in which water or other liquid is thrown out through a suitable hose or nozzle by the force of gas generated in a vessel which also incloses the water or other liquid used in extinguishing the fire.

WATER WHEEL.—J. L. RUMRILL, Hartford, Vt.—This invention relates to the cylinder of a water wheel which may be adjusted inside the wheel, and brought to a suitable or proper bearing so that it will not leak, and so that it may be tightened as it wears and becomes loose.

COTTON PRESS.—C. E. MCNEIL, Lynchburg, Va.—This invention has for its object the pressing of cotton into bales by hydraulic pressure, and consists in making two hydraulic presses and working them in conjunction with each other or separately as may be desired.

MACHINE FOR ORNAMENTING MOLDING.—J. W. CAMPBELL, New York City.—The object of this invention is to construct a machine by which ornaments of whatever description may be applied to and pressed upon moldings used for various purposes, or by which the said ornaments may also be cast in independent strips.

COMBINED DIE PLATE AND WRENCH.—J. A. SMITH, New York City.—The object of my invention is to combine a die plate supplied with a number of dies for cutting screw threads upon bolts, and at the same time have a wrench, the jaws of which may be moved or made to approach and recede from each other, for the purpose of bringing it to the capacity of different sized nuts, thus combining the two tools in one without making them cumbersome.

PRESS.—J. V. C. CRATE, Waterbury, Conn.—The object of this invention is to compensate for the variation in the thickness of the articles to be operated upon, so that in case a thicker piece of metal than usual is inserted under the punch or die attached to the reciprocating rod or shaft, the machine will not be strained or injured in any way by a restriction of the full throw of the crank or eccentric—a contingency of frequent occurence in using the ordinary presses.

BOOT TREE.—WILLIAM and A. G. KELSEY, Delaware, Wis.—This invention consists in a new and improved construction of a boot tree, which renders it more convenient and powerful for general use in stretching, shaping, and finishing boots.

WAGON BRAKE.—I. GROSS and I. M. GROSS, New Galena, Pa.—This invention consists in a novel application of a brake to a wagon, whereby the brake is rendered capable of being operated in three different ways, to wit, from the driver's seat on the wagon, where the driver is riding; at the rear of the wagon when the driver is walking behind it, or at the side of the wagon when the driver is walking by the side of it.

SEALING OR CEMENTING CANS.—J. M. BRUCE, Wilkins, Pa.—This invention relates to a useful device for sealing or cementing cans, designed more especially for sealing or cementing fruit cans.

WIND WHEEL.—J. E. FAY, New York City.—This invention consists of two vertical wheels inclosed within a case having a vane attached to keep the front of the case facing the wind, the wheels being connected with each other, and to a shaft from which the power is taken by gears, and the front end of the case provided with doors which are connected with a regulator, whereby it is believed that a simple, economical and efficient wind wheel is obtained.

FURNACE FOR HEATING SOLDERING IRONS.—R. BRADY, New York City.—This invention consists in providing a chamber to receive the soldering irons, while being heated, which opens at one end but is closed upon all its other sides, and is so constructed as to prevent the outward radiation of heat, produced in it by gas flames or other heating medium employed.

BALING PRESS.—C. W. GILLIS, San Antonia, Texas.—This invention relates to a new and improved press for compressing cotton, hay, and other substances for baling, and it consists in a novel manner of applying power to the follower or plunger, and in a novel manner of securing and arranging the doors, whereby a very simple and efficient press for the purpose specified is obtained.

CIDER PRESS.—THOMAS APPLEGET, Princeton, N. J.—This invention relates to a new and improved cider press of that class in which endless pressure belts are employed, and it consists in having the belts constructed of plates of metal or other rigid material connected together by hinges and operated by gears and racks attached to one of the belts, whereby the ground apples are subjected to a degree of pressure sufficient to express all the juice from them. The canvas belts hitherto employed for this purpose have proved inefficient on account of their flexibility and the difficulty in operating them by mere tension only, difficulties which, it is believed, are fully obviated by this invention.

GANG PLOW.—PETER MERKEL, St. Louis, Mo.—This invention relates to an arrangement of the plow beams whereby the plows may, with the greatest facility, be adjusted higher or lower according to the depth of furrow required, and also readily elevated above the ground when not required to work, as, for instance, in turning at the ends of a field or in drawing the machine from place to place; the invention at the same time admitting of the side wheel which runs on the land or unplowed surface being adjusted higher or lower, as occasion may require.

CIDER MILL.—WILLIAM SHAW, New Gerdon, Ohio.—This invention consists in the employment of an endless apron, pressure rollers, grinding cylinder, scrapers, and a rotary brush, whereby apples may be crushed and the juice expressed from them at one operation with but a moderate expenditure of power and by a very simple arrangement of parts.

BRICK MACHINE.—E. R. GAND, Chicago, Ill.—This invention consists in the application of hooks and anti-friction rollers to the followers, in connection with lateral projections on the way or track, whereby the followers are raised and lowered in the molds by a positive movement, and the proper operation of the followers insured. The invention also relates to an improved means for striking the molds, removing the surplus clay therefrom, whereby that work is performed in a perfect manner, and the striking plates allowed, in case of any foreign substance being in the molds, to become detached or free themselves so as to prevent the straining or breaking of any of the working parts of the machine.

HATS AND BONNETS.—EDWIN COPLESTON, Wrentham, Mass.—This invention relates to an improved method of manufacturing hats and bonnets, and consists in making the hat and bonnet by flocking upon a foundation or body formed of buckram or other suitable fabric which is pressed into the desired shape with hot dies, by which means an elastic and durable article of any desired color is produced, much cheaper and more beautiful than hats or bonnets made of felt.

SEEDER, HARROW, AND ROLLER.—C. A. FAIRCHILD, Independence, Iowa.—The nature of this invention consists in combining a field roller and reciprocating harrow with a seeding machine in such a manner that each machine performs its functions in the most perfect manner.

SEEDING MACHINE.—J. D. FIELD, Keokuk, Iowa.—This device is designed to plant and cover corn in check rows after the ground has been marked off one way, the device also admitting when desired, of a fertilizer being sown previous to the seed being planted.

APPLE-PARING MACHINE.—HORATIO KEYES, Terre Haute, Ind.—This invention relates to mechanism of apple-paring machines whereby they are made double acting and capable of paring apples much faster than ordinary machines. The operation is such that the paring knife having passed from the back to the front of the apple holder and thus pared one apple, is thrown down out of the way so that the pared apple can be removed and another put on the fork in its place, to be pared on the return movement of the knife to its first position.

FRUIT CAN.—GARRET WILLIAMS, Spring Hills, Ohio.—This invention relates to metal cans of that class in which fruit or other articles are preserved, to which no air should be admitted, and it has for its object the construction of a cap and the arrangement for securing the same to such a can in such a manner that no air can pass in when the cover is closed, that it may easily be opened and reclosed, and be of a very simple and cheap construction.

HAY DERRICK.—W. P. SQUIRE, Paris, Ill.—This invention has for its object to furnish an improved derrick, so constructed and arranged that the hay may be raised and carried forward, and at the same time swing to the right or left for the purpose of placing it upon a stack or depositing it in a barn, as may be required.

Inventions Patented in England by Americans.

Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,261.—NEW METHOD FOR DETACHING BOATS FROM THEIR DAVITS.—Thomas Huntington, New York City. Sept. 3, 1866.

2,422.—FABRIC FOR THE MANUFACTURE OF DRIVING BELTS, HOSE, AND OTHER USEFUL PURPOSES.—Thomas R. White and William G. Bedford, Philadelphia. Sept. 21, 1866.

2,426.—SECURING TEETH IN SAWS.—American Saw Company, New York City. Sept. 21, 1866.

2,430.—CONSTRUCTION OF WEIGHTS.—Daniel B. and Isaac A. Lacy, Mott Haven, N. Y., and Thomas T. Lacy, Jersey City, N. J. Sept. 21, 1866.

2,436.—MANUFACTURE OF BRUSHES.—Florence Manufacturing Company, Florence, Mass. Sept. 22, 1866.

2,456.—APPARATUS FOR STEERING VESSELS.—Robert Creuzbaur, New York City. Sept. 24, 1866.

2,466.—IMPROVEMENT IN STEAM ENGINES, APPLICABLE ALSO TO PUMPS, AND OTHER APPARATUS IN WHICH PISTONS OR PLUNGERS ARE USED.—John B. Root, New York City. Sept. 25, 1866.

2,468.—CORNETS, AND OTHER SIMILAR MUSICAL INSTRUMENTS.—Schreiber Cornet Manufacturing Company, New York City. Sept. 25, 1866.

2,496.—PROCESS OF DISTILLING PETROLEUM AND OTHER OILS.—Orazio Lugo and Theodore O. L. Shrader, New York City. Sept. 27, 1866.

2,500.—POWER LOOM.—Erastus B. Bigelow, Boston. Sept. 27, 1866.

2,509.—RAILWAY SWITCH.—Benjamin Shiverick and Thomas L. Calkins, Philadelphia. Sept. 28, 1866.

2,559.—GRATE BARS.—Samuel Harrison, Philadelphia. Oct. 4, 1866.

2,561.—MODE OF FORMING COLLARS ON METALLIC AXLES AND OTHER ARTICLES. William Allen, Auburn, N. Y. Oct. 4, 1866.

5,565.—ANCHOR.—Denison C. Pierce, Clayton, N. Y. Oct. 5, 1866.

2,646.—DETECTING APPARATUS FOR REGISTERING THE TIME OF WATCHMEN, MECHANICS, AND OTHER EMPLOYES.—Jacob E. Buerk, Boston, Mass. Oct. 12, 1866.

1,880.—SEWING MACHINE.—Albin Warth, Stapleton, N. Y., and Eberhard Faber, New York City. July 19th.

2,197.—FRICTION CLUTCH FOR STARTING AND STOPPING MACHINERY.—James Brown, Pawtucket, R. I. Aug. 25th.

2,535.—COTTON-BALE TIE.—Charles W. Walley, New Orleans, La. Oct. 3.

2,610.—SEWING MACHINE.—Thomas A. Macauley, New York City. Oct. 9, 1866.

2,635.—TIRES FOR CARRIAGE WHEELS.—Smith Collins, New Haven, Conn. Oct. 13.

2,673.—STEAM BOILER.—Henry Feyh and George T. Emery, Columbus, Ohio. Oct. 16.

2,677.—STAMPS, HAMMERS, ETC.—Christopher R. James and Nathan W. Condict, Jr., both of Jersey City, N. J. Oct. 17.

2,685.—PROCESS OF DISTILLING PETROLEUM, ETC.—Orazio Lugo and Theodore O. L. Schrader, New York City. Oct. 17.

2,707.—PROCESS FOR THE PREPARATION OF INDIA-RUBBER, ETC.—Edwin L. Simpson, Bridgeport, Ct. Oct. 19.

2,759.—GAS MANUFACTURE, ETC.—William Elmer, M.D., New York City. Oct. 25.

2,810.—PREPARATION OF GALVANIZED IRON.—Charles H. Perkins, Rhode Island. Oct. 30.

2,811.—BOOTS AND SHOES.—Lyman Daggett, Massachusetts. Oct. 30.

Drill Rest for Grinding.

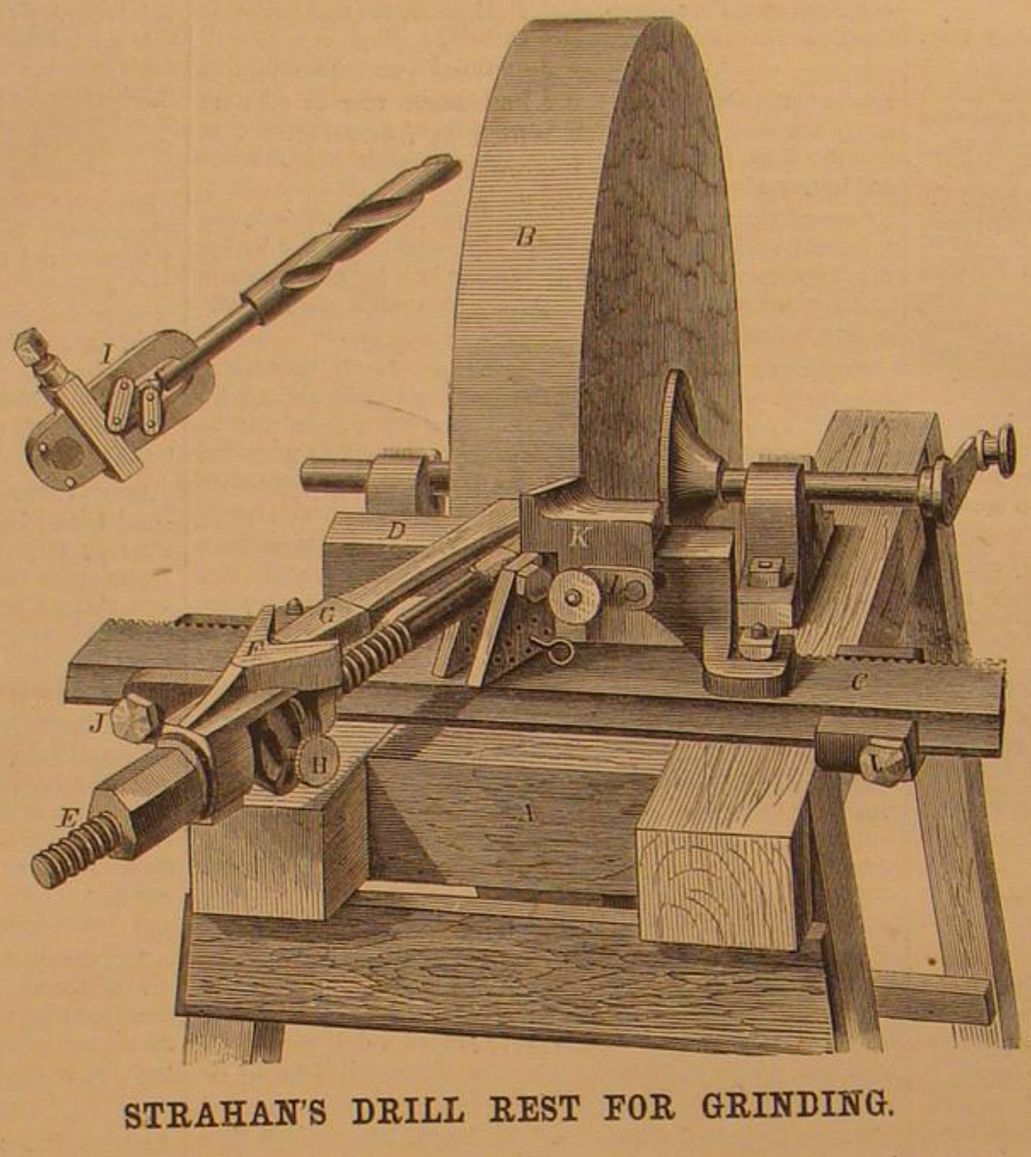
Machinists, and iron workers generally, understand the great difficulty in grinding a drill so that both the side angles of the cut are equal. It is necessary, often, after gaging the sides, to test the drill by boring a hole. If the point formed by the angles is on one side, or in the least out of the center, the drill will form a larger hole than its diameter. It is especially difficult to grind a twist drill true. The device herewith illustrated is one of the neatest and most efficient arrangements we have ever seen for the purpose of obviating these difficulties. With it the greenest hand in a shop can, with certainty, grind a drill to a true and perfect point.

A is the grindstone frame, and B the stone. Across the frame is placed the platform, C, of cast iron, carrying the rest, D. Extending from this rest, at the proper angle, is a pivoted screw, E, carrying a sliding thrust-block, F, which is driven forward by the nut.

The operation is simple. The drill, G, is placed on the rest, the heel in the thrust-block, F, and the point resting on D. Turn the nut gradually, thus forcing the drill against the stone until you have a good edge on one angle of the drill. Then set the stopper by the thumb-screw, H, and recede the nut. Turn the drill over and proceed as before, gradually pressing the drill forward by means of the nut. When the thrust-block is arrested by the stopper, the grinding of the drill is completed. For grinding a twist drill, a convenient little vise, having a center always coincident with the jaws, is provided. It is seen at I.

The inclination, vertically, of the pivoted screw, E, is determined by means of a projection formed on the pivoted end, which is held in any position by the pin which passes through holes in the jaw. The apparatus can be put on or taken off the grindstone frame in a moment, by means of the jaws and screws, J, at the ends. The jaws have wedge-like projections on the under side, which engage with the wood of the frame and hold the device rigidly. The guide block, K, is readily removed by lifting the catch, L, when the rest becomes an ordinary one.

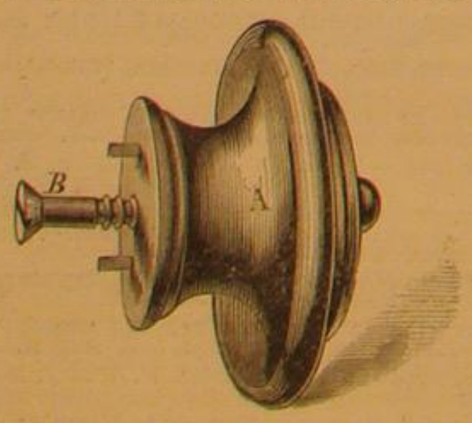
This arrangement was patented Oct. 2, 1866, by W. H. Strahan. For further information address Merrick & Sons, manufacturers, 430 Washington avenue, Philadelphia, Pa.



STRAHAN'S DRILL REST FOR GRINDING.

MYER'S DRAWER KNOB.

In old-fashioned times the ornaments of a chest-of-drawers, or bureau, were of metal and of the most elegant and solid description. Knobs for opening drawers were unknown, but swing handles, solidly secured to the wood, were for that use as well as for ornament. The convenience of knobs, the modern



device, suffers some detraction from their liability to break off, or unscrew and become loose. To prevent this latter occurrence is the object of the improvement herewith illustrated.

A is a knob of the usual form, having, instead of the wooden screw on its inner face, a plane surface, The common wood screw, B, is used to attach it to the drawer or door while the two sharp pins, one on either side of the screw, secure it in position. It is easy enough to see that these pins effectually prevent the removal of the knob from the outside by unscrewing.

Patented through the Scientific American Patent Agency Oct. 30, 1866, by Dr. L. B. Myers, whom address for further information at Elmore, Ohio.

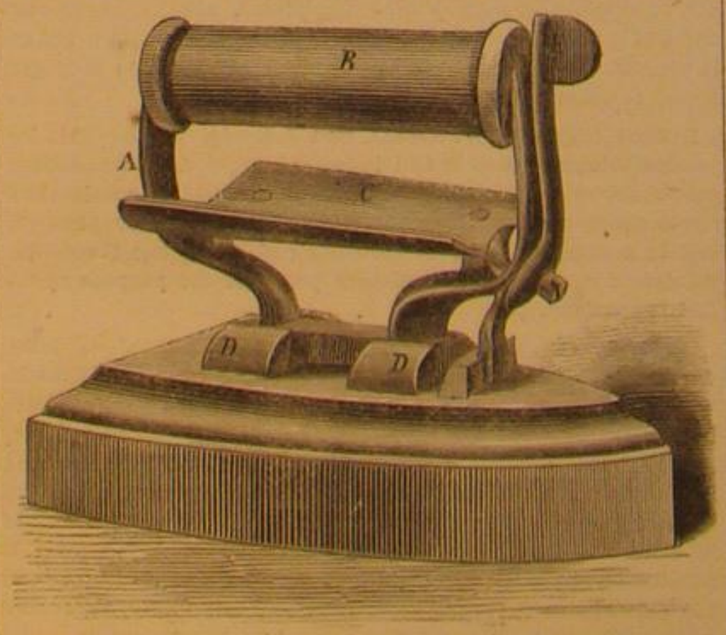
The attention of furniture dealers to the above is particularly requested by Dr. Myers.

Shot Guns.

A. Cokins, of Lamartine, Wis., says that the device of S. M. Blake to concentrate the charge of a shot gun, published in our issue of Oct. 27th, is a good one. He, however, offers an improvement on the plan proposed in that article of placing a film of solder on the inside of the muzzle. He reams out the barrel from the breech about the thickness of two sheets of paper to within two inches of the muzzle, then reams from the muzzle about one-half as much, leaving a space of one-quarter of an inch the original size of the bore between the two reamings. He says with such a gun he does not care to get nearer than fifteen rods for ducks or smaller game, and has driven No. 6 shot through an inch board in a mass at that distance, making a hole like that made by a ball.

REHORN'S PATENT SADIRON.

The object of this neat improvement will be appreciated by every housewife and laundry woman. Ironing day has almost as many vexations as the traditional "blue Monday." There are scorched fin-



gers, flushed faces, and the annoyances of hot handles and clumsy holders to protect the hands. This handle, however, is movable, detached when the iron is to be heated, and firmly secured when in use.

The frame, A, of the handle is cast in one piece, the uprights connected at the bottom and also the top. The wooden handle, B, is turned and then grooved to fit the upper cross piece, to which it is secured by pins. To the handle frame a guard, C, if attached, lined on the inside with a sheet of non-conducting substance to prevent the radiation of the heat.

On the iron proper are lugs, D, which form an inclined dovetailed recess to receive the base of the handle frame. This is slipped in from the rear of the iron, and when in place is secured by the swing catch, E, which engages with a lug and holds the handle firmly to the iron without shaking. The catch is readily operated with the thumb of the hand that grasps the handle. The device appears to be simple, handy, and not liable to get out of order.

A patent was secured through the Scientific American Patent Agency, Sept. 25, 1866. For additional information address the patentee, Frederick Rehorn, 179 East 58th street, New York City.

THE GREAT IRON BELT.

The steady and rapid progress of the great continental railroad is encouraging to every lover of the country and believer in the civilizing influences of internal improvements, especially facile intercommunication.—From Omaha, on the Missouri, about fifteen miles above the mouth of the Platte, the road runs nine miles southwardly to reach the Platte valley. Then turning to the west it follows the course of the Platte on its northern bank for three hundred miles, when it crosses the river at a point about forty miles from the junction of the north and south fork of the Platte, and follows the latter, on its north bank, to a point near Denver, in Colorado, at the foot of the Rocky Mountains. The pass through the mountains will probably be at a point about seventy-five miles north of Denver, as it is the only point where the construction of a tunnel will not be necessary.

Already the trains are run over about two hundred and fifty miles of the road, west of Omaha, to Cottonwood, from which the stage route begins, which is forty-eight hours to Denver city. Before the winter fairly sets in it is expected this staging will be reduced to thirty-six hours. From Denver city the stage route extends to Salt Lake city and California.

On this side of Omaha, the route is by way of the Northwestern railroad to Chicago, thence to New York, 1,958 miles, in seventy-five hours. The progress of the road has been, during the summer, at the rate of about two miles per day. It is probably, considering its length, the straightest road on the continent. Its completion will not only develop the vast mining interests of the Great West, but its agricultural resources, so that in a few years we may expect that hitherto almost untrodden wilderness to bud and blossom like the rose.

Public Works in Holland.

The Dutch Government, with a view to unite the network of railways with the islands of Walcheren and Zind Beveland, as well as the port of Flushing, have undertaken to close, by means of a viaduct, the eastern arm of the Scheldt. It flows entirely in Dutch territory, and being of little depth, is only frequented by small coasting vessels. At the same time the Cabinet of the Hague, by a stipulation in the Treaty of 1839, are obliged to leave open for navigation the waters between the Scheldt and Rhine; it now offers to make a new route between those two rivers by means of a large canal just constructed in the island of Zind Beveland, and thus the two arms of the Scheldt are in communication with each other below the dam. This canal is ten kilometers in length, and is provided with two locks, and is to be free from any toll.

To Architects.—An advertisement appears in this number offering premiums for the best designs for the new building to be erected for the use of the War Department. Plans offered in competition must be sent on or before the 1st of February next.

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NEW YORK, SATURDAY, DEC. 1, 1866.

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IMPORTANT TO ADVERTISERS.

With the enlargement of the SCIENTIFIC AMERICAN on the 1st of January next, it is our purpose to issue an edition of about fifty thousand copies of the first number of the new volume. We intend also to devote a portion of the back outside page to advertisements, for which seventy-five cents per line will be charged. Those who may wish to avail themselves of this rare opportunity to publish their advertisements will do well to correspond with the publishers as early as possible. We can admit but few. First come first served.

"A VERY EMINENT OFFICER OF THE UNITED STATES NAVY" ON IRON-CLADS.

A communication copied from the New York *Army and Navy Journal*, on "American Monitors and Foreign Iron-Clads," is going the rounds of the English engineering journals.

From the article in question we get some singular statements, when compared with official reports made by a high authority; that of Vice Admiral D. D. Porter, U. S. N., who, like the writer of the article, "had, during the Rebellion, some little experience, and knows exactly what monitors are capable of enduring." That a United States naval officer should publish to the world, through American and English papers, his opinion that our best war ships are failures, is, to say the least, unofficer-like, and a remarkable exhibition of patriotism. His duty should require him to report to his department, if the nature of his experimental investigations or the value of his opinions entitled him to attention; and if no consequent action was taken, he had no right to give the world at large the benefits of his knowledge, or of his doubts. These remarks are as applicable to a Vice-Admiral as to any "middy" in the navy. In his report to the Secretary of the Navy made Feb. 16, 1864, Vice-Admiral Porter says of the Western monitors :—

"I can only draw comparison between these and the first Ericsson *Monitor*. . . I remember pronouncing that vessel a perfect success, and capable of defeating anything that then floated. . . The results have justified me in forming a high estimate of the monitor principle."

Speaking of the *Benton*, the best broadside ironclad on the Mississippi, he says: "The heaviest and best vessel we have, the *Benton*, would stand a poor chance against the monitor alluded to." And replying to some popular attacks on them, "I think too much has been expected of monitors heretofore, and the fact that two or three of them were not able to overcome obstacles formidable enough to keep out a large fleet of three-deckers, has, in a measure, weakened the confidence of the public (who generally know little or nothing of such matters) in them." Referring to the Mississippi broadside ironclads, "Still they were very deficient in one respect, as they were very vulnerable, suffered a good deal, and proved that in the end the monitor principle, from its invulnerability, was the only thing that could be safely depended on. For this reason, I often wished that I had been provided with one good monitor, with which at certain times, I could have accomplished more than with a fleet of such boats as we have here." Again, "Two of these have been tried under batteries, and the *Indianola* in battle, against vessels, and have shown that the monitor principle, only, is the right one." And further; "The *Cincinnati* was sunk, when my own judgment told me it was wrong to place her where I was called upon to order her to." "With a single monitor, results would have been very different; and on that day instead of having a vessel sunk, the right wing of our army would have gained a position commanding the most important works in and about Vicksburg."

A year passed by, and either through impulse or reason, the Admiral is still further convinced that the iron-clad that gives the maximum thickness of armor with a given displacement, and can handle any size of cannon which can be made, is the solution of the problem. For, in his report of Jan. 15, 1865, on the performance of the monitors in the attack on Fort Fisher—the last battle in which they were engaged—we find the following :—

"The *Monadnock* is capable of crossing the ocean alone (when her compasses are once properly adjusted), and could destroy any vessel in the French or British navy, lay their towns under contribution, and return again (provided she could pick up coal), without fear of being followed." And a writer in the *Army and Navy Journal* logically observes :—

Fortunately, the nation possesses four monitors of the *Monadnock* class—the *Miantonomoh*, which has created such a sensation in Europe, being one of this class. There are still stronger grounds for congratulating the nation. It possesses, beside the *Dictator* and *Puritan*, four double-turreted monitors of the *Kalamazoo* class, each twice as large, in point of capacity, as the *Monadnock*, being 345 feet long, 56 feet beam, and drawing 17 feet of water, with 6,000 tuns displacement, and provided with much greater engine power. But, what is far more important, the *Kalamazoo* and her sister ships have turrets of the *Dictator* pattern, 15 inches thick, composed of two distinct plate cylinders, with 5-inch-thick solid iron in the middle. Again, the side armor of these formidable iron-clads is nearly twice as thick as that of the *Monadnock*. What might we not expect in a naval conflict from these monster monitors, under the command of a plucky sailor like Vice-Admiral Porter? Having told us he could destroy any vessel in the French and British navy with the little *Monadnock*, with her 12-inch thick turrets, what force could resist his squadron of *Kalamazoos*, with 15-inch turrets? What town would refuse any "contribution" he might demand? As to ramming, your correspondent, with all his misgivings, surely cannot apprehend that the 6,000-tun craft, with their ponderous decks and armor offering an almost unlimited resistance, would be run over "like any other raft."

In the article under notice, the following paragraph occurs: "In the case of the *Saugus* three shots from a Brooke gun, at Howlett's Battery, knocked the turret into a cocked hat."

In the Admiral's report of Feb. 5, 1865, this circumstance is alluded to as follows, after stating that the *Saugus's* turret had been struck by a shot from a Brooke 200-pounder, which loosened some bolts. "This was owing to the bolts being driven from inside to out, instead of from outside to in. The turret was *not materially injured*."

We need only add the fact that is now well known that the *Saugus's*, as well as several other turrets, were very defectively put together. We feel very much mortified to find the following opinion, which occurs a little further on, to have been made by a "distinguished navy officer." "Their (monitor's) great superiority vanished with the late experiments at Fortress Monroe, and we might as well go ahead and make something stronger and faster."

How the experiment of firing at four one-inch plates, placed against an exceedingly massive granite wall, proves "their great superiority" to have "vanished," is not explained, probably, no doubt, from the fact that it could not be explained how this experiment had anything to do with the question of iron-clads at all. It was conducted for an entirely different object, and, we may add, that if the thickness of the iron had been doubled the effect on the unyielding structure of the target would not have been materially different.

The most remarkable paragraph appears to us to be the following: "This whole matter requires a great deal of consideration, and a Board of experienced officers should be appointed to recommend such improvements in iron-clads as may be required owing to the late advances in ordnance."

Now is it not perfectly clear that "late advances in ordnance," demand thicker armor? and how is thicker armor to be attained except on the monitor system? Have not the English and French pushed the broadside armor system to the maximum? and yet they admit that their armor is not thick enough. It is well known that the English iron-clads cannot support even their thin armor over their whole length. Is it possible that a "distinguished navy officer" desires to recommend that we copy the monster, vulnerable, costly, deep draft, and unwieldy European iron-clads?

VENTILATION OF THE NATIONAL CAPITOL.

We are in possession of a document from the Department of the Interior, which is a report on the method of warming and ventilating the two chambers of the national legislative bodies, with the offices and lobbies adjacent. Some complaint had been made that the air of the halls, particularly during the winter, was not entirely pure, and that headache and other annoyances were caused. After a very lengthy and exhaustive series of experiments, it was found that the air furnished was deficient in moisture, a matter that can be easily remedied.

The ventilation of the Capitol is altogether artificial. The air is forced into the apartments, through numerous apertures, by immense fans driven by steam power. The furnaces of the engines furnish the necessary heat for warming the air in winter by passing the columns of air in contact with stacks of pipes.

There are four fan wheels employed, one for each of the halls of Congress, and one for the committee rooms and passages in each wing. The fan for the Senate Chamber is 14 feet in diameter, weighing 6,536 pounds, and driven by a 16-horse engine, running from 30 to 60 revolutions per minute. At the lowest rate this delivers into the Senate Chamber 30,000 cubic feet of air per minute, being 20 cubic feet per minute for each one of 1,500 persons. The Hall of Representatives has a fan 16 feet in diameter, weighing 9,050 pounds, and driven by an engine of 30 horse-power. This fan can be run up to 80 turns per minute, delivering 100,000 cubic feet of air per minute, equal to entirely filling the hall every five minutes. In winter one half this capacity is exercised.

The other two fans for the committee rooms, offices, and corridors are each 14 feet in diameter, weighing over 5,000 pounds, and can be run to 60 revolutions. Driven each by a 16 horse-power engine.

In summer the air which is delivered to the building is cooled and hydrated by coming in contact with water falling in a shower, similar to the means employed in low-pressure engines for condensing steam. The same principle, or something similar, will probably be adopted to moisten the air used in winter for the double purposes of heating and ventilating.

THAT skating has become a fashionable exercise, is evident from the following statements as to the materials consumed during the present year, in one skate factory at Worcester, two tuns of brass, 5,000 gross of screws; 50,000 brass thimbles, 1,000 lbs. of German silver, nearly six tuns of rosewood, and ten tuns of steel, worked up by thirty-five men and women into 25,000 pair of skates.

Patent Claims

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING NOV. 20, 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.

59,740.—DRILL FOR WELLS.—Perley Ainsworth, Cape Vincent, N. Y.

First, I claim the combining the center beam reamer, auger stem, sand pump, grabs, jars, sinker bar, and rope socket, so that they may be worked and used efficiently, separate y or together, as above set forth.

Second, I claim the plan or method of coupling, as above described.

Third, I claim the grab jars, constructed as above described, separately and in combination with the apparatus, as above substantially set forth.

Fourth, I claim the tube and reamer, C, center bit, B, and valves, a a, constructed so as to admit of their being used separately or in combination with the other apparatus as a sand pump, pumping the debris or sediment into the main trunk as fast as made, by the action of either the center bit or reamer, or both, when worked together, as herein above substantially set forth.

Fifth, I claim the round reamer constructed as above described, separately and in combination with the apparatus, as above substantially set forth, whether attached to the bottom or the top of the auger stem or the sinker bar, cutting either upward or downward.

Sixth, I claim, in combination with the above described apparatus, the center bit made hollow, as shown at B B, and beveled at the edges, substantially as and for the purpose set forth.

59,741.—FILING MACHINE.—A. G. Burton and H. W. Covert, Rochester, N. Y.

First, We claim the t ble, C, adjustable in the manner described, in combination with the reciprocating file, K, substantially as and for the purpose herein specified.

Second, We claim the combination of two ball and socket joints, E D, adjustable in position, one bearing a file carriage and the other a table or support for the articles filed, for the purpose herein set forth.

Third, We claim the combination of the lateral auxiliary leaves, L, with the table, C, and file carriage, H, for the purpose of presenting the articles to be filed to the edge of the file, substantially as specified.

Fourth, We claim the arrangement of the machine as a whole, consisting of the carriage frame, B, the file carriage, H, the table, C, provided with the lateral leaves, L, and the universal joints, D E, constructed as described, the whole operating substantially as herein set forth.

Fifth, We claim the combination of the cam, m, with the file carriage, H, which is provided with a reacting force, so that its returns will economize time and power, as set forth.

59,442.—CORN PLANTER.—Wm. R. Butler, Greenbush, Ill.

I claim the combination, construction and arrangement of the boxes, F, plates, G, regulators, G', levers, H, and bar, H', substantially as and for the purpose represented.

59,743.—GATE.—Isaac J. Gray, Seville, Ohio.

I claim the double pivot revolving hinge, and the mode of its application to the hanging of gates, as described.

59,744.—MANUFACTURE OF HOES.—Reuben Harper, Philadelphia, Pa.

I claim the stamping of the plate and the forming of the shank in the manner and for the purpose substantially as set forth.

50,745.—BANDELORE.—James L. Haven and Charles Hettrick, Cincinnati, Ohio.

We claim the disks, A B, united at their centers by the rivet, F, and interlocking bosses, E, substantially as set forth.

59,746.—MACHINE FOR SEWING THE SEAMS OF LOOPED FABRICS.—Edward E. Kilbourn (assignor to Norfolk and New Brunswick Hosiery Company), New Brunswick, N. J.

I claim the combination in a seaming machine of the following devices, viz., the seaming mechanism, straight supporting plate, and feed screw, all operating in the combination substantially as set forth.

I also alaim the combination in a seaming machine of the devices recited in the preceding claim, with cam collars operating upon the feed screw, substantially as set forth.

I also claim the combination in a seaming machine, of the needle, the looper, the cam that operates them, the carriage, and the mechanism for causing the carriage and its appurtenances to vibrate, all these devices operating in the combination substantially as set forth.

I also claim the combination in a seaming machine of a series of points for holding the loops of fabric to be traversed by the needle, with the reciprocating needle and the looper, and with a cam so formed as to cause the looper, after the passage of the needle through a loop of the fabric to be seamed, to take the loop of needle thread at one side of the needle and withdraw from it at the opposite side thereof, all operating in the combination substantially as set forth.

I also claim the combination in a seaming machine of the devices recited in the first claim, with a section of a nut that can be disengaged from the feed screw to permit the carriage to be moved quickly back to its starting point, all said devices operating in the combination substantially as set forth.

I also claim the combination in a seaming machine of the seaming mechanism with a supporting plate, provided with half as many supporting points as the number of stitches made by the seaming mechanism, so that the stitches are made in regular succession through the loops of the fabric and out of them, substantially as set forth.

59,747.—STONE-SAWING MACHINE.—Franklin S. Packard, Springfield, Mass.

I claim, First, Producing the rolling or rocking motion of the saws by the arrangement of the connections, d d' g g', and standards, f f', or equivalent devices, arranged substantially as herein described.

Second, Forming the ways or guides, k k', etc., for the slides, l l and h h, on a curve, substantially in the manner and for the purpose herein set forth.

59,748.—TOBACCO PRESS AND CUTTER.—Samuel G. Rice, Albany, N. Y.

First, I claim the cover, B, applied to a box, A, by a hinge at one end, and a vertical adjusting device at the opposite end, for the purpose of pressing the tobacco at or near its point of discharge from said box, substantially as described.

Second, The combination of an expanse, b b, follower, G, with a hinged pressing cover, B, press box, A, and cutter, K, substantially as described.

59,749.—MANUFACTURE OF PARAFFINE CANDLES.—Henry Ryder, New Bedford, Mass.

I claim my improved process as described for effecting the annealing or gradual cooling of paraffine in a mold, such consisting in the subjection of the mold containing the melted paraffine to a chilling bath of water of about freezing temperature, and subsequently allowing water of about such temperature to flow into, and warmer water to flow out of the chilling bath, as explained.

59,750.—MEDICAL COMPOUND.—Barclay Samson, Cortlandville, N. Y.

I claim a preparation or compound composed of the ingredients above specified, and compounded substantially in the proportions and manner set forth.

59,751.—TREATING HYDRO-CARBON OILS.—H. K. Taylor and D. M. Graham, Cleveland, Ohio.

First, We claim the disposing affinity of sulphuric acid, causing a chemical combination of the gases used with the oil, either in connection with our process, patented May 22, 1866, or in connection with other processes.

Second, The disposing affinity of sulphuric acid in the treatment of hydro-carbons, that its use in connection with other substances, solid, gaseous, or fluid, by means of which the energy combination of these substances, or parts of them, with the hydro-carbons, is very much increased.

Third, Treating oil by means of air and acid gases, substantially as set forth and described for the purposes specified.

59,752.—STOP-VALVE FOR STEAM PIPES.—George E. Whitmore (assignor to himself and E. S. Pixley), Housatonic, Mass.

I claim the eccentric pin, in combination with the valve stem for forcing the valve, A, against and into the valve seat, F F.

I also claim the choke plug, I I, which prevents the valve, A, and the valve seat, F F, from being worn by the action of the steam in passing between the valve, A, and valve seat, F F.

I also claim the arrangement of the ground joint, G G, at the inside end of valve stem, C C, and lead ring, H H, or equivalent, at outside end of valve stem, C C, which forms a double packing; and the combination of all these parts in the manner and for the purpose specified.

59,753.—GATE AND GATE POST.—George W. Balding, Pleasant, Ind.

I claim the invention of the form of the notches in the posts, being an open-hooked notch, with square or smooth bottom, so that the gate bearings can turn in them, as necessary, to open the gate as aforesaid, into which it is secured by a loosely fitting pin, reference being had to the said drawings.

Further, I do not confine my invention to any limited number of bearings or notches in the posts, but to the nature and principle of the aforesaid invention.

59,754.—LIGHTING GAS.—Arthur Barbarin, New Orleans, La.

First, I claim, in combination with ordinary burners for burning illuminating gas, the application and use of spongy platinum in connection with the means of projecting through or upon it a jet of hydrogen gas, substantially as described, for the purpose of igniting the gas issuing from the burners, as herein shown and set forth.

Second, I claim arranging the hydrogen gas pipe and spongy platinum above and on opposite sides of the gas burner to which they are applied, so that the hydrogen, while issuing from its pipe, shall traverse the course of the gas discharged from the burner, substantially as and for the purposes shown and set forth.

Third, I claim the method of and apparatus for simultaneously igniting two or more ordinary gas burners by the use of spongy platinum, acted on by hydrogen in the manner and by the means herein described, whether the pipes by which the said hydrogen gas is conveyed to the platinum be within or exterior to the pipes by which the illuminating gas is conducted to the burners.

Fourth, I claim the concentric arrangement of the pipes, conveying the illuminating and the hydrogen gases to their respective burners, the pipe by which the hydrogen gas is thus conveyed being within and surrounded by the pipe which conducts the illuminating gas, substantially as herein shown and set forth.

59,755.—MANUFACTURE OF BLANKS FOR HORSE SHOES.—Hazen J. Batchelder, Boston, Mass.

I claim, as an article of manufacture, a bar of metal, shaped, creased, and punched as herein described, and as represented in Figs. 1 2 and 3, of the drawings, the same constituting a series of blanks suitable for horse shoes.

59,756.—MEDICAL COMPOUND.—Daniel D. T. Benedict, Havana, N. Y.

I claim the combination of the three medical materials herein named, namely, quinine, ipecac, and iodine, in the proportions herein stated, into one medicine.

59,757.—TOOL HANDLE.—C. W. Bioren, Philadelphia, Pa., assignor to Lysander Flagg, Central Falls, R. I.

I claim a tool handle, provided with the stationary ratchet, d, the double-faced sliding ratchet ring, e, and the revolving socket, b, having a ratchet on its under face, when said parts are combined and arranged to operate as shown and described.

59,758.—MACHINE FOR FELTING HAT BODIES.—Job W. Blackham, Brooklyn, N. Y.

First, I claim the combination and arrangement of the reciprocating presser, C, with the bed of rollers, b, so as to treat the hats by the surfaces of the presser and the rollers, substantially as and for the purpose herein set forth.

Second, I claim, in connection with the above, so proportioning the extent and velocity of the motion of the presser, C, to the size and velocity of the rotation of the rollers, b, that the hats shall tighten in the roll and tend to stand and roll with only a rotary motion during a great portion of the return movement of the part, C, and shall tend to advance to an extent equal to the diameter of one of the rollers during each forward movement, substantially as and for the purpose herein set forth.

Third, I claim, in combination with the presser, C, and rollers, b, the springs, G 1 2, etc., or their equivalents, arranged as herein specified for increasing the force with which the hat is treated, as and for the purpose herein set forth.

Fourth, I claim, in combination with the presser, C, and rollers, b, the shaft, I, and cords, g, or their equivalents, arranged as specified, for graduating the effect of the force in holding down the presser, C, substantially as and for the purpose herein set forth.

Fifth, I claim the spring, P, or its equivalent, arranged to operate in opposition to the gravity of the presser, C, so as to reduce the pressure on the hats, substantially as and for the purpose herein specified.

Sixth, I claim the devices substantially as herein shown and described, for putting into and out of action the lateral motion of the bed of rollers, b.

59,759.—CHURN.—John C. Bodine (assignor to himself and J. Vickers), Camden, N. J.

I claim the oblong body, A, with its semi-cylindrical bottom, its detachable angular grate composed of bars, x, and its vertical slats, t, in combination with the central shaft, B, and its paddles, q, the whole being arranged and operating as and for the purpose herein set forth.

59,760.—LIME KILN.—Uriah Cummings, Buffalo, N. Y.

I claim in a lime kiln the draw flues, G G', and enlarged fire chambers, D', constructed and arranged with an unpartitioned cupola, substantially as described.

59,761.—APPARATUS FOR MEASURING LIQUIDS.—E. K. Dutton, Manchester, England.

First, I claim the chamber, g, its openings, e and f, and two-way cocks, c, or their equivalents, in combination with the tubes, l m, and receptacle, i, the whole being constructed and arranged substantially as described.

Second, The combination of the above with the within-described registering mechanism and dials.

59,762.—ANIMAL TRAP.—Samuel F. Estell, Richmond, Ind.

First, I claim the double rack, N N, construct d and operating substantially as set forth and for the purposes described.

Second, I claim the shaft, H H, the crank, m, and arms, b b, all made of one single piece of wire, when operating substantially in the manner and for the purposes described.

Third, I claim the rack, N N, shaft, H H, crank, m, arms, b b, doors, K K, and panels, S S, in combination, the box, J, the openings, A A, and platform, B, all arranged substantially as set forth and for the purposes described.

59,763.—LINE WIRE FOR TELEGRAPHS.—M. G. Farmer, Salem, Mass., and G. F. Milliken, Boston, Mass.

We claim, in combination with the instruments making up with the conducting wire a telegraph circuit, a copper wire conductor strengthened with iron or steel, substantially as set forth.

59,764.—LOCK-UP SAFETY VALVES.—Chileon M. Farrar, Buffalo, N. Y.

First, I claim the arrangement and combination of compound levers, D F, movable and adjustable fulcrum, I, fixed weight, H, and safety valve, B, within a suitable lock-up box, A, for the purposes and substantially as described.

Second, The hook, L, having a long handle projecting upwardly through the box, in combination with the lock-up box, for the purpose and substantially as set forth.

Third, The plate, N, placed under the escape pipe and within the box, A, for the purpose and substantially as described.

59,765.—COTTON-SEED PLANTER.—Henry R. Fell and Edward Phifer, Trenton, N. J.

We claim the combination with the hopper and spout, of the shaft, M, provided with the feeding screw, P, and stirring rods, N, operating substantially as described.

59,766.—COAL-OIL STOVE OR GAS HEATER.—C. A. Harper, Rahway, N. J.

First, I claim the combination of an exterior and interior drum with draft pipes and air flues, when arranged substantially in the manner and for the purpose set forth.

Second, A shifting heater, movable upon slides, when used in combination with an exterior and interior drum, substantially as set forth.

59,767.—DEVICE FOR OPERATING THE SHUTTLES IN LOOMS.—Joseph J. and Edward Harrison, Manchester, England.

First, We claim the novel and peculiar arrangement of mechanism described, for expelling the shuttle of looms from one box unto the other, and vice versa, without the use of the picker as now employed for the same purpose.

Secondly, We claim the eccentric swell and the apparatus in connection therewith for gradually and effectually checking the shuttle upon its being received by the shuttle box, and also for instantly releasing the same upon the expulsion, as hereinbefore described, set forth, and fully illustrated in the drawings attached.

59,768.—PREVENTING THE INCRUSTATION OF STEAM BOILERS.—A. T. Hay, Burlington, Iowa.

I claim the use of a galvanic battery, or its equivalent, placed outside of the boiler of a steam engine, the two poles of which battery are connected respectively with the opposite ends of the boiler, substantially as and for the purpose above set forth.

59,769.—TRUSS BRIDGE.—George P. Herthel, Jr., St. Louis, Mo.

First, I claim a trussed bridge, or other structure, having flexible joints throughout, when constructed substantially in the manner herein described.

Second, In the construction of truss bridges and other structures, forming the joints between the posts, braces, and cords thereof, or either of them, by interposing a rod or bolt in such joint, whereto said posts, braces and cords shall be so pivoted or otherwise loosely connected, as to form a flexible or yielding joint, each part being independent in movement, all substantially in the manner and for the purpose herein set forth.

Third, The arrangement of the braces, K, for adjustment of the parts forming the panels, in combination with the keys, g4, for adjustment of the end parts, thus by said combination permitting a change or reproduction of camber, substantially as set forth

Fourth, The general combination of the parts, F, with G H I and K, substantially as and for the purpose set forth.

59,770.—TOOL FOR SHARPENING SICKLES OF HARVESTERS, ETC.—John Jann, New Windsor, Md.

I claim the tool holder, A B, in combination with substituter cutter plates, C C C, of varying angular forms, applied and secured to said holder, as and for the purpose described.

59,771.—CEMENT.—Adolph S. Jourdan, Nashville, Tenn. Antedated November 9, 1866.

I claim the herein described cement, consisting of shellac and pumice stone, substantially as set forth.

59,772.—LAMP BURNER.—Anson Judson, Brooklyn, N. Y.

First, I claim making the shell of the burner and the wick tube in a single piece, substantially as and to the effect hereinafter set forth.

Second, Making the shell of the burner with vertical slits or openings for the admission of air to supply the flame, when said openings are so formed and arranged as to permit the said shell to be cast in a two part flask, and without cores to form said openings, as hereinabove set forth.

59,773.—APPARATUS FOR SEPARATING METALS FROM ORES.—Stephen R. Krom, of New York City, assignor to Apollos R. Wetmore.

First, I claim giving the intermittent action to the blast in a separating machine, substantially as specified, by means of the valve, M, or its equivalent, operating between the blowing means and the perforated bed, substantially as herein set forth.

Second, I claim the endless traversing perforated bed, E, in combination with means for blowing through the upper half thereof, so as to lift and agitate the material thereon, substantially as herein set forth.

Third, I claim the tube, a, or its equivalent, of less breadth than the endless belt, E, and adapted to carry the fresh material down and deposit it immediately upon the endless belt, E, while the lighter material is allowed to traverse past it down the incline, substantially as and for the purpose herein specified.

Fourth, I claim the scraper, K, arranged to operate in combination with the endless traversing perforated bed, E, and with means for producing intermittent blasts or puffs of air through the same, substantially as and for the purpose herein specified.

59,774.—CEMENT FOR LEATHER.—Albert Leach, Lynn, Mass.

I claim as my invention the composition made of the materials and in the manner substantially as hereinbefore specified.

59,775.—COAL STOVE.—James S. Marsh, Lewisburgh, Pa.

I claim the construction of a stove with an upper single heat-radiating wall, and with a lower air-heating space, which is formed by the outer wall and fire pot, and which is provided with a pipe leading through the smoke pipe, or some other portion of the stove, where it will be exposed to the escaping products of combustion, as described.

59,776.—MEDICAL COMPOUND.—Zephaniah Marshall, Andersonville, Ind.

I claim the within-described medical compound, for the purpose specified

59,777.—CUT-OFF VALVE GEAR.—William G. Pike, Philadelphia, Pa.

First, I claim the combination of the double arm, G, cylinder, a', and dash pot, b', in the manner and for the purpose substantially as shown and described.

Second, The spring boxes, l l', with their inclosed spring, k k', adjusting screws, m m', and bearing rods, l l', in combination with the rods, S S', in the manner and for the purpose substantially as shown and described.

Third, The lifter, q, arranged and operating substantially as shown and described.

59,778.—DIE FOR CUTTING AND POINTING WIRE.—J. C. Plumer, Boston, Mass. Antedated Nov. 10, 1866.

I claim the device, substantially as shown in figs. 3 and 4, and for the purpose specified.

59,779.—Self-lubricating Axle Box for Carriages.—Silas S. Putnam, Dorchester, Mass.

First, I claim the chamber, a, with the slots, c, in combination with the openings, b, at its inner end, constructed and operating sudstantially as set forth.

Second, I claim the axle box, A, provided with a flange, e, and finished with a projection, f, which forms the outer end of the hub, in combination with the screw nut, F, for confining it tightly in place within the hub, substantially as set forth.

59,780.—Steam Generator.—Edwin Reynolds, Boston, Mass.

I claim the section, c, when constructed and arranged so as to operate substantially as described.

Also, in connection therewith, I claim the arrangement of the sediment chambers in the ends of the lower pipes, a.

59,781.—Churn Dasher.—James T. Rittenhouse, Urbana, Ill.

I claim the combination of the arms, A A, made tapering, as above set forth, with the diamond-shaped wedges, B B, attached to the ends thereof, for the purpose of agitating the cream in such a manner (forcing it upward and outward), as to admit of a free circulation of air while thus agitated. No claim whatever is made to that part of the dasher designated as the shaft, except in so far as it is necessary to secure, by the use of it, the combination above mentioned.

59,782.—Apparatus for Obtaining Oil from Wells.—William Shoupe, Saltburgh, Pa.

First, I claim, in combination with the well pipes, B and D, and a chamber, E, the gas pipe, F, having a safety valve applied to it, substantially as described.

Second, Sustaining the pump tube, D, in the well by means of a self-sealing dome, E, or its equivalent, which forms a chamber at the top of the well, communicating with the gas space between the two pipes, B and D, substantially as described.

Third, The inlet, J, applied to the dome, E, for admitting of the introduction of water into the well, substantially as described.

Fourth, The means, substantially as herein described, whereby oil is allowed to flow into the outer casing, B, at points intermediate between the packing, and, at the same time, the surface water is kept back and not allowed to flow into the well.

Fifth, In combination with a casing, B, which is perforated at suitable points, and which encloses the pump tube, D, I claim the chamber, E, and an outlet pipe which is provided with a safety cock or valve, substantially as described.

59,783.—Apparatus for Binding Circular Paper or other Fans.—Roswell T. Smith, Nashua, N. H.

I claim constructing a fan binder, with the circular disk, A, or its equivalent, in combination with the hinged flap, B, mounted upon a suitable turn stand, a, substantially in the manner and for the purpose herein described.

59,784.—Dental Plugging Instrument.—G. B. Snow and T. G. Lewis, Buffalo, N. Y.

We claim so constructing a dental plugging instrument that it may be operated automatically to give repeated blows, or its operating parts locked so that it may be used as a hand-pressure instrument, substantially as described.

59,785.—Scissors Sharpener.—James J. Tobey, Boston, Mass.

I claim the combination and arrangement of the block, A, the steel, B, and the screw, C, in such a way as to form a scissors sharpener, substantially in the manner and for the purpose set forth.

59,786.—Type Separator.—Elber Van Gieson, Newark, N. J.

First, I claim the use of the springs, or spring levers, e, and the spring, g, constructed, arranged, and operated in the manner and for the purpose specified.

Second, Also, each cam and lever, shown and described, when used in combination with the springs, e and g, substantially in the manner and for the purpose hereinabove set forth.

59,787.—Coating Sheet Iron with other Metals.—John H. Whitting (assignor to J. Bardsley and M. Hall), Philadelphia, Pa.

I claim coating sheet-iron plates with tin or other metals, or alloy, by the process substantially as herein described.

59,788.—Machine for Washing and Drying Wool.—John and William Yewdall, Philadelphia, Pa.

First, We claim the hollow cylinder, E, with its bars, F, and pins, e, in combination with the weighted pressing roller, H, the whole being arranged and operating as and for the purpose described.

Second, The sectional grooved plates, G, constructed and adapted to the cylinder, E, and its bars, F, substantially as and for the purpose specified.

59,789.—Adjustable Damper for Fireplaces.—Stephen Albertson, New York City, administrator of the estate of Samuel Albertson, deceased.

I claim the combination of the extension piece, k, with the rack and pawl, for the purpose of governing or controlling the sliding plate upon and with the stationary plate, as herein described and set forth.

59,790.—Churn.—John Davis, 2nd, Lake Village, N. H. Antedated Nov. 16, 1866.

I claim the hollow, conical agitators, E E, with their air-supplying tubes, G G, arranged and operating substantially as and for the purpose herein specified.

59,791.—Manufacture of Artificial Fuel.—Henry G. Dayton, Maysville, Ky., assignor to himself, B. Young, N. C. Morse, and R. B. Wilson.

I claim, as a composition for treating or saturating corn cobs or kindling wood, a compound of rosin and the residuum of the petroleum distillation, in about the proportions described.

I claim, also, as as a new article of manufacture, a kindling material composed of corn cobs, treated or saturated with the above composition.

59,792.—Faucet.—Daniel Drawbaugh, Eberly's Mill, Pa.

First, I claim the hubs, b and c, with their pistons, constructed and operating substantially as above described, that is to say, so that when the one of those hubs has a constant motion, that of the other shall be intermittent, substantially in the manner and for the purpose above shown.

Second, In combination with the subject matter of the first claim, I claim the recess, k, upon one or both the flat surfaces which are swept by the hubs and pistons aforesaid, which said recesses enable the liquid drawn through said faucet to pass outward toward the eduction pipe, h, from between the said pistons, substantially as described.

Third, In combination with the subject matter of the first claim, I claim the cogged wheel, s, with its index, x, and the pin, m, upon the crank, n, for the purpose of denoting, automatically, the precise number of revolutions of said crank, substantially as described.

Fourth, In combination with the subject matter of the first claim, I claim the gate, g, having its face and the plane of its seat inclined to the axis of revolution of such gate, substantially as and for the purpose described.

59,793.—Faucet.—Daniel Drawbaugh, Eberly's Mill, Pa.

First, I claim the combination of the screw flanch, b, spigot, A, chamber, h, and piston, p, substantially as and for the purpose set forth.

Second, I also claim, in combination with the above, an indicator, d, attached to the piston, p, and a proper scale on the outer side of the vessel, h, by which to denote the exact amount of fluid within that vessel, substantially as and for the purpose described.

59,794.—Bedstead Fastening.—William H. Elliot, New York City.

First, I claim so constructing the mortise cut in the fact of the post, and the tenon cut on the end of the side rail, that the tenon, with its projections, may pass to its place in the mortise by a direct downward and inward movement, substantially as herein set forth.

Second, Cutting the bottom of the mortise and the end of the tenon at an angle which corresponds with the direction of the movement of the tenon when it passes into the mortise, as herein shown.

Third, The combination of the several shoulders, herein described, for supporting the side rail, when formed out of the solid material of the bedstead, and operating as set forth.

59,795.—Bedstead Fastening.—William H. Elliot, New York City.

First, I claim cutting the seat for the key, c, in the contiguous surfaces of the mortise and tenon, substantially as shown and described.

Second, The key, c, when placed between the contiguous surfaces of the mortise and tenon, and supported as herein shown, in combination with the mortise and tenon, as a self-tightening bedstead fastening, substantially as specified.

59,796.—Skates.—A. W. Elmer (assignor to himself and C. Ensminger), Springfield, Mass.

I claim an elastic skate having the foot plate, B, and runner, A, combined with the spring, M, constructed and operating substantially as described.

59,797.—Burning Fluid.—Geo. L. Fattie, Buffalo, N. Y.

I claim an illuminating burning fluid, compounded substantially as herein described.

59,798.—Roller for Clothes Wringer.—James Bennett Forsyth, Roxbury, Mass.

I claim a roll, constructed substantially as described, with a core so formed that the ends of the threads of the cloth will rest upon the shaft for the purpose set forth.

59,799.—Spring Holder for Bed Bottoms.—Rufus Lapham, New York City.

First, I claim the device for attaching the spring to its seat, substantially as described.

Second, The combination of the screw seat and spring, substantially as described.

Third, Also, the combination of the seat, spring, and frame, substantially as described.

59,800.—Photographic Printing Frame.—C. L. Lochman, Carlisle, Penn.

First, I claim, on the one side or body of a photographic printing frame, two adjustable rabbeted bars, F F, to hold a negative in place, in combination with two or more tightening screws, E E E', or their equivalents.

Second, I claim the adjustable hinged piece or bar, J, with its mortised ends, and supporting screws and burs, constructed and operated substantially in the manner set forth.

59,801.—Reel.—Daniel H. McLean, Ilion, N. Y.

I claim, in combination with the hinged or pivoted arms of the reel, the washer or nut for spreading and forcibly holding said arms to the skein, and against any tendency to rise on their pivots or hinges, substantially as described.

59,802.—Churn.—Eli McMillan, Jr., Wilmington, Ohio.

I claim the combination of the imperforate dashers, B C, rods, B' C', guiding stem, D, flywheels, F F', and cranks, I I', all constructed, arranged, and operating as and for the purposes specified.

59,803.—Medical Compound.—David W. Stutsman, Upshur, Ohio.

I claim the composition, for a fever and ague pill, composed and compounded as set forth.

59,804.—Iron Gutter.—Edward Whitehead, Cincinnati, Ohio.

I claim the cast-iron gutter, A A' B C, when provided with the longitudinal slot, D, as and for the purposes herein described and set forth.

59,805.—Electro-magnetic Car Brake.—Francois Ferdinand Auguste Achard, Paris, France.

I claim, First, The eccentric, B, and lever, C, in combination with the magnetic cylinder, N, flanged drums, O, and brakes, 5, all constructed and operating substantially as and for the purpose described.

Second, The sliding armature, I, and hand lever, 6, in combination with the electro-magnet, K, lever, C, and eccentric, B, constructed and operating substantially as and for the purpose set forth.

59,806.—Drying Fruit, etc.—R. N. Allen, Cleveland, Ohio.

I claim, First, One or more adjustable frames, D, constructed substantially as and for the purposes set forth.

Second, The combination of the truck, C, with the adjustable frames, D, as and for the purpose set forth.

Third, The arrangement of an open or perforated ceiling, K, carriage, C, and frames, D, when used in connection with a drying apparatus, for the purposes set forth.

59,807.—Cider Mill.—Thomas Appelget, Princeton, N. J.

I claim the machine constructed to operate substantially as described and in the manner set forth, to press the juice from ground fruit by means of passing the pomace between the endless belts which are geared to work together, and have pressure rollers above and below that part of the belts which have the pomace between them.

59,808.—Lamp-chimney Cleaner.—Frederick Ashley, New York City.

I claim so constructing the holder or holders for the sponge, etc., of a lamp-chimney or other similar cleaner, that the said sponge, etc., can be attached thereto or detached therefrom at pleasure, substantially as and for the purpose described.

59,809.—Smoke Furnace for Curing Meat, etc.—John I. Barringer, Germantown, N. Y.

I claim, First, The fire pan, J, constructed as described, in combination with the smoke furnace, A D, substantially as and for the purpose set forth.

Second, The combination of the covers, H G, one or both, with the furnace, A D, substantially as described and for the purpose set forth.

59,810.—Combined Lantern and Foot Warmer.—W. F. Bartlett, Hillsdale, Mich.

I claim the cross flues, D', and reflector, H, in combination with the lamp, G, and case, A, as and for the purpose set forth.

59,811.—Churn.—E. H. Beckwith, Westernville, N. Y.

I claim, First, The curved hanging arms, g g, combined with the metal hubs, e e, the wooden bushes, h h, the wooden wings, f f f, and the sliding hub, d, on the spindle, C, when arranged in a churn, substantially as and for the purposes herein specified.

Second, I claim making the outer ends, c' c', of the cross ribs, c c, on the bottom of the churn diverging at an angle from them and higher than they are made, substantially as herein specified.

59,812.—Oyster Dredging Apparatus.—William Belbin, Baltimore, Md.

I claim, First, The davit, G, pivoted upon the gunwale and provided with a lever by which the dredge is raised, substantially as described.

Second, The auxiliary bow, I, of the dredge.

Third, The flange in the gunwale roller.

Fourth, The roller or sleeve, e, on the post of the davit.

59,813.—Gang Plow.—D. Bequeret and E. Demonlin, Jamestown, Ill.

We claim a plow composed of a long and a short beam with plow shares, F F', which are operated by levers, G G', in combination with the unequal crank axle, C, draft pole, E, placed in line with the short beam and with the caster wheel, I, all constructed and operating substantially as and for the purpose set forth.

59,814.—Stove Cricket.—Frank Bowman, Waltham, Mass.

I claim the peculiar construction and arrangement of a portable stove cricket, substantially as and for the purpose set forth and described.

59,815.—Heater for Soldering Irons.—R. Brady, New York City.

I claim, First, The cylinder, B, of the furnace lined with a series of castings, H, having air spaces between them, substantially as and for the purpose described.

Second, The inclined rests or supporters, G, for the soldering irons, substantially as described.

59,816.—Apparatus for Sealing Fruit Cans.—E. K. Bruce and J. M. Bruce, Wilkins, Pa.

First, We claim the cement vessel, E, provided with a discharge opening or tube with a cut-off or valve, K, in combination with a rotary table or disk, O, on which the can to be sealed is placed, and a screw clamp or its equivalent for holding the lid or cover on the can while the latter is being sealed, substantially as shown and described.

Second, The adjustable bar, C, fitted on the upright bar, A', in connection with the adjustable arm, D, placed on bar, C, all arranged as shown, to admit of the proper adjustment of the cement vessel to the can to be sealed, as set forth.

Third, The central tube, F, in the cement vessel, E, in combination with the lamp, G, fitted in an adjustable support, H, when said parts are used in connection with the rotary table or disk, O, and clamp, for the purpose set forth.

59,817.—Machine for Ornamenting Molding.—J. W. Campbell, New York City.

I claim, First, Constructing a machine for forming long strips of ornaments either independently or to be attached to moldings, consisting of a combination of the hopper, i, wheels, g and h, rollers, m and s, and wheel, p, and operating substantially as described.

Second, The application of the strip of muslin or other material for the purpose of supporting the plastic material, while and after the same is being finished in the manner specified.

Third, The box, r, for the purpose of supplying gum to the molding, so that the ornament may at once be firmly attached to the same, substantially as herein shown and specified.

59,818.—Treadwheel Hoisting Power.—Joseph C. Cassel, Worcester Township, Pa.

I claim the arrangement of the treadwheel provided with notches and pawl, and the platform with handles, the whole being adapted as described to the purpose set forth.

59,819.—Harness Reins.—William Clark, Valatie, N. Y.

I claim the combination of the stop, D, with the harness reins, A, substantially as and for the purpose described.

59,820.—Door Bell and Burglar Alarm.—D. L. Collins (assignor to himself and Elbridge Sims,) Antwerp, N. Y.

I claim the within-described door bell and burglar alarm, consisting of a single hammer, D, arm, E, piece or tappet, F, spring, J, cam, L, spindle, K, curved notched arm, L2, actuating spring, S, spindle, P, and projections, Q R, arranged in connection with the bell, A, as and for the purpose specified.

59,821.—Stave Machine.—J. C. Cook, Buffalo, N. Y. Antedated Nov. 16, 1866.

I claim the combination and arrangement of the self-adjusting feed rollers, G G, spring roller guide, a, fixed guides, b and c c, and the two cutter heads, H I, having a different number of cutters, substantially as and for the purpose herein specified.

59,822.—Fabric for Hats and Bonnets.—E. Copleston, Wrentham, Mass.

I claim as a new article of manufacture, hats or bonnets made by flocking upon the surface of a foundation or body of buckram or other suitable fabric, substantially as herein described.

59,823.—Rods of Punching Presses.—Joseph V. C. Crate, Waterbury, Conn.

I claim the shaft, A, in combination with the screwed rod, B, and spring, E, constructed, arranged and operated substantially as described.

59,824.—Method of Holding and Adjusting Scaffolds.—William A. Devon, Richmond, N. Y.

I claim the combination with the platform, C, of the winch barrel, G, falls, c c, of end tackles, E E, intermediate block, F, and window hooking frames, G G, for operation together essentially as herein set forth.

59,825.—Bedstead Fastening.—William H. Elliot, New York City.

I claim the combination of the mortise, m, the tenon, c, projections, i, depression, i', and key, e, when these devices are so employed as to form a self-tightening bedstead fastening, substantially as herein shown.

59,826.—Tenoning Machine.—D. Evers, Van Wert, Ohio.

I claim the cutter head constructed of the sliding collars, d d, saws, e e, cutters, s s, and mortised bolts, l l, when arranged and operating substantially as described for the purpose specified.

59,827.—Combined Seeder and Harrow.—Asahel Fairchild, Independence, Iowa.

First, I claim the roller, A, provided with cams, C C, in combination with the harrow bars, H and K, for the purposes and substantially as described.

Second, I claim the separate harrow bars, H and K, pivoted levers, I I, in combination with the slotted lever, M, and slide, P, and agitator, O, substantially as described.

Third, I claim the combination of the rock shaft, S, with the frame, G, and slide, a, for the purpose of shutting off the grain when the harrows are raised, substantially as herein set forth.

59,828.—Wind Wheel.—J. C. Fay, New York City.

First, I claim the two vertical wheels, I I, placed side by side in the box, A, connected with each other by gears, r r, and to a power shaft, L, by gears, J K, substantially as and for the purpose set forth.

Second, In combination with the wheels, I I, the doors, C C, applied to the front end of the box, A, as shown, so as to open and close and admit of a greater or less amount of wind to pass through the box and act upon or against the wheels, as set forth.

Third, The governor, H, connecting with and receiving its motion from the wheels, J I, and connected with the doors, C C, as shown, or in any equivalent way so that the doors will be open and closed and the speed of the wheels rendered uniform under variable degrees of velocity of the wind as set forth.

Fourth, The power shaft, L, connected by a pinion, K, and toothed wheels, J, with the wind wheels, I, in combination with the base, M, provided with the annular way, t, and the box, A, having rollers, s, attached to its under side to work on the way, t, substantially as and for the purpose specified.

59,829.—Seeding Machine.—J. D. Field, Keokuk, Iowa.

First, I claim the intermittingly rotating scrapers or shovels, G G, and rods, c, in combination with the fixed scraper, H, arranged to operate in the manner substantially as and for the purpose set forth.

Second, The arms, J J', in combination with the cam, L, having the pins, d d, attached the arm, K, and spring, I, for operating the cylinder, O, substantially as and for the purpose specified.

Third, The cylinder, O, placed within a case, L, which com-

municates with the seed box, N, and provided with the holes, p p', and an inclined projection, t, within it in combination with the bar, P, with shoe or cut-off, b, attached, all arranged to operate substantially as and for the purpose set forth.

59,830.—Pocket Match Safe.—Charles E. Fowler, Carmel, N. Y.

I claim an improved match safe, A, so constructed that the lid, a2, may close down over the opening and over the roughened part, a3, of the box, being kept closed by its own spring or elasticity, substantially as herein described and for the purpose set forth.

59,831.—Brick Machine.—E. R. Gard, Chicago, Ill.

I claim the striking plate, M, and plate, P, when applied or arranged substantially as shown and described, to yield or detach themselves in the event of stones or other foreign substances entering the molds, as set forth, the whole being constructed and operating in the manner and for the purpose herein described.

59,832.—Baling Press.—C. W. Gillis, San Antonio, Texas.

First, I claim the upright windlass, B, with rope, D, attached in combination with two rollers, a, fitted in sockets, F, at each end of the follower or plunger, E, and the roller, c, in bar, f, all arranged substantially as and for the purpose set forth.

Second, The bar, G, attached to the follower or plunger, E, with roller, c, at its ends working in grooves, d, in the sides of the press box, substantially as and for the purpose specified.

Third, The adjustable or pivoted racks, H, in combination with the pawls, I, and the bars, J, all arranged and applied to operate in the manner substantially as and for the purpose set forth.

Fourth, The securing of the doors, K K', in a closed state by means of the battens, f, buttons, j, in connection with the hinged bars, M M, provided with slotted lips, m, with a key, l, driven in them substantially as shown and described.

59,833.—Preserving Oysters.—E. T. Gilmore, Springfield, Mass.

First, I claim the method herein described of putting up oysters for preservation.

Second, The oyster can, having two apartments, B and C, arranged substantially as and for the purpose set forth.

59,834.—Wagon Brake.—Isaac and I. M. Gross, New Galena, Pa.

We claim the shoe bar, B, in combination with the lever, J Q, pulley blocks, K M, rope, L, windlass, O, lever, R, and rod, j, all arranged and applied to a wagon, substantially in the manner as and for the purpose set forth.

59,835.—Axle Nut for Wagons, etc.—John Haggert, New York City.

I claim the combination with the axle arm, a, and collar, f, of the grooves c q l, projections, h, and cap, o p, when all are constructed and arranged as herein specified to form a bayonet joint with a shoulder at right angles to the axis, to secure the wheel upon the axle, as explained.

59,836.—Mode of Attaching Pictures to Frames.—Stedman W. Hanks, Lowell, Mass.

I claim the combination of claps, A, with hooks or clasps, B, and wire springs, c, supported upon nails or tacks, D, operating in the manner and for the purposes set forth.

59,837.—Stuffing Box.—William Harsen, Greenpoint, N. Y.

I claim the combination of the lugs, D D, having threads on their inner faces and forming an open or divided screw box with the screw formation, s, on the gland, C, outside of the socket, for operation together, substantially as specified.

59,838.—Grain-hulling Machine.—F. Henckel and William Seck, Munich, Bavaria.

First, We claim the method herein described of separating the grain in two or more currents and uniting the same again, consisting of the centrifugal feeder, T, channels, W, terraces, E F, jacket, A, and apertures, a, substantially as described.

Second, The adjustable slide, R, in combination with the apertures, a, in the jacket, A, and with the several terraces of the revolving drum, when constructed and operating substantially as and for the purpose described.

59,839.—Lamp Wick.—Isaac L. Hoard, Bristol, R.I.

First, I claim paper lamp wicks made of paper pulp, substantially in the manner herein described and for the purpose set forth.

Second, The use of paper pulp for the manufacture of lamp wicks, substantially as described and for the purpose set forth.

59,840.—Making Sand Cores for Axle Skeins and Hub Boxes.—James G. Holt, Chicago, Ill.

First, I claim a frame which is constructed substantially as described and adapted for sustaining a series of core boxes in a fixed position during the operation of making a sand core.

Second, The means substantially as explained for making one or many sand cores upon a sand bed, so that the axis of the core shall be perpendicular to said bed, thus insuring the proper centering of the core in the mold for which they are adapted, substantially as set forth.

59,841.—Sawmill.—Samuel Jackson, Jr., New York City.

First, I claim the combination of the segmental gears, pinions, movable boxes, caps, and grooved guides for turning the saw while retaining the belt in position, when the same shall be constructed and operated substantially as shown.

Second, The combination of the belt, grooved cam wheel, and sliding guide, for the purpose specified.

59,842.—Boot Tree.—William and A. G. Kelsey, Delevan, Wis.

We claim the independent center, C, and pivoted stretchers, a a, in combination with the follower, c, and rod, d, all arranged as herein described, and adapted to operate upon a boot tree, as set forth.

59,843.—Apple Parer.—Horatio Keyes, Terre Haute, Ind.

First, I claim the segmental wheels, d d, in combination with the lever brake, h, and the paring knife arm, f, constructed and arranged substantially as and for the purposes herein described.

Second, I claim also the segmental wheel, i, and the pin, m, in combination with the eccentric rack frame, k, and rack, j, constructed and arranged substantially as and for the purposes herein specified.

Third, I claim also the combination and arrangement of the bevel wheel, c', with the segmental wheels, d d', the pin, m, the segmental wheel, l, the eccentric rack frames, k, the lever brake, h, and the knife arm, f, constructed and operated substantially as and for the purposes herein set forth.

59,844.—Spring Fish Hook.—Jacob King, Jr., Fort Wayne, Ind.

I claim the tube, A, with the hooks, C, pivoted to it and provided with the pinions, c, and catches, j j, in combination with the internal tube, D, provived with the spring, e, and rack, d, in which the pinions, c, gear, and the rod, E, provided with the cup disk, h, and spring, i, all arranged to operate substantially in the manner as and for the purpose set forrh.

59,845.—Medical Compound for the Cure of Foot Rot in Sheep.—Daniel Kinney, Loami, Ill.

I claim the improved medical compound herein described, for the purpose specified.

59,846.—Sawmill.—Dennis Lane, Montpelier, Vt.

I claim operating the carriage by means of the lever arm, Q, with its lip, a, and friction roller, R, belt, K, pulleys, L and M, clutch, S, hollow loose wheel, I, operating shaft, J, forked arm, V, and slide, W, constructed and arranged substantially as described for the purpose specified.

59,847.—Extinguishing Fire.—James R. Laurent, Milford, Pa.

I claim the solution of bicarbonate of soda and common salt in combination with alum, applied and operating substantially as and for the purpose set forth.

59,848.—Balanced Slide Valve.—John Lockhead, San Francisco, Cal.

I claim the overhanging edge or flange, e, of the ring, D, in combination with opening, b, in the valve, B, and with the inner surface of the steam chest cover, constructed and operating substantially as and for the purpose described.

59,849.—Envelope.—Richard Magee, Philadelphia, Pa.

I claim an envelope for use, closed at its top and bottom and open at both ends, one of the inner sides of each of the said ends being gummed and the other provided with a flap gummed in like manner so that either can be cemented to the inclosure, substantially as described for the purpose specified.

59,850.—Paint Brush.—John Marchbank (assignor to James McQuade), Lansingburgh, N. Y.

I claim the coiled wire ferrule, C, enlarged at the center and adapted to admit of the insertion of the bristles, substantially as and for the purpose specified.

59,851.—Blacking.—John McCrellish, Philadelphia, Pa.

I claim a blacking or coloring composed of the ingredients herein specified and described.

59,852.—Wrench.—James McLaren, Albany, N. Y.

I claim the within-described tool as a new article of manufacture.

59,853.—Cotton Press.—Thomas E. McNeill (assignor to himself and Wm. D. Miller), Lynchburgh, Va.

I claim, First, The cylinder, J, pipes, I and N, in combination with the cylinder, O, for the purposes and substantially as herein shown.

Second, I claim cylinder, J, piston, L, in combination with the press or follower, K, substantially as described.

Third, I claim a hydraulic press provided with or constructed with two cylinders so as to operate or act in conjunction with each other or separately when constructed and operated for the purposes and substantially as described.

59,854.—Machine for Rolling Rubber.—Charles V. Mead, Hamilton, N. J.

I claim, First, Rolling rubber by the action of the reciprocating table, H, and platform, A, substantially as herein set forth.

Second, The springs, a, in combination with the pinions, F, racks, G, table, H, and platform, A, constructed and operating substantially as and for the purpose described.

Third, The weights, I, or their equivalents, in combination with the table, H, and platform A, constructed and operating substantially as and for the purpose set forth.

59,855.—Gang Plow.—Peter Merkel, St. Louis, Mo.

I claim, First, The combination of the windlass, M, shaft, L, with its arm, n and p, links, q, and plow beams, I, substantially as described for the purpose specified.

Second, I claim the adjusting of the plows, J, higher or lower to suit the depth of furrow required, and also adjusting the wheel, C', by means of the shaft, G, provided with the pinions, f f g, and the rack bars, F F, and slide, d, provided with a rack, substantially as and for the purpose set forth.

Third, The fitting and securing of the front ends of the plow beams, I I, in a cross piece, H, composed of two parallel bars, j j, provided with journals, m, fitted in the rack bars, F, substantially as and for the purpose specified.

59,856.—Machine for Channeling Stones.—Andrews T. Merriman, Rutland, Vt., and Thomas Ross, Middlebury, Vt., assignors to themselves and J. B. Reynolds and R. Berrett, Rutland, Vt.

We claim, First, A stone-channeling machine composed of a gang of cutters in combination with the direct-acting steam cylinders, the automatic valve gear, and provided with a suitable truck frame upon which the boiler and whole apparatus is mounted, constructed and operating substantially as described and for the purpose specified.

Second, The adjustable cross piece, h, and feed screw, j, in combination with the cutter bar, K, and cross head, I, substantially as described and for the purpose set forth.

Third, Operating the feed wheel, y, from the cross head, I, by means of the rod, d', lever, r, rod, s, and rock shaft, u, or their equivalents, operating substantially in the manner described.

Fourth, Mounting the wheels, B and B', on adjustable brackets, substantially as and for the purpose described.

Fifth, The method herein described of changing the valve of the steam cylinder by the concussion of the cutters in striking the rock, consisting of the elbow, o' p', parallel bar, m, stop pawl, j', rod, g', lever, r, and valve rod, q, or other equivalent means producing the same effect.

Sixth, The method herein described of changing the valves of the steam cylinder when the cutters do not strike the rock, consisting of the roller or stud, S', inclined projection, t', pawl, j', rod, g', lever, r, and valve rod, q, or other equivalent means of producing the same effect.

Seventh, The adjustable rod, d', and the lever, r, in combination with the cutter bar, K, cross head, I, valve rod, q, and feed slide, w, constructed and operating substantially as and for the purpose set forth.

59,857.—Cranberry Gatherer.—Erasmus D. Miller, Dorchester, Mass.

I therefore claim my improved cranberry gatherer, made as hereinbefore described, that is, of a series of wires or theeth and a shallow cylindrical box, or the same and a handle, arranged as specified, the front ends of the teeth under such arrangement being back sloped, as set forth.

59,858.—Car Coupling.—Thomas S. Mimiss, Meadville, Pa.

I claim, First, The triggered pin, constructed as and for the purpose specified.

Second, The weighted link holder, operating as set forth.

Third, The combination of the weighted link, triggered pin, and drawhead, constructed as and for the purpose described.

59,859.—Horse Hay Fork.—Henry Neumeyer, Millerstown, Pa.

I claim, First, The forked locking lever, H, with its short arm or prong, adapted to press the catch, F, in against the notch, and its longer arm releasing it, in combination with the rack bar, B, and slotted handle, D, receiving the pulley, E, substantially as described for the purpose specified.

Second, The combination of the crank, M, shaft, J, cog wheel K, and spring, L, with each other and with the tube, A, and bar, B, substantially as described and for the purpose set forth.

59,860.—Car Coupling.—H. L. Ogden, Atkinson, Ill.

I claim the rings, C, attached to the shafts or arbors, B, in combination with the rods, D, provided with the pins, e, and the chains or cords, d, which pass around the shafts or arbors, B, and the sliding bars, E, all arranged and applied to operate in the manner substantially as and for the purpose herein set forth.

59,861.—Hand-screw Clamp.—William Ormsby, Boston, Mass.

I claim a hand screw formed of the jaws, A and B, the screws, C and D, and the nuts, E and F, substantially as herein described and for the purpose set forth.

59,862.—Bran Duster.—Geo. H. Reynolds, Peoria, Ill.

I claim the bran duster consisting of the ribbed cone, E, ribbed encasing cone, F, spiked stationary head, H, spiked movable head, I, winged arms, K, bolt frame, M, chamber, R, arms, U, inclosing case, T, uprights, C', weighted levers, D', and levers, E', arranged and operating substantially as described for the purpose specified.

59,863.—Water Wheel.—J. L. Rumrill, Hartford, Vt.

I claim, First, The cylinder, C, constructed as described in combination with the radial buckets, J, and curved buckets, N the whole being constructed, arranged, and operated in the manner and for the purpose set forth.

Second, And in combination with the above I claim the collar, X, and cylinder, C, made so as to be adjusted to the inside of the wheel in order to prevent leakage, substantially as described.

59,864.—Cider Mill.—William Shaw, New Gordon Ohio.

I claim the cider mill consisting of the toothed cylinder, B, endless apron, D, rollers, E E', adjustable pivoted bars, F, scrapers, H I, brush, J, spout, N, and chute, O, arranged and operating substantially as described for the purposes specified.

59,865.—Lantern.—A. G. Smith, Jersey City, N. J.

I claim, First, Fastening the glass or globe, D, into the frame or guards, B, substantially as and by the means described, so that when the safe guards, B, and cap, A, are removed, the said globe shall remain fixed within the said guards, B, while at the same time it may be readily removed to be cleaned, substantially as and for the purpose set forth.

Second, The combination of the metal rims, b and c, with the removable globe, D, substantially as and for the purpose set forth.

Third, The burner shaft, l, and pin, g, in combination with the band, f, for the purpose set forth.

Fourth, The deflector, l, and square shoulder, S, in combination substantially as and for the purpose set forth.

Fifth, The frame or guard, B, provided with the groove, c, and the band, f, in combination with the globe, D, provided with the projection, a, so that the globe and the frame may be securely fastened together and the globe readily removed by passing it down through the band, f.

59,866.—Tool.—James A. Smith, New York City.

I claim the combination of the rods, o o, with the dies, F F, jaws, A A', bar, B, and nut, c, substantially as and for the purpose specified.

59,867.—Machine for Folding Paper Fans.—Roswell T. Smith, Nashua, N. H.

First, I claim the alternately sliding or vibrating folding blades, C C', or their equivalents, when used for folding or crimping paper or textile fabrics, substantially as herein set forth.

Second, The alternately sliding or vibrating folding blade, C C', in combination with the vertical gage, B, or its equivalent, when used for the purposes substantially as herein set forth.

59,868.—Compound for Lighting Cigars, etc.—Charles J. M. Sohet and H. C. F. Molvaut, New York City.

We claim a lighting compound, made as described.

59,869.—Pump.—William P. Squire, Paris, Ill.

I claim the combination of the pump cylinder, A, with its fixed upper and lower movable valve boxes, B B2, when the latter is connected through a suitable connecting rod, H, and other parts with the pump handle, J, or its equivalent, and when the flow of water is direct, substantially as and for the purpose described.

59,870.—Hay Derrick.—William P. Squire, Paris, Ill.

I claim, First, The car pulley, C, constructed as described, in combination with the crane, B, and ropes, D G, substantially as and for the purpose set forth.

Second, The sliding pulley, E, constructed as described, in combination with the ropes, D G, and frame, A, of the derrick, substantially as and for the purpose set forth and described.

Third, The combination and arrangement of the crane, B, car pulley, C, ropes, D G, fixed pulleys, H F, and sliding pulley, E, with each other and with the frame, A, of the derrick, substantially as herein described and for the purpose set forth.

59,871.—Machine for making Rule Joints.—D. H. Stephens, Riverton, Conn.

I claim the cutter head, c, working on the arbors, a, and arranged with the adjustable cutters or knives, b, feed screw, h, and binding screw, n, in connection with the movable arbors, a, and lever, d, or its equivalent, whether operated by hand or other power.

59,872.—Flour Packer.—Lewis W. Teeter, Hagerstown, Ind.

I claim the flour packer, the operating parts of which consist of the platform, B, rack slide, C D, eccentric, G, inclined rack, H, slide, I, pin, F, lever, J, spring catch, K, spring lever, L, slide, O, shaft, R, gear, S T, shaft, U, packer, X, when constructed and arranged to operate together, substantially as and for the purpose specified.

59,873.—Farm Gate.—Fayette F. Terry, Port Gibson, N. Y.

I claim suspending the gate by means of the screw rod, b, and nut, c, substantially as and for the purpose specified.

59,874.—Pulley.—Jonathan S. Tibbets, Terre Haute, Ind.

I claim the cam hook, A, when constructed substantially as herein shown and described, in combination with the pulley, B, substantially as and for the purpose set forth.

59,875.—Bottle Stopper and Medicine Gage.—Samuel H. Timmons, Lafayette, Ind.

I claim a graduated bottle stopper or one made with a definite capacity by which a specific dose may be measured, and the stopper fitted either within or around the neck.

59,876.—Treadle.—A. P. Torrence, Columbus, Ga.

I claim a treadle, hung and arranged in such a manner as to operate substantially as and for the purpose described.

59,877.—Vibrating Governor.—Elson Towns, Morland's Grove, Ill.

First, I claim the combination of the pulley, A, pinion wheel, K, bevel gear wheels, F G H, and frame or box, E, with each other, with the driving shaft, B, the verge shaft, I, the weighted rack, L, and the frame, D, of the machine, substantially as described, for the purpose of obtaining the difference between the required and actual velocity and the application of said difference, as herein set forth.

Second, The combination of the jointed verge, X, constructed as described, with the verge wheel, W, with the pendulum, B' C', and vibrating wheel, M', either or both, and with the frame, D, of the machine, substantially as described and for the purpose set forth.

Third, The combination of the spring, W', pitman, S', lever, U, and vibrating frame, T', with each other, with the vibrating wheel, M', and with the frame, D, of the machine, substantially as described and for the purpose set forth.

Fourth, The combination of the pawl, G', ratchet wheel, H', windlass, E', and cord, I', with each other, with the pendulum weight, C', and with the frame, D, of the machine, substantially as described and for the purpose set forth.

Fifth, The combination of the spring catch, U, and pulley, V, with the driving shaft, B, with the rack, L, and with the frame, D, of the machine, substantially as described and for the purpose set forth.

Sixth, The combination of the jointed lever, O o', and stirrup, N, with the rack, L, and with the fulcrum post, P, substantially as described and for the purpose set forth.

59,878.—Swinging Power.—William Valentine and Thomas C. Longton, Trenton, N. J., assignors to Sehees and Charles V. Mead, Hamilton Township, N. J.

First, We claim a swing, constructed substantially as described, in combination with the pulleys, B and F, the latter being provided with the arm, H, by means of which a rocking motion is imparted to the shaft of a washing machine, and a reciprocating motion to the dasher of a churn, substantially as described.

Second, We claim a swing, constructed substantially as described, in combination with the double pulley, J, and clutches, K K', on the shaft, L, by means of which a continuous rotary motion is imparted to the shaft, L, substantially in the manner and for the purpose set forth.

59,879.—Binder for Sewing Machines.—Geo. Vincent, Stockton, Cal.

I claim the combination of the plates, A and C, with blocks, G

and its spur, H, operating substantially as above described and for the purpose herein set forth.

59,880.—Hoisting Apparatus.—William S. Watson, New York City.

First, I claim the combination of the rope, A, and hoisting tackle, B C, with the hook, a, and its arm, g, windlass, D, rope, E, and hook, b, all arranged in the manner described, and employed to permit the weight or thing lifted to be transferred from the rope and tackle to the windlass, substantially as and for the purpose specified.

Second, In combination with the above I claim the spring brake, F, lever, H, and nose, d, arranged and operating in the manner and for the purpose specified.

59,881.—Spittoon for Railroad Cars.—Ambrose H. Wells, Waterbury, Conn.

I claim an open-ended spittoon, A, having a cover, C, and valve 1, both arranged to turn upon a pivot, E, substantially in the manner described and for the purpose specified.

59,882.—Peat Machine.—Thomas J. Wells, New York City.

First, I claim the combination of the fixed and rotating diagonal arms or knives, a b, when placed within a horizontal frame, with spiral propelling blades, Q, substantially as described.

Second, I also claim making spiral blades or ridges, one or more, in the inside of the discharge neck, O, in direction the converse of the directions of the spiral propelling blades, Q, substantially as described.

Third, I also claim a stationary die, L, one or more, projecting through the movable bottom of the mold, substantially as described.

59,883.—Distributing Table.—George Whitaker, Lewistown, Ill.

I claim a table made in a box form, and provided with a series of spouts or boxes, E, around its sides, either one or more, having hooks, a, or other means at their lower ends suitable for suspending a bag or sack or other receptacle thereto, substantially as described and for the purpose specified.

I also claim the combination with the table boxes, E, of the racks or frames, I, for receiving and holding the cards indicating the portions of mail or other matter to be placed in the same, substantially as described.

59,884.—Apple Parer.—D. H. Whittemore, Worcester, Mass. Antedated Nov. 11, 1866.

First, I claim the cams, c c, upon the face of the gear, C, for the purpose of giving and reversing the motion of the paring knife, substantially as described.

Second, I claim the projection or rib, I I, upon the gear, C, for the purpose of tipping the knife back from the apple to admit of the easy removal of the apple from the fork and replacing of another, as described.

59,885.—Milk Strainer.—N. A. Wright, Prairie du Chien, Wis.

I claim the combination of the rubber or other elastic lining, a, on the inside of a lower section, A, of a strainer, with the springs, b b, arranged substantially as herein shown and described.

59,886.—Steam Engine Cut-off Valve Gear.—William Wright, New York City.

First, I claim the clogged sliding toe or toes, and the spirally-grooved or threaded longitudinally moving spindle, N, in combination with each other, and with the cam, F, and valves, substantially as and for the purpose herein specified.

Second, The spirally cogged or threaded spindle, N, so combined with the governor and the sliding toe or toes of the valve operating cam as to have a longitudinal movement as the governor rises and falls, and also to be capable of turning independently of the governor, as the latter rises and falls, substantially as and for the purpose herein specified.

Third, The combination of the rolling slide valves, I I', with the flexible plates, U U', substantially as herein described, for the purpose herein set forth.

Fourth, The set screws, u u', in combination with the flexible plates, U U', and valves, I I', substantially as and for the purpose herein specified.

59,887.—Variable Cut-off Valve Gear.—William Wright, New York City.

I claim the combination of the revolving toothed lifter, E, eccentric, G, fast to the valve shaft and toothed and spirally grooved or ribbed longitudinally sliding spindle, C, arranged for operation together, and with the hollow valve shaft, substantially as shown and described.

58,888.—Manufacture of Gun Cotton.—Frederick Augustus Abel, Woolwich, G. B.

First, I claim reducing gun cotton to a pulp, and consolidating such pulp with or without the aid of pressure into the form of sheets, disks, granules, cylinders, or other solid forms, either with or without the admixture of binding materials.

Second, Combining with gun cotton reduced to a pulp, gun cotton in a fibrous state, and consolidating such mixture into sheets, disks, granules, cylinders, or other solid forms, either with or without the admixture of binding materials.

Third, Combining soluble and insoluble gun cotton, either when both are in a state of pulp, or when one is in a state of pulp and the other in a fibrous condition, and consolidating such mixtures into cylinders, sheets, disks, granules, or other solid forms, either with or without the admixture of binding materials.

Fourth, Subjecting mixtures of soluble and insoluble gun cotton, either when both are in a fibrous condition or when both are in a state of pulp, or when one only is in a state of pulp and the other in a fibrous condition, to the action of solvents of the soluble gun cotton, either alone or with the employment of pressure, so as to effect the consolidation of the same.

Fifth, The application to the surface of the consolidated gun cotton of a solution of the soluble forms of gun cotton or of shellac, or other suitable gums or resins.

59,889.—Cane Mill.—Walter Briggs, Green Castle, Iowa.

First, I claim the rollers, a a, with iron shafts and metal boxes, with concave in the ends of the rollers, a a and b, and convex surfaces, operating as described and for the purposes set forth.

Second, The sliding feed, H, in combination with the rollers, a a and b, and the concave, m, operating as described and for the purposes set forth.

59,890.—Hook and Fastening for Ropes.—C. B. Bristol, New Haven, Conn.

I claim casting the clasp, A, hook or loop, B, and points or spurs, a and b, in one piece, when so constructed and shaped that in fitting, the points or spurs, a and b, may pass through the rope or cord, D, and the edges or lips, c and a', may be bent or turned over so as to firmly and entirely clasp the rope or cord, substantially as herein described and set forth.

59,891.—Manufacture of Alcohol and other Spirits.—John F. Collins, New York City.

I claim, First, The treatment of wash or mash, or other substance from which alcohol or other spirits are to be distilled, with phosphate of lime or soda, or carbonate of ammonia.

Second, The distillation of spiritous solutions at a temperature not exceeding 176 deg. Fahrenheit, for the purpose of preventing the formation of acetus and acetic acid, and also the different ethers.

Third, Having, in connection with the still or other apparatus, a pipe longer or higher than the column of water at the natural pressure of the atmosphere, for the purpose of returning any aqueous vapors to the still.

Fourth, The use of a current of suitable gas to propel the alcoholic vapors, instead of using heat.

Fifth, The use of a circulating current of air or suitable gas between the condenser and the still, for the purpose of preventing oxidation during the process, substantially as and for the purpose described and set forth.

59,892.—Knitting Machine.—William Cotton, Loughborough, England.

I claim the improvement in operating the sinkers in order for the formation of loops on the main needles, such being by means of the jacks, f, and a catch bar, h, or its equivalent, provided with actuating mechanism, substantially as described, whereby certain of the sinkers are operated in succession by the jacks, and the intermediate sinkers, or those termed "dividers," as well as the rest or jack sinkers, are subsequently moved in a body, in manner as explained.

I also claim the improvement by which the beards of the needles are closed, the same being effected by means of a stationary presser, P, and by moving the needles up against it, as explained.

I also claim the vertical arrangement of the needles, d, relatively, to the stationary presser bar, P, and the sinkers, e, arranged horizontally or thereabout, as described, the same being advantageous in rendering the needles capable of being moved up to and away from the presser bar with great ease and little expenditure of power.

I also claim the combination as well as the arrangement of the fashioning needles, m, formed and provided with mechanism for operating them, substantially as described, with the comb, l, and presser, P, and the main needles, d, and the sinkers, provided with mechanism for operating them for the production of a knit fabric, as set forth.

I also claim the fashioning needles, constructed as described, viz: with a curve at and near its point, and with the groove in its shank, and extending back from the point, as set forth.

I also claim the improvement for operating the thread carriers, viz: a friction brake applied to their supporting rod, and extended from the slur box sustaining bar, as set forth.

I also claim the combination as well as the arrangement of the adjustable stops, j4 k4, provided with mechanism for operating them, substantially as described, with the thread carrier or carriers, their supporting rod and the friction brake extended from the slur box carrier.

I also claim the improvement in the construction of the thread carrier, the same consisting in making it next the needle, flat or nearly flat, as represented at k^*, in Figures 15, 16, 17, and 18, the same being for the purpose hereinbefore set forth.

I also claim the combination of the adjustable stops, j4 k4, provided with mechanism for operating them, substantially as described, with the fashioning needles, and the thread carrier or carriers provided with mechanism or mechanisms for operating them, substantially as explained.

59,893.—Fish Hook.—C. O. Crosby (assignor to The Fish-hook and Needle Company), New Haven, Conn.

I claim flattening fish hooks in the bend, substantially as and for the purpose described.

59,894.—Hot-water Reservoir for Stoves.—John B. Crowley (assignor to himself and Chamberlain & Co.), Cincinnati, Ohio.

First, I claim the sliding plate, D or D', framed with projections, d d', and a lug, G, in the described combination with the grooves, E E', for the purpose set forth.

Second, I further claim the combination of the lugs, G, M, screw, bolt, or pin, H, hooks, N, and studs, O, for securing the flue plate and cover to each other and to the vessel, A, as described.

59,895.—Metallic Bindings.—Thomas B. De Forest, Birmingham, Conn.

I claim tipping or binding the end of skirt bands with metal, when the said tip is secured to the strap by indentations oblique to the fiber, in the manner substantially as described.

59,896.—Buckle.—Thomas B. De Forest, Birmingham, Conn.

First, I claim the combination of the frame, A, the tongues, B B, and the sleeve, D, when the said sleeve, D, serves to hinge the tongues to the frame, substantially in the manner as herein set forth.

Second, I claim securing the said buckle to its strap, by means of the sleeve, D, around the bar and over the strap, substantially as herein set forth.

59,897.—Washing Machine.—Daniel Dishart, Canton, Ohio.

First, I claim the adjustable slide, C, with spring attached, in combination with the boards, b b, as and for the purposes specified.

Second, The support, m, and receptacle, b, in combination with the box, A, and hinged cover, the whole being arranged and operating substantially as herein specified.

59,898.—Tubular Wick Burner.—H. W. Dopp, Buffalo, N. Y.

First, I claim the water jacket, B and B', in combination with a wick burner, for the purposes set forth.

Second, I claim the combination of the two rings, I and K, with the pipes, C and C'.

Third, I claim the combination of K2, with a tubular wick burner, when operated as set forth.

Fourth, I claim the combination of the cone, I' and I, for the purpose specified.

59,899.—Skates.—H. W. Dopp and Charles P. Weiss (assignors to themselves and I. Forsyth), Buffalo, N. Y.

First, We claim the combinations of the self-adjusting jaws, C C, levers, B B, and rod, D, as described.

Second, We claim the lever arrangements, E and G, in combination with rod, H.

59,900.—Field Fence.—Abram Fanckboner, Schoolcraft, Mich., assignor to Almeron F. Chapin, Richmond, Ind.

I claim the braces or stakes, F, battens, C D, pins, E, in combination with the end pieces, B, and fence panels, constructed and arranged as and for the purpose set forth.

59,901.—Manufacture of White Lead.—Thos. M. Fell and Ambrose G. Fell, Brooklyn, N. Y., assignors to themselves and William Bell, New York City. Antedated Sept. 25, 1866.

First, We claim the production of a sulphate of lead, in the manner and for the purposes substantially as described.

Second, The treatment of the sulphate of lead so produced with an alkali solution, in the manner and for the purposes substantially as described.

Third, The treatment of the sulphate of lead so produced with the carbonate of either potash, soda or lime, followed by an alkali solution, in the manner and for the purposes substantially as described.

Fourth, The treatment of the sulphate of lead so produced with any alkali compound, in the manner and for the purpose substantially as described.

Fifth, The manufacture of white lead from the ores of lead or the metallic lead, or from the oxide of this metal, by the use of nitric and sulphuric acids, in combination with an alkali solution, with or without the prior treatment by an alkali compound, substantially as described.

59,902.—Manufacture of White Lead.—Thos. M. and Ambrose G. Fell, Brooklyn, N. Y., assignors to themselves and William Bell, New York City.

We claim, First, The treatment of a solution of lead with a combination of acids, in the manner and for the purposes substantially as described.

Second, The production of a basic chloro-sulphate, either by separate or complete solution or precipitation, or by treatment in one and the same vessel, in the manner and for the purposes substantially as described.

Third, The treatment of a precipitate so produced with an alkali solution, in the manner and for the purpose substantially as described.

Fourth, The treatment of a precipitate so produced with the carbonate of either potash, soda, or lime, followed by an alkali solution, in the manner and for the purpose substantially as described.

Fifth, The treatment of a precipitate so produced with an alkaline compound, in the manner and for the purpose substantially as described.

Sixth, The manufacture of white lead from the ores of lead, metallic lead, oxide of lead, or litharge, or other substance containing lead, either by separate or complete solution and precipitation or by treatment in one and the same vessel, of a salt of lead with a double precipitant in combination with an alkali solution, either with or without the prior treatment by an alkaline compound, substantially as described

59,903.—Pegging Machine.—Walter Fitzgerald, Boston, Mass.

I claim, in combination with the gear plate, b, upon which the last is mounted, and through which the feed of the shoe is effected, the mechanism which admits of both longitudinal and transverse rocking movement of the shoe, substantially as set forth.

I also claim, in combination with the peg tube, n, in the face plate, o, the cutter, p, placed in the face plate, with its cutting edge disposed as shown, so that lateral movement of the plate severs the end of the pegwood in the tube from the strip to form the peg, substantially as described.

59,904.—Stump Extractor.—Ira Flanders, Lafayette, Mich.

I claim providing the lever, C, with the slot, m, and the recesses for the pin, F, in combination with the said pin, F, and link, g, and lever, D, arranged substantially as described and for the purposes set forth.

Second, I claim the combination of the hooks or bolts, j j j j, the braces, i i i i, with the bed pieces, A A, to operate as set forth.

59,905.—Pastry Roller.—Joseph S. Foster, San Francisco, Cal.

I claim the combination of the revolving board, B, the roller, C, the adjustable guide rocks, D D, with the rods, e e e e, operating substantially as and for the purpose specified.

59,906.—Skating Floor.—H. P. Gengembre, Pittsburgh, Pa.

I claim, First, Producing a sheet of ice for a skating floor by freezing from the under side, a sheet of water, as described.

Second, The floor, A, composed of a number of boxes, a a' a'', etc., in combination with a refrigerating apparatus, R, arranged as described and for the purpose specified.

Third, A skating floor composed of a sheet of ice resting on the floor, A, as described or its equivalent, and kept from melting as specified.

59,907.—Piston-rod Packing.—Thomas R. Grant, Newark, Ohio.

I claim a metallic steam packing composed of the sections, A, and cups, E and F, constructed as described.

In combination with the sections, A, and the cups, E and F, the spring, H, as and for the purpose described.

59,908.—Boot Heel.—J. H. Greenleaf (assignor to himself and Isaac N. Dann), New Haven, Ct.

I claim the heel constructed as herein described, that is to say, by the combination of the heel, A, the plates, B and C, and the elastic face, D, substantially as herein set forth.

59,909.—Boiler Feeder.—Caleb H. Griffin, Chelsea, Mass., assignor to himself and W. E. P. Smyth.

I claim the arrangement of the pistons, c c', chamber, a, we pipe, e, steam pipe, g, part, k, reservoir, l, and feed pipe, h, with reference to each other and the boilers whereby to operate, as and for the purpose set forth.

Also in connection therewith the arrangement of the pipes, n o whereby to regulate the hight of water in the boiler, as set forth.

59,910.—Preventing Incrustation of Sugar or other Boilers.—A. T. Hay, Burlington, Iowa.

I claim the application of electricity to prevent the formation of scale or incrustation in evaporating pans or kettles, substantially in the manner herein described.

59,911.—Cigar Press.—Geo. Heiss, Lancaster, Pa

I claim the frame, A A C C, with its movable ends, B, and slats' 1 2 3 4, etc., in combination with the rods, G, springs and blocks, E F, arranged and operating in the manner and for the purpose specified.

I also claim the arrangement of the open frame, A C, and its parts, in combination with the top, P, with its slats, H, and pins, I, and bottom, O, substantially made and used for the purpose specified.

I also claim the construction of the filling-in board, L, with its handled screws, in combination with the forked terminus, K N, turning press block, M, when employed for the purpose and in the manner specified.

59,912.—Instrument for Stretching Boots and Shoes Lengthwise.—Wiley Jones, Norfolk, Pa.

I claim the above described instrument or its equivalent for the purpose of stretching boots and shoes lengthwise at the toe, and thus securing ease and comfort to the wearer, when the boot or shoe is found to be to short or to cramp the toes of the foot in the manner and for the purpose specified.

59,913.—Fluting Machine.—Susan R. Knox, New York City.

First, I claim the standard, D, when constructed substantially as herein described, and located at the ends of the rollers, in contradistinction to a point between the ends, when said standard is employed in combination with the lever, C, as and for the purpose set forth.

Second, I claim the detachable bearing, F, in combination with the rollers, B B' substantially as and for the purpose specified.

Third, I claim the spring, J, arranged as described and employed in connection with the lever, C, bar, E, and bearings, F F', for the purpose specified.

59,914.—Belt Clasp.—Otto Kromer and Charles Ohlemacher, Sandusky, Ohio.

We claim the bar or back, A, the tongues, C, rod or slide, B, as arranged in combination with the belt, F, for the purpose and in the manner set forth.

59,915.—Velocipede.—Pierre Lallement, Paris, France, assignor to himself and James Carroll, New Haven, Conn.

I claim the combination and arrangement of the two wheels, A and B, provided with the treadles, F, and the guiding arms, D, so as to operate substantially as and for the purpose herein set forth.

59,916.—Machine for Polishing Marble.—James Maloy, Boston, Mass.

I claim, First, Polishing marble by means of an endless band of felting or other suitable material arranged and operating as described.

Second, I claim the combination of an endless band as described, with the sliding platform, d, substantially as and for the purpose described.

59,917.—Solar Cameras.—W. H. Masters, Princeton, Ill.

I claim the shielding cone, v, and diaphragm, w, between the lenses, t u, substantially as and for the purposes set forth.

59,918.—Piston-rod Packing.—James P. McLean and John Vandercar (assignors to James McLean), Brooklyn, N. Y.

We claim the combination of the cork, N N, and leaden strips, 1 2 3, for the purposes substantially as described and shown in the drawings.

59,919.—Carding Engine.—Thomas McGuirk and Orin Cole, Millville, Mass.

We claim the combination of the doffer of the finishing carding engine with one of the carding cylinders and a conveying mechanism, the whole operating substantially as set forth.

59,920.—Shifting Seat for Carriages.—Christian K. Mellinger, Manor Township, Pa.

I claim the specified combination and arrangement of the top and bottom pieces, A B, braces, C D, held by pivots, P, within the boxes or slots, a' a'', and b' b'', beveled or constructed and operating in the manner and for the purpose specified.

59,921.—Stair-rod Fastening.—William T. Mersereau, Newark, N. J.

I claim combining with the ring the tip, for the purposes herein fully indicated

59,922.—Bolster Plate for Wheeled Vehicles.—Oren E. Miles (assignor to himself and Wm. B. Sigley), Aurora, Ill.

I claim the projections, M N, around the bolt holes near the ends of the plates and adapted to stand in corresponding holes in the wood work and resist both the lateral and the torsional strains, as and for the purpose herein set forth.

59,923.—Screw.—George L. Morris, Taunton, Mass.

I claim, as a new article of manufacture, a cast wood screw, combining the conical stem under the thread, thread whose convolutions are all of the same diameter except the last concave faces to the thread, rounded spaces between the convolutions of the thread, and the horizontal cutting edge for the point.

59,924.—Torpedo.—John S. Morris, Buffalo, N. Y.

I claim a blasting cartridge or torpedo, constructed substantially as described.

I also claim the blocks, H, and stays, I, in combination with the detonating tubes, b, by which the latter are secured in place, and maintained in their proper relative position within the case, A, substantially in the manner specified.

I also claim constructing the plugs, C D, with the hole for the friction rod enlarged at the outer end, when used in combination with wax, o, or other similar substance for packing the same, and also construct ng the former with the groove, h, all arranged and operating substantially in the manner and for the purpose described.

59,925.—Coal Hod.—John H. Pocock, Chicago, Ill.

I claim, First, The bottom made up of the pieces, b and c, the pieces having the flanges for connection to the body of the scuttle and for forming the hoop or bottom bearing surface as a part of them, and con tructed substantially as herein set forth.

Second, The lips, a, when constructed and formed as herein recited, with the side pieces of the scuttle as described.

59,926.—Comb.—Ignatius Rice, New York City.

I claim the combination of the elastic spring band with the comb, in the manner and for the purpose set forth.

59,927.—Sifter.—N. L. Robertson, Rockford, Ill.

I claim the sifting apparatus consisting of the box, A, provided with the sieve, C, resting on the rollers, D, and the removable hopper, B, all arranged to operate as herein shown and described.

59,928.—Roofing and Clapboarding.—Samuel J. Seely, New York City.

I claim the sheet metal clapboarding, bent and united substantially in the manner described, for covering the walls or roofs of buildings, and for other analogous purposes.

59,929.—Construction of Houses.—Henry Sidle, Minneapolis, Minn.

I claim the casing, C, placed in an inclined position and used below the lower windows of the house with its lower edge buried so as to form an air-tight chamber between it and the house, as and for the purpose specified.

59,930.—Gate.—Stephen Spoor, Phelps, N. Y.

I claim adopting the gate to be elevated for the passage of swine, etc., by means of the two projections, h i, and pin, d, and securing the same in place by means of the catch, I, hanging free on the outside of the post, the whole arranged and operating substantially as and for the purposes specified.

59,931.—Portable Metallic Smoke House.—Lyman S. Stephens, Waltham, Mass.

I claim, as a new article of manufacture, a portable metallic smoke house, substantially as described.

59,932.—Window Brush.—John Stofer, Cleveland, Ohio.

I claim the brush, A, jointed handles, B C, provided with a locking device and elastic cord, E, arranged substantially as and for the purpose set forth.

59,933.—Blotting Pad.—David Walker, Newark, N. J.

I claim securing the paper to the holder by the springs, constructed and arranged substantially as shown.

Also the projecting edges of the holder, when in combination with the springs.

59,934.—Screw Clamp for Bending Axletrees.—Levi Wilkinson, New Haven, Conn.

I claim the combination of the bar, A, and screw, c, with the clamp or hook, C, when the whole is constructed, arranged, and fitted to produce the result, substantially as herein described and set forth.

59,935.—Clothes Drier.—L. C. Wright (assignor to Warren Chrysler), Lockport, N. Y.

I claim the combination of the sockets, a, and keys, b, with the particular arrangement of the rack, consisting of the bars, A and B, of different lengths, pivoted at the top to the bearings, D, the whole operating substantially as and for the purpose herein set forth.

59,936.—Method of Increasing Capacity of Oil Wells.—Edward A. L. Roberts, New York City.

I claim the above-described method of increasing the productions of oil wells by causing an explosion of gun powder, or its equivalent, substantially as above described.

REISSUES.

2,395.—Harrow.—Francis Granger, Lockport, Ill. Patented July 17, 1866.

I claim a combination of the circle, b, the flanged friction roller, c, the arms, d d, the weight, e, and friction rollers, i, arranged and operating in the manner substantially as described.

2,396.—Distillation.—John F. Collins, New York City. Patented Oct. 30, 1866.

I claim the process, substantially as above described, of separating and obtaining alcohol or other volatile matters by constantly agitating the "wash" or other contents of the still or retort, by means of a current or currents of steam, or gas, or air, forced into the same and bringing the vapors in contact with currents of air from without while passing from the still or retort into the conductor which leads to the worm or condenser, as above set forth.

2,397.—Take-up for Circular Knitting Machines.—Clark Tompkins, Troy, N. Y., assignor to Henry Brockway. Patented Nov. 8, 1864.

I claim the combination in the take-up mechanism of a knitting machine of the following instrumentalities, viz.: a stationary cam, revolving frame of the take-up mechanism, take-up roll, cam lever, ratchet wheel and vibrating pawl stop (for preventing the pawl from vibrating), and variable instrument (or operating the stop), all operating in the combination, substantially as set forth.

I also claim the combination in the take-up mechanism of a knitting machine of the following instrumentalities, viz.: the revolving frame of the take-up mechanism, take-up roller, cam, ratchet wheel and pawl, endless screw and worm wheel, and variable instrument for controlling the action of the pawl, all operating in the combination, substantially as set forth.

DESIGNS.

2,506.—Coach Lamp.—Edwin Blakeslee (assignor to C. Cowles & Co.), New Haven, Conn.

Note.—Fifty-nine Patents in the above list were secured hrough the Scientific American Patent Agency.—Eds.

TO ARCHITECTS.

Plans and Specifications for new buildings for the War Department at Washington, D. C.

Architects are invited to prepare plans and specifications, and estimates of cost, for new fire-proof buildings for the War Department, on the site now occupied by the War Department and adjacent vacant ground, in Washington, D. C.

The buildings required should have a superficial area as large as the site selected will admit of. Photographs of site, and all other information relating to the subject, will be furnished to Architects desiring to compete for the work, upon application, personally or by letter, to the undersigned.

A premium of $3,000 for the first, of $2,000 for the second, and of $1,000 for the third most acceptable plans and specifications received, will be awarded, upon the approval of the Hon. Secretary of War, by the Board of Officers charged with the duty of selecting a site and preparing plans and specifications for the buildings of the War Department, under act of Congress approved July 28, 1866.

The plans and specifications must be sent to the office of Brevet Lieut. Col. T. J. Treadwell, Recorder of the Board, Ordnance Office, Winder's Building, Washington, D. C., on or before the 1st day of Feb., 1867.

The Board will reserve the right to reject any or all plans submitted, should none be deemed suitable for the purpose, as well as to retain any or all of such plans.

By Order of the Board:

T. J. TREADWELL,
23 4] Bvt. Lieut. Col., U. S. A., Recorder.

LECTURES ON CHEMISTRY AND METALLURGY.—Tickets for Prof. SEELY'S Lectures may be procured at his office, No. 26 Pine street, or from Dr. Kingsley, Dean of the Faculty, No. 25 West 27th street. 23 3

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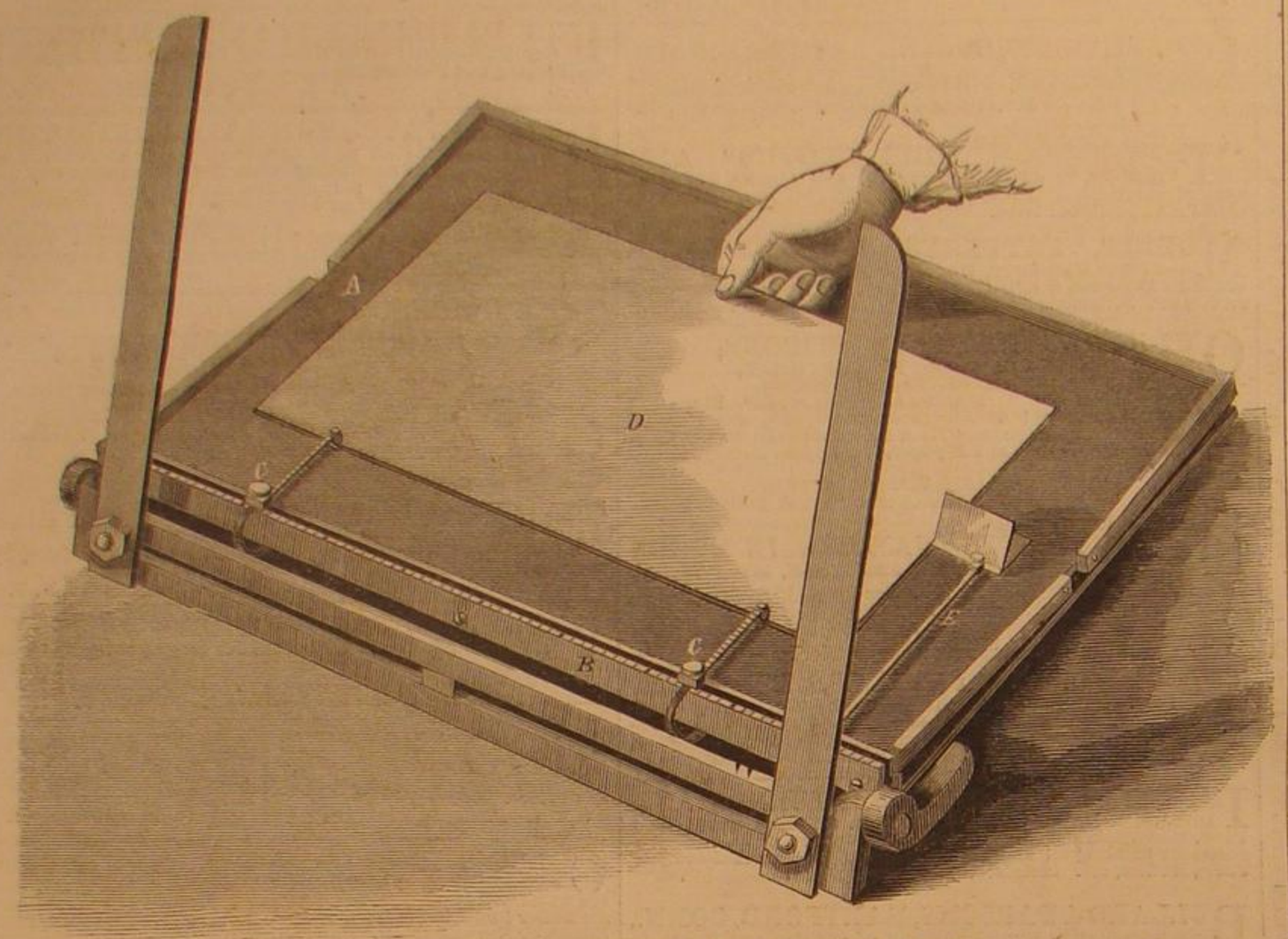
N. B.—Reliable orders filled for any part of the world. 2tf

Improved Printing Gage.

Practical printers, particularly those employed on job presses, are much annoyed for the want of some adjustable gage which can be readily adapted to differing varieties of work. "Quads," pins, paste, etc., are nuisances. They have to be placed and replaced before the sheet can be properly adjusted, are liable to move, and sometimes in the way. In job offices, where frequent changes of work are necessary, the consumption of time in these details, and the consequent vexation, constitute a serious evil. The design of this improvemen is to furnish a permanent gage which shall always be at hand and be quickly set to any job. It is particularly applicable to the Gordon, Degener, and to other job presses.



THYNG'S PATENT PRINTING GAGE.

In the engraving, A is the platen of a press. At the rear end, at B, is the principal feature of the improvement under consideration. It is a longitudinal bar, grooved to admit two or more bolts with heads which engage with the top of the bottom groove. C are the bolts or posts, slotted to admit slips of spring steel, bent at the ends to form a guide to the sheet, D. At E is a bar, jointed so that its unused end may be thrown under the platen out of the way, and carrying at its forward end a guide of thin metal, which, being in a V-form, will always come in contact with the sheet. By this arrangement the sheet can be at all times perfectly gaged, while the arrangements necessary will never be in the way of the grippers or of any portion of the press.

By the set screws, C, the gages can be adjusted to any size of sheet without loss of time. The gage rods and the gage bar are divided into scales of inches and their parts, so that the printer is aided by these in the work of adjustment. The bar with its appurtenances can be readily attached to the platen of a press. It is evident that this device is a saving of time and labor in any job office.

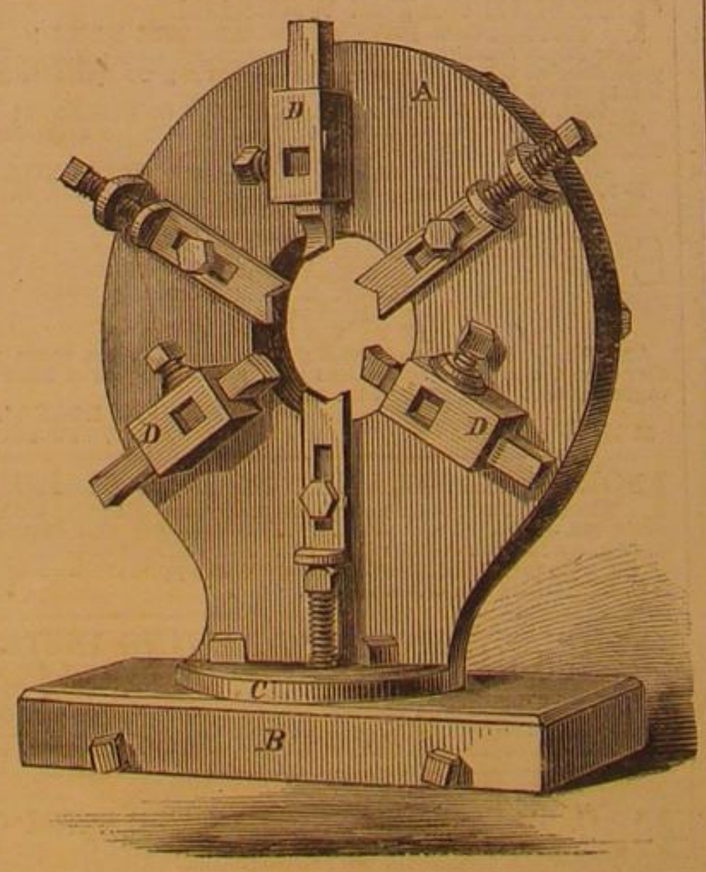
It was patented July 3, 1866, by J. Warren Thyng, publisher of the Salem *Witch*. Address for additional information, Thyng & Babbidge, *Witch* Office, Salem, Mass.

COAL, IRON, AND OIL.—Some time since we noticed at length the recent valuable work on the above subjects, edited by Daddow & Bannan. The London *Mining Journal*, in a recent notice of the volume, says: "It may safely be said that we have no single work in this country so thoroughly calculated to afford the superior collier and iron worker all the information he requires in connection with his business as is the book of Messrs. Daddow & Bannan to meet the wants of those similarly engaged in the United States. The work must have entailed a large amount of labor, and there is ample evidence that the labor has not been applied without being made to yield the largest results of which it was capable."

WOLFENDEN'S UNIVERSAL BOX FOR TURNING LATHES.

Usually, in a machine shop, after turning studs or bolts, they must be taken from the centers and be threaded either in a bolt cutter or readjusted to a lathe for screw cutting. The improvement herewith illustrated is intended to save a portion of the time and labor expended in this work.

It is a plate resembling in appearance the ordinary steady rest, for which purpose it can be used. The plate, A, is secured to the block, B, by bolts passing through segmental slots in the foot, C. The block is secured to the slide or carriage of the lathe, and is "fed along" with it. D are tool posts, which have shanks passing through the plate, A, that are furnished with segmental threads similar to those on the jaws of the ordinary scroll chuck, and like them engaging with a scroll thread on a disk at the rear of A (not shown). E are jaw rests set by screws in the ordinary manner.



The object of the improvment is to avoid the trouble of removing bolts or studs from the lathe, after being turned, for the purpose of threading them in the screwing machine, which is a quicker way than that of chasing them on the lathe, but renders them liable to be threaded one sided.

For cutting V-threads on bolts or studs or any thread of more than four to the inch, put block, B, on the carriage of the lathe, and the wheels for cutting the thread required. When cutting coarse threads, use three chasers or dies in the tool posts, D. The dies can be cut with the hub between centers, and the dies are thus readily formed.

For threading shafts of any size it is no less efficient, as will be seen at a glance. Long screws, as those intended for lathes, are kept from springing, as the rests, E, follow the cutters on the top of the thread and hold the work steadily and firmly to the tools. It can be used also for cutting down hubs on cast or wrought work, facing and squaring up, and for many other purposes easily understood by the practical machinist. Where the thread to be cut is square and fast, the plate, A, can be set obliquely by means of the bolts and segmental slots in the foot, C.

Patented through the Scientific American Patent Agency, July 31, 1866, by James Wolfenden, to whom, at the Jersey City Locomotive Works, Jersey City, N. J., apply for rights to make, use, and sell.

THE

Scientific American.

TO BE ENLARGED

For 1867.

This valuable journal enters upon its twenty-second year on the first of January next, at which time the Publishers have determined to considerably enlarge and otherwise improve it. The SCIENTIFIC AMERICAN is the oldest, and, by general consent, the most popular Journal of Science ever published; and, in point of circulation, it is safe to say that it exceeds the aggregate issues of all similar papers in this country and Great Britain combined.

The first number of the SCIENTIFIC AMERICAN, a folio of four pages, appeared in the summer of 1845. Soon after its appearance the form was changed to a quarto of eight pages. In 1859, encouraged by the great success which met their efforts, the Publishers determined to double its size to sixteen pages. But this enlargement has finally proved inadequate to the great demands upon its columns, and, in spite of the greatly enhanced cost of paper and all other materials, the Publishers have decided that their journal must be enlarged, *without any increase in the terms of subscription*, confident that their generous patrons will appreciate the benefits of the proposed change, and lend their influence to increase its subscription list. It has been the constant aim of the editors of this journal, who are aided by some of the best known scientific writers in the country, to discuss all subjects relating to the Industrial Arts and Sciences in a plain, practical, and attractive manner.

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Scientific American.

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

Vol. XV.—No. 24. [NEW SERIES.]

NEW YORK, DECEMBER 8, 1866.

$3 per Annum, [IN ADVANCE.]

Improved Dead-Stroke Hammer.

The trip hammer has been used almost from time immemorial for heavy forging. It still occupies a prominent place, notwithstanding the introduction of more modern devices, partly because its construction is so simple that it can be made by ordinary mechanics with the most ordinary tools. Cheaply, however, as it can be built, it is really expensive to keep in operation, as one part or another is continually getting out of order and requiring repairs.

Fig. 1

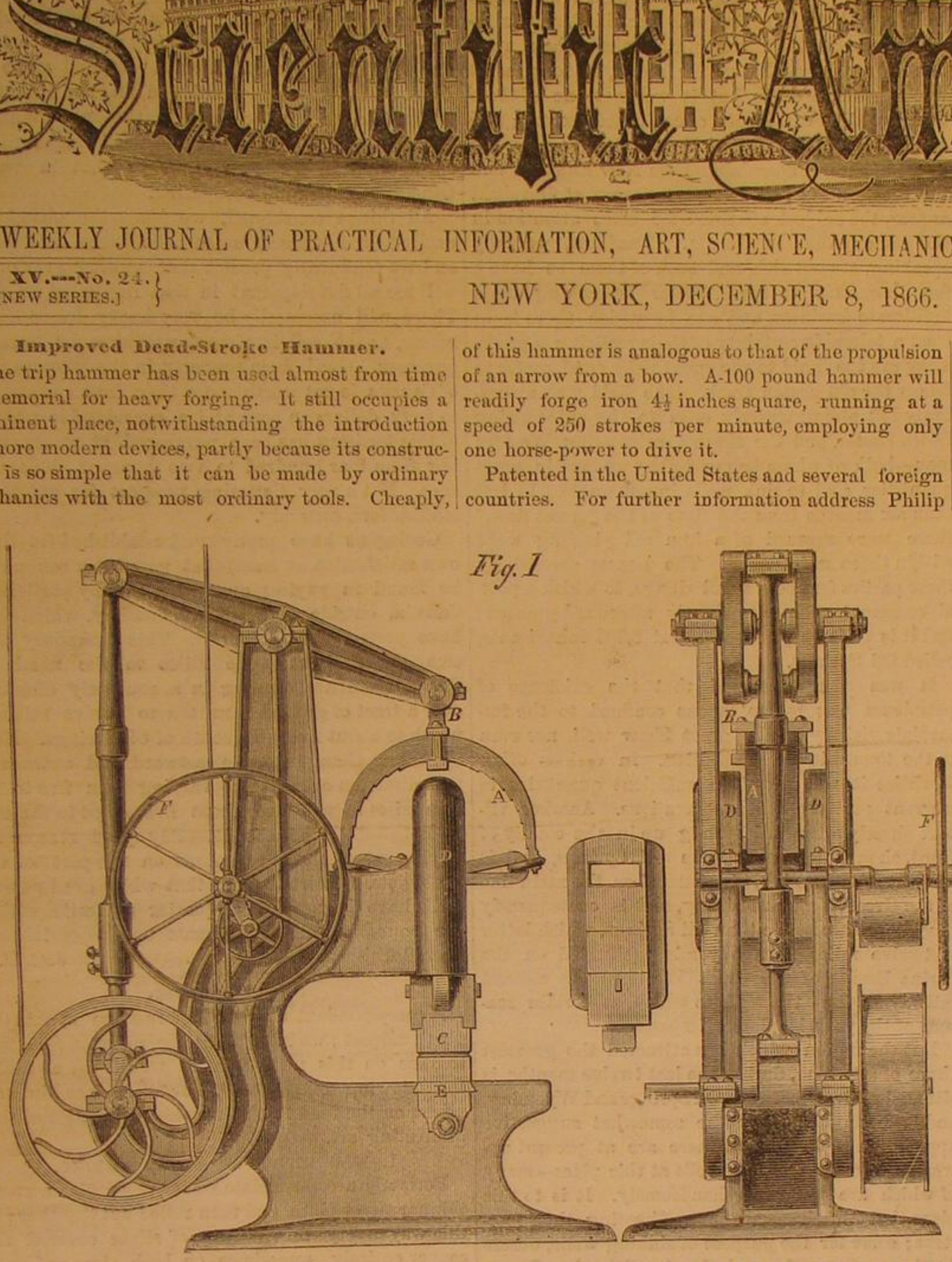
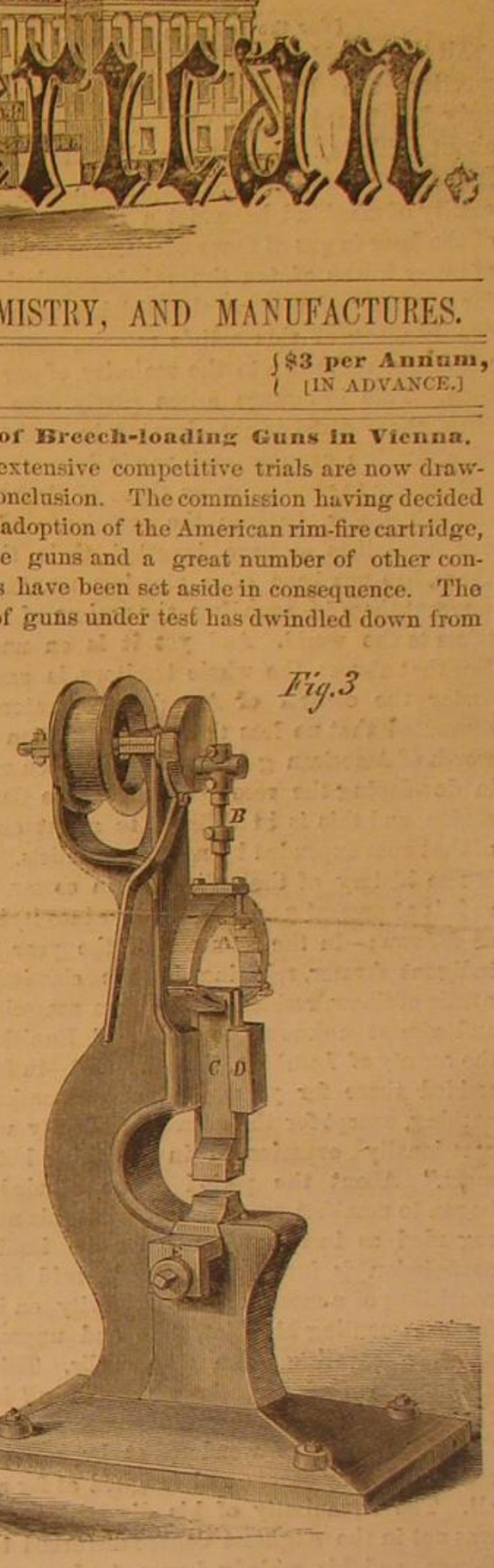


Fig. 3



SHAW & JUSTICE'S DEAD-STROKE HAMMER.

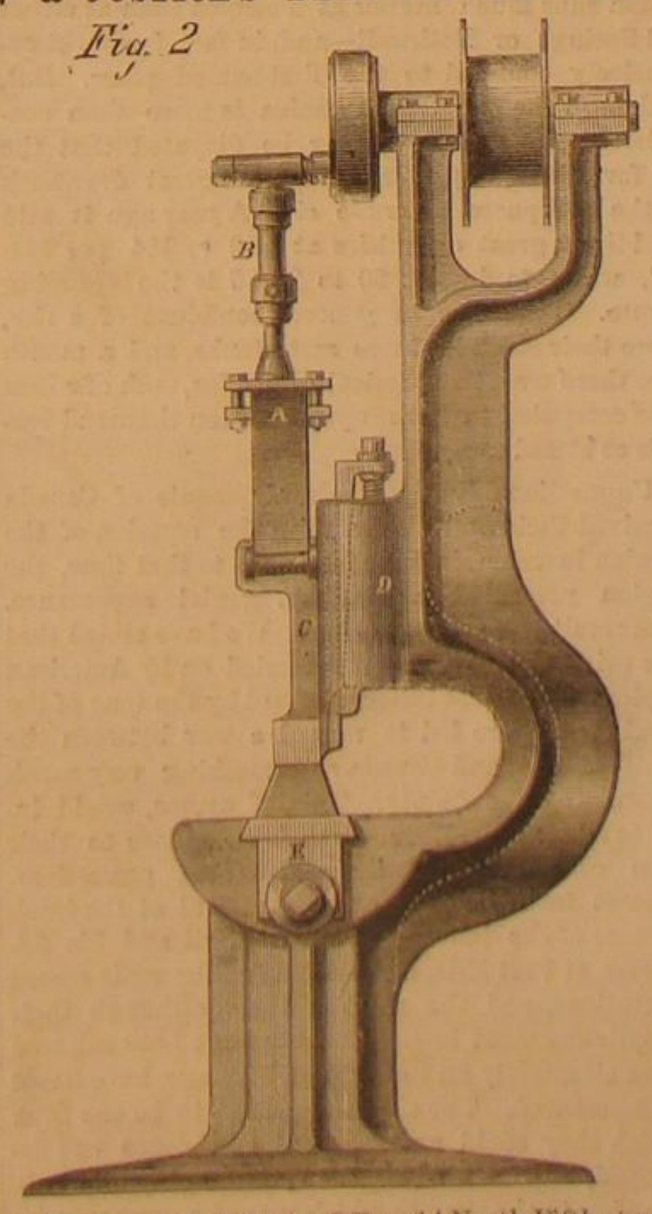
The engravings represent a hammer designed to take the place of the common trip-hammer, and calculated to do work of all kinds for which the trip-hammer or other hammers are now used. They are now made of eight different sizes, varying from 15 to 1,000 pounds, and it is intended to construct them up to 10 tuns weight. The engravings show a 15-pound hammer and one of 1,000 pounds. The latter has a walking beam and is calculated for heavy work, as in the forging of blooms, while the smaller size will do the lightest work, readily forging iron one and a quarter inches square.

They are run by a pulley and slack belt, in combination with a tightening pulley operated by a lever. The force of the blow is given by a steel bow spring, A, attached to a crank by the connection, B. The hammer proper, C, is suspended, by a belt and links, to the reflexed ends of the spring, and moves in the guides, D. The bottom die in the anvil block is held by a wedge-shaped gib, E, which is tightened by a screw, preventing the bursting of the block and saving the labor and time of adjusting the bottom die parallel with the upper die, a feature of importance where swaging dies are used. The operation of the hammer can be readily understood by reference to the engravings.

Among the advantages claimed for it, is its ease of working, requiring but a fraction of the power demanded by other hammers; the absence of destructive shocks to the machine, the spring and strap taking up the rebound soon as the blow is delivered; and the enormous force of the hammer, entirely disproportioned to the mere weight. In fact the action of this hammer is analogous to that of the propulsion of an arrow from a bow. A 100 pound hammer will readily forge iron 4½ inches square, running at a speed of 250 strokes per minute, employing only one horse-power to drive it.

Patented in the United States and several foreign countries. For further information address Philip S. Justice, manufacturer, Offices 14 North Fifth street Philadelphia, and 42 Cliff street, New York.

Fig. 2



Trials of Breech-loading Guns in Vienna.

These extensive competitive trials are now drawing to a conclusion. The commission having decided upon the adoption of the American rim-fire cartridge, all needle guns and a great number of other constructions have been set aside in consequence. The number of guns under test has dwindled down from day to day until at present there are only the Remington and the Peabody guns competing with each other with almost equal chances on either side. Upward of 2,000 rounds have been fired from each of the two guns without the slightest deterioration. Cartridges have been filed through at the back, and then fired, to test the chances of an accident from the bursting of the copper shell; but both guns withstood the firing without showing any causes of danger for the soldier. It is still doubtful which of the two guns will ultimately gain adoption by the Austrian war-office, but the decision is expected very soon. Immediately after that, very extensive orders for guns and ammunition will be given out. It is expected that all barrels will be made of steel. The bore will be considerably reduced, and the manufacture of rifles by machinery will be taken into consideration. A novelty of specific Austrian origin is the manufacture of cartridge shells of Bessemer steel instead of copper. The steel is rolled in thin sheets, and its great ductility is taken advantage of to produce the cartridge shells of this material. To prevent oxidation, the steel shell is coated inside and outside with a suitable varnish. These cartridges are said to be much cheaper, and also much stronger, than the copper cartridges, and trials will be made to establish their qualities and value. The Bessemer steel for these cartridges is produced in Austria from Styrian charcoal iron, and is of a very high quality. —*Engineering.*

THE Quartermaster-General is preparing to establish in his department a museum of the anatomy and diseases of the horse. A great variety of specimens have already been collected and prepared under the superintendence of Dr. Braley, an eminent veterinary surgeon,

THE OIL DISTRICTS OF CANADA.

[For the Scientific American.]

All the world knows somewhat, if not more, respecting the Pennsylvania oil districts. Everybody has heard of the vast developments in and about Pithole, Alleghany, and Petroleum Center. Indeed, we question very much whether the generality of mankind have not a more accurate idea of the *locus in quo* of those odoriferous localities than of many towns of ten times their population. But, for a variety of reasons, the districts referred to in the heading of this article remain, comparatively speaking, unknown to the majority of our countrymen. This ignorance arises partly from the fact that those districts are situated in a distant part of a foreign country, and partly because they are not nearly so productive as those of Pennsylvania; but principally, because the experience of such of our capitalists as have invested their thousands there, has not been of so pleasing a nature as to warrant them in sounding the praises of these districts to the world. And yet it is an undeniable fact that almost the whole territory is exclusively under the control of American operators. It is computed that no less than twelve million dollars' worth of American gold has already been expended in developing the resources under the Canada oil region, and this is in addition to about one-fourth of that sum expended by native capitalists.

The history of these districts (in so far, at least, as it is at present necessary to enter into it) is briefly as follows:—In the summer of the year 1859, an indigent farmer, rejoicing in the classical patronymic of Shaw, resided in the then sparsely-settled and almost unknown township of Enniskillen, in the county of Lambton, Canada West—in fact, had resided there for years, and was remarkable for nothing, except for the extreme difficulty which he occasionally experienced in "making both ends meet." About the period above alluded to, he began to manifest symptons of what his neighbors regarded as incipient fitness for the issuing of a commission *de lunatico inquirendo*—said symptoms consisting of a most decided proclivity on his part for ornamenting his "flat, stale and unprofitable" acres, by covering them with wells. This being an indication of a species of "madness" in which the aforesaid neighbors could perceive no traces of "method;" he was wondered at by some, remonstrated with by others, and laughed at for a fool by all. The equanimity of his disposition, however, was not in the slightest degree disturbed by these things, and his malady began to be regarded as incurable, when a few weeks later, he was observed in the act of inserting in one of the holes a primitive sort of force pump, which he had manufactured with his own hands. The only reply which he vouchsafed to those who inquired the object of this facetious proceeding on his part, was, "Wait a few days, and you will see." They accordingly waited, and in a few days, sure enough, they did see, with a vengeance. The well in which the pump was placed was situated in a valley, close to the edge of a small creek—now known as "Oil Creek." One morning, shortly afterward, the well commenced, as it is technically termed, to "flow." And such a flow! Never, in the most productive region of which Pennsylvania can boast, has such a quantity of crude petroleum been produced at any one well as flowed from Mr. Shaw's well during the ensuing forty-eight hours. We have heard the most conflicting and exaggerated accounts as to the actual quantity—it has been variously estimated at from three to seven millions of barrels. The fact is, we presume, it is neither more nor less than an absolute impossibility to form anything like a close estimate; for, with the exception of about thirty barrels (which was all that the inhabitants could find accommodation for) it all made its escape down the creek.

Such is the somewhat singular history of the first attempt at oil-development in Canada. It would be positively incredible, were it not that we have as ample evidence of its veracity as we have of the existence of such a place as Canada. Any person who chooses to take the trouble may, to this day, see unmistakable traces on the trees along the bank of the creek that there must have been a thickness of more than two feet of oil for several miles down the stream. The whole neighborhood, as might well have been expected, was electrified, and forthwith proceeded to manufacture tanks without number. They kept the matter secret, as long as it was possible to do so, but it was not one of those things which will admit of continued secrecy; and ere long the township of Enniskillen became the resort of shrewd speculators from New England and the Western States. Strange as it may at first sight appear, the subject attracted far more attention in this country than in Canada. Canadians, generally speaking, are not rich, and such of them as have a few thousands to spare, prefer embarking in a legitimate business, and one in which there is at least a tolerable certainty of their realizing a profit. They are too timid to run great risks, and prefer to follow the old beaten track. The field was accordingly left almost entirely open to the enterprising Down-Easter, and the shrewd, calculating Western man—both of whom began to buy up land in great quantities, and to sink wells innumerable. In less than six months from the time of the "great flow," there were upward of a hundred yielding wells within three miles of it. The houses erected by these parties formed a small village, to which a postal communication was shortly afterward granted; and it is to-day a place of about 3,500 inhabitants, called Oil Springs.

It was soon discovered that the existence of petroleum was by no means confined to the immediate vicinity of the great Shaw well, nor even to the township of Enniskillen. In various other localities it was found in sufficient quantities to warrant pretty extensive operations. Another village shortly afterward sprung up in the county of Kent, about thirty miles from Oil Springs, and is known as Bothwell. It is situated on the main line of the Great Western Railway, and is consequently much more accessible than Oil Springs, which latter is twelve miles from Wyoming (situated on the Sarina Branch of the Great Western) the nearest railway station—the road to which, at certain seasons of the year, is almost impassable.

But the region which has attracted the greatest share of attention, during the last twelve months, is situated midway between Oil Springs and Wyoming, and is distinguished by the somewhat suggestive appellation of Petrolea. There are at present upward of seventy working wells at this place—many of which are producing handsomely. It is to this place that Americans are now directing their footsteps; some for the purpose of sinking wells, others for the purpose of speculating in oil lands. Speculation runs much higher at Petrolea than at either Oil Springs or Bothwell—and, in fact, is almost exclusively confined to the first-named place. But, although the yield at Petrolea is more than considerable, it can no longer be disputed that the oil fever is rapidly dying out. One great drawback is the cheapness of crude oil. A year ago it sold rapidly in great quantities at $12 to $14 per barrel, while to day $2 90 to $3 35 is the standing figure. Operators in general, confident of a rise, store their stock in huge earth-tanks, and a month ago there were two parties in Petrolea, each of whom was computed to have upward of ten thousand barrels so stored away.

Unquestionably the oil developments of Canada received their death blow upon the occasion of the Fenian invasion, in June last. Up to that time, the region presented a healthy, genial appearance. The result was instantaneous. We have stated that the principal operations are carried on by American capitalists. These latter, alarmed by the tone of the local press, were led to regard a war between the United States and Canada as something very much resembling a certainty. This, of course, would involve a sacrifice, either of their allegiance to their own country or of their Canadian possessions. Almost immediately upon the arrival of the intelligence of the landing of Gen. O'Neil and his followers at Fort Erie, at least half of the wells ceased operations, and tho most of these, although their proprietors must be presumed to have been relieved from all anxiety on the subject long ago, have never recommenced. The shock appeared to be one from which they could not recover. Confidence was destroyed, and has never been thoroughly re-established. At the time to which we refer, property depreciated in value two hundred per cent within a week. Several leading capitalists, two of whom hailed from New York, immediately sold out at a sacrifice which was perfectly tremendous, and made the best of their way homeward. In fine, for more than a month after the Fenian raid, the inhabitants of Oil Springs, Petrolea, and Bothwell regarded oil speculation in a similar light to that in which Othello regarded his occupation.

All things considered, we place the oleaginous excitement in Canada among the things that were; and we confidently predict that another year or so will see all development in that region at an end. There will necessarily be very heavy losses somewhere, as the soil is almost worthless for farming purposes. Good farm property in the western part of Canada is not worth more than from twenty-five to forty dollars an acre, and a considerable portion of this territory has been purchased at prices varying from four hundred to two thousand dollars an acre. Not a very flattering prospect for extensive landholders, certainly.

Geologists have pretty well established (to their own satisfaction at least) that petroleum can never be found in paying quantities in any portion of Canada, outside of a given boundary, which they have pretty closely defined. This boundary line commences about three miles to the north of Petrolea—thence running in a southerly direction over a tract of ground from ten to twelve miles in width to about five miles south of Oil Springs. Here the course changes to the eastward, and extends in that direction over a tract varying from five to fifteen miles in width to about five miles to the east of Bothwell. There is tolerably good reason for relying upon these assertions on the part of the geologists, for certain it is that while good paying wells have been found a quarter of a mile within the boundary, all experiments outside of it have proved fruitless.

J. C. D.

Silver Plating.

A correspondent asks for information about the above subject; we have, of course, no room for a full treatise on this matter, as it would fill a book; the following remarks will, however, place him and others on the road to the successful practice of this interesting art.

1.—OLD METHOD OF SILVER PLATING.

Formerly a copper plate was covered with a much thinner silver plate, and then rolled out together; in this way a very thin coating of silver covered the copper entirely, sometimes on both sides; of such silver-covered copper plates, different objects were manufactured, as teapots, pitchers, goblets, etc. This is still practiced; however, to a very limited extent since the invention of the electro-plating process. The daguerreotype plates are chiefly manufactured in this way.

2.—SILVER PLATING BY FRICTION.

Objects made of copper or brass may be coated in a simple way by a process described by Berzelius in his chemistry, by rubbing them with a chemical mixture consisting of chloride of silver, 1 part; well dried potash, 3 parts; Paris white (very fine chalk), 1 part; common salt, a little more than 1 part. The brass surface is well cleaned, moistened with a little salt water, and then the surface is rubbed with the above mixture till it is silvered. This is the customary way that the thermometer and barometer scales, clock dials, etc., are silvered, and it is well to cover them afterward with a colorless varnish, the process being so very economical, and the silver coating consequently so thin, that when dirty it can stand so much cleaning and polishing afterward without being removed. A later invented method to accomplish the same purpose, and which many operators prefer, is to take 1 part of nitrate of silver and 3 parts of cyanide of potassium, rub these together and add a little water to make them into a paste; rub this with a piece of flannel on the object to be silvered, which, however, before must have been carefully cleaned. This process is peculiarly adapted to copper and brass name-plates attached to apparatus, etc. The film of silver obtained in this way is also very thin, and it is also advisable to cover it with a colorless varnish. When calculating the price of this process after silvering a great number of objects, it is always found to amount to only from 1 to 2 cents per square foot.

3.—SILVER PLATING BY A SIMPLE BATH.

This method requires no friction whatever, and is accomplished thus: Make a saturated solution of common salt, dissolve cyanide of silver in it, and filter. A piece of clean copper or brass placed in this solution is soon covered with a silver coating which adheres very strongly.

If the object to be silvered is iron, it must first be coated with copper, as silver will not very well equally deposit on iron. This is simply accomplished by placing the iron object for a sufficient time in a diluted solution of blue vitriol (sulphate of copper) acidulated with sulphuric acid; afterward wash and clean the object, and when it is well covered with copper, place it in the above described silver bath.

Care must be taken not to touch the cleaned object with the fingers, as the silver will never deposit equally on the thus touched spots.

4.—SILVER PLATING BY ELECTRIC ACTION.

The most important way of silvering is, however, the electro-plating or galvanic process. This is founded on the fact that when an easily oxidable metal, like zinc, is placed in a properly prepared silvering liquid, it will combine with the acids which hold the silver in solution, and the silver will be precipitated in its metallic state on any object in contact with the zinc, provided the surface of this object is a conductor of electricity. The simplest explanation of this curious fact, is that the action of the acids on the zinc generates electricity which repels the metallic silver from the zinc and carries it to any other metal plunged in the liquid, provided this metal is not acted on by the acid, and is in contact with the zinc, so that it may carry back the electric current to the latter metal. The metal receiving the silver deposit acts as it were like a sieve which lets the ethereal electric current pass through its mass, but retains on its surface the material particles of silver carried on with that current. We do not say that this is the latest and most approved explanation of the phenomenon, which, in reality, is more complex, but it is the simplest reasoning by which beginners, in this branch of study, may satisfactorily account to themselves for the curious results they observe.

In a continuation of this article, we will describe the various processes of electro-plating; first, the simple process without battery, and, second, that with the help of galvanic batteries. V.

AMERICAN INSTITUTE---POLYTECHNIC BRANCH.

The usual weekly meeting was held on Thursday evening, the 22d inst. The President, Prof. Tillman in the chair.

THE OCEAN CURRENTS.

Columbus, during his first voyage, discovered in the midst of the ocean an immense stream moving with great velocity and superior in its proportions to the largest continental river known. Since the announcement of the existence of this, the Gulf Stream, similar currents have been traced, both in the Pacific and Indian oceans, and now physicists recognize five, one each in the North and South Atlantic and Pacific, the remaining one in the Indian ocean. An inquiry into the causes which produced them was the subject of the interesting remarks of Prof. Grimes, of Philadelphia.

The six continents of the world are arranged in pairs, as a glance at any map will show. Hence, from this and many other points of similarity, it is evident that whatever force caused the one, repeated itself in forming the others. The hypothesis advanced by Prof. Grimes refers the question back to the age when the entire earth was covered with water, at which time six elliptical currents were formed. Five now remain; the sixth one was formed in the North Indian, an ocean which, owing to the elevation of land, no longer exists, but the Caspian and Aral seas, and the large lakes of Asia furnish proof of its former reality. By a simple mechanical problem we can demonstrate why these ellipses were formed. If near the edge of a disk, revolving rapidly on its center, a ball is placed, and caused by any means to pass alternately back and forth on the radius, its motion will not be in a straight line, but it will invariably traverse an ellipse. To make an application: when the waters in the Gulf of Mexico have become heated by the sun, the tendency will be to pass north until cooled, then to return to the equator; and such would be the only motion were the earth at rest, but the revolution of the earth is a constant force acting upon the current of water and gradually overcoming this northernly motion, and turning it to the east, by the coast of Ireland. Becoming cool, it seeks the warmer regions, and the easting is transferred into a general southernly direction, but, as it nears the coast of Africa, its velocity is lost, and as the earth moves more rapidly than the current, the latter is left behind, or is given an apparent westward motion, till the Gulf of Mexico is again reached and the circle is completed.

During the creation the land appeared on the margin of, and between, the circles; in proof of which the pointing of the three southern continents to the south-east—features first pointed out by Humboldt—the accumulation of lands toward the north, rather than the south, and the direction of the glacial markings during the drift period, these all bear witness to, and are explained by this theory.

At the conclusion of his remarks Prof. Grimes accepted the invitation of the Association, for a further presentation of this subject at some future meeting.

OXIDABILITY OF PETROLEUM.

Dr. Hirsch read an article, which he had prepared in answer to assertions made at a recent meeting, to the effect that petroleum could not be oxidized under any circumstances; could never be made into soap, or undergo a decomposition similar to rancidity.

The mode of purifying hydrocarbons by sulphuric acid, it was shown, was a true process of oxidation, for during the operation the acid loses one atom of oxygen, which is taken up by the oil to form water, while the carbon, formerly belonging to the hydrogen, precipitates, rendering the oil and acid black.

But even without the presence of chemicals, hydrocarbons undergo oxidation, as we see in the popular disinfectant, carbolic acid, formed from benzine by adding two atoms of oxygen. In distilling petroleum, paraffine appears when the temperature is kept high, but if the fires are slackened, air enters the still through the gas escape pipe, and paraffine will be decomposed into lighter hydrocarbons, resulting in permanent gas and naphtha of a very light color, besides water, or oxidized hydrogen. If, when the still is withdrawn from the fire, the manholes are opened at once, the hot vapors will ignite, on contact with the air. The same is true of the pitch, therefore the still is always allowed to cool for a time before making an opening and discharging the pitch.

At common temperatures, petroleum will oxidize in time, and will solidify, forming resins or gums. Light-colored oil, placed in bottles loosely corked, become gradually darkened, showing true oxidation. In bleaching petroleum, by means of boneblack, a black pitch is deposited in the pores, the same that is precipitated by sulphuric acid. The same result being obtained, why not account for it in the same manner? The boneblack acts both mechanically and chemically, for heat is given out. This shows also the condensation of air which is the true cause of rapid oxidation. Spontaneous combustion, then, is possible of all porous combustible bodies; but if petroleum is employed as a lubricator, the small quantities ordinarily brought in contact with porous materials are not sufficient to endanger property. The only reason to account for the aversion of insurance companies to the universal introduction of the oil, for this purpose, is that it would be followed by the use of inferior inflammable oils, from which danger might be expected.

In reply to Dr. Hirsch, Prof. Vander Weyde testified to the change of views held by some of the authorities quoted, caused by later investigations, and brought counter proof to sustain the opposite side of the question. The discussion was continued to a late hour, when the meeting adjourned.

THE daily change in the length of the Britannia Suspension Bridge, owing to temperature, varies from half an inch to three inches.

[For the Scientific American.]

A Self-adjusting Telegraph Instrument Wanted.

A self-adjusting instrument has long been a *desideratum* in telegraphing. That such an invention will be discovered is a fixed belief among all telegraphers. The necessity of it is never more apparent than on a wet foggy day, particularly when the poles, wires, and insulators have become well saturated with moisture, and the "escapes" along a line are numerous. Let the battery power be ever so excessive, the current in the distance of 100 miles will seldom reach its destination continuously, but will be "everything by fits and starts and nothing long." An observer of human nature, if he entered a large telegraph office on such a day as is mentioned, would be amused and instructed to see its effect on a body of gentlemen discharging their duty as operators. Some will meet their trouble humorously, some angrily, some with epithets not fit for "ears polite," and yet all displaying an intelligence and skill truly marvelous, in every now and then getting their instrument so nicely adjusted, that a few sounds are caught all right—a word or two obtained, and a good *guess* made for the balance of the message. In thus succeeding a visitor would observe how incessantly the operator screwed and unscrewed the spring of his armature, and sometimes changed the poles of his instrument, because of his *residuum* magnetism; and though he succeeded in freeing it from this saturation, yet how difficult it was after all to get the necessary signals for constructing a message.

It should be observed that rarely, if ever, does a circuit fail to complete its course, but the mischief is that when it reaches its destination it is so attenuated, so inappreciable, that it does not move the armature, and therefore, practically, there is no circuit at all. Now such an instrument is wanted as will reconcile itself to all the vagaries of electricity, even when the current is so "inappreciable," that the armature shall act on the closing and opening of a circuit. Whoever can invent such an instrument will win fame and fortune, and it is more easy to make the discovery than to find out "perpetual motion," on which so many mechanical minds have spent the best part of their existence.

Again, for want of a self-adjusting instrument underground lines cannot be laid down, and thus the country and cities are disfigured with unsightly poles and wires, with kite tails and rags dangling from them.

Underground lines exist in some parts of England and Europe, but it is necessary to have a battery in every office because of the return current. This is very expensive, and the belief is that a self-adjusting instrument will remedy the evil.

There is *genius* enough among operators to invent this "desideratum," but they don't do it because they are thoughtless and spend their leisure time unprofitably. If the money laid out for cigars, etc., was spent in buying a little machinery, chemical apparatus, etc., for practically understanding the nature of the telegraph instrument in all its details, and the character of a battery; if two or three would put their heads together—work together—make a shop of their bedroom, and take advantage of many machine shops in this city, access to which would not be refused them, it would not be long before the "desired thing" would be found, and, as is not uncommon, in the pursuit of an object, some other equally important discovery be made. A beginning made in a good course soon becomes fascinating. H.

Circular Skids.

In some of the crowded streets of New York, wherever a cart backs up to the curb to take on or discharge a load, the traffic of the street, railroad cars, and vehicles are arrested, to the great inconvenience of the public.

Mr. Sinclair Tousey, of the American News Company, New York, proposes a very simple remedy, which consists in the use of circular skids, instead of the common parallel skids, for loading. By the use of circular skids the cart may be brought into position parallel with the curb, leaving the center of the street unobstructed, while the loading and unloading may be as readily performed as with straight skids.

MANUFACTURE AND COMBUSTION OF PEAT.

Peats differ in color, weight, degree of decomposition or transformation, in purity, and richness or value for fuel. Grass peat is grayish in color and moss peat of a reddish hue. That formed from shrubs is generally darker. These are the surface hues; as we descend, if the deposit is deep, the peat changes to very dark brown or black. Surface peat is usually light and fibrous. It is neither living vegetation nor perfected peat, and is unfit for fuel. The peat below the surface is soft, pliable, and when moist can be easily molded; it is fine in grain, oily to the touch, and has no perceptible odor. If it shows sand or clay when dried, it is not valuable as a fuel. To be profitable it should not, when consumed, leave more than one-fifth of its weight in ashes. Some very fine specimens do not leave over one-fortieth of ashes.

The author of a little treatise entitled "Peat," published by J. H. Benham, New Haven, Conn., says: "Peat possesses elements and qualities like coal. As manufactured by the present improved machinery, the actual heating power is two-thirds that of coal, while for the generation of steam it is, by its abundant blaze, fully equal to coal. It has qualities peculiarly adapting it to manufacturing purposes. Improvements in machinery for its preparation, to which the best scientific minds in the country are now turned, will, we doubt not, soon enable manufacturers so to condense peat as to make it, with its other excellent qualities, superior to coal for many purposes. It can be prepared and brought to market at a profit, for less than half the present cost of coal."

The deposits of peat fuel have been utilized from time immemorial. The Irish have depended upon them for fuel for many generations. In some countries the turf has been used as a material for constructing habitations, as well as for the furnishing of fuel. In this country peat has been used almost ever since its first settlement, as a fuel. The first settlers discovered, as early as 1690, the value of their peat beds as a means of warming their houses and cooking their victuals. When wood was plenty and easily cut they preferred that, but there are not wanting evidences that our forefathers, in colonial times, knew that peat was a valuable, or at least, a feasible substitute for the plentiful wood pile. We can well recollect when, with team and wagon, we were sent to the adjacent "peat bog" to bring home the results of the summer cutting, and loaded into our wagon the blocks of air-dried peat. They were cut out from the mass with a spade called a "slane" having a side and edge turned at right angles, so that the workman separated at each pressure a complete block. These were built into cob-houses, allowing the air to pass freely through, which dried the turf, until that quality which was the most porous assumed a light brown hue and was as light as cork. The more solid qualities were heavier.

We never burned the peat in a confined air space, as a stove or close grate, but we have seen it used in an open fireplace instead of wood. In these situations it burns as fine as the best walnut. It gives out a genial heat without sparkling or throwing out splinters, and retains fire long after it has ceased to blaze. For this reason, we judge, in our juvenile days the late hours in the evening were enlivened with the glare of burning peat, which held the fire until the next morning.

But lately, since the people have been aroused to the value of their peat beds—a value which we cannot but think has been in some cases overrated—various means have been invented for condensing the turf and for burning it with economy. One means of preparing it for the market, and for economical use as a fuel, is that of treating it as clay for bricks is treated, by grinding it to an almost impalpable pulp, or powder, and then compressing it by mechanical agency, finishing by drying it by artificial means. This, even by the most rapidly working machines, is costly, especially the artificial drying. Another plan is to agglomerate and condense the material by mechanical means and then subject the blocks thus formed to the action of the atmosphere. The result is excellent.

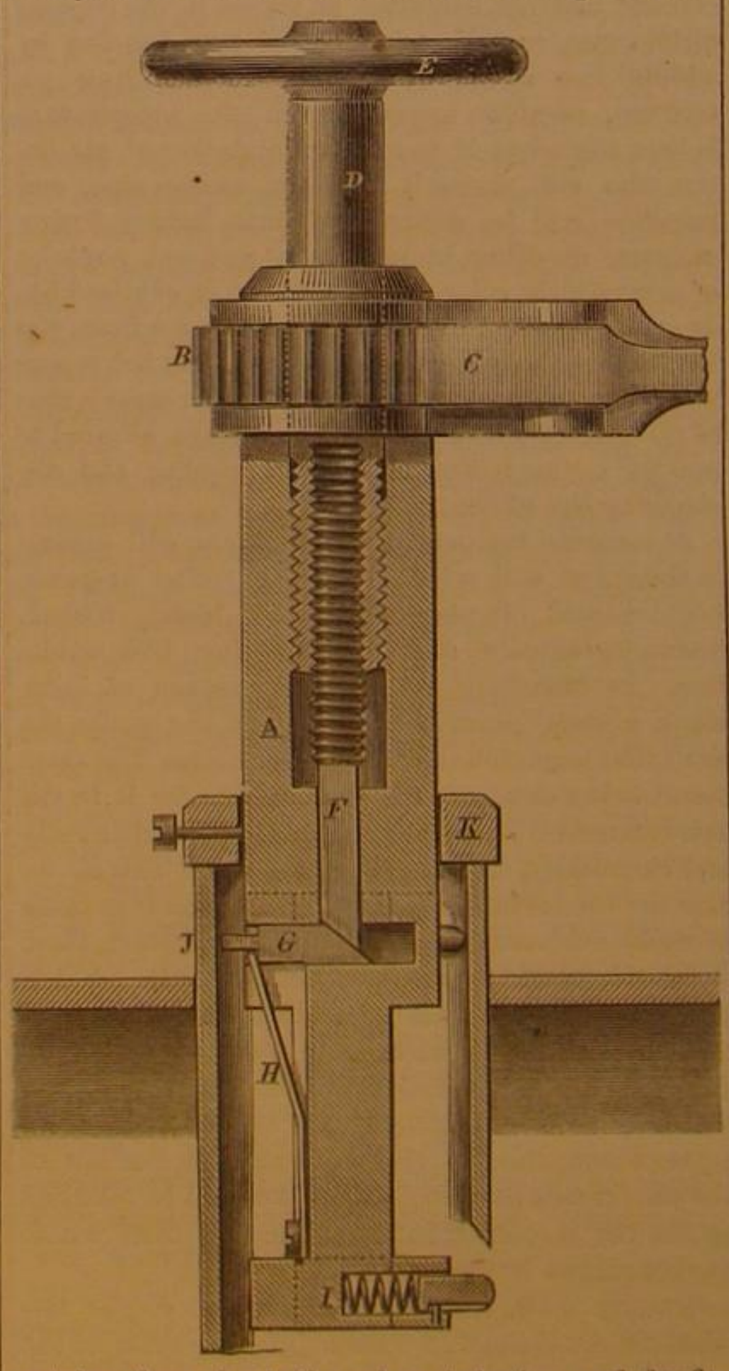
There can be no doubt of the value of peat as a fuel, either for domestic or manufacturing purposes, when properly prepared and where the place of consumption is near the place of production, and away from the sources of coal supply. Merely cut and dried, however, it still contains about twenty per cent of water, sufficient to greatly lessen its value as a fuel. Disintegration and compression seem to be necessary to rid the substance of this surplus moisture. Baking it, or partially coking it, by expelling the moisture, greatly enhances its value. Even the "grinding" or thorough mixing of the mass aids in the expulsion of the water, and peat so prepared and afterward air dried is greatly improved. The best results however, are obtained by subsequent compression and if possible a thorough after drying.

Peat can be burned as wood on an open hearth, or as coal in an open grate. It can be used under the furnaces of engines adapted for burning either anthracite or bituminous coal, but in neither position do we think it is superior to mineral coal. For manufacturing purposes, when used in combination with iron, it may be less deleterious to the metal than uncoked coal; but we much doubt whether it will ever usurp its place until coal shall become scarce in this country, which will not be in this nor in several succeeding generations.

On the whole, we believe peat to be valuable where it can be prepared and used near the point of production, but notwithstanding the reports we have seen in its favor as a substitute for coal, in heat-producing qualities, as in the running of locomotives, etc., we believe it is far below mineral coal as a fuel. While wood and coal, our ordinary fuels, rule so high in the market, it may be found profitable both to manufacturer, and consumer to enter it as a competitor. It can be said that no fuel now used requires less skill in its management or gives a more genial heat for domestic and household purposes.

THOMAS'S PATENT TUBE CUTTER.

The engraving exhibits a sectional view of a neat, handy, and effective instrument for cutting out boiler tubes from the boiler when defective, and for fitting new tubes to length. A brief description, with reference to the parts, will enable any practical mechanic to understand the device and its mode of operation.



A is a stock, made of wrought or malleable iron, and having at one end a ratchet, B, which is worked by a lever and pawl, C. The stock is bored out from the ratchet end to the diameter of one inch, and tapped with a thread of twelve to the inch. A plug, D, fitted with a feed wheel, E, and threaded to fit the stock, is inserted. Into the opposite end of this plug is fitted a screw, F, the thread of which is fourteen and a half to the inch. This thread, as well as that of D, is left-handed. The lower portion of the screw, F, is square, the point being wedge-shaped. This part traverses a square hole in the stock to prevent the screw, F, from turning. A cutter, G, is fitted into a transverse slot, and is fed out by the action of the wedge-like end of F, in combination with the corresponding end of the cutter. A spring, H, engages with the shoulder of the cutter and holds it in close contact with F. At the end of the stock is a collar, I, furnished with three spring plugs, disposed at equal distances around its periphery. Similar plugs are placed in that portion carrying the cutter.

The operation of the machine is simple. The stock is placed inside a tube, far enough for the spring plugs nearest the cutter to take on the inside the pipe, J. This steadies and holds firmly the apparatus, and this steadiness is further assured by the movable collar, K, which comes against the end of the tube, and is secured by a set screw. Then, by operating the ratchet lever, the outside stock is rotated, and the hand wheel, E, being held, the difference in the pitch of the screws feeds the cutter out just fast enough to cut the most effectually without breaking the cutter. The inventor says he has cut a pipe one-eighth of an inch thick in nine turns of the cutter, and has cut off a two-inch tube in one minute. The collars carrying the spring plugs can be removed at any time and larger ones substituted, although the same heads will cut tubes from two inches to two and a half in diameter. If more rapid feed than the difference in the threads is desired, it can be obtained by turning the hand wheel. The fact of this instrument cutting from the inside of the tube is greatly in its favor.

Patented through the Scientific American Patent Agency June, 5, 1866, by Nicholas Thomas. For additional particulars address the patentee, Box 2,847, P. O., Chicago, Ill.

THE TRICENNIAL METEORIC SHOWER.

Our foreign advices afford the most satisfactory corroboration of the astronomical calculations which our own beclouded view of the expected meteoric shower only confirmed rather faintly. The display witnessed from the British observatories was truly magnificent. One observer (Mr. G. J. Symons) estimates the total number of meteors visible at seven to eight thousand. Another (T. W. Weare, at Weston-super-Mare), whose report differs from the majority, as to both date and numbers, asserts that from 1:15 to 2:30 A. M., there were visible, in a range of view extending from a point or two south of east to a point or two south of west, say 160 degrees laterally, and 70 degrees vertically, not less than three meteors in every second of time, making 13,500 in one hour and a quarter. At 3:45 they ceased entirely; the earth had passed through the belt of meteoric planets. Prof. Grant, of Glasgow, seems to indicate about 1:18, A. M., as the culmination of the shower. Mr. Symons, and Mr. C. J. Talmage at Leyton, Essex, coincide to a minute (1:12) in fixing the maximum of frequency, and Mr. Hind places it at 1:10. The latter eminent astronomer counted 1,634 meteors from 12 o'clock to $7\frac{1}{12}$ minutes after 1, when a sudden increase rendered it impossible to count, and after culminating at 1:10, the number began to decline at 1:20, and diminished steadily until, in the last quarter before 6, A. M., only six meteors were observed. Mr. Symons's maximum was 100 per minute; Mr. Talmage's, 314 in five minutes. Thus the important fact of a well defined point of maximum density in the meteoric shower, is abundantly confirmed.

The tract of sky in which the first meteors appeared, had been equally visible (says one observer) the whole evening, and so continued after the shower had ceased; so that the maximum frequency obtained soon after 1 o'clock, admits of no other explanation than that the star shower, actually, and irrespective of visibility, culminated at about that hour. This was on the 14th, and after daylight, or between seven and eight o'clock, A. M., in our hemi

sphere; which accounts for the partial disappointment here experienced.

Another and most important scientific *datum* was confirmed with beautiful precision by the English observations, coinciding with the fainter notices obtained on this side. That is, the entire discharge of meteors (with only three apparent exceptions in the many thousands), radiated from an exact point in the constellation Leo, located in a line between the stars *gamma* and *mu* Leonis, about three degrees from the former and five and a-half degrees from the latter star. The arcs traversed by the meteors increased without exception, according to their distance from this point, while those near the radiant had an extremely short path and train (that is, extremely foreshortened to the eye) with proportionally slow movement, some of the nearest even appearing for an instant as if without motion; the white or yellow light of the head blending visibly with the beautiful emerald green of the train which characterized all these meteors. Some, close to the radiant, are described as little illuminated puff-balls, more or less elongated, or egg-shaped, from the blending of head and train; and one is described as simply a star, that shone out, waxed, waned, and vanished, where it stood. "As clearly as the spokes of a wheel point to the center of the wheel, so did these short-course meteors, of which the trains of two or three were sometimes visible together, point to the spot in the constellation Leo from which they all emanated." At about the culmination of the shower (1:18), Prof. Grant, of Glasgow, saw a whole group of brilliant meteors burst out and diverge like a fan from the radiant point in Leo. Others observed them to fly out simultaneously in every direction from the radiant, like sparks from iron on the anvil. Some, again, darted about in a zig-zag course, but in the same general direction.

The size of the meteors was, in no case, remarkable; the very largest being compared to Venus at her brightest. The trains are described as extremely beautiful, of a greenish (or some say bluish) tint, strikingly phosphorescent in appearance, and leaving a lingering haze of light, but not in themselves remarkably persistent—the longest, according to Mr. Hind, enduring for three seconds. Professor Grant, of Glasgow, gives the maximum duration as five seconds; and a third observer allows it to be possibly ten. But Mr. Symons says that the trains were visible in a two and a-half inch telescope, for two minutes. A singular phenomenon observed by Professor Grant, was an extraordinary blaze of light at the vanishing of a large meteor in Ursa Major, leaving a residue of faint light in the form of a horse-shoe, continuing visible in the heavens for twenty minutes, and expanding in dimensions as it grew fainter, until its extremities included the stars *Epsilon* on one hand, and *Alpha* and *Beta* on the other. This was at 2:42 A M. In another splendid instance (*Times* report), after the trail had nearly disappeared, together with the rocket-head that had produced it, both were again lit up together. The light of the trains was most brilliant at their midpoint, while that of the meteor itself was brightest just before its extinction.

These stones enter our atmosphere with a velocity, as reckoned by some, of forty miles per second, and are mostly melted and dissipated by the intense frictional heat evolved by their passage through the atmosphere. Many, however, reach the earth; and as every generation has to run the gauntlet of this celestial bombardment (once in thirty-three years), it becomes an interesting question, what may, perhaps, be its future volume and force. But the assurance that He who holds the winds in his fists, and who says to the sea, "Thus far shalt thou come and no farther," wields also the planetary artillery for his own holy purposes of goodness or of judgment, should compose the minds of all who can trust in him; and as for the rest of us, may well "give us pause."

Utilization of Waste Substances.

While considerable attention is being given to gun-cotton and nitroleum, a somewhat similar substance is gradually making its way as an article of ordinary domestic use, entirely free from danger, and possessing such advantages as are likely to secure its general adoption. In the manufacture of Parkesine, fibrous vegetable matter of any and every kind —cotton and flax waste, and old rags, being, from their cheapness, the favorite materials—may be employed. These are first dissolved by acids, and they then yield what chemists call pyroxyline. Pyroxyline, however, as its name implies, is highly inflammable, and indeed explosive, like gun-cotton, and this dangerous qualification has to be neutralized. Mr. Parkes effects this by the introduction of either of various chemical ingredients, as iodide of cadmium, tungstate of soda, chloride of zinc, gelatins, several carbonates, sulphates, and phosphates. Collodion (as used by photographers), when evaporated so as to leave a solid residue, has been employed in the production of Parkesine, but it was found by far too expensive. The substances which have given the best results with the pyroxyline are nitrobenzole, aniline, and glacial acetic acid. By the use of various proportions of these substances, all consistencies of Parkesine, from the solid to the fluid form, may be obtained. The applications of Parkesine are, of course as numerous as its forms are various. In the fluid form it is available for waterproofing fabrics, and in this way it is very serviceable. In a plastic state Parkesine is useful is making tubes, etc., and for insulating telegraph wires. Where hardness and toughness are required, these desiderata are arrived at by the admixture of oils prepared with chloride of sulphur, which latter solidifies and makes them (the oils) non-adhesive. Again, by the use of resins, gums, stearin, tar, etc., modified preparations of the invention may be made te suit special applications. Parkesine, indeed, is a most accomodating material, and may be made as hard and brittle as glass, or as fluid and yielding as cream and of every intermediate consistency. It may have elasticity imparted to it to almost any extent or degree, and in this state it is likely to become, a dangerous rival to india-rubber and gutta-percha, inasmuch as it will become, if it be not now, far cheaper than those useful articles of commerce, and answer almost all their uses equally well. Vulcanized India-rubber will find a sturdy competitor in Parkesine, for it may be manufactured with less of brittleness, quite as much hardness, and at a lower cost than that tediously manipulated substance. There is no refuse in the manufacture, the chips and cuttings being capable of re-manufacture with the greatest facility. Parkesine will take any color, and may be given any degree of hardness; it may be made to imitate tortoise-shell, marble, malachite, or amber, and can be cut with a saw, turned in the lathe, planed, carved, engraved, stamped between dies, rolled into thick or thin sheets, worked into screws, shaped into moldings or cornices, etc. It is susceptible of a high polish, agreable to the touch, and not disagreable in smell. At a temperature of 340 deg. Fah., it is consumed, without flame, being decomposed and passing off as dense smoke, leaving but a dark colored ashy residue behind. It is now being manufactured for a variety of purposes, and is daily becoming more extensively known. —*Mining Journal.*

THE London *Mining Journal* says, "a valuable discovery has just been made by a gentleman, a cheap process for smelting titanic iron ore, which has hitherto defied all iron masters and scientific men in the trade. It is well known that titaniferous ore is most valuable, on account of its hardness and tensile strength being five times greater than ordinary iron. This iron will be admirably adapted for plating on iron-clads, and also for rails, on account of its hardness and strength, and the discoverer will be prepared to test this iron against any other iron hitherto discovered for these purposes, or for making steel."

ENGINES for railroads are used in England weighing each 56 tuns, and Mr. Fairlie, the eminent locomotive builder, is constructing one of 72 tuns weight, intended to be placed in the Paris Exhibition. The boiler is to be double, each barrel 4 feet 4 inches diameter, having together 408 tubes 2 inches diameter and 11 feet long.

ASSOCIATIONS and factories for cheesemaking are springing up in various parts of the country.

THE velocity of the sun has been estimated at 422,000, miles per day.

Correspondence

Manufacture of Pure Acetic Acid and Acetates from Empyreumatic Wood Vinegar.

MESSRS. EDITORS:—I herewith send you the description of a new method for producing pure acetic acid and acetates from wood vinegar, which, full of empyreuma, has long baffled different attempts at producing that result. Of those attempts, only the trials with charring or combustion of the empyreuma recommended themselves on account of their cheapness and simplicity, but the difficulty encountered was, to conduct that combustion without the simultaneous destruction of a part of the acetic acid.

The acetate of lime does not give satisfactory results in this respect, because lime is too weak a basis for the constancy of an acetate, which cannot suffer the heat necessary for the combustion of the empyreuma without undergoing decomposition, which diminishes considerably the resulting quantity of the pure salt.

The acetate of soda behaves similarly. Although it may be exposed to a high temperature without suffering decomposition, the result still leaves room for improvement, as the carbonate of soda, formed by the decomposition of the empyreuma in contact with the soda acetate, is kept mixed with the latter, decomposing it, and combining constantly with fresh quantities of liberated empyreumatic acids. This necessitates an increase of degree and duration of heating when a partial decomposition of acetate of soda can hardly be obviated. From the melted, sirup-thick mass the empyreumatic vapors escape with difficulty only, while the surface of the mass, cooled on stirring, forms hard crusts, which still retain empyreumatic particles.

All the evils referred to may be avoided by employing baryta in place of lime or soda. The acetate of baryta suffers no change at an elevated temperature; it does not melt, and behaves, therefore, perfectly indifferent toward empyreuma. For the production of acetate of baryta, it is best to use powdered native carbonate of baryta (witherite), which is introduced into the wood vinegar, until effervescence ceases, when the still somewhat acidulous solution is neutralized with caustic baryta, or the sulphuret of barium. After clarification by rest, the liquid is evaporated in a shallow pan, the crystals are raked off as fast as formed and left to drain on the inclined sides of the pan.

The dry crystals are heated in a cast-iron pan, about four inches deep, which is so set as to expose its bottom to an even, equalized heat, which has to be kept below red heat. In this pan the crystals are spread about two inches deep, constantly stirred, so as to prevent their burning fast to the bottom, while the heating is continued until empyreumatic vapors cease to escape, and the crystals, placed in water, form a clear, colorless solution.

The crystals fall to powder during roasting, and, when sufficiently roasted, as mentioned, are cooled in another pan under constant stirring, which prevents the burning of the mass. This may be caused by the minute particles of carbon remaining in the mass of crystals and originating from the destroyed empyreuma, the carbon becoming pyrophorus. In order to prevent the loss by dusting during the roasting process, an addition to the melting salt of two per cent. of acetate of soda is appropriate, as it melts, preserving the acetate of baryta moist. The solution, as made at first, may, therefore, at once be neutralized with carbonate of soda instead of the caustic baryta or the sulphuret. The roasted mass is next exhausted with water which furnishes, on evaporation, the acetate of baryta, from which pure acetic acid or acetates may be prepared.

JOSEPH HIRSH.

New York City.

Coloring Ivory.

MESSRS EDITORS:—If some of your readers, who are well posted in the process, would be kind enough to give directions how to dye ivory in various colors, I am certain it would be appreciated by a large number. I have tried all the recipes published in hand-

books, but either they are at fault or I am; for the colors produced are any thing but attractive. Will correspondents please state full particulars, how long the ivory must remain in the dye, etc., etc.

E. P. W.

New York, November, 15, 1866.

Dyeing of Horn.

MESSRS. EDITORS:—A few recipes for the dyeing of horn, especially with reference to the manufacture of buttons, or such other articles as may be exposed to the heat of boiling water, may not be out of place here, especially as practice has proved them to work satisfactorily.

1. DULL BLACK.—The buttons are boiled in a saturated solution of sugar of lead, until the color has acquired the desired shade. According to the quality of the horn, this may take a quarter to half an hour. The buttons should then be washed with water, slightly acidulated with vinegar.

2. IRON BLACK.—The buttons, after being treated as stated in No. 1, are placed in a cold solution of an alkaline sulphuret. The result is, the buttons possess a bright, metallic luster.

3. PEARL.—After undergoing the treatment of No. 1, the buttons are brought into diluted muriatic acid, containing 3 per cent of the strong acid. This weak solution produces, according to the duration of its influence, all shades, from the darkest blackish blue to the lightest white.

4. SILVER-GRAY.—The buttons from No. 1 are placed in a solution of nitrate of mercury, saturated at a temperature of 140 degs.—170 degs., Fah. The treatment in this bath should last ten to twenty minutes, which, if cleanliness is observed, will produce most elegant results.

5. CHOCOLATE BROWN.—The buttons from No. 4 are boiled for about a quarter of an hour in a concentrated but thin solution of catechu.

6. CHOCOLATE BROWN, DARK.—The buttons from No. 5 are placed in a warm bath of bicarbonate of potash, containing 3 per cent of the salt. With the duration of the treatment the color darkens.

7. CHOCOLATE BROWN.—The buttons of No. 5 are placed in a warm solution of sugar of lead, saturated at the common temperature. This color looks especially well in knife handles, etc.

8. BRONZE BROWN.—The buttons from No. 4 are placed in a solution of æsculine (the pigment of the horse chestnut), and treated and boiled as in No. 5.

9. BRONZE BROWN.—The buttons from No. 4 are boiled for quarter of an hour in a concentrated solution of green vitriol, and then in æsculine. The resulting bronze differs materially from the former, possessing great softness.

10. LIGHT BROWN.—The buttons from No. 4 are boiled in a solution of galls or pure tannin. This is especially adapted to netty designs, to which it imparts a silky luster.

Upon the sensitive surface, produced by treatment No. 4, a great many combinations of colors may be produced.

JOSEPH HIRSH.

Changes in Steel by Friction and Heat.

MESSRS. EDITORS:—The "singular quality of steel" alluded to in the SCIENTIFIC AMERICAN of Nov. 3d, is familiar to all saw makers.

When a hand saw is hardened and tempered it is crooked but elastic. Hammering it straight takes from it its elasticity, but not its hardness; for it yet grinds and files hard. Grinding and polishing will destroy the spring nearly as effectually as the hammering, either of which affects soft steel in a manner exactly the reverse.

To restore the elasticity of saws, they are exposed to a degree of heat that will produce a straw color, and if not done too quickly this will be effectual. The color is removed with an acid; the presence or absence of it makes no difference in the elasticity of the saw; that is doubtless due to a certain definite arrangement of the "grain" of the steel.

Heat has power to alter the molecular condition of steel, a fact that can be demonstrated by breaking a rod of soft steel; then harden and break it, again draw the temper and break it once more. The three pieces will be, at the point of fracture, quite dissimilar in appearance. Now if the hardened and the tempered pieces are heated enough to remove all the temper, the grain of the steel will appear as in the first piece.

Saws will lose their spring by long use from friction. We restore it every day, in repairing them, when the original temper is good. I have heard farmers declare that a fractious tempered scythe hung out in the sun during summer would be improved. I have, with others, ridiculed the idea. I am now inclined to think their observations correct.

The "razor question," discussed in your columns some time since, is, I think, susceptible of an explanation from the above facts. The frequent friction the edge is subjected to in honing and stropping, abstracts from it its elasticity, or weakens the cohesion of the particles of steel composing the edge for each other, resulting in a crumbling, tender edge. If so, the effect of dipping the razor in hot water is to restore the toughness and elasticity of the edge, and as a consequence make it retain its sharpness longer. The remarkable changes caused by, or attending different degrees of heat on steel, seem explicable only by admitting "heat to be matter in motion."

WM. CLEMSON.

Middletown, N. Y., Nov. 9, 1866.

Plumbago in Georgia.

MESSRS. EDITORS:—Will you please advise, through your journal, the uses, value, amount of consumption, and best market for plumbago or black lead. We have mineral resources and must develop them, or this poverty-stricken and desolated country is gone up.

THOS. L. WATERMAN.

Marietta, Ga., Nov. 7, 1866.

[Plumbago is used in this country mainly in the manufacture of crucibles, stove polish, and for lining molds for casting iron. It is also used in limited quantities, when of good quality, for the manufacture of black lead pencils. Its value depends altogether upon its quality. That of the Barrowdale, England, mine is used mainly for pencils, as it contains over ninety per cent of carbon. That procured from Ceylon is still more valuable. The manufacture of crucibles and stove polish is restricted to a few concerns in this country, as for the first the demand is limited, the crucibles being used mostly in the steel business, which is not, as yet, very extensively prosecuted in this country. The best method of utilizing a plumbago mine in Georgia, it seems to us, would be to create a demand for the article by starting the steel manufacture.—EDS.

Welding Mixture.

MESSRS. EDITORS:—Herewith I send you a recipe for using on cast steel in weldng and in restoring burnt steel. It is the best preparation that I have ever seen or used. 1½ lbs. of borax, ½ lb. of salammoniac, ¼ lb. of prussiate of potash, 1 oz. of rosin, 1 gill of alcohol, 1 gill of water. Pound fine, and boil in an iron kettle slowly until it becomes a thick paste. Use as borax.

WM. A. SWEET.

Syracuse, N. Y., Nov., 12,1866.

Russian Railroads and the Krupp Guns.

Engineering, under the heading, "In Russia," says:—"There are great lines of railway, extending hundreds and hundreds of miles across the same universal plain, so alike everywhere that a difference of a thousand miles is one of distance and nothing more. These railways are well built and well appointed, and at many of the principal stations, as at Wilna, Pskoff, Tver, and others, the passenger is struck by the magnificence of the buffets, rich with stained glass and oak carvings, while the nearest town—for the railways but seldom run through them—is but a straggling street of miserable log huts. The line from the Prussian frontier is worked by new, well-made, and very powerful wood-burning engines, perhaps one-half of which were made by Borsig, of Berlin, and the rest by various makers, a few by Sharp, of Manchester, others made at Seraing, and at Couillet, in Belgium, and others yet at Stettin. They are nearly all outside-cylinder engines, with four coupled wheels and a bogie, and many of them weigh 36 tuns. The trains are very long and heavy, as many as thirty carriages being taken. The highest speed is very fair, perhaps 45 miles an hour; but as brakes are seldom used in stopping, much time is lost in slacking up at stations. The carriages are intersected by passages between the partitions, so as to form seperate compartments not only at the ends, but at the sides also. The most remarkable railway carriages to be met with anywhere are those on the St. Petersburg and Moscow line, and which are of recent French design. They are two stories high, and stand apparently nearly 18 feet from the rails, which are laid to the 6 feet gage. The principal floor is divided, by passages and partitions, into end compartments, interior compartments with windows on one side only, and a central saloon, generally monopolized by Russian officers. From this saloon a staircase ascends to a large apartment above, like the interior of a huge omnibus. It has windows and lounges along the sides, and is furnished with card-tables and wax-lights, and offers every convenience for smoking and sleeping.

"Where are the Krupp guns? Despite Mr. Longsdon's reiterated denials, it is repeated here by every one who pretends to know anything of the matter, that all of Krupp's guns, of any considerable caliber, have burst on trial, and are hardly better for the purposes of ordnance than cast iron, albeit that the steel is apparently of excellent quality. It is not indeed a question of quality, but wether cast steel is fit for heavy ordnance. As for enormous orders having been given for steel guns, the report is of a piece with that by which Mr. Sampson, the city editor of the *Times*, was imposed upon two years ago, when he gave out that Captain Blakely had received an order from the Russian Government for £900,000 worth of his guns, whereas hardly any of his guns ever went to Russia."

THE center-rail system, for inclines, has been adopted on the Mont Cenis railway, and is found to work well on inclines as great as 1 in 12. It is claimed that the friction, or adhesion, of the two horizontal wheels on the sides of the central rail, allows a great diminution in the weight of the locomotive, gives control as brakes, over the velocity in descending, prevents the train from leaving the track, and gives greater security in rounding curves.

IN the year 1865, Belgium had 365 inhabitants to the square mile, England and Wales had 367, and France 176. If the United States was as densely populated as France, our population would amount to 528,000,000; as England and Wales, 924,000,000, and according to the Belgium density of population, the United States would contain 1,195,000,000 inhabitants, being 110,086,000 more than the entire population of the world in 1866.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

TANNING MIXTURE.—IRA WOOD, Woodstock, Vt.—This invention relates to a new mixture for tanning or dressing glove calf, buck-skins, and other hides.

WINDOW-SHADE FIXTURE.—J. W. TAYLOR, Dubuque, Iowa.—This invention consists in the employment of a perforated wheel secured to the end of the shaft of a shade for windows in combination with a lever which is operated by means of a cord passing through an eye arranged on the lower end of the lever.

CAR BELL.—JAMES SWEENEY, New York City.—This invention elates to a car bell which is put up in an inverted position so hat the dust and dirt readily discharge therefrom, and the water its not liable to freeze in and to injure it by lodging in the same.

STILL.—B. P. STEBBINS, Corry, Pa.—This invention has for its object to furnish an improved cone still by means of which the steam or spirit vapor may be readily and rapidly condensed, and which shall be simple and cheap in construction.

PERCUSSION TABLE FOR CONCENTRATING AND DRESSING ORES.—HENRY ALDERSON THOMPSON, Grant, Gipp's Land, British Colony of Victoria.—This invention is to provide a table for concentrating and dressing ores, on which the materisl is kept in a oose state by means of stirrers, thus allowing a more perfect concentration with less loss at one dressing than can be obtained on the plan now generally used by means of several dressings.

CHURN.—G. B. WALLER, Franklin, Ill.—This invention has for its object to furnish an improved churn by means of which the cream may be thoroughly aired while being agitated; and by the use of which the churning may be done in a very short time, and with a small outlay of power.

MACHINE FOR MOLDING CRUCIBLES, ETC.—SAMUEL R. THOMPSON, Portsmouth, N. H.—This invention has for its object to furnish an improved machine by means of which crucibles and other vessels may be molded from any suitable plastic material perfectly and rapidly.

EMBOSSING BRASS TUBES, ETC.—DAVID T. SANFORD.—This invention relates to a machine which is intended to emboss cylindrical pipes or rods of wood, metal, or any other suitable material, the operation of embossing being effected by three or more revolving wheels or knurls which are mounted on pins in the forked ends of shafts that radiate from the center of a hollow spindle and which are so arranged that they can be adjusted toward and from the center.

CARRIAGE TOP.—W. F. RUNDELL, Genoa, N. Y.—This invention relates to the frames for buggy and other carriage tops, and it consists in securing the front bow or section of the frame to the one next adjoining in an extremely novel manner, whereby not only is the frame greatly simplified in construction, but its strength much increased.

CHURN.—J. K. REINER, Line Lexington, Pa.—This invention consists in constructing the body of the churn or cream receptacle of oval form in its transverse sections, the receptacle being placed horizontally on a suitable support and provided with two longitudinal shafts, having curved arms attached which have an oblique position in their transverse section, the arms of one shaft having an opposite oblique position with those of the other, and he two shafts connected by gears at one end, whereby the cream, as the two shafts are rotated, will be forced toward each end of the cream receptacle, and agitated in such a manner as to cause butter to be produced in a short space of time. The invention also consists in having a chamber or butter receptacle attached or applied to the cream receptacle, the butter receptacle having a strainer at its outer end and provided with a slide at its inner end, whereby the latter may be readily separated from the buttermilk.

MODE OF ATTACHING DRAFT POLES TO AXLES.—E. C. SMITH New Haven, Conn.—This invention relates to a mode of attaching draft poles to axles, whereby a draft pole may be attached to axles of different vehicles. The clips which receive the eyes of the cross bars of draft poles are not placed in the same place on the front axles of different vehicles, they vary materially, and the object of my invention is to have the eyes of the cross bars attached to the latter in such a manner that they may be adjusted to suit the position of the clips at whatever point they may be placed.

HAY FORK.—W. F. RUNDELL, Genoa, N. Y.—This invention relates to a hay fork for which Letters Patent were granted to this inventor bearing date March 28, 1865. The present invention and improvement consist in a modification of the ferrule, whereby the strength and durability of the fork are very materially increased. The handles of hay forks being invariably constructed of wood and tapered at the end in which the tang of the fork is fitted, are very liable to split and break at said end, as that is the point where they are subjected to the greatest strain.

STRAW AND FODDER CUTTER.—W. D. SCHOOLY, Richmond, Ind.—This invention relates to that class of straw and fodder cutters which are provided with a rotary knife or cutter working over a slanting knife, and it consists in attaching and arranging the rotary knife on its arms, in such a manner that it may, with the greatest facility, be adjusted whenever required to compensate for wear. The invention also consists in a novel construction and arrangement of parts partaining to the feed mechanism, whereby the same may be readily adjusted to admit of the fodder being cut into pieces of greater or less strength, as may be required, and all the parts pertaining to the feed mechanism rendered strong and durable.

PERPETUAL BRICK KILN.—JOHN MCDONALD, New York City.—This invention relates to a useful improvement in that class of brick kilns which are known as perpetual kilns.

TANNING PROCESS.—ALEXANDER HILL, Dubuque, Iowa.—By this process skins may be tanned in a very superior manner and in a very short time.

SIFTING DEVICE.—PAUL CEREDO, Canada East.—This invention relates to a screen or sifting device for separating ashes from cinders or unconsumed coal, and for sifting or separating other substances, and it consists in the employment of a screen box provided with a proper screen and fitted within a suitable case or box so as to work on journals or pivots, and operated through the medium of a cam and spring, the case in which said screen box is placed being provided with discharge spouts so arranged in relation with the screen box as to discharge the parts which are separated from each other by the screening process from different parts of the case and into separate receptacles prepared to receive them.

CUTTING AND RAKING CORN AND COTTON STALKS.—HILL and TUTTLE, Eaton, Ohio.—This invention consists in a combination of plows, cutters and a rake applied to a mounted frame, whereby corn and cotton stalks may be cut, plowed up, and raked into suitable piles, convenient for removal from the field.

BURGLAR ALARM.—C. A. BLAKE, Philadelphia, Pa.—The burglar alarm embraced in this invention is extremely simple and in operation must be efficient and certain.

CLASP LOCK FOR BOOKS, PORTFOLIOS, ETC.—LEOPOLD LALL, New York City.—This invention consists in applying a lock to a book clasp in such a manner that when the clasp is closed and the covers of the book secured, so that the book will be in a closed state, the clasp may be locked and rendered incapable of being opened without the aid of a key. The object of the invention is to prevent books being opened and their contents inspected by any except the proper person, and it will prove to be a desirable device for account books in counting houses and other institutions where curious visitors and customers have frequently the opportunity of looking at accounts not designed for their inspection.

SHUTTLE FOR SEWING MACHINES.—GEORGE H. LENHER, Richmond, Va.—One of the objects of this invention is to prevent the twisting of the thread of a rotating shuttle, for which purpose the bobbin is placed at one side of the center of motion of the shuttle and left free to be revolved on its own axis by the pull on its thread in the operation of sewing. Another object is to provide an adjustable tension upon the bobbin thread, which is accomplished by the pressure of a spring whose free end bears against the inner side of the bobbin.

CAR COUPLING.—JOHN H. KAVANAGH, Joliet, Ill.—This invention consists in so constructing the coupling of a car that as the cars approach each other, the link on one car strikes a wing of a trip lever on the other car whereby the coupling of the cars is effected.

WOOD-SAWING MACHINE.—P. A. GERRY, Dover, Me.—This invention has for its object to furnish an improved machine, by means of which wood may be sawed rapidly and conveniently.

DRYING LUMBER.—JAMES W. HANNA, Wabash, Ind.—This invention has for its object to furnish an improved means for drying lumber which will be free from any danger of fire, and which will preserve the lumber from checking.

LUMBER WAGON.—JOSEPH N. BYINGTON, Stockton, Min.—This invention has for its object to furnish a means by which a lumber wagon, used for drawing heavy loads, may be readily changed into a spring wagon for carrying people or light loads.

PORTABLE COMBINED FIRE GRATE AND ANDIRONS.—JOHN H. COATE, West Milton, Ohio.—This invention has for its object to furnish a grate which may be adjusted to radiate more or less heat into the room, and which may be arranged for burning wood, coal, chips, or corn cobs, etc., as may be desired.

GRAIN DRYER.—JOHN R. EVERTSON, Mt. Vernon, Ind.—This invention has for its object to furnish an improved portable apparatus for drying grain, meal, malt, and similar substances, quickly and conveniently.

HAME-TUG BREAST COLLAR.—ADAM MCMULLEN, Sterling, Ill.—This invention has for its object to furnish an improved breast collar, so constructed and arranged as to cover the parts of the horse's breast upon which the draft comes, affording an easier and better purchase than the breast collars now in general use.

WASHING MACHINE.—JAMES LAMPHEAR, Panama, N. Y.—This invention consists of a washing machine formed by the combination of the fluted rollers and plain feed roller with each other and with the frame of the machine.

MANUFACTURE OF SUPERPHOSPHATE OF LIME.—A. DE FIGANIERE, Philadelphia, Pa.—This invention has for its object to improve the manufacture of superphosphate of lime, by the more thorough incorporation of the acid with the guano, or other fertilizer, than can be done when the operation is performed by hand labor.

HOE AND SEED PLANTER.—A. T. LARGE, Tomah, Wis.—This invention consists in a combination of a hoe and seed planter, whereby holes may be made in the earth to receive the seed, the seed dropped in the earth and then covered, the work all being performed with the same implement and with great facility and expedition.

MACHINE FOR DRESSING THE FELLIES OF WHEELS.—ANDREW P. OLDHAM, Bridgeport, Conn.—This invention relates to a machine for dressing the sides of the fellies of wheels, and is more especially designed for operating upon carriage wheels. The object of the invention is to obtain a machine of simple construction which will admit of the work being rapidly and perfectly performed, and capable of being adjusted to suit wheels of different sizes or diameters.

BROOM HEAD.—THOMAS MOORE, Bloomington, Ill.—This invention consists in a broom head formed with elongated sides or ears and hooks, and in combination therewith and with each other of the crescent-shaped tightener, wire ledge on the interior surface of the broom head, the screw by which the tightener is drawn up into the broom head, the bottom of the socket, and the handle.

FEED MOTION FOR DRILLS, ETC.—G. T. CASE, New York City.—This invention relates to an automatic feed motion for drills, boring bars, etc., and particularly for what is known as "Case's expanding drill for enlarging the diameter of oil wells." It consists of a feed screw provided with a nut and worm wheel, to which a slow revolving motion is imparted by a worm which revolves with the feed screw, and which is caused to turn on its own axis by a suitable cam and corresponding cam wheel, in such a manner that the feed screw is caused to advance slowly and continually, and a uniform and automatic feed for the boring bar or other mechanism is obtained.

BUTTER WORKER AND PACKER.—CHARLES F. BARRAGER.—Patented November 23, 1866.—Arranged in connection with the working bowl and packing tub is a pivoted lever with a paddle attached thereto by a universal joint. The lever can be rotated horizontally on its pivoted standard to operate by a plunger upon the butter in the tub.

PRESSING HATS, BONNETS, ETC.—G. L. THOMPSON, New York City.—This invention relates to an improvement in that class of machines in which the operation of pressing hats, bonnets, or other similar articles, is effected by means of steam or other fluid at a suitable pressure acting upon a flexible diaphram or core applied to one side of the article to be pressed, while the other side is supported by a rigid block or form. By combining with said flexible diaphram or core a piston which works in a suitable barrel or cylinder, and which can be moved toward and from said flexible core, the pressure of the liquid or fluid can be increased or diminished at pleasure, and the operation of pressing hats, bonnets, or other similar articles, can be effected with the greatest ease and nicety.

SHAFTS FOR SLEIGHS AND CARRIAGES.—GEORGE COFFIN, Boston, Mass.—This invention has for its object to furnish an improved means for detaching the horse from the sleigh or carriage when he becomes unmanageable.

TURNING OR PLANING TOOL.—CHARLES W. BURDIC, Norwich, Conn.—This invention has for its object to furnish an improved tool for turning or planing iron or steel, the holder of which can receive and hold cutters of various shapes, and designed for various uses.

BROOM HEAD.—JAMES C. MCCLELLAND and JAMES GRAHAM, Pittsburgh, Pa.—This invention consists principally in the circular top of the broom head, having a tapering band and short tube through which the handle passes, in the combination of arms with the broom-head cap, and with the binding wire, in forming the lower side edges of the broom-head cap double, and in the combination of the interior ring with the broom head and handle.

EXPANDING MANDREL.—ISRAEL BEETISON, New Britain, Conn.—This invention consists in a tapering mandrel, which is flattened on three or more sides, in combination with three or more segmental wedges, which are fitted on the flattened sides of the mandrel and held in position by a suitable clamp, in such a manner that by moving said edges up or down, the mandrel can be adjusted for different sized holes, and one and the same mandrel can be used for turning a variety of articles.

MACHINE FOR EDGING BUTTON-HOLES.—JOHN T. BRUEN, New York City.—This invention relates to a machine which is intended to cut out and apply automatically an annular disk of muslin or other textile fabric to the edge of the button-holes in paper collars, cuffs, and other articles of a similar nature, so as to render said button-holes strong and durable.

CARRIAGE.—LOUIS KUTCHER, New York City.—This invention consists in combining the box or top part of a carriage or wheel vehicle with the lower part of the fifth wheel instead of with the upper part thereof, as usual, in such a manner that said box will always remain at right angles to the tongue, and move with the same in either direction independent of the body of the carriage or vehicle, and that the driver is thereby enabled to face in the same direction in which his horses or draft animals pull or move.

INFANTRY ACCOUTERMENTS.—Colonel J. K. MIZNER, Fort McPherson, Nebraska.—Patented November 27, 1866.—The nature of this improvement consists in so arranging the parts of a knapsack as to afford a more convenient mode of packing than has been hither o attained, while the ration bag or haversack is so attached as to be out of the way in marching, and not so liable to be caught and torn.

MOLD FOR FURNITURE COMPOSITION.—JAY J. WIGGIN, Cincinnati, Ohio.—Patented November 27, 1866.—This invention relates to a mold made up of detachable sections which are held together by screws and clamps. It is employed in the manufacture of the "Egyptian Case-hardened Marble," patented by the same inventor simultaneously herewith.

COMPOSITION FOR FURNITURE AND OTHER PURPOSES.—JAY J. WIGGIN, Cincinnati, Ohio.—Patented November 27, 1866.—The subject of this invention is an artificial substitute for wood, stone, and metal, which has the requisite qualities of hardness, neatness, and durability to adapt it for use in the manufacture of furniture, billiard-table foundations, coffins, floors, and for many other purposes which are generally subserved by the employment of wood, etc. The appellation applied by the inventor to his composition is the "Egyptian Case-hardened Marble."

PLANING MACHINE.—HENRY CLIMER and JOHN D. RILEY, Cincinnati, Ohio.—Patented November 27, 1865.—This invention relates to an improved combination of devices intended for planing and mortising pieces of furniture which contain both square and turned work, such as bedsteads, etc., in the manufacture of which the material is fed to the machine by hand.

Notes and Queries

Y. M., of ——.—Your question is rather indefinite but if you desire our opinion as to the anti-incrustation you mention we can only say it is highly recommended by practical engineers who have tested it. We are inclined from these reports to a favorable opinion.

A. J. H., of Me.—We do not know the address of the company you inquire about. . . . The Avery engine does not develop so much power, "pressure and speed being equal," as the ordinary steam engine. It is used where fuel is not an element of great expense for its cheapness and simplicity. . . In calculating the power of a double cylinder engine the capacity, etc., of each cylinder must be taken. If indicated the indication should be made at each end of each cylinder. . . . Spiegeleisen will not turn cast-iron to steel in a cupola furnace. The iron may be made very hard by its use, but hardness is not the only, nor distinctive quality of steel. . . Other things being equal, there is no doubt that the draft of a boiler with upright tubes is greater than one with horizontal tubes.

H. B., of Mo.—The material (mixture of hammer slag and cinder) with which you protect the cast-iron bottom of your puddling furnace is mainly composed of oxide of iron and silicate of iron. It serves as a protector by reason of its non-conducting quality; without it the cast-iron plates would be at once melted. It confines the heat to the iron to be puddled, where alone the heat is wanted.

B. G., of N. Y.—The reason that your hair is not so promptly blackened at its ends as near the roots, is probably because at the ends the hair is more dead and dense so that the coloring matter does not penetrate. . . . The sulphur and lead preparation is the least harmful of hair dyes. With care to prevent too much getting on to the scalp, it may safely be used for many years. The coloring matter is sulphide of lead.

BUSINESS NOTICES.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal Queries," as below:—

H. M., of Pa., wishes to know where the patent needle threader is manufactured.

V. E. Keegan, Roxbury, Mass., wishes to communicate with parties concerned in the manufacture of saltpeter.

L. W. R. Blair, Camden, S. C., wants the best cooking stove.

O. W. Ross, Northfield, Mass., wants 1,000 small pamphlets printed at a cheap rate.

O. H. Strong, Rouseville, Pa., wishes to purchase a good self-regulating wind mill.

Dr. J. B. Williams, 251 Pennsylvania street, Pittsburgh, Pa., desires to communicate with makers of artificial stone.

J. P. Nicholson, West Stockbridge, Mass., desires to communicate with parties owning patents for burning lime with anthracite coal.

Improvement in Screw Plates.

The common screw, or jamb plate, has some objections, known full well to practical workmen, which make the doing of what machinists' apprentices facetiously denominate "circular work," very tedious. The repeated trials of running up and down the bolt, cleaning the dies, and testing the proper size of the thread are trying to the patience. Then, when the dies are worn, it may be necessary not only to recut them on the "hob," but to replace them by new dies, involving much time. The improvement herewith represented is intended to overcome these difficulties.

Fig. 1

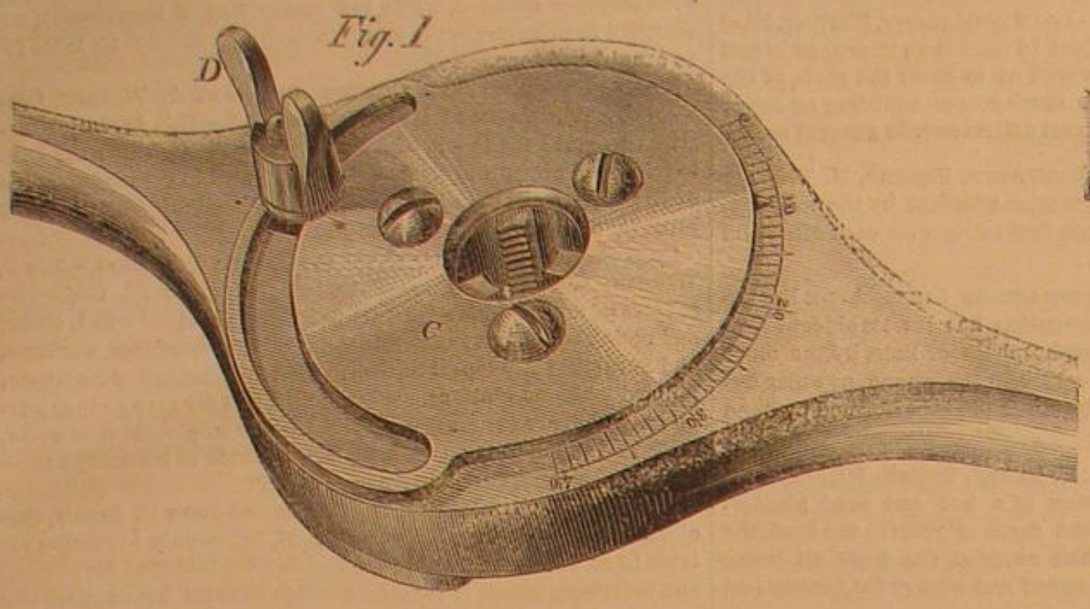
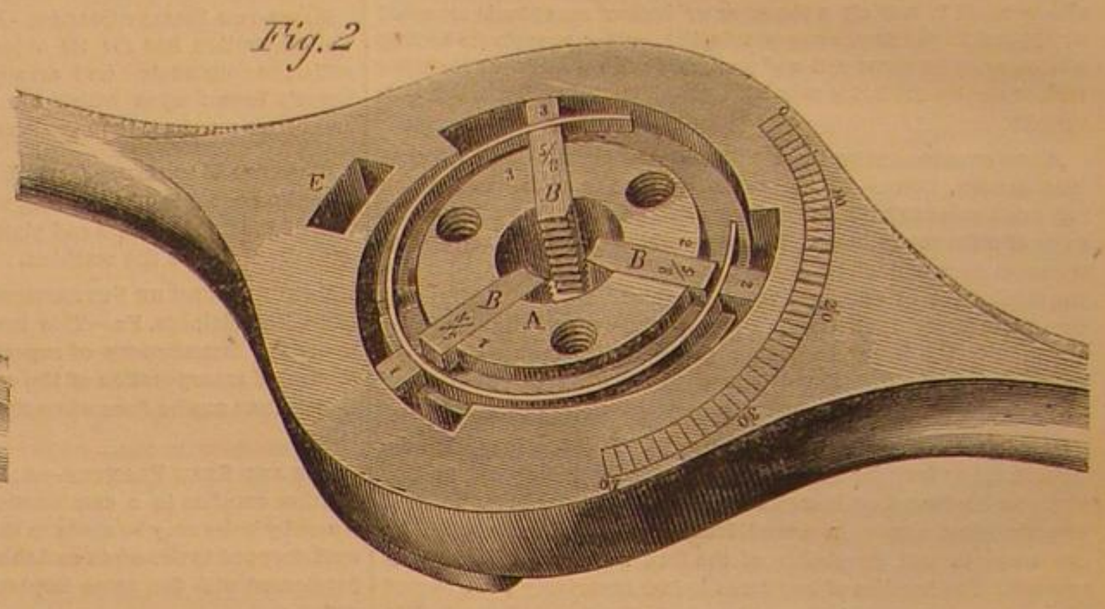


Fig. 2



ZILLIER'S PATENT SCREW PLATE.

Fig. 1 shows the center of a plate ready for use. Fig. 2 represents the same portion with the top covering plate removed. The plate itself, at the center, is bored out to receive the disk, A, which has radial slots in which slide dies, B, which are actuated by the spiral, cam-like cuts, equal in number and disposition to the dies. A coiled spring engages in slots in the dies and keeps their outer ends in contact with the cam slides. The top plate, C, has a corresponding plate on the under side, both rigidly secured to the disk, A, so that turning them revolves the disk, and throws the dies in or out according to the direction in which they are rotated. The stock has a scale to which a pointer on the plate, C, is directed. This secures a uniform size to a number of screws or bolts. A thumb nut, D, on a bolt passing through the slot, E, holds the top and bottom plates, and consequently the dies, in any required position. The dies are so arrang d and the threads in them so cut, that always the cutting edge alone is presented to the bolt or screw, and there can be consequently no "raising" of the thread by compression, but the thread must be cleanly cut. This device can be used on a lathe to thread bolts, as well as by hand.

It appears to be a convenient tool, not liable to derangement, and easily kept in order. It was patented through the Scientific American Patent Agency, July 24, 1866, by Nicholas Zillier, whom address for further particulars at No. 1,033 Artisan Street, below Richmond, Philadelphia, Pa.

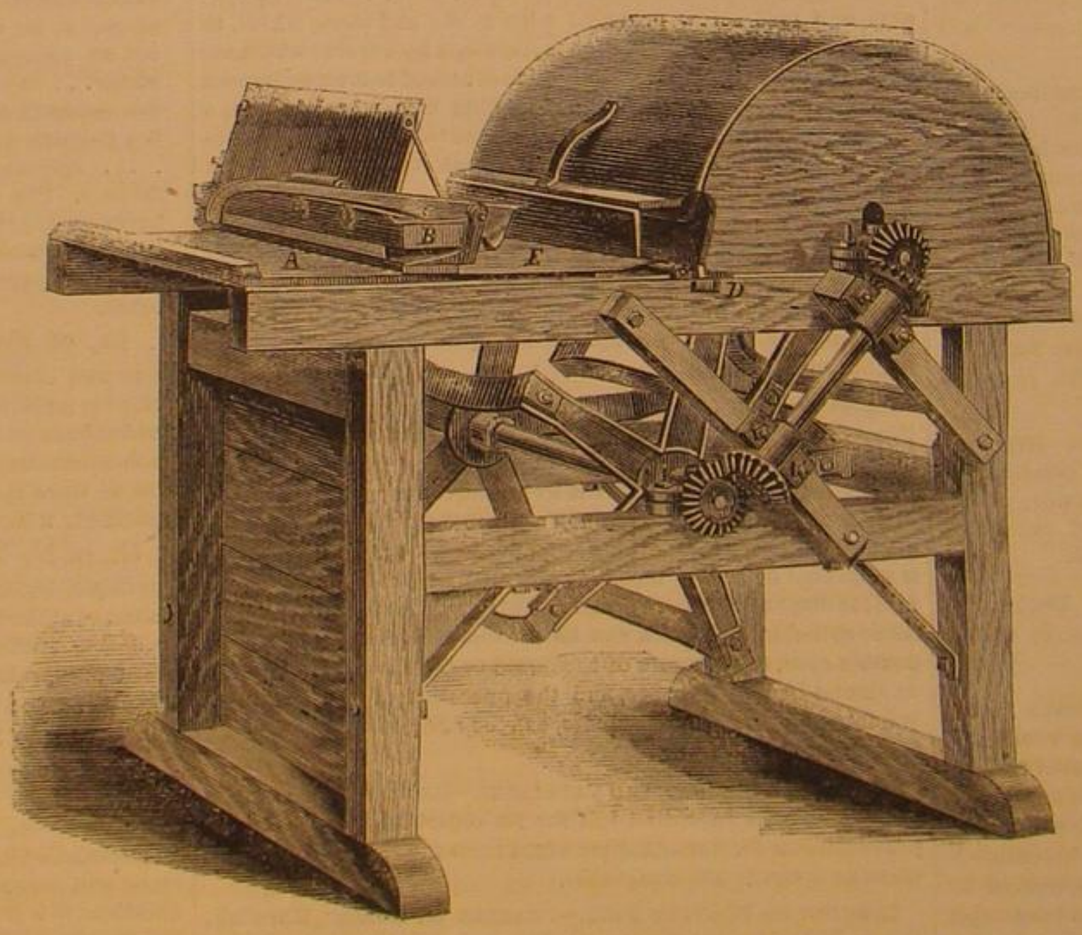
Flax Breaker and Dresser.

The engraving is a perspective view of an improved machine for dressing flax without previously passing it through a breaker. In the usual way the flax is held in the hand, presenting so small a surface to the action of the beaters, that the outside of the handful is worked too much before the inside is properly dressed; and, if a little damp, the flax becomes knotted and snarled. This machine, the inventor says, breaks and dresses the flax at one operation, and will also dress flax rapidly after having been broken in the ordinary manner. It requires no skilled labor to operate it, and will do twice the amount of work now done by the pulley and blade machines in common use. The flax being presented to the beater blades in a thin sheet, it will dress the top and bottom sides and the middle simultaneously, doing the work well, even when the flax is damp, and leaving the fibers parallel. It is claimed also that this machine leaves less tow on the hackles than any other in use.

The flax is spread on the table, A, the clamp, B, is raised by the lever, C, and the flax pushed under it. The clamp is then brought down upon it and held securely by the lever. At D is a bar extending across the frame, on which the flax rests while the beaters are at work. The table is pushed forward as the work proceeds, until that portion on the apron, E, beyond the clamp is thoroughly dressed, when the flax is reversed and the operation repeated. The blades of the beaters are curved inward on their edges from each end, to keep the flax from spreading and becoming entangled on the shaft ends. There are two sets of these blades, each five in number, working into one another's interspaces. Those of the upper cylinder beat the flax on the top, and those of the lower act against the under side, each revolving toward the free ends of the flax. It can readily be seen that while these blades thoroughly break the flax, they as certainly clean it from the "shives."

The clamp, B, is hinged at one end, and, by lifting the lever, C, is instantly raised to a perpendicular position. Its under surface is provided with a cushion of rubber or other elastic material, which, by means of bars under the table, A, hold the flax securely in place while being dressed. Power is applied to either of the drums.

The patent was secured through the Scientific American Patent Agency, June 12, 1866, by David S. Abbott, Cuba, Allegany county, N. Y., who will sell machines and territorial rights on application.



ABBOTT'S FLAX BREAKER AND DRESSER.

The Action of Acids on Steel.

A correspondent, F. L. K., of Worcester, Mass., says that his experience with steel differs from that of J. E. E., in No. 20, current volume. That correspondent found that removing the blueing from steel with diluted sulphuric acid would not injure its elasticity. F. L. K. says:—"I desired to coat over with tin some steel hoop-skirt wire tempered in oil. I used sulphuric acid, prepared in the usual way, to brighten the wire. It was easily coated with tin, but about nine-tenths of the wire had lost its elasticity. I dropped a piece about two feet long, on the floor, which broke into six or eight pieces. I used the lime water to remove the acid as J. E. E. did. It may be said that the wire, being thin, the acid penetrated entirely through, which can hardly be the fact, as some of the pieces were as tough after the process as before, although all were from the same coil and received the same treatment."

We think that in coating the wire with tin some of it may have been heated too much and then suddenly cooled, while other pieces may have cooled gradually. The acid and lime water may have had nothing to do with it.—Eds.

Practical Hints.

No. 4. To Prevent the Water in Gas Meters, Gas Holders, and other Similar Reservoirs from Freezing.—Formerly alcohol was used for this purpose, as it only freezes at 250 degrees below zero, Fah., consequently all watery liquids containing this substance will freeze at a much lower temperature than pure water. and alcohol is very effective; however, there are two objections; one is, that the price of the alcohol is so high, because of the internal revenue tax; and the most serious objection, that the preventive is only temporary, as the gas passing through the meter causes the alcohol to evaporate still faster than the water, which also disappears, and must be supplied from time to time, as is generally known. Solutions of common salt and other compounds soluble in water, have also been tried in gas meters, but they invariably attacked, in the course of time, the metal of which the meter was made, and were, therefore abandoned.

However, we have now a substance which is much cheaper than alcohol, never evaporates, but on the contrary, resists the evaporation of water, does not act injuriously on metals, is soluble in all proportions in water, and only freezes at about 160 degrees below zero, Fah.; this substance is glycerin. The amount to be put in a gas meter depends, of course, on its size, and the degree of cold to which it is exposed in the coldest winter nights. From one-half to one pint of glycerin to a gallon of water will be found sufficient for ordinary circumstances. V.

The Union Pacific Railway excursion from Philadelphia to Fort Riley, Kansas, and back, was accomplished in a single car, by means of broad-flange wheels, covering the different gages which occur on the intermediate roads. The distance is nearly 1,500 miles each way.

THE

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VOL. XV., No. 24 [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, DEC. 8, 1866.

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IMPORTANT TO ADVERTISERS.

With the enlargement of the SCIENTIFIC AMERICAN on the 1st of January next, it is our purpose to issue an edition of about fifty thousand copies of the first number of the new volume. We intend also to devote a portion of the back outside page to advertisements, for which seventy-five cents per line will be charged. Those who may wish to avail themselves of this rare opportunity to publish their advertisements will do well to correspond with the publishers as early as possible. We can admit but few. First come first served.

THE PARIS EXHIBITION BUILDING.

From the variety of descriptions which have reached us, we condense the following outline of the enormous preparations made by the French Emperor, in the Champs de Mars, for the approaching "World's Congress" of arts, products, and manners.

The monster building is of an oblong form, with rounded corners, coliseum-like, and covers forty acres. It consists, in fact, of eight hollow elliptical structures, one within another, "wheel within wheel," connected by galleries and corridors, and united by one vast iron roof, stretching over all. The inmost area, at the center, is a magnificent garden of trees, flowers, shrubbery, pools, fountains, cascades, statuary, and illustrations of the architecture of all nations, in the form of bowers, cloisters, offices, etc. It has a suspended roof of iron and glass, and occupies an acre and a quarter of ground. The trees in this space—where, six months ago, there was not a green thing—have been transplanted at full size, and the total number here and elsewhere in the grounds, thus transplanted, is eight thousand.

Sixty grand arches open into this garden from the main building around. Between them, and opening likewise into the garden, are located all the *cafés* or refreshment rooms, distributed in the divisions proper to their respective nationalities, and will each present the indigenous articles of food, in the characteristic styles, of their several countries.

The interior area is, of course, open to the lofty roof; likewise the outermost of the eight elliptical structures enveloping it. Two grand transverse avenues—extending to the roof, but not continued across the central garden—divide the whole pile into four quadrant-shaped sections. Twelve intermediate avenues, radiating in like manner from the center, three in each section, again subdivide the whole into sixteen grand national departments, each covering about two and a half acres. Passing from the center, outward, through any of these avenues, the visitor will inspect thirteen successive departments of the civilization of that nationality assigned to either side of the avenue; the first being that of the fine arts, and the second a museum of the history of labor, from the rudest ages. Following any of the elliptical corridors around the building, he will see a single aspect of civilization, as presented in diverse forms and stages by each of the sixteen nationalities, in succession.

Light, ventilation, warming, cleansing, drainage, etc., are munificently provided. For example, the great gallery for machinery is said to be lighted on each side by 260 windows, 520 in all; each of which is about 23 feet high, and 13 feet wide. The underground galleries beneath all parts of the structure, for the various kinds of service and communication, are over three miles in length; the length of drainage is five miles. Air is to be introduced and distributed by means of immense steam pumps.

But the cost of this work is, perhaps, the most impressive illustration of its vastness. The edifice, it is said, will cost $16,000,000, and the transformation of the grounds $6,400,000 more. It is built entirely of iron and glass, except the two inner structures, and the grand portal, which are of masonry. Six thousand workmen have wrought on the iron, two thousand five hundred masons on the foundations, fifteen thousand laborers on the grounds, and eleven hundred carters and teamsters, with twenty-eight hundred horses, have conveyed the materials brought in or removed; an army of nearly twenty-five thousand men. And with all this inconceivable force, perhaps the greatest marvel is that it has been so ably handled as to complete the work (so it promises to do) within one year from its commencement, and within eighteen months from the examination of the plans. Of all the trophies of human skill to be exhibited there, the French will be able to point to this dazzling creation with the highest pride.

MODERN MEDICINE.

Professor Paine, of Philadelphia, has recently issued from the press of the University Publishing Society, of that city, a new volume of 950 pages, devoted to the principles and practice of medicine and pathology—a comprehensive and valuable work, based upon observations and experience of twenty-five years' extensive practice. The work embraces modern investigations into the nature and cause of disease, and the improved methods of treatment by recently-discovered therapeutic agents, forming a text book for the student and the profession.

In his introduction, the author slashes into what he denominates the "Old School Practice," a system that condemns everything opposed to the prejudices and inherited opinions of its supporters and advocates. Some old doctors denounce all progress in medicine—they must find a warrant for everything in the doctor-books of olden time, and all new theories and methods of practice are scouted as imposture and quackery. This heathen system of medical priesthood, the author declares, is going out of the old temples consecrated to Æsculapius, together with bleeding, blistering, mercury, antimony, and other prominent therapeutic agencies, and bigotry gives way to new, living, theories, and practice. The author condemns blood-letting as a "murderous practice," which declaration calls to mind our friend, the late Dr. Turner, who, with his chrono-thermal system, years ago, led the opposition of regulars in this city against the practice of bleeding, but he died long before he had secured so able a champion of his cause as Prof. Paine. The author of this new treatise also thrusts his scalpel into the epidermis of Homeopathy, and criticises some of the notions put forth by Dr. Jahr, in his manual; for example, that "pulsatilla will cure despair of eternal happiness, with continued prayer and devout aspects." In other words, the *Materia Medica* is made to supply despairing souls with relief from spiritual depression, which the Scriptures and theologians declare can only be met and satisfied by the divine Spirit. Jahr was probably a German idealist, and had more faith in a thin dilution of pasque-flowers, than he had in the divine agency. We cannot look for impartial criticisms in the writing of any school of medicine. Prejudice governs the minds of learned doctors quite as much as it does the leaders of other professions, but mere slaps at the vagaries of Homeopathy do not make the system impotent in the treatment of disease. On the contrary it seems to have gained, step by step, a high rank, and thousands seem to be satisfied with it in preference to other systems. It boasts of its colleges, dispensaries hospitals, journals, practitioners, and clients, and occupies, in point of numbers, a position second only to the Allopathic school. Prof. Paine belongs evidently to the school of Eclectics, which, like old Potamon, professes to select whatever was good and true from all other systems.

We do not propose to judge between the claims of these rival systems, but we insist that when doctors come to deal with the afflicted bodies of man, and when death stands just outside the door, waiting to claim its victim, it will not do for them to argue with the suffering one the special merits or demerits of different systems of treatment. The patient is entitled to the best known remedy to cure his disease, and any physician that ignores it is unfit to enter the sick chamber.

Dr. John Brown, in his "Horæ Subsecivæ," mentions that some years ago a dyspeptic patient in a state of despair called upon his physician, who advised plain food, making a thorough change, and ended by writing a prescription for some tonic, saying, "Take that, and come back in a fortnight." Ten days afterward the patient returned quite well, blooming, and happy. The doctor was proud of his skill, and asked to see what he had given. The patient replied that he had taken it; "ate the prescription, sir, as you told me." The author adds, "I once told this little story to a Homeopathic friend, adding, 'Perhaps you think the iron in the ink may be credited with the cure?' 'Well,' said my much-believing friend, 'there is no saying; perhaps it may have contributed to the cure.'" A good illustration this of the importance of diet, and of the Homeopath's credulity in the matter of infinitesimal doses. A good illustration, too, of this important principle of therapeutics, that to discover and then to avoid the cause of a disease is a better and a more successful practice than to prescribe remedies for symptoms.

THE STEAM FERRIES OF NEW YORK.

The recent destruction of a New York and Brooklyn ferry boat by fire, at the very beginning of her short trip, with the demonstrated impossibility of escape for most of the passengers on a crowded boat, in such a case, has directed attention to the vast amount of ferry transportation, and to the insecure and reckless manner in which it is carried on. It seems to be taken for granted that a steamboat within a few rods of the shore, as these boats always are, may be got to land in every emergency, by a fair degree of coolness, skill, and courage, in the pilot and engineer. It would seem that this might have been done in the case of the *Idaho*, if the pilot and engineer had stood to their posts but a minute or two, after the danger was realized. But courage and presence of mind in these stations can be secured by no inspection laws. The case of the *Idaho* proves that no reliance can be placed on the proximity of the shore, when a burning or sinking boat may be instantly deserted to drift with the tide. Nothing remains but to insist on a life-preserver just over every passenger's head. How badly the numerous ferries of the metropolitan district are furnished, in this respect, one of our daily cotemporaries has been at the pains to show.

The ferries are no less than 25 in number, and the steamboats in daily use number 61; carrying an estimated average of 208,000 passengers per day, beside thousands of carriages and heavily-laden carts and trucks. The chief concern is the Union Ferry Company to Brooklyn, running four ferries and thirteen boats, and doing nearly as much business as all the others combined. It carries 95,000 passengers per day, and perhaps a dozen life-preservers to each boat, well out of reach. The boats are among the

best of their kind in existence, but the fearful jam of passengers every evening at dusk creates a constant peril, which nothing short of doubling their boats at those hours will remedy. This should be imperatively required. They carry nearly 7,000 per boat, or 25 per cent. more than any other line, and more than twice the average.

Next is the New York and Brooklyn Company, carrying 60,000 passengers, on 11 boats, to the eastern part of Brooklyn. This is the company that lost the *Idaho*. The complaints against its management are chronic, universal, and bitter. No life-preservers reported discoverable.

Seven minor ferries continue the communication of the city with the Long Island shore, eastwardly. These are: the Jackson street ferry to Brooklyn, 2 boats, and 2,000 passengers; Houston street ferry to Brooklyn, Eastern District, formerly Williamsburgh, 3 boats, and 3,000 passengers; Tenth street ferry to Greenpoint, 2 boats, and 2,000 passengers; Twenty-third street ferry to Greenpoint, 1 boat, and 1,000 passengers; James street and Ninety-fourth street lines to Hunter's Point, in connection with the Long Island Railroad, 4 boats, and 3,000 passengers; Sixty-first street ferry to Astoria, 1 boat, and 200 passengers; and the line to Flushing and Harlem, 2 boats, and 2,000 passengers. Of these, the Houston street line is highly spoken of; the boats are supplied with cork life-preservers, and life-ladders. The Flushing and Hunter's Point lines are well conducted.

The Staten Island ferry, west side, has 3 boats, and carries 5,000 passengers, just as it pleases, without life-preservers or common civilities. The north side ferry runs two boats, and 1,500 passengers, in a rather shabby way.

There are four ferries to the New Jersey shore. The chief of these is the New Jersey Ferry Company, with 6 boats, carrying 30,000 passengers per day, from the foot of Cortlandt and Desbrosses streets, to Jersey City. The life-preservers are not visible, but the passengers are kept off the boat by a strong gate, until there is a chance for them to get on safely, and a man is stationed to prevent people from jumping after the boat when it has left. Next is the Hoboken ferry, from Barclay and Christopher streets, 5 boats, and 20,000 passengers per day, well provided with life-boats and life-preservers, within easy reach of the passengers, and with the same arrangements for restraint and protection as the New Jersey Company. Of the New Jersey Central Railroad ferry the same praise is given. Their two boats are the largest in the harbor, and models in every way. The Weehawken ferry, from Forty-second street, runs one boat, and carries daily 1,000 passengers, and many cattle.

Southern Fair.

The first Louisiana Agricultural and Mechanical Fair, just held in New Orleans, is at once a feature and a force in the new era of the South. It has been a brilliant success, and is asserted to have already given a visible impulse to the new spirit of improvement and economy in plantation and domestic management. Mowers, reapers, improved cooking stoves, and other labor-saving and waste-saving implements, now come in for premiums instead of contempt. A remarkable fact developed by the awards at New Orleans, is that the best pianos in this country are made in St. Louis, and the second best in New Orleans. The New York and Boston makers competed in vain for the prize. Preparations are already begun for another fair next November, and to erect permanent buildings for the purpose. The *Picayune* mentions a man who came down the river 150 miles in a skiff, with a basket of vegetables to exhibit, and seemed fuller of enthusiasm for the success of the fair than many who had much more at stake. Over 30,000 people were present at the opening.

THE Selma (Ala.) *Messenger*, states that a comet of considerable brilliancy, was observed on the night of the 10th inst., in the northwest, at an elevation of about 30 degrees above the horizon.

THE great desert of Sahara is in process of transformation into a garden. Every day new oases are produced by the multiplication of artesian wells which supply vast quantities of water.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING NOV. 27, 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.

59,937.—BRIDLE.—George H. Albright and William R. Burns, Lancaster, Pa.

We claim the construction and combination of the gag reins, c c', face pieces, A, passing over the horse's head, one branch thereof connected to the bit by the cased spring, F, when the united branhes arise from the single bit, and unitedly connected with an ordinary line and bridle, in the manner and for the purpose specified.

59,938.—PAPER COLLARS AND CUFFS AND THE MANUFACTURE THEREOF.—David A. Alden, Roxbury, Mass.

First, I claim the method herein described of manufacturing flaring paper collars and cuffs, by forming paper directly from the pulp, so corrugated that it may be cut into collars or cuffs with the requisite flare, without subsequent molding, swedging, or stretching, substantially as described.

Second, I also claim, as a new article of manufacture, a flaring paper collar or cuff, in which the flare is produced by the form given to the paper in its manufacture from the pulp, substantially as described.

Third, I also claim, as a new article of manufacture, paper so formed and corrugated in its manufacture from the pulp that it may be cut into flaring collars or cuffs, substantially as described.

59,939.—FAUCET.—Charles E. Allan, Boston, Mass.

I claim an improved combination cock formed by the combination of the plug, B, with the body, A, of the cock, when the passage ways through said plug are formed and arranged substantially in the manner herein shown and described and for the purposes set forth.

59,940.—FORGING APPARATUS.—John Gay Newton Alleyne, Alfreton, England, assignor to Zoheth Sherman Durfee, Pittsburgh, Pa.

First, I claim the combination and arrangement of two or more direct-acting steam hammers, each connected with a separate steam cylinder so as to be susceptible of simultaneous, or alternating, or other relative action as may be desired, and so situate relatively to each other as that their strokes converge at a central point at which the iron to be worked is placed, substantially as hereinbefore described.

Second, The combination of two or more horizontal or nearly horizontal direct-action steam hammers, with or without a vertical steam hammer, arranged substantially as hereinbefore described, and connected by links attached to a counter weight for the purpose of producing uniformity of action of the horizontal hammers, and of compensating for the force of gravity of the vertical hammer, when used in connection therewith.

Third, The combination of two or more horizontal or nearly horizontal direct-action steam hammers, with one vertical or nearly vertical steam hammer, so arranged as to strike a mass of iron placed at the converging point of their stroke, when such horizontal steam hammers are both connected by links, or equivalent device, with the vertical hammer, so as to act alternately therewith and produce regularity and uniformity of action.

Fourth, The use of rollers or wheels, in combination with the hammer blocks of steam hammers, for the purpose of sustaining and guiding the hammer blocks in their motion in a horizontal or nearly horizontal direction, substantially as hereinbefore described.

59,941.—CHEESE VAT.—Albert G. Bagg, Holland Patent, N. Y.

First, I claim the combination of the pipes, m f J and K, with the vat, P, said pipe and vat being constructed, arranged, combined, and operating substantially as herein described.

Second, The combination of the above with the furnace, A, the heat chamber of said furnace being provided with tiles or bricks, 1 and 2, for the purpose of supporting the bottom of the vat, and for distributing the heat evenly through all parts of said heat chamber, as herein described and set forth.

Third, The "fire dog" or grate bar, e, provided with openings, i, when used in connection with a furnace, combined with a cheese vat, as herein described and for the purpose set forth.

59,942.—MANUFACTURE OF SHEET-METAL BOXES.—Alfred Barnes, Williamsburgh, N. Y.

I claim the struck-up flanged sides of the body, A, of the shape herein described for the purpose specified.

59,943.—METHOD OF TEMPERING CLOCK SPRINGS.—Wallace Barnes, Bristol, Conn.

I claim the mode or process in the manufacture of springs for clocks, substantially as described.

59,944.—APPARATUS FOR MAKING PAPER BOXES.—Richard P. Barton, New Haven, Conn.

First, I claim the formation of the recess, E.

Second, The arrangement of the knives, A A A A.

Third, The punches, C C C C, all in combination and constructed for the purposes herein specified.

59,945.—CUSHION AND MATTRESS.—Louis Bauhoefer, Philadelphia, Pa. Antedated Nov. 3, 1866.

I claim the mattress, A, in combination with the air bag, B, divided into two or more compartments, when the mattress is reduced in thickness in the center, as and for the purpose described.

59,946.—MEDICINE FOR HOG CHOLERA.—George H. Baugh, Oskaloosa, Iowa.

I claim the compound, substantially as above specified, as a medicine for the cure of hog cholera.

59,947.—STEAM GENERATOR.—F. Baumann, Chicago, Ill.

First, I claim generating steam by the injection of heated water through pipes, c, into a generator, H, in which is placed loose metallic substances, as described.

Second, The combination of a number of heated metallic vessels, H, with water injecting pipes, c, and outlet pipes, O, connecting with a common receiver, G, arranged to operate substantially as set forth.

Third, I claim the water jacket, I, arranged in combination with the generators, H, and receivers, G, as shown and described.

Fourth, The combination and arrangement of a receiving and distributing vessel, E, supplied with water from the water jacket, I, with a series of generating vessels, H, all located within the furnace, substantially as set forth.

Fifth, In combination with the heating and distributing vessel, E, generator, H, and receiving vessels, G, I claim the use of a receiving and equalizing chamber, F, arranged to operate substantially as herein described.

Sixth, I claim, in combination with a steam generating furnace, constructed substantially as described, the dampers, I and I', arranged to operate as set forth.

59,948.—EXPANDING MANDREL.—Israel Beetison, New Britain, Conn.

First, I claim the tapering mandrel, A, flattened on three or more sides, in combination with the segmental wedges, b, fitted on the flattened sides of the mandrel, substantially as and for the purpose described.

Second, I claim the wings, c, provided with screws, d, in combination with the segmental wedges, b, and mandrel, A, constructed and operating substantially as and for the purpose described.

59,949.—BURGLAR ALARM.—Charles A. Blake, Philadelphia, Pa.

I claim the block, A, primer, E, and forked lever, H, or lever, L, when combined and arranged together substantially as and for the purpose described.

59,950.—MACHINE FOR SHARPENING SAWS.—John Borthwick, Philadelphia, Pa.

First, I claim the solid emery ring or rim, of any suitable size, for the purpose of sharpening saws, combined with flange, K, and plate, P, and arranged substantially as herein described.

Second, I claim the combination of the hinged rest, g, constructed as described, with screws, y y, and bed plate, L, for the purpose as above described.

Third, I claim the combination of the emery ring with the rest, screws, and bed plate, as herein described and set forth.

59,951.—SAW.—Alfred Boynton, Wright Township, Mich., assignor to Eben M. Boynton, Grand Rapids, Mich.

I claim a saw, provided with the teeth, No. 1, and the cleaner teeth, No. 2, arranged and constructed to operate substantially as shown and described.

59,952.—STEAM GENERATOR.—William Branagan, Burlington, Iowa.

I claim the construction of a steam boiler of an elliptical outer shell, A, an elliptical inner shell, B, horizontal transverse communications, g, and a removable portion or portions, G, on the side or sides of the outer shell, all arranged substantially as described and for the purpose set forth.

59,953.—TRAPPING WILD FOWL.—Abel Brear, Saugatuck, Conn.

First, I claim the combination to form a game trap of supports and stretchers, constructed, arranged, and operating substantially as herein specified.

Second, I claim the combination with such trap of a net, D, one or more, substantially as and for the purpose specified.

59,954.—COMBINED COAL HOD AND SIFTER.—Benjamin F. Brown, Portland, Me.

I claim the combination with a hod of the form described, of the sifter, constructed and set forth as and for the purpose specified.

59,955.—SEPARATING GOLD AND SILVER FROM ORES.—Edmund Brown, Chicago, Ill. Antedated October 20, 1866.

First, I claim the application of compressed air for forcing the quartz down into the lead.

Second, I claim the tubes, D D, running down the outside of the kettle, allowing the quartz to become thoroughly heated and desulphurized, the whole combined and arranged for the purpose specified.

59,956.—CENTRIFUGAL MACHINE FOR DRAINING SUGAR.—J. R. Brown, Winchester, Ind.

First, I claim the revolving separator, H, when constructed in the form of the frustum of a cone inverted, and having its outwardly-inclined sides formed of wire gauze or woven wire, and a foraminated plate, substantially as and for the purpose set forth.

Second, I claim the combination of the distributer, F E, shaft, D, and separator, H, when respectively constructed and arranged substantially as and for the purpose set forth.

Third, I claim the combination and arrangement of the tub, B, partition, C, outwardly-flaring separator, H, and cover, S, arranged to act as a deflector, substantially as set forth.

59,957.—MACHINE FOR CUTTING AND RE-ENFORCING BUTTON-HOLES.—John T. Bruen and G. M. Jacobs, New York City, assignor to G. M. Jacobs.

First, We claim the suspended die plate, D, in combination with the punches, v w, and main die plate, B, constructed and operating substantially as and for the purpose described.

Second, We claim the feeding toes, a, in combination with the die plates, D B, and punches, v w, constructed and operating substantially as and for the purpose set forth.

Third, We claim the hinged dogs, i, arm, f, and pitman rods, g, in combination with the feeding toes, a, and die plates, B D, constructed and operating substantially as and for the purpose set forth.

Fourth, We claim the pusher bars, b', in combination with the die plates, B D, constructed and operating substantially as and for the purpose described.

Fifth, We claim the hinged dogs, e', and stops, g', in combination with the pusher bars, b', cross head, b, and die plates, B D, constructed and operating substantially as and for the purpose set forth.

Sixth, We claim the roller, c', and apron, d', in combination with the die plates, B D, constructed and operating substantially as and for the purpose described.

59,958.—TURNING AND PLANING TOOL.—Charles W. Burdic, Norwich, Conn.

I claim the combination of the holder, A, shoe, C, cutter, B, and set screw, D, when the said holder and shoe are constructed and arranged substantially as herein described and for the purposes set forth.

59,959.—ORNAMENTING PIANOFORTE COVERS, ETC.—J. F. Burgess, Brooklyn, N. Y.

First, I claim applying to india-rubber cloth, or such cloth, having a flocked surface, ornamental figures or designs, in the manner and for the purpose substantially as described.

Second, I claim a pianoforte or table cover composed of an india-rubber cloth or such cloth, with flocked surface, having ornamental figures or designs placed thereon, either in flock or bronze or both, substantially as described.

59,960.—ROCK-DRILLING MACHINE.—Charles Burleigh, Fitchburg, Mass.

I claim the annular projection, M, upon the piston bar, E, or an attachment thereto, for the purpose of operating the valve and feeding device or either of them, substantially as set forth.

Second, The stationary rotating device when operated by the movement of the piston bar, substantially as shown and described.

Third, The hollow valve, K, with its chest, L, arranged to operate in line with the axis of the cylinder, substantially as described.

Fourth, The clamp, C, consisting of the box, c, and pieces, A' and B', constructed and operating substantially as described, in combination with the slide or drill frame, B.

59,961.—SPRING WAGON.—Joseph N. Byington, Stockton, Minn.

I claim, First, Hinging the springs, F, to the bottom, D, of the wagon, and connecting them to the side of the bolsters, A and B, in such a manner that when not in use they may be turned up out of the way, substantially as herein described and for the purpose set forth.

Second, The combination and arrangement of the springs, F, cross bars, G, links, I, bolts, J, and catches, H, with each other, and with the bottom, D, and bolsters, A and B, of the wagon, substantially as herein described and for the purpose set forth.

59,962.—STOP MOTION FOR LOOMS.—Alexander Carmichel and William Barrey (assignors to themselves, Cottrell and Babcock), Westerly, R. I.

We claim, First, The combination with a loom of a be t-shifting motion and positive stop arranged for joint operation, substantially as and for the purpose herein specified.

Second, Arranging a positive stop in such combination that it shall act against the lay of the loom, substantially as and for the purpose herein specified.

Third, The within-described arrangement of such positive stop in combination as specified, in sight and within convenient reach

of the operator, and providing it with a handle, K3, or its equivalent, so that it may be more easily placed by hand in such a position as to allow the loom to be operated freely by hand, all substantially as and for the purpose specified.

59,963.—Feed Motion for Drills.—G. F. Case, New York City.

I claim the sleeve, B, which carries the worm, f, and cam wheel, g, in combination with the feed screw, A, nut, D, and worm wheel, h, all constructed and operating substantially as and for the purpose described.

59,964.—Ash Sifter.—Paul Ceredo (assignor to himself and James H. Springle), Montreal, C. E.

I claim the arrangement of the screen box, B, cam, E, spring, G, spouts, I J, constructed and operating in the manner and for the purpose herein specified.

59,965.—Reins for Horses.—George T. Chapman, New York City.

I claim the combination of the elastic reins, above described, with the auxiliary reins and with the curb gag and check reins, as constructed and arranged for the purpose described and set forth.

59,966.—Planing Machine.—Henry Climer and John D. Riley, Cincinnati, Ohio.

We claim the two beds, C C', to receive the material to be planed, operating substantially in the manner and for the purpose set forth.

59,967.—Tree Protector.—Francis Clymer, Galion, Ohio.

I claim the cap, A, stake, E, slats, C, and braces, D, in combination with the thatch, K, as and for the purpose set forth.

59,968.—Portable Fire Grate and Andiron.—John H. Coate, West Milton, Ohio.

First, I claim the combination of the back plate, L, the side bars, A and B, foot, E, cross bars, F H G C, and part, d2, of the bar, D, with each other, substantially as described and for the purpose set forth.

Second, The combination of the side grates, J and K, cross bars, I, and bar, D, with the back plate, L, side bars, A and B, foot, E, and cross bars, F H G C, substantially as described and for the purpose set forth.

59,969.—Capstan and Windlass.—D. N. B. Coffin, Jr. (assignor to himself and J. D. Spaulding), Boston, Mass.

I claim, First, The employment of the shaft, b, extended from the capstan, in combination with the shafts, d or e, with suitable gears as, u f s and t, substantially as described.

Second, Locking the fulcrum gear of a capstan to the bed plate by means of bolts movable upward from beneath into contact therewith, substantially as described.

Third, The employment of a series of inclines movable in a circle and so applied in combination with the fulcrum gear of a capstan as to lift said gear from its position of inaction to the proper position to be acted on by gears playing into it, substantially as described.

Fourth, Fastening the cover of a capstan by means of lugs, v, in combination with sockets or grooves in the hub, substantially as described.

Fifth, The arrangement of the cover fastenings in relation to the locking mechanism of the capstan, so that when the cover is rotated to a stop in one direction the bolts will be adjusted for the simple power and the cover fastened, and when rotated in the opposite direction to a stop the cover will also be fastened and the bolts adjusted for the multiplied power, while in an intermediate position the cover is unfastened and may be removed, substantially as described.

Sixth, Suspending the fulcrum gear to the rotating body of the capstan.

Seventh, The arrangement of the gears, A Z, pawl wheel, F, barrel, I, friction, L, and chain wheel, P, and the points of disconnecting, whereby both barrel, I, and chain wheel, P, are brought under control of the friction mechanism and yet used separately for winding, heaving in, etc., substantially as described.

Eighth, The windlass shaft, N, in combination with the friction band and barrel of a windlass, substantially as described.

Ninth, The partly-circular heads and sockets in combination with the pawls of the windlass, substantially as described.

Tenth, I claim finally a groove formed under the projecting part of a capstan base, substantially as and for the purpose set forth.

59,970.—Attaching Shafts to Sleighs and Carriages.—George Coffin, Boston, Mass.

I claim the combination of the wedge-shaped keys, C, and rods, D, with the parts, A and B, of the shafts when said parts are constructed with tenons and sockets, substantially in the manner herein described and for the purpose set forth.

59,971.—Heat-radiating Attachment to Stovepipes.—Nathaniel E. Cornwall, New York City.

I claim, First, The convexo-concave or crescent-shaped pipe, c, arranged and combined with the chambers, b and e, and the pipes, d d d d, in the manner and for the purposes set forth.

Second, In connection with the pipe, c, the close chamber, j, constructed substantially as described and for the purposes shown.

Third, The chambers, b and e, connected by pipes, d d d d, etc., together with the close chamber, j, constructed and arranged to operate in connection with a stovepipe, in the manner described.

59,972.—Harness Motion for Looms.—George Crompton, Worcester, Mass.

I claim the provision for simultaneous and equal adjutment of all the sheaves of either set, by mounting them in a swinging frame which is controlled and moved by an adjusting screw or other equivalent device, substantially as set forth.

Also, the construction and arrangement as shown and described of the parts by which the heddles are operated to produce the shed.

59,973.—Spinning Machine.—Joseph Crowfoot, Worcester, Mass., assignor to himself, Johathan Gill, Fitchburg, Thomas Gill, Springfield, and Wm. Gill, Cambridge, Mass.

I claim the machine, substantially as described, by which the sliver not only can be drawn and twisted but have the twist varied, by means as set forth, or their equivalent.

59,974.—Table-leaf Support.—Alpheus Cutler, Pittston, Penn.

I claim an adjustable extension leg, or table-leaf supporter, constructed as described and operating as set forth.

59,975.—Method of Preparing Coloring Matter for Butter.—Daniel W. Dake, Brooklyn, N. Y.

I claim, First, The method or process herein described of preparing a coloring matter for butter, consisting of pure oil of butter and the coloring matter of anotta, combined as herein described.

Second, I claim as a new composition of matter for coloring butter, pure oil of butter and the coloring matter of anotta, prepared and combined substantially as described.

59,976.—Oil Cup.—Charles F. Davis, New Market, N. H., assignor to J. L. Norris and G. R. Neal, South New Market.

I claim the combination and arrangement of the said insulator with the oil feeder, A, the valve, C, and the valve-operating apparatus, substantially as described.

59,977.—Broom Clamp.—Justus Day, Murray, N. Y.

I claim the levers, A and B, in combination with the connecting links or straps, C C, the slots, D D, the chamfered semicircular notches, E E and F F, the wide notches, K K, the clasp, H, and the rods, G G, operating for the purpose and in the manner specified.

59,978.—Manufacture of Superphosphate of Lime.—A. de Figaniere, Philadelphia, Pa.

I claim, First, Making superphosphate of lime by bringing the powdered guano or other suitable fertilizing material in contact with a surface covered or dampened with sulphuric acid, substantially as herein described.

Second, An apparatus for incorporating sulphuric acid with powdered guano, or other suitable fertilizer, formed by the combination of the acid tank, A, the cylinder, C, the hopper, E, and the scraper, F, with each other, substantially as herein shown and described.

59,979.—Surface for Washing Machine.—George M. Denison, New London, Conn.

I claim the construction of a ribbed or corrugated washing surface of sheet india-rubber folded over the edges of and clamped between strips, t, substantially in the manner herein set forth.

59,980.—Animal Trap.—S F. Dimock, Spencer, Ohio.

I claim the box, A, door, I, link, J, and tin door, K, as arranged in combination with the pedal, E, in the manner and for the purpose as substantially set forth.

59,981.—Attaching Locks to Safes, Vaults, etc.—Thomas Dolan, Albany, N. Y.

I claim a locking mechanism for safes, vaults, etc., consisting of a lock, A, and notched sliding bar, C, applied to the door frame and dogs or catches, D, applied to the door, all constructed, arranged, and operating substantially as and for the purpose herein set forth.

59,982.—Pipe Coupling.—Edward Duffee (assignor to himself and George Appleton), Haverhill, Mass.

I claim the new or improved pipe joint, consisting of the opening, d, and the auxiliary flange, a, the main flange, f, and the socket head, c, arranged an applied to the pipes, A and B, as set forth.

59,983.—Sewing-machine Gage for Tucking, Felling, Binding, etc.—Mary A. Duffy, New York City.

I claim, First, The several devices of plate holder, B, tucking plate, A, folding plate, E, and tucking gage, D, or their equivalents, in combination with the presser foot of a sewing machine for the purpose of folding and marking or creasing a tuck, substantially as explained.

Second, The combination of plate holder, B, tucking plate, A, felling plate, F, and felling guide, G, or their equivalents, constructed and operating together substantially as and for the various purposes described.

Third, The combination of plate holder, B, with felling plate, F, constructed substantially as and for the purposes described.

59,984.—Tool for Setting Temple Teeth.—Warren W. Dutcher, Milford, Mass.

I claim the rotary temple tooth setting tool made substantially in the manner and so as to operate as and for the purpose hereinbefore specified.

59,985.—Butter Worker.—Reuben R. Eastman, Granby, Mass.

I claim, First, In a butter press, the combination of the roller, C, and plate, G, with teeth to mesh, substantially as and for the purpose set forth.

Second, The trough, A, in combination with the roller, C, and plate, G, substantially as described.

59,986.—Composition for Destroying Insects on Trees and Plants.—Joseph A. Elias, Le Roy, Ohio.

I claim the compositions, Nos. 1 and 2, herein described, consisting of the several ingredients in or about the proportions stated, and applied in the manner as herein specified, and for the purposes set forth.

59,987.—Loom.—Henry A. Ellis (assignor to himself and Pequot Machine Company), Mystic River, Conn.

I claim the construction of the lever, C, with a slot, d, pin, b, and screw hooks, r r, substantially as and for the purposes set forth.

Second, The combination of the slots, d, in levers, C, with the slots, 1, in the outer rims of the cams, E, substantially as described.

59,988.—Lozenge.—Frederick Ernst, New York City.

I claim the deodorzing lozenges as a new article of manufacture, consisting of the ingredients described, for the purpose set forth.

59,989.—Grain Dryer.—John R. Evertson, Mount Vernon, Ind.

First, I claim the oscillating slide or pan, B, constructed as described in combination with the furnace, A, and with the frame, G, substantially as and for the purpose set forth.

Second, The combination of the cover, F, and hopper, D, constructed as herein described with the slide or pan, B, substantially as and for the purpose set forth.

Third, The combination and arrangement of the discharging spout, E, with the slide or pan, B, substantially as described and for the purpose set forth.

59,990.—Post Driver.—D. D. Foley, Washington, D. C.

I claim the fence-post driver composed of a cap, A, and sides, B, substantially as and for the purpose set forth.

59,991.—Apparatus for Carbureting Air.—Theodore F. Frank, Buffalo, N. Y.

I claim the combination of the two air-supplying rerervoirs, operating alternately and provided with valves, b and f, and pipes, e, with the series of carbureting vessels, D D1 D2, or equivalent, substantially as and for the purpose set forth.

I also claim arranging the series of carbureting vessels, D D1 D2, on different planes and connecting them by suitable pipes and stop cocks, y z, substantially in the manner and for the purpose specified.

I also claim, in combination with the carbureting vessel, D, the perforated air-discharge pipe, n, provided with stem, v, stuffing, w, and flexible pipe, t, for adjusting the former, substantially as and for the purpose set forth.

I also claim the combination of the air-supplying apparatus and the carbureting apparatus, both constructed as described, with the regulator, E, the whole arranged and operating as described.

59,992.—Curry Comb.—Francis N. Frost, New Britain, Conn. Antedated Nov. 15, 1866.

I claim, in curry combs made of thin plate steel as described, the shank, c, of malleable cast iron and made in the form shown, so as to bear with equal force laterally across the entire breadth of the comb, substantially as described.

59,993.—Cooler for Preserving Butter, Milk and other Articles.—William Garrand, Fallston, Pa. Antedated Nov. 23, 1866.

I claim a cooler made of any kind of unglazed pottery ware of any size or shape, and so constructed that the articles to be kept cool are in a vessel entirely surrounded by water, and therefor air tight and made to combine all the advantages of a more perfect evaporation for the purposes intended as is herein substantially described and set forth.

59,994.—Sawing Machine.—P. A. Gerry, Dover, Me.

First, I claim clamping the wood by means of the lever, R, operating with the arm, O, roller, N, arms, T, and swinging arm, U, arranged and operating as herein represented and described.

Second, Raising and lowering the saw by means of the lever, R, arm, O, roller, N, arm, V, spring, W, and slide box, X, with its guide arm, Y, substantially in the manner and for the purpose represented and described.

59,995.—Spectacles.—Samuel Gregg, Boston, Mass.

I claim constructing glasses of spectacles where two distinct lenses or segments of lenses are contained in one glass adapted for seeing near and distant objects, in such manner that the upper edge of the convex lens adapted for seeing near objects, shall be concentric with the upper edge of the lens adapted for seeing distant objects for the purpose of enlarging the field of vision for the latter lens.

59,996.—Bridle.—Michael Haberbush and Edward Kreckel, Lancaster, Pa.

First, We claim the construction and combination of a tubulated snap hook, C, gum within a sheath, D, formed by the end of a continuous strap, both united and held by a socked head and ring, E, jointly passed through the rings of the bit so that the inclosed gum with its snap will hook into the said ring of the bit in the manner and for the purpose specified.

We also claim the face pieces, G G, attached to the rings of the bit and severally passed upward through their respective loops, H I, and forming the throat latch, K, with its hitching ring, L, all combined and arranged in the manner specified for the purpose set forth.

59,997.—Sewing Machine.—Thomas Hall, Bergen, N. J., assignor to Geo. B. Buell, New York City. Antedated Nov. 22, 1866.

I claim cutting away a portion of the cloth table of a sewing machine or depressing a furrow therein to admit of sewing buckles or other articles upon garments or fabrics, substantially as described.

59,998.—Appratus for Drying Lumber.—James W. Hanna, Wabash, Ind., assignor to himself and James H. Osgood, Jr.

First, I claim the combined process of steaming and drying lumber, substantially as herein described and for the purpose set forth.

Second, The combination and arrangement with the kiln of the pipe or pipes, C, for admitting the exhaust steam, the pipe or pipes, E, for admitting the blast of air, and the pipe, F, for introducing the live steam, substantially as herein described and for the purpose set forth

59,999.—Pessaries.—E. B. Harding, M. D., Northampton, Mass.

First, I claim a pessary constructed with loops, g h, arranged substantially as and for the purpose set forth.

Second, In combination with a pessary so constructed the levers, A B, arranged and operating substantially as set forth.

Third, The instrument shown in fig. 6, when constructed and operated in the manner and for the purpose substantially as set forth.

60,000.—Eyeleting Machine.—Philander Harlow, Hudson, Mass.

First, I claim the combination with the setting die of an eyeleting machine of an eyelet-receiving rod and surrounding sheath or die plate, and mechanism for actuating the same under the arrangement and for operation as herein described, so that the said receiver rod shall constitute the means whereby the eyelet is adjusted to the punched leather and the leather fed forward to the setting die, substantially as set forth.

Second, In an eyeleting machine, I claim the combination with the eyelet receiver rod, and surrounding sheath or die plate, as described, of the setting die and punch forming the eyelet holes under such an arrangement that by the action of said punch, receiver rod, sheath and setting die, the leather or other material operated on shall be alternately punched, fed forward to the setting die and stamped with eyelets, substantially as herein shown and described.

Third, In an eyeleting machine as described, I claim the combination with the punch for forming eyelet holes, of a reciprocating or sliding plate for sustaining the leather under the action of said punch, arranged and operating substantially in the manner and for the purposes set forth.

Fourth, I claim the adjustable presser foot and its actuating mechanism as herein described for producing an intermittent pressure upon the leather or other material operated on by the punch and eyelet-setting die, substantially as and for the purpose set forth.

Fifth, I claim the mechanism for feeding the eyelets as herein described, the same consisting of a hopper and vibratory arm provided with one or more chutes for conducting and holding the eyelets and a wheel or disk in the periphery of which recesses are formed for the reception of the said eyelets, the whole being combined and operating substantially in the manner shown and specified.

Sixth, I claim the combination of the above-described eyelet-feeding mechanism with the eyelet-receiver rod and surrounding sheath, under such an arrangement that by the motion of said vibrating arm the eyelets held in the recessed wheel may be fed to the said receiver rod, substantially as herein shown and described.

Seventh, I claim the combination in an eyeleting machine of mechanism for punching, feeding and holding the material operated on, and for feeding and setting the eyelets to the same, under the arrangement and for operation substantially as herein shown and set forth.

60,001.—Method of Exhibiting the Gas of Mineral Springs.—J. P. Haskins, Saratoga Springs, N. Y.

I claim the method herein described of exhibiting the gas contained in mineral waters while they are ascending through the same and before reaching the surface.

60,002.—Manufacture of Wrought Iron and Steel Direct from the Ore.—William Henderson, Glasgow, Scotland.

First, I claim the several improved processes hereinbefore described for manufacturing wrought iron and steel direct from the ores of iron.

Second, The formation of the bottom of the furnace to be used in the working of the above-described processes with the materials and in the manner hereinbefore described.

60,003.—Coal Scuttle.—Charles F. Henis, Cincinnati, Ohio.

I claim the coal hod constructed with its body, D, fitted upon the shoulder, C, of the corrugated base, B, as and for the purpose set forth

60,004.—Comb.—Joseph H. Hicks (assignor to himself and George H. Chinnock), Brooklyn, N. Y., assignors to Ignatius Rice, New York City.

I claim a comb having the strip of metal, e, and rivets, t, in combination with each other with the longitudinal groove in the back of the comb, substantially as herein set forth, for the purpose specified.

60,005.—Cut-off for Cistern Leaders.—W. M. Hicks and F. Welker, St. Louis, Mo.

We claim the arrangements herein described for a cut-off for cistern leaders, consisting of a chamber, A, and a revolving and adjustable door, B, set in the side thereof, said door being hinged in the middle and when turned down itself serving as a spout, for the purpose and in the manner as described.

60,006.—Tanning.—Alexander Hill, Dubuque, Iowa.

I claim the within mode of treating hides, substantially as specified.

60,007.—Process for Ornamenting Marble.—Asa Hill, Norwich, Conn. Antedated Nov. 14, 1866.

I claim the process of producing figures upon and in marble or other calcareous stones, substantially as herein described.

60,008.—Machine for Cutting and Raking Corn Stalks.—Thomas M. Hill, and S. D. Tuttle, Eaton, Ohio.

First, We claim the plows and cutters, M M, applied to standards, L, which are secured on the axle, A, of the machine and connected to the sliding thills, E, by chains and rods, I, and connected by chains, m, to the frame, G, all arranged to operate substantially in the manner as and for the purpose herein set forth.

Second, The rake, J, attached to the levers, H H, and connected to the frame, G, by springs, f f, in combination with the plows and cutters, M M, all arranged substantially as and for the purpose specified.

60,009.—Crumb Remover.—Amelia B. Hoffman, Roxbury, Mass.

I claim the combination of a fan or receiver, A, with a blade or scraper, B, in the manner and for the purpose described.

60,010.—Machine for Making Hoop Skirts.—E. R. Hopkins, New York City.

First, I claim a machine in and by which a series of springs such as are used in the manufacture of hoop skirts by properly feeding them to the machine, can be respectively, but simultaneously, cut to their proper lengths for encircling the frame or other suitable form used for the building or making the skirt upon, substantially as herein described.

Second Whether combined with the above or not, a marker so arranged and operated as to mark the series of springs whether more or less in number, used for a hoop skirt at such points of their respective lengths as correspond to the points of intersection therewith of the various tapes to be used for connecting and binding the series of springs together, substantially as herein described.

Third, The conical or other equivalent shaped feed rollers or drums, B B, so hung and connected together as to revolve with their surfaces in contact or nearly so with each other and in conjunction, in combination with any suitable knife or cutter blade, when arranged and combined together, substantially in the manner described, and for the purpose specified.

Fourth, In combination with the above, either with or without the knife or cutter blade, of a marker of any suitable form arranged so as to operate substantially in the manner and for the purpose described.

Fifth, The combination with the rollers or drums, B, of the guides, H and I, for the springs passing between the said rollers arranged together, substantially as and for the purpose specified.

Sixth, The raising and lowering the marker, R, used by means of a cam, A2, so constructed or formed as to operate upon the marker, substantially as described for the purpose set forth.

Seventh, So arranging and connecting the marker used with the driving power or shaft of the machine at the proper times that it will be moved against the springs for the purpose of marking them, and then draw back from the same, substantially as and for the purpose described.

Eighth, The combination with the feed rollers or drums, B B, of any suitable form or frame, such as are now used in the manufacture of hoop skirts or any equivalent for the same, whether a knife or marker or both together are used, when said frame is arranged with regard to the rollers substantially as described and for the purpose specified.

Ninth, A machine in which a series of springs such as are used for the manufacture of hoop skirts can be cut to their respective and proper length according to the portion of the skirt they are to encircle, and marker at such points of their length as are to be intersected by the tapes used for binding and connecting the springs together, and also delivered to and wound about and around any suitable form or frame on which the skirt is to be built or made, when the whole is combined together and arranged so as to operate substantially in the manner described.

Tenth, Providing a frame or form suitable for the manufacture of hoop skirts upon it with a series of spring arms, V2, or their equivalents, having studs projecting from them, when such arms with the studs are so arranged as to prevent the hoop skirt when wound upon the form from slipping thereon while at the same time they can be moved or swung away so as to offer no obstruction to the withdrawal of the skirt from the said form after completion, or whenever so desired, substantially as described.

60,011.—Bung.—H. Hufendick and E. Spangenberg, St. Louis, Mo.

First, We claim the application of a valve or valves and capillary passages or any equivalent devices to permit the passage of air into a barrel, but prevent the passages of liquor out of the barrel through the bung, substantially as set forth.

Second, The combination of the top plate, B, its projections, b1, and recesses, b2, and bottom parts, C and D, and rubber or leather packing, d2, respectively with the upper part of the socket, A, its recesses, a1, and projections, a2, shelving, a3, stops, a3, and the lower part of said socket, "a", or their equivalents, as and for the purposes set forth.

Third, The application of the screw, c, and nut, b3, or their equivalents, when operating on the parts described in our second claim, as and for the purposes set forth.

Fourth, The combination of the ridge, b4, on B, and the packing C' on C, operated in connection with the pin, c, in the groove, b4, and the screw, c, and nut, b3, to either permit or prevent the passage of air, etc., between the plates, A and C, as set forth.

Fifth, The combination of the plate, C, and holes, c4, valves, c5, nut, d1, plate, D, and rubber or other packing, d2, as and for the purpose set forth.

Sixth, The application of the packing, d2, to produce with the grooves, d4 and d5, on D, capillary passages which permit the passage of air, but prevent the passage of fluid, as set forth.

Seventh, The application of a key to the parts of our said bung, when operating as and for the purpose set forth.

60,012.—Car Coupling.—John H. Kavanagh, Joliet, Ill.

First, I claim the shaft, F, provided with the wing, G, and trip lever, E, connected to the bumper of a car, substantially as herein shown and described and for the purposes set forth.

Second, I claim the lever, H, in combination with the coupling pin, C, substantially as shown and described and for the purposes set forth.

Third, I claim the tube or guide, B, in combination with coupling pin, C, and shaft, F, and trip lever, E, substantially as shown and described.

60,013.—Boiler Flue Brushes.—Robert King, Brooklyn, N. Y., assignor to T. Prossr & Son N. Y. City.

I claim a helical wire brush in which the wires are arranged to protrude unequally from opposite sides of the core or stock, substantially as shown and described.

60,014.—Cement Pipe.—Henry Knight, Brooklyn, N. Y.

I claim the combination of a mold, composed of a shell and core, for making a cement article with a pipe by which a heated fluid may be introduced into the hollow portion of such mold for the purpose of heating it, substantially as set forth.

60,015.—Sheep Shed.—J. Knupp and H. S. Elliot, New Prospect, Ohio.

We claim the construction and arrangement of a shed, B, in combination with the trough, a, doors, L, rail, N, runners, F, for the purpose and in the manner as set forth.

60,016.—Carriage.—Louis Kutcher, New York City.

I claim attaching the box, F, to the lower part, a, of the fifth wheel, instead of to its upper part, as usual, substantially as and for the purpose set forth.

60,017.—Clasp Lock for Books, etc.—Leopold Lall, New York City.

I claim a clasp for books, portfolios, albums, etc., having a lock applied to it and inserted in the binding, substantially as shown and described.

60,018.—Washing Machine.—Jonas Lamphear, Panama, N. Y.

I claim the vibrating frame, H, provided with one or more rollers, to operate in combination with the rollers, B C, substantially as and for the purposes set forth.

60,019.—Hand Seed Planter.—A. T. Large, Tomah, Wis. Antedated Nov. 17, 1866.

I claim the tubes, B, provided with the valves, C C', arranged with the levers, D G, and spring, H, and applied to the handle of a hoe to operate in the manner substantially as and for the purpose herein set forth.

60,020.—Fence.—Cornelius G. Lazear, Norwalk, Ohio.

First, I claim the pannels, A, and posts, D, when respectively constructed as described, and used in combination with the intermediate posts, C, and hooks, C', for securing the panels in position, substantially as set forth.

Second, The pannels, A, in combination with the posts, C, and hooks, C', and with the corner posts, B, with cleats, B', all of said parts being respectively constructed, and the whole arranged for use, substantially as set forth.

60,021.—Sewing Machine Shuttle.—Geo. H. Lenher, Richmond, Va.

First, I claim, in rotating shuttles for sewing machines, winding and unwinding the shuttle thread so as to prevent it from being twisted and untwisted during the revolutions of the shuttle, by arranging the bobbin eccentrically to the center of motion of the shuttle, substantially as shown.

Second, The arrangement of the spring, I, collar, h, bobbin, F, screw, G, shuttle, C, and plate, E, constructed and operating in the manner and for the purpose herein specified.

60,022.—Die for Forming the Eyes of Pick Axes.—H. L. Lowman, New York City.

I claim the combination of a die, A, and punch, B, constructed substantially as described, for simultaneously punching and giving proper form, both externally and internally, to the elongated eye of a pick axe, or other tool, with similar elongated eye, the whole operating substantially as set forth.

60,023.—Mode of Hanging Windows and Doors.—G. H. Lupton, Cleveland, Ohio.

First, I claim the link, E, and counterbalance, G, in combination with the rods, D, pins, and window or door, as and for the purpose set forth.

Second, The weather strip, H, groove, c, and sill, M, arranged as set forth, in combination with apparatus for raising the window or door, substantially as set forth.

60,024.—Boots and Shoes.—John C. Mack, Philadelphia, Pa.

First, I claim a boot or shoe having a slit or opening in the center of the upper, in combination with an elastic fabric, extending across said opening, all substantially as and for the purpose described.

Second, In combination with the foregoing, I claim the elastic bands, c, and buttons, d, or their equivalents, the whole being constructed and arranged substantially as and for the purpose specified.

60,025.—Ditching Machine.—J. H. Marshall, Lockport, N. Y., and O. E. Mann, Somerset, N. Y.

First, We claim the triangular lever frame consisting of the parts, K g h, hinged to the frame, A, and connecting with the axis of the wheels, B B, caster wheel, C, scoop, E, in combination with the toothed segment, I, pinion, l, and spring pawl, k, for supporting, raising, and lowering the frame, A, arranged and operating in the manner specified.

Second, We also claim the arrangement of the gearing, d e f, the latter provided with pawl, n, with the axis, b, ratchet wheel, m, and belt, G, operated by driving wheels, B B, for communicating motion to the endless belt, F, substantially in the manner set forth.

60,026.—Hook and Eye.—James B. Martindale, New Castle, Ind.

I claim a hook, formed as described, and an eye having loops, e e, and a tongue, d, when respectively constructed and arranged to operate, when combined substantially as and for the purpose set forth.

60,027.—Process of Curing Hops.—C. C. Masson, Brookfield, N. Y., assignor to himself and Levi Mason, Clayville, N. Y.

I claim the improvement in the process of curing hops, in the manner and by the means substantially as described.

60,028.—Apparatus for Obtaining the Measures for Ladies' Dresses.—Curran E. McDonald, Indianapolis, Ind.

I claim the within-described instrument when the same is constructed as aforesaid, in its said several parts, and operated for the purpose and in the manner substantially as set forth.

60,029.—Brick Kiln.—John McDonald, Saratoga Springs, N. Y.

First, I claim the groove or way, G, in the tunnel, A, and the cars, K K, in combination with their running gear, all arranged to operate substantially as and for the purpose specified.

Second, The combination with the cars, K K, and the supplemental cars, m m, tracks, a H I and J, arranged as herein described, and employed to permit the cars to be moved circuitously, in the manner and for the purpose specified.

60,030.—Broom Head.—James C. McLelland and James Graham, Pittsburgh, Pa.

First, We claim forming the lower side edges of the cap, A, double, substantially as herein shown and described, and for the purpose set forth.

Second, The combination of the ring, H, with the cap, A, handle, B, and bolt, C, substantially as herein shown and described, and for the purpose set forth.

60,031.—Hame Tug and Breast Collar.—A. McMullen, Sterling, Ill.

First, I claim the breast strap, A, made in two parts, a1 and a2, connected by a snap hook and eye, when said parts are constructed in the form and manner substantially as herein shown and described, and for the purpose set forth.

Second, The breast collar, A, in combination with the plates, D and J and the tug clips, H, substantially as described and for the purposes set forth.

Third, Pivoting the neck strap tugs, K, to the parts a1 and a2, of the collar, A, so that the position of the neck strap on the neck can be changed, when desired, substantially as described and for the purpose set forth.

60,032.—Foot Stove.—Melcher Mellinger, Dayton, Ohio.

First, I claim the disk, H, and annular plate, F, provided with the flange, a, and mouth b, in combination with the air tubes, c, and annular flue, E, constructed, applied, and operating conjointly in the manner and for the purpose specified.

Second, The detachable bottom, A, with its fastening, B, constructed and arranged in combination with the cylindrical body of the stove so as to form an annular air passage for the lamp, substantially as and for the purposes described.

60,033.—Breeching Hook.—George W. Miller, Springfield, Mass.

I claim a breeching hook for the shafts of vehicles, having the spring, C, constructed substantially in the manner and for the purpose described.

60,034.—Knapsack.—J. K. Mizner, Detroit, Mich.

First, I claim the straps, D F and H, riveted together and arranged and combined with each other, and with a knapsack, substantially as set forth, for the purpose of affording a reliable support for the weight of a knapsack and its contents.

Second, The manner, as described, of slinging a knapsack by means of straps passing over the shoulders, under the arms, and across the back to meet and connect together, substantially as set forth.

60,035.—Churn.—Lawrence Mooney, Alleghany City, Pa.

I claim arranging the breakers, e, with relation to the shaft, d, so that they will throw two counter currents of the milk or cream, the reaction of which will cause the milk or cream to flow spirally down and around the shaft, d, and thereby gather the butter as it is formed into two balls or rolls, the whole being constructed, arranged, and operating substantially as herein described and for the purpose set forth.

60,036.—Nozzle for Hose Pipes.—Robert F. Moore, Manchester, N. H.

I claim, in combination with a hose pipe, or nozzle, a perforated movable cup, made in two parts, and arranged to traverse on the end of a hose pipe or nozzle, substantially as described, to enable the operator to convert a single stream into a shower or sprinkle, and reconvert it to a single stream without stopping the flow of water from the nozzle.

60,037.—Roofing Cement.—Solomon B. Moore, Lockport, N. Y.

I claim the combination, and using the materials, as herein specified.

60,038.—Broom Head.—Thomas Moore (assignor to Jackson Hukill), Bloomington, Ill.

I claim the combination of the part, A, with its ears, a2, hooks, D, wires, E, wire F, crescent nut, G, screw, H, socket, A', and handle, C, and keys, I, in the manner as and for the purpose specified.

60,039.—Medicated Troches.—Caleb H. Needles, Philadelphia, Pa.

I claim the compound camphor troches, prepared substantially as herein set forth and described.

60,040.—Machine for Dressing Fellies of Wagon Wheels.—Andrew P. Odholm, Bridgeport, Conn.

First, I claim the slide, D, with adjustable arbor, E, attached, the rotary cutter, D, and the adjustable plate, F, provided with the guide arms, l, arranged so as to rotate as shown, or in any other equivalent way, to admit of being removed or adjusted out of the way of the spokes, by the action of the spokes themselves, in the turning of the wheel, substantially as and for the purpose set forth.

Second, The swinging pendant, K, suspended from the adjustable slide, L, having an arm, I, attached, in connection with the plate, O, on slide, F, and cutter, D, all arranged to operate, substantially in the manner as and for the purpose specified.

60,041.—Composition for Making Soap.—Nelson Orcutt, Binghamton, N. Y.

I claim making soap from untried or unrendered tallow or grease, and the other ingredients named, the ingredients being in the proportions stated.

60,042.—Surface Condenser.—Frederick Ortleib, Williamsburgh, N. Y.

First, I claim, in hydro-atmospheric condensers, the use of air and water combined, when the same is introduced to the body of the condenser in the form of spray or mist, injected directly downward, in contradistinction to an upward injection, through the condensing tubes, which form said body, substantially as specified.

Second, The combination of the condensing tubes, t, air-discharge pipe, O, and receiving chamber, F, with its delivery pipe, X, said pipes, O and X, being arranged so as to effectually separate the air and water after the same have been injected or passed through the tubes, essentially as herein set forth.

Third, The combination of the upper chamber, H, blast nozzle, or tweers, T, perforated pipe or pipes, P, and screen, S, with the condensing tubes, t, arranged for action together, substantially as specified.

Fourth, The receiving chamber, F, with its delivery pipe, X, arranged to pass through a stuffing box, W, in combination with the tubes, t, and air pipe, O, suspended from above, essentially as and for the purpose or purposes herein set forth.

Fifth, The combination with devices for producing a spray action of air and water combined at the top of the condenser and downwardly through the tubes thereof of a water base, B', hollow jacket, A', and circulating pipe, N, substantially as specified.

Sixth, In combination with a surface condenser, the arrangement at or near the top thereof of one or more automatic relief or escape valves, Q, operating essentially as shown and described.

60,043.—Apparatus for Drying Lumber.—J. H. Osgood, Boston, Mass., assignor to himself and J. W. Hanna, Wabash, Ind.

I claim the combination of a steam-heating chamber with a hot-air chamber, substantially as and for the purpose set forth.

60,044.—Turnout for Railroads.—Samuel A. Otis, Boston, Mass.

I claim the combination of the device described for turning the car out of the straight line with the fixed points of the dummy switches, as shown and described.

60,045.—Slate Cleaner.—Abraham W. Overbaugh, New York City.

I claim the plate and tube for moistening the sponge.

60,046.—Corn Sheller.—Isaac E. Overpeck, Overpeck's Station, Ohio.

I claim the shelling disk, h, and bisected conical tube, c', in combination with discharging spring, m, arranged and operating in the manner and for the purpose specified.

60,047.—Adjustable Spring Back for Vehicles.—Louis E. Page, Pontiac, Mich.

I claim the springs, E E, at the sides, and springs, F F, at the back, when constructed as described and connected to the buggy seat by means of the bar, B, or its equivalent, the plate, G, and lazy back, H, in the manner and for the purposes specified.

60,048.—Manufacture of Cutlery.—George Parr, Buffalo, N. Y.

I claim a cast metal bolster for cuttlery made in two parts, A and B, and having a prong, a', socket, b', and wedge, c, or d, for the purpose and substantially as herein described.

60,049.—Device for Lubricating Carriage Axles, Journals, etc.—G. W. Parsons, Harrisburg, Pa.

I claim the screw plug or tube, D, in combination with the plunger, e, with its stem and the cap, F, constructed as and for the purpose herein specified.

60,050.—Brick Machine.—John W. Pease, Belmont, N. Y.

I claim, First, The employment in conjunction with an endless chain of mold boxes, G, of the leveling roller, L, and a pressure roller, N, arranged and operating substantially as described.

Second, The grooved face pressure roller, P, constructed and operating substantially as described for pressing the clay into the mold boxes.

Third, Sustaining the endless chain of mold boxes, G, upon the supporting bars, J and J', by means of offsets, g, on the ends of said boxes, during the filling of the boxes; and also during the discharging of the bricks therefrom.

Fourth, Discharging the bricks from the endless chain of boxes, by means of an inclined plate, K, acting upon the stems, e, of followers, b, substantially as described.

Fifth, Constructing the mold boxes with offsets on their ends which are adapted to form connections for said boxes and also means for sustaining the boxes upon the bars, J, and J', substantially as described.

Sixth, Preventing clay or other substance from getting between mold boxes, which are connected together in the form of a chain, by means of lips, i, substantially as described.

60,051.—Boxes for putting up Caustic Alkali.—Henry Pemberton, Alleghany City, Pa.

I claim making boxes or cases for inclosing, preserving and protecting the aluminates and hydrates of the alkalies, by means of paper muslin or other suitable fabric, wrapped and cemented together in folds or layers, with silicate of soda or other cement or glue, and externally coated with tar, beeswax, resin, or other substance capable of resisting the caustic action of such alkalies, and of rendering the fabric of which the case or box is made imper

vious to moisture or air, substantially in the manner and for the purposes hereinbefore described.

Also, the use of a solution of the silicates of soda or potassa, for saturating, coating, or cementing together paper muslin, pasteboard, or other fabrics for making boxes, cases or wrappings for inclosing and protecting the aluminates and hydrates of the alkalies and similar articles requiring protection from air or moisture.

60,052.—Regulator for Reaction Water Wheels.—Dewey Phillips, Manchester, Vt.

I claim, First, A valve or gate hinged at or near the end of the water way, in a reaction water wheel, to regulate the opening for the escape of the water in proportion to the centrifugal force resulting from the rotation of the wheel acting upon such valve or gate to close the same, substantially as specified.

Second, I claim the valve or gate, hinged as specified, in combination with the elastic or yielding packings, n, and s, substantially as specified.

60,053.—Machine for Making Buttons.—L. D. Phillips, New York City. Antedated November 11, 1866.

I claim, First, The general construction and arrangement of the entire machine for forming buttons from plastic materials, the several parts constructed and operating, severally and in combination, substantially as described.

Second, The combination and arrangement of the operating lever, B, with the two cross heads or levers, D and E, substantially as described, by which the outer ends of such cross heads are made to approach or recede from each other simultaneously, substantially as and for the purposes set forth.

Third, The construction and arrangement of the movable jaws, in combination with the former or its equivalent for making and shaping the eye of the button, the several parts constructed and operating substantially as described.

Fourth, The construction and arrangement, substantially as described, of the mold to form the button, the same being in two parts, one fixed and the other movable, and the latter shutting over or upon the former, substantially as and for the purposes set forth.

Fifth, The construction and arrangement of the oscillating plate between the mechanism that forms the eye and the movable part of the mold, such plate supporting the former while the eye is being formed, and constituting also a portion of the mold for shaping the button, and by its oscillating motion discharging the buttons as they are formed.

Sixth, The combination of the several parts forming the eye of the button with the parts which mold or shape the button, and their relative motions toward each other, and operating substantially as described, whereby the eye of the button is formed and inserted in the button at the same time the latter is being molded and shaped.

Seventh, The arrangement of the mechanism for feeding the wire to form the eye, arranged and operating substantially as described.

Eighth, The construction of the arm, B, in combination with the pin, s, or their equivalent, for oscillating the plate, i, substantially as and for the purposes set forth.

60,054.—Cooking Stove.—Samuel G. Piper, Lynn, Mass. Antedated November 22, 1866.

I claim the combination and arrangement of the vessel, B, and the air conduit, C, provided with an air-receiving passage, b, and a register arranged with respect to it, as described, the whole being for application, as explained, to a stove and to the floor of an apartment over that in which the stove may be situated.

69,055.—Mortar Mill.—Leman B. Pitcher, Salina, N. Y.

I claim the cylinders, A B C and D, with or without any of the attachments which form a part of either of them, made and operated substantially as and for the purposes described.

I also claim the mechanical process of making mortar therewith, substantially in the manner described.

60,056.—Machine for Making Nails.—Arlon M. Polsey, Boston, Mass., assignor to T. H. Fuller.

I claim a series of rolling dies provided with die grooves having enlargements therein for reception of headed blanks, and otherwise formed substantially as described when arranged with reference to each other, and so as to operate substantially as specified.

60,057.—Method of Sinking Tubular Wells.—Orrin Pratt, Athol, Mass.

I claim so combining with an external tube or case a boring instrument such as described, so that said instrument will bore a suitable hole for, and carry down with itself, the external tube, which can remain while the borer is withdrawn, and until the tubular well and strainer are introduced and the external tube then withdrawn from the hole, the operation being such substantially as described.

60,058.—Churn.—J. K. Reiner, Line Lexington, Pa.

I claim, First, The two rotating shafts, C C', provided with curved arms, a a', having an oblique position in their transverse section, and the arms of one shaft having a reverse oblique position to those of the other, substantially as and for the purpose specified.

Second, The butter chamber, D, applied to the cream receptacle, A, and provided with the slide, E, and the strainer or screen, F, substantially as and for the purpose set forth.

60,059.—Apparatus for Cooling Beer.—Henry Reusch, Quincy, Ill.

I claim as my improvement a perpendicular cylinder with double walls, supplied with cold or ice water at the bottom and escaping at the top, in combination with the receiving and distributing troughs at the top, and opening in the bottom of the cylinder for the escape of the beer running down on the inside of the cylinder.

And, in combination with the cylinder above claimed, I claim the pipe, Q, or its equivalent, for supplying air to the interior of the cylinder, near the bottom, to carry off the steam or evaporation from the liquid being cooled.

I also claim the construction and arrangement of the guiding rims, M and N, or flanches, for the purpose set forth.

60,060.—Fruit Press.—Daniel T. Robinson, Boston, Mass.

I claim the improved implement or machine constructed and operating as above described, consisting of the frame, A, spring arms, e e, dogs, d d, and clamps, D D, or their equivalents.

60,061.—Reel or Swift.—A. Rohm and P. Guetlich, Lancaster, N. Y.

We claim the combination of the auxiliary arms, I, and disk, H, with the primary arms, E G, and disks, C D, operating substantially as and for the purpose herein set forth.

We also claim, in combination with the above, the slots, i, and joints, b, for the purpose of producing an independent adjustment of the lower arms, as set forth.

We also claim, in combination with the above, the ratchet teeth, g, and collar, K, with spring projection, h, operating in the manner and for the purpose specified.

60,062.—Piston Packing.—Frank J. Roth, Newark, Ohio.

I claim, First, The application of expansible packing rings to the circumference of pistons, in such manner that said rings shall be expanded by the pressure of steam upon such portions of them as are exposed beyond the periphery of the piston, substantially as described.

Second, The arrangement of spring plates, g, to recesses formed in circumference of pistons, substantially as described.

Third, The arrangement of springs, c c, so as to act upon the ends of the packing rings, b b, which are made up of segments, substantially as described.

60,063.—Shoe Brush.—E. A. G. Roulstone, Roxbury, Mass.

I claim combining with the handle, d, and brush block, a, a spring for holding the box on the brush block, substantially as described.

60,064.—Axle Box.—Henry B. Rowley, Rushville, N. Y.

First, In combination with the journal box, C D, I claim the axle, A, constructed with a hardened metal collar, B, or collars, b a', on its ends, the hardened or chilled metal collar or collars being made separate from the axle and shrunk or otherwise fastened thereon, and said collar or collars conforming in diameter to the chamber or chambers of the journal boxes in which they revolve, all substantially as herein described and for the purposes set forth.

Second, The arrangement of the flexible wipers, e e, in combination with the journal and journal box, substantially in the manner herein described.

60,065.—Hay Fork.—William F. Rundell, Genoa, N. Y.

I claim the ferrule, C, constructed with a conical part, d, and a cylindrical part, e, in combination with the screw tang, b, of the fork, B, the key, f, and handle, A, to form a new and improved hay fork, substantially as set forth.

60,066.—Carriage Top.—W. F. Rundell, Genoa, N. Y.

I claim the top frame for carriages, having its front section or bow secured to the section next adjoining, substantially in the manner described and for the purpose specified.

60,067.—Machinery for Embossing Brass Tubes. D. T. Sanford, New York City.

I claim, First, The arrangement of a series of knurls, to which a positive revolving motion is imparted, in combination with a hollow spindle, A, constructed and operating substantially as and for the purpose described.

Second, Making the knurls yielding in a radial direction, by springs, g, substantially as and for the purpose set forth.

Third, The thimbles, e, and boxes, E, in combination with the shafts, c, the ends of which form the bearings for the knurls, substantially as described, so that said knurls can be adjusted at any desired angle toward the axis of the articles to be embossed, without throwing them out of gear with the driving mechanism.

60,068.—Lamp.—William H. Langster, Chicago, Ill.

I claim, First, The combination of the chamber, I, on shaft, i, the sheave, v, on shaft, h, driven by the belt, s, that carries upon one end the blower, g, with the within described mechanism that supplies the power for operating the blower, when used in a lamp, lantern, or chandelier, in the manner and for the purpose herein set forth.

Second, The placing of the mechanism, c c, on its side, substantially in the manner described.

Third, Attaching the mechanism, c c, with a lamp, lantern, or chandelier, by means of the springs, o o, substantially as described.

60,069.—Straw Cutter.—W. D. Schooley, Richmond, Ind.

I claim, First, The vibrating box, O, provided with the pawl, P, and the lever, N, fitted in said box, and provided with the rack, J, for the purpose of admitting of said lever being readily adjusted higher or lower to vary the movement of the feed as occasion may require.

Second, The radius plates, T, provided with the pawls, U, and fitted loosely on the roller shafts, a a', in combination with the ratchets, M M', on said shafts and the adjustable lever, N, substantially as and for the purpose set forth.

Third, The combination of the rod, R, operated from the shaft, E, by the eccentric, Q, the adjustable lever, N, fitted in the vibrating box, O, provided with the pawl, P, the rods, S S, radius plates, T T, with pawls, U, attached, and the ratchets, M M', all arranged to operate substantially in the manner and for the purpose specified.

60,070.—Blow Pipe.—Friedrick Shaller, Hudson, N. Y.

I claim, First, The arrangement of the blow pipe, J, and the piston blower, C B, in relation with each other and with the work table, b, and air reservoir, G, substantially as herein set forth for the purpose specified.

Second, The arrangement of the treadle, R, pitman, z, cranks, 5 and s, bent connecting rod, N, and lever, M, in combination with each other and with the spring, T, substantially as herein set forth for the purpose specified.

60,071.—Attaching Carriage Thills.—William C. Sherman, Boston, Mass.

I claim the hook, E, taking a solid bearing on the lower part of the draw bar in combination with spring, G, shoulder, J, and rubber pad, C, all constructed, arranged, and operating substantially as described.

60,072.—Policeman's Rattle.—Francis P. Smiley, Charles K. Becher, and Isaac Townsend, Philadelphia, Pa.

We claim the application to a policeman's rattle of a jointed handle, constructed and arranged to operate in combination therewith, substantially as and for the purposes described.

60,073.—Flour Bolt.—A. R. Smith, Delaware, Ohio.

I claim the reel, F, provided with knocker blocks, or a circular series of projections around it from rib to rib, in combination with a pivoted spring lever, operating substantially as described.

60,074.—Cartridge Machine.—Dexter Smith, Springfield, Mass.

First, I claim the disk, P, operated from the shaft, B, by means of the cams, K and O, connected with the ratchet and pawls, g h, and stop piece, m, or equivalent mechanism, for the purpose of transferring the shells, substantially as herein set forth.

Second, The combination of the cam, H, shaft, D, and mandrel, s, with the cam, Y, and tool, Z, when arranged and operating substantially and for the purpose as described.

Third, The chuck, O, constructed as described, and used for the purpose of holding the shells, as set forth.

60,075.—Attaching Draft Pole to Axles.—F. C. Smith, Birmingham, Conn.

I claim the bars, G, with the eyes, F, at their rear ends fitted on the iron bar, E, of the cross bar, B, within mortises or notches, D, made therein and provided with the gib or key, H, and screw, I, all arranged substantially as and for the purpose herein set forth.

60,076.—Treating Oils, etc.—H. L. Smith, Gambrier, Ohio.

First, I claim for the purpose of rectifying or refining crude petroleum, or the distillates thereof, the herein described process, which I divide into two parts.

Second, I claim the process of treating crude petroleum, or its distillate, in a closed retort, by the introduction of steam, as and for the purpose specified.

Third, I claim the process of treating cold petroleum, or its distillate, by agitation with cold air, as and for the purpose specified.

60,077.—Churn.—T. K. Smith, Oskaloosa, Iowa.

I claim the spring-board and churn combination, whereby I have made a churn which can be used without a dasher of any kind. In said drawing, blue color denotes metal (tin), and buff denotes wood.

60,078.—Tobacco-pipe Case.—John Speirs, Boston, Mass.

I claim as my invention the combination of the parts, a b and B, arranged and applied together, substantially as described.

I also claim the pipe case, as made of the tubes, c B, and the bowl parts, a b, combined and arranged substantially as specified.

I also claim the pipe case as composed of the bowl parts, a b, the stem holder, B, the cup, c, and the tube, c, arranged together as specified.

I also claim the combination of the cleaner, d, with the cup, c, to be applied to the pipe case stem receiver, B, as specified.

60,079.—Still.—B. P. Stebbins, Corry, Pa.

I claim an improved cone still formed by combining a corrugated cone-shaped partition, B, and an inclined circular flange or apron, C, with each other and with the tank, A, substantially as described and for the purpose set forth.

60,080.—Hoisting Jack.—J. W. Steed, Minneapolis, Minn.

I claim the combination of the cap, D, and the screw, B, with the flange, C, and the conical rollers, a, arranged and operating substantially as and for the purpose set forth.

60,081.—Silde Valve.—Wm. J. Stevens, New York City.

First, I claim the arrangement relatively to each other of the slotted yoke, C, flexible diaphram, D, roller, b, stop, f, and valve, A, substantially as shown and described.

Second, The arrangement of the flexible diaphram, D, with the yoke, C, and roller, b, substantially as specified.

Third, The stops, f, in combination with the yoke, C, diaphram, D, and valve, A, substantially as and for the purpose set forth.

60,082.—Faucet.—James R. Street, and Sianey M. Davis, Washington, D. C.

We claim the combination and arrangement of the barrel, 7, cap, 5, plunger, 3, spiral spring, 2, elastic bale valve, 4, raised valve seat, a, inlet passage, 6, and exit post, c, all substantially as shown and described.

60,083.—Car Bell.—James Sweeney, New York City.

I claim the bell, B, having the edge chamfered as described, in combination with the frame, C, and hammer, D, provided with the ears, c c, lug, d, and projections, e, the whole being constructed, arranged, and operated in the manner and for the purpose set forth.

60,084.—Governor for Steam Engines.—Francis Taggart, Brooklyn, N. Y.

I claim a regulator for engines, fitted substantially in the manner specified, so that the pressure from the boiler shall act in the opposite direction to the pressure from the engine, and the difference of pressure produce a movement to regulate the supply of steam, substantially as set forth.

60,085.—Scaffold.—Charles M. Tanner, Mentor, Ohio.

I claim the sliding frames which support the stage or platform, H, in combination with the main frame constructed with recesses, D, guide plate, I, windlass, C, hoisting ropes, E and E', and additional pairs of framed legs provided with sockets, L, as herein described, and operating as and for the purpose set forth.

60,086.—Lamp Bracket.—R. S. Tay, Medford, Mass., and Francis T. Fracker, Cambridge, Mass.

We claim a side light in which the lamp ring or support is hinged to and so as to swing up against the hanger plate, substantially as set forth.

60,087.—Curtain Fixture.—J. W. Taylor, Dubuque, Iowa.

I claim the perforated wheel, e, attached to the roller of a window shade, in combination with the lever, H, when constructed and arranged substantially as herein shown and described and for the purposes set forth.

60,088.—Machine for Pressing Hats.—G. L. Thompson, New York City.

I claim the combination of the barrel, G, and movable piston, H, with the flexible or elastic core, F, and die, D, constructed and operating substantially as and for the purpose set forth.

60,089.—Table for Concentrating Ores.—Henry Alderson Thompson, Grant, Gipps Land, Victoria.

I claim the combination of the frame, A, supports, N, and screws R, with the table, B, stirrers, Q, and stirrer-frame, O, substantially as and for the purposes herein shown and described.

60,090.—Machine for Making Crucibles.—Samuel R. Thompson, Portsmouth, N. H.

I claim, First, The combination of the cylinder, B, piston head, D, screw piston rod, E, bevel gear wheels F and G, shaft H, and crank wheel, J, with each other, and with the frame, A, of the machine, substantially as herein described, and for the purpose set forth.

Second, The combination of the case, K, core, L, and cover, M, with each other, when said parts are constructed and arranged substantially as herein described, and for the purpose set forth.

Third, The combination of the swinging guide bar, R, the swinging binding bar, T, and the binding and centering screw, U, with each other, with the cover, M, and with the posts, O and P, substantially as described, and for the purpose set forth.

Fourth, The combination of the bow, V, wire, v3, and guide rod, W, with each other, and with the cylinders, B and K, substantially as herein described, and for the purpose set forth.

60,091.—Molder's Clamp.—William W. Tice, California, Ohio.

I claim the molder's clamp, composed of the hook, A B, guard, C, and cam-headed lever, E E' F.

60,092.—Car Coupling.—Daniel J. Tittle, Albany, N. Y.

First, The draft bar, c, provided with a head, i, and two hooking shoulders, h h, and slat, o, in combination with the springs, l l and e.

Second, I claim the rack bar, m, and segment, n, in combination with the draft bar, c, as and for the purposes set forth.

60,093.—Carriage.—James D. Van Hoevenbergh, Kingston, N. Y.

I claim the wrist and sleeve, or equivalent hinge connection between the side springs and the "third axle," substantially as and for the purpose herein specified.

I also claim the yoke, M, and kingbolt, I, constructed and arranged substantially as described, to connect the forward axle, A, and third axle, D, for the purpose herein set forth.

I also claim the construction of the springs, each composed essentially of the half springs, E and G, with the india-rubber spring cushion, O, between them, substantially as herein specified.

60,094.—Car Brake.—Louis Alexis Felu, Eugene Francois Fosse, and Louis Eugene Alphonse Fosse, Paris, France.

We claim combining with a lever, or its equivalent for operating the brake, and with the frame or wheels of a car, or other similar carriage, the brake blocks, E, and wedges, G, constructed and arranged to operate, in the manner and for the purpose substantially as described.

60,095.—Plow.—Bruno Volkmann (assignor to Frederick Volkmann), New York City, N. Y.

First, The plow frame or plow cart, A B C D E F, constructed substantially as described in combination with the plow beam, L, for the purpose set forth.

Second, The small balance beam, e, in combination with the screw chain a, the screw, n', and plow beam, L, substantially as described, for the purpose set forth.

Third, The screw tree, I, in combination with the two horizontal frame pieces, d d', and the plow beam, L, substantially as described for the purpose set forth.

Fourth, The cart shaft, G, in combination with the semicircle, D, regulating screw S, and with the plow frame, A B C D E F, substantially in the manner and for the purpose described.

Fifth, The cart axle, D1 D2, in combination with the movable side piece, E, and regulating screw, T, for the purpose of deepening the furrows as required, substantially in the manner described.

60,096.—Grain Drill.—Elijah Wagoner, Westminster, Md.

First, I claim the combination of the drill, A, elastic bars, B B, lever, E, spring, G, and link, D, substantially as and for the purpose herein specified.

Second, In combination with the above parts, I claim the link, D D, and lug a', when formed with the shoulders, a2 d, in the manner and for the purpose set forth.

Third, I claim the stem or shank, f', when formed as a part of the washer, I, and employed in connection with the spring, G, bars, B B, and stirrup, H, as described.

60,097.—Churn.—G. B. Waller, Franklin, Ill.

First, I claim the combination of two or more inclined tubes, K, with the dasher shaft, B, substantially as herein shown and described, and for the purpose set forth.

Second, The combination of the inverted cup, J, and two or more inclined tubes, K, with the dasher shaft, B, substantially as herein shown and described, and for the purpose set forth.

Third, The combination and arrangement of the inclined tubes, K, inverted cup, J, dasher shaft, B, shafts, D and H, gear wheels, F and G, and frame, E, with each other, with the cover, C, and with the body, A, of the churn, substantially as described, and for the purpose set forth.

60,098.—Bellows Pump.—J. M. Wallace, and E. P. Swearingen, Milton, Iowa. Antedated Nov. 11, 1866.

I claim the pump, consisting of a double bellows, with a center board, a, having a chamber, H, and a valve guarding the openings, J J, operated and combined with the pump stock, substantially as described and represented.

60,099.—Grape-vine Protector.—John Walter, Princeton, Ill.

I claim a grape-vine protector made and operating substantially as herein shown and described.

60,100.—Machine for Pressing Tobacco.—Wm. H. Watson, Yonkers, N. Y.

First, I claim giving to the tobacco a gradual pressure, substantially as shown, prior to the actual or uniform pressure for the purpose specified.

Second, Retaining the tobacco under a uniform pressure, substantially as shown, for the purpose of giving solidity to the sheet formed.

Third, The use or employment of the side belts, in combination with the main belts, substantially as shown, for the purpose set forth.

Fourth, The use or employment of the chains, in combination with the bolts and springs, for the purpose described.

Fifth, The use or employment of the main belts, in combination with the chains, for the purpose specified.

Sixth, The use or employment of the side belts, in combination with the chains, for the purpose specified.

60,101.—Loom.—George L. White, Woonsocket, R. I.

I claim the combination of the stop cam, and the spring bolt, constructed, arranged, and to be applied as specified, and the combination of the same or their equivalent, with the lay and its operative mechanism, substantially as described, the purpose and mode of operation of such mechanism being as herein before explained.

60,102.—Mop Wringr.—J. F. White, Brattleboro, Vt.

I claim the rectangular frame, A, and yielding roller, C, in combination with the hinged or pivoted frame, E, roller, B, and foot rest, H, when said frame, E, is arranged within the said frame, A, all as herein described, and for the purpose specified.

60,103.—Machine for Drying Yarn.—Hugh Whitehill, Newburgh, N. Y.

I claim, First, The system of heating pipes, E, connected at both ends by transverse pipes, f, forming a continuous passage for the steam through the entire system, arranged and operating with relation to the revolving slatted cylinder, G, and fan, D, substantially as and for the purpose set forth.

Second, The guard or shield, I, arranged in relation with the opening, B', of the shell or casing, B, substantially as herein set forth, for the purpose specified.

Third, The arrangement and combination of the revolving and slatted cylinder, G, with the casing, A B, and system of heating pipes, E, substantially as and for the purpose specified.

60,104.—Measuring Faucet.—Seba Squire Wiles, Santa Clara, Cal.

I claim, First, The faucet composed of the barrel, A, and the feed and discharge passages, C and D, with the valve, d, operated substantially as described.

I also claim, in combination with the devices above claimed, the scale, o, index, b, and piston, B, with its rod, C, all arranged to operate substantially as and for the purpose set forth.

60,105.—Grinding Mill.—George L. Witsil, Philadelphia, Pa.

I claim the roller, D, when constructed with a single helical rib like the thread of a screw, and suspended upon the vertically adjusted shaft, B, when used in combination with the hopper, A, and spirally-ribbed concave, A', said parts being respectively constructed and the whole arranged to operate substantially in the manner and for the purposes set forth.

60,106.—Breech-loading Fire-arm.—H. H. Wolcott, Yonkers, N. Y. Antedated November 22, 1866.

First, I claim the lock frames, C, composed of two parts, a a', hinged to each other at b, and constructed and operating substantially as described.

Second, I claim securing the extremities of the main spring, F, in the manner described within notches, U S, in the hammer, but and sere, respectively, avoiding any intermediate attachment or bearing point, thus adapting the spring to move freely with the pivoted frame, and causing any deflection of the spring to be equally distributed throughout its entire length.

Third, I also claim the swell, 6, on the back part of division, a' of the lock frame, for the purpose of bringing the hammer to half cock in the way substantially as above described.

Fourth, I also claim the projection, 4, of division, a', for keeping the lock frame in place, and preventing its withdrawal when the hammer is at full cock, substantially as above described.

Fifth, In combination with a hinged lock frame, of the construction herein specified, I further claim the shell drawer, e, made with arms, r and k, and operated by the contact of a projection, J, from the guard bow, I, as explained.

60,107.—Horse Collar.—Christian Wolf, Rantoul, Ill.

First, I claim connecting the upper ends of the side pieces, A A, of a wooden collar together, by means of a hinge, a, and clamping nuts, c c, in combination with an interposed block for staying said parts, A A, laterally, substantially as described.

Second, The leather strap, D, applied to the upper part of the wooden collar, substantially as and for the purpose described.

Third, Connecting the lower ends of the side pieces, A A, together by means of an adjusting screw, C, substantially as described.

Fourth, Connecting the trace hooks, k, and rings, s, to the wooden sides, A A, of the collar, by means substantially as described.

Fifth, In combination with the wooden side pieces, A A, and padding, B, I claim the hinged clamp, a, movable blocks, d or g, and the adjusting screw, C, all constructed and operating substantially as described.

60,108.—Tanning.—Ira Wood, Woodstock, Vt.

I claim the tanning mixture, composed of the ingredients mixed together in and about the proportions herein stated, and substantially as and for the purpose described.

I also claim the leather, as a new article of manufacture, produced substantially as herein described.

60,109.—Fluid Lenses.—D. A. Woodward, Baltimore, Md.

First, I claim the method herein described, of bending disks of glass so as to produce a concave or convex lens of spheroidal, parabolic or hyperbolic profile for the purpose set forth.

Second, I claim the use of two or more pieces of plate, or flat tched glass, bent to the required curve or profile as herein specified, in combination with the cement and rings, or their equivalents for holding them together, substantially as set forth.

Third, I claim combining with three or more glasses formed into cells, as described, fluids of different index of refraction, that will correct chromatic aberration, substantially as described.

60,110.—Stamp Quartz Mill.—William Wright (assignor to John W. Cheever), New York City.

First, I claim the arrangement of the stamps, in the form of a group, in combination with a central feed opening and surrounding screen and delivery receptacle, substantially as and for the purpose herein specified.

Second, In the direct application of steam power to stamping mills or hammers, I claim providing for the adjustment of the steam cylinders and their valves, toward and from the battery, substantially as herein described, whereby the wear of the stamps and the battery may be compensated for, and a uniform, or nearly uniform clearance between the pistons and the tops and bottoms of the steam cylinder may be maintained.

Third, In combination with the above specified provision for the adjustment of the steam cylinders, I claim the attachment of the feeding hopper or hoppers, to the said cylinders, substantially as and for the purpose herein set forth.

60,111.—Marking Device for Sewing Machines.—Charles O. Yale, New York City.

First, I claim giving a rotatory motion to the pencil while resting on the fabric, substantially as and for the purpose herein set forth.

Second, I claim, in connection with the above, the supporting and guiding parts, E H, and the pressure spring, I, arranged relatively to each other and to the marking device, G, for joint operation, substantially in the manner and for the purpose herein set forth.

REISSUES.

2,398.—Power Hammer.—Philip S. Justice (assignee of Thomas Shaw), Philadelphia, Pa. Patented February 27, 1866.

I claim the combination of a vibratory hammer, with the spring and flexible belt substantially as described.

2,399.—Harvester.—Hobart H. Smith, Carlisle, Pa., assignee by mesne assignments of C. M. Lufkin. Patented September 8, 1857.

First, I claim the combination in a two-wheel side-draft machine, of a main frame arranged between the wheels and connected to the main axle with a laterally-projecting hinged cutting apparatus connected to said frame by means of a hinge at its inner or heel end only, in such manner that each end of the cutting apparatus, independently of the other, is free both to fall below and to rise above the plane on which the main carrying wheels are passing, for the purpose specified.

Second, The employment in a two-wheel side-draft machine, of a main frame, which is connected to the main axle, or gear center, and which extends beyond the periphery of the driving wheel at one end only, in combination with a laterally-projecting hinged cutting apparatus, for the purpose specified.

Third, In a two-wheel side-draft machine, a main frame connected at one end to, and vibrating about the main axle or gear center, in combination with a cutting apparatus hinged to the other end of said frame.

Fourth, In a two-wheel side-draft machine, a laterally-projecting cutting apparatus, hinged to one end of a frame which is connected at its other end to and vibrates about the axle or gear center of said machine.

Fifth, In a two-wheel side-draft machine, a vibrating frame arranged between the wheels, and connected to the main axle or gear center, in combination with a laterally-projecting cutting apparatus, which is hinged at one of its ends to said frame.

2,400.—Harvester.—Hobart H. Smith, Carlisle, Pa., assignee by mesne assignments of C. M. Lufkin. Patented September 8, 1857.

First, I claim the combination in a two-wheel side-draft machine, of a main frame, a hinged cutting apparatus, and a draft pole or tongue hinged at a point within the periphery of the driving wheel, for the purpose specified.

Second, The combination in a two-wheel side-draft machine, of a vibrating frame, a tongue hinged to said frame on a line nearly coincident with the axle, and a laterally-projecting hinged cutting apparatus, for the purpose specified.

2,401.—Harvester.—Hobart H. Smith, Carlisle, Pa., assignee by mesne assignments of C. M. Lufkin. Patented September 8, 1857.

First, I claim, in a two-wheel side-draft machine, the combination of a main frame arranged between the wheels and a vibrating draw bar, or its equivalent, with a laterally-projecting hinged cutting apparatus, which is free at each end independently of the other, and of the vertical movement of the main axle, to conform to the surface of the ground over which it is drawn.

Second, The employment in a two-wheel side-draft machine of a draw bar, or its equivalent, connected at one end to and vibrating about a shaft or gear center of said machine, in combination with a main frame, arranged between the wheels, and a laterally-projecting hinged cutting apparatus.

Third, A draw bar, or its equivalent, connected at one end to and vibrating about the main axle or gear center, in combination with a laterally-projecting cutting apparatus hinged to the other end of said bar.

2,402.—Harvester.—Hobart H. Smith, Carlisle, Pa., assignee by mesne assignments of C. M. Lufkin. Patented Sept. 8, 1857.

First, I claim the employment in a side-draft machine of a curved slot and set screw, in combination with a vibrating frame, or its equivalent, which adapts a laterally-projecting hinged cutting apparatus to conform to the surface of the ground over which it is drawn, independently of the vertical movements or vibrations of the main axle of the machine, for the purpose specified.

Second, The employment of a curved adjusting way or standard located on the vibrating frame, or its equivalent, for the purpose specified.

Third, The combination of an adjusting lever with a curved standard or way, on which said lever is adjusted or held, for the purpose specified.

Fourth, The combination of a curved way or standard, an adjusting lever, and a means for setting or holding said lever, for the purposes specified.

2,403.—Harvester.—Hobart H. Smith, Carlisle, Pa., assignee by mesne assignments of C. M. Lufkin. Patented Sept. 8, 1857.

First, I claim the employment in a two-wheel side-draft machine of a carrying wheel or roller connected to the inner or heel end of a laterally-projecting hinged cutting apparatus, which is free at said end to conform to the surface of the ground over which it is drawn, independently of the vertical movements or vibrations of the main axle of said machine, for the purpose specified.

Second, The employment in a two-wheel side-draft machine of an adjustable wheel or wheels connected to and in combination with a laterally-projecting hinged cutting apparatus, which is free at each end, independently of the other end and of the vertical vibrations of the main axle, to conform to the inequalities in the surface of the ground over which it is drawn, in such a manner that the same may be used both in reaping and mowing, for the purpose specified.

Third, The employment of a rock-shaft lever and an adjusting wheel or wheels, in combination with a hinged cutting apparatus, which projects laterally from the main frame by which it is drawn forward over the ground.

Fourth, A laterally-projecting hinged cutting apparatus, which is free at each end, independently of the other, to conform to inequalities in the surface of the ground over which it is drawn, in combination with a mechanism, whereby the attendant is enabled, by operating a single lever, to raise and lower said cutting apparatus bodily, for the purpose specified.

2,404.—Distilling Coal Oil and other Substances.—Herbert W. C. Tweddle, Pittsburgh, Pa. Patented Feb. 4, 1862.

First, I claim distilling hydro-carbon oils, such as petroleum, and other substances under a vacuum or partial vacuum, by the use of steam for producing the vaporization of the article to be distilled.

Second, The use of superheated steam in combination with the employment of a vacuum or partial vacuum, for the distillation of petroleum and other hydro-carbon oils and similar substances.

Third, The combination of a steam vacuum apparatus, constructed substantially as hereinbefore described, with the oil receiver, L and M, for the purpose hereinbefore described.

Fourth, The combination of the vacuum apparatus hereinbefore described, with the steam pipe or pipes in the interior of the still and with the still for the purposes hereinbefore described.

EXTENSIONS.

Dumping Wagon.—Thomas Castor, Philadelphia, Pa. Letters Patent No. 9,164, dated August 3, 1852.

I claim the arrangement of the body on a fixed roller fulcrum on the frame of the running gear, in such manner that by a slight amount of force the body can be turned to give its under side, which rests on the roller, either a forward or backward inclination to cause the weight of its load to tend to hold it forward or back, as it is required to carry or dump the same, substantially as herein set forth.

Whiffletree Hook.—E. A. Palmer and A. J. Simmons, Clayville, N. Y. Letters Patent No. 9,252, dated Sept. 7, 1852.

We claim the head turning upon the shaft to close the hook, the sliding catch to prevent its opening, and the spring within the head acting upon them, the whole combined and operating substantially in the manner specified.

Door Lock.—William Moore, Brooklyn, N. Y., assignor to James Carman, New York City. Letters Patent No. 9,265, dated Sept. 14, 1852.

I claim the tumbler, k, inclosed by the dividing plate, h, to be operated on solely by the key when entered from the inner keyhole, in combination with the revolving check, or its equivalent, and the bolt, for the purposes as described and shown.

Machinery for Beveling the Edges of Skelps or Metallic Strips, etc.—Rob. Knight, Cleveland, Ohio. Letters Patent No. 9,274, dated Sept. 21, 1852.

I claim arranging the rollers in the frame, so as to receive a lateral movement, as may be desired, in other words, giving the rollers end play one over the other, as thereby increasing or diminishing the distance between the bosses (according to the width of the plate or strip), and providing suitable means for retaining the same in place.

Lath Machine.—H. C. Smith, Cleveland, Ohio. Letters Patent No. 9,286, dated Sept. 28, 1852.

I claim the combination of the method of rotating the log or bolt from which the laths are to be cut, by means of the poppet wheels, J J', arranged respectively on the shafts, E' E, which forms a part of the mandrel at each end of the log, and the gear wheels, I I', or their equivalents, moving with equal velocity, so as to prevent any wrenching or twisting of the log on its centers, and to hold it firmly up to the knives while being operated upon by them, and the method of clutching and releasing the log by means of the dog, A, hollow bearing, C', for containing the clutch head, G, and hollow shaft, E', for receiving the rod, F, which screws into said clutch, and by which the dog may be driven into the log or the log released, the whole being arranged and operating substantially in the manner and for the purpose set forth.

Beehive.—Lorenzo L. Langstroth, Oxford, Ohio. Letters Patent No. 9,300, dated Oct. 5, 1852. Reissue No. 1,484, dated May 26, 1863.

I claim, First, Constructing and arranging the movable comb frames of beehives in such a manner that when placed in the hive or case, they have not only their sides and bottoms kept at suitable distances from each other and from the case, substantially in the manner and for the purposes described, but have likewise their tops separated from each other throughout the whole or a portion of their length, substantially in the manner and for the purposes set forth.

Second, Constructing and arranging the movable frames in such a manner that when they are inserted in the hive the distance between them may be regulated at will, substantially in the manner and for the purposes described.

Third, Constructing movable frames and arranging them in the hive, in such a manner that the bees can pass above them into a shallow chamber or air space, substantially in the manner and for any or all of the purposes set forth.

Fourth, The shallow chamber, in combination with the top bars of the laterally movable frames, or their equivalents, and with the perforated honey board, upon which to place surplus honey receptacles, substantially as and for the purposes set forth.

Fifth, A movable partition or divider, substantially as described, when used in combination with movable frames, substantially in the manner and for the purposes described.

Sixth, The use of movable blocks for excluding moths and catching worms, so constructed and arranged as to increase or diminish at will the size of the bee entrance, substantially in the manner and for the purposes set forth.

Grinding Mill.—Oldin Nichols, Roxbury, Mass. Letters Patent No. 9,330, dated Oct. 12, 1852.

I claim the pointed projections, b, on the front edges of the teeeth of the cylinder, E, when used in combination with the teeth, c c, in the concave formed with concavities in their front edges, substantially in the manner and orr the purpose herein set forth.

Grain Separator.—Peter Geiser, Greencastle, Pa. Letters Patent No. 9,341, dated Oct. 19, 1852.

I claim the method herein described of regulating the blast of winnowing machines by means of a flap on the fan case, arranged and adjusted substantially as herein set forth.

I also claim the reciprocating toothed bars, G, with the trough, A, whose bottom is divided into three portions, the lowermost being tight and acting merely as a conveyor, the middle one acting both as a conveyor and screen to separate the wheat from the straw and allow it to pass into the winnower, and the upper or third portion acting as a conveyor for the straw and a coarse screen to separate therefrom the heads of unthreshed grain that would not pass through the lower screen, the teeth of the reciprocating bars moving the straw regularly along the trough and working or shaking the grain and heads so effectually through the screens that none is left to pass off with the straw when it is discharged from the uppor end of the trough.

Mode of Counterbalancing Harness in Looms.—James Greenhalgh, Woonsocket Falls, R. I. Letters Patent No. 9,377, dated Nov. 2, 1852.

I claim the construction of the long, double heddles or jacks, D D, in such a manner and so hanging them on the axle, E, by a short arm, or its equivalent, that in their vibrations neither end of them shall pass beyond a vertical plane passing through the axle on which they rock or oscillate, so that the weight of the jacks shall be thrown outside of their points of suspension, thus counterbalancing the weight of the harness.

Tool for Cutting Pegs out of Boot Soles.—D. D. Allen, Adams, Mass. Letters Patent No. 9,340, dated Oct. 19, 1852.

I claim the adjustable float or cutter, C D E, connected to a shank, B, by means of the pin or pivot, b, which turns loosely in the bearing or standard, a, so as to permit the float to adjust itself to the proper positions to cut the pegs from the heel to the toe of the boot, in the manner herein set forth.

Constructing Plow.—Albert Gardner and Wm. L. Hunter, deceased, Cincinnati, Ohio. Letters Patent No. 9,363, dated Oct. 26, 1852.

I claim for myself and said Hunter, deceased, bolting the standard, mold board, land side, and share to the block, F, or its equivalent, instead of bolting or fastening the parts to each other as has been practiced heretofore, which block, F, may be connected to the beam by a bolt, K, or otherwise, substantially as described and represented.

Self-acting Mule for Spinning.—Wanton Rouse, Taunton, Mass. Letters Patent No. 9,378, dated Nov. 2, 1852. Reissue No. 233, dated March 15, 1853.

I claim, First, Governing the revolution of the spindles in winding the yarn on the cop, and also in backing off during the progressive stages of the building by means of a cam, B, or any equivalent device of irregular form circumferentially with the said irregularity varying from end to end, the said cam, or equivalent, being caused to operate upon the mechanism which drives the spindles in any way that will produce the results herein set forth.

Second, The mechanism for causing the finger, d, through which the irregular surface of the cam, B, or its equivalent, acts upon the mechanism which drives the spindles in backing off and building on, to traverse the said cam and to be kept close to its

surface, consisting of the screws, e and k, the nut, j, cord or chain, f, lever, G, and stud, h, operating in combination, in the manner substantially as set forth.

MODE OF THROWING SHUTTLES IN LOOMS.—Stephen C. Mendenhall, Richmond, Ind. Letters Patent No. 9,387, dated Nov. 9, 1852.

I claim the combination and arrangement of the spring triggers, f f, cords, h h, and treadles, 1 2 3, etc., so that the depression of any one of these treadles shall release the trigger on the forward movement of the lay and allow the picker staff to actuate the shuttle, substantially as set forth.

HAND LOOM.—S. C. Mendenhall, Richmond, Ind., and Obed and Ezra King, Salem, Iowa. Letters Patent No. 9,388, dated Nov. 9, 1852.

First, We claim the combination of nerve, K, operated by lay inclined plane, O, and its guides, M M', and adjustable pin, W, or their equivalents, combined and operating as described so that we can operate and vary the number of heddles, substantially as and for the purpose set forth.

Second, The combination of the inclined plane, O, on picker staff, spring, T, and hooks, R R, for the purpose of lifting the hooks, in the manner and for the purpose specified.

DESIGNS.

2,507.—TOBACCO PIPE.—George C. Britner (assignor to Harvey and Ford), Philadelphia, Pa.

2,508—COACH LAMP. — James H. Downs (assignor to C. Cowles and Co.), New Haven.

2,509.—HAT ADVERTISING CARRIAGE. — Samuel Jackson, Jr., Roxbury, Mass.

2,510.—BURIAL CASKET.—William L. Lockhart and J. C. Seelye, East Cambridge, Mass.

2,511.—CEMETERY MONUMENT. — Reuben Miller, Lincoln, Ill.

2,512.—HANDLE OF A FORK OR SPOON.—George Sharpe, Philadelphia, Pa.

2,513.—TRADE MARK.—George W. Westbrook, New York City.

MAKE SURE OF IT.—THE PHRENOLOGICAL JOURNAL for December contains fine portraits of Doré, the great French Artist, the King and Queen of Prussia, twelve distinguished American Clergymen, Miss Kate Bateman, with biographies and sketches of character. Also, a host of interesting matter, including What is Education? by John Neal; Characters of Shakespeare; Falseness of Society; Thiers, the French Statesman; Ourang-Outangs, etc. Only 20 cents; $2 a Year. Now is the time to Subscribe. A New Volume begins with the next No. Address FOWLER & WELLS,
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2. The head blocks to be made in accordance with the specifications, and to conform strictly to the samples, both of which may be seen at the Offices of the Depot or Chief Quartermasters at Boston, New York, Philadelphia, Pittsburgh, Baltimore, Washington, Fortress Monroe, Richmond, Raleigh, Newbern, Fayetteville, Charleston, Savannah, Augusta (Ga.), Tallahassee, Mobile, New Orleans, Galveston, Vicksburg, Memphis, Nashville, Chattanooga, Murfreesboro', Louisville, Cairo, Chicago, Jefferson ille, Columbus (Ohio), Cincinnati, Detroit, St. Louis, Fort Leavenworth, Omaha, Little Rock, and San Francisco. (Bids for San Francisco will be received until December 31, 1866.)

3. They will be about nine (9) inches high, from ten (10) to twelve (12) inches long, and from three and a half (3½) to four and a half (4½) inches wide, with a flange around the bottom. They will be hollow, and will have a number cast on the back, and an inscription of the name, rank, regiment, arm, company, or corps, and date of death of the deceased, cast in raised letters on the top. They must be cast of good stove-plate iron, weight not less than twenty (20) lbs. each, and be coated thoroughly by dipping in melted zinc.

4. Separate bids are invited for delivery at each place; and in case the same parties offer to supply more than one locality, it should be stated at what reduced price the articles would be furnished in the increased number.

5. Each bid must be accompanied by a good and sufficient guarantee of at least two responsible parties that the contract, if awarded, will be faithfully and promptly executed. (The responsibility of the guarantors must be shown by the official certificate of the clerk of the nearest District Court, or of the United States District Attorney.)

6. The Government reserves to itself the right to reject all bids, if unsatisfactory; and to delay the award not later than the first of January, 1867; and also, in some instances, to change the points of delivery of a portion of the head blocks, in which case a reasonable allowance for increased, or deduction for diminished transportation will be made.

7. The time of delivery to be subject to future arrangement, sufficient time being allowed after the lists of names are furnished to the contractor.

8. The articles must conform rigidly to the sample, and will be subject to such inspection, at the point of delivery, as the Chief of the Bureau may direct.

9. The full name and post office address of the bidder should appear in the proposal.

10. Proposals should be plainly endorsed "Proposals for Iron Head Blocks," and be addressed "To the Quartermaster General U. S. A., Washington, D. C."

M. C. MEIGS, Quartermaster General, Brevet Major General, U. S. A.

21 3]

TO ARCHITECTS.

Plans and Specifications for new buildings for the War Department at Washington, D. C.

Architects are invited to prepare plans and specifications, and estimates of cost, for new fire-proof buildings for the War Department, on the site now occupied by the War Department and adjacent vacant ground, in Washington, D. C.

The buildings required should have a superficial area as large as the site selected will admit of. Photographs of site, and all other information relating to the subject, will be furnished to Architects desiring to compete for the work, upon application, personally or by letter, to the undersigned.

A premium of $3,000 for the first, of $2,000 for the second, and of $1,000 for the third most acceptable plans and specifications received, will be awarded, upon the approval of the Hon. Secretary of War, by the Board of Officers charged with the duty of selecting a site and preparing plans and specifications for the buildings of the War Department, under act of Congress approved July 28, 1866.

The plans and specifications must be sent to the office of Brevet Lieut. Col. T. J. Treadwell, Recorder of the Board, Ordnance Office, Winder's Building, Washington, D. C., on or before the 1st day of Feb., 1867.

The Board will reserve the right to reject any or all plans submitted, should none be deemed suitable for the purpose, as well as to retain any or all of such plans.

By Order of the Board:

T. J. TREADWELL, Byt. Lieut. Col., U. S. A., Recorder.

23 4]

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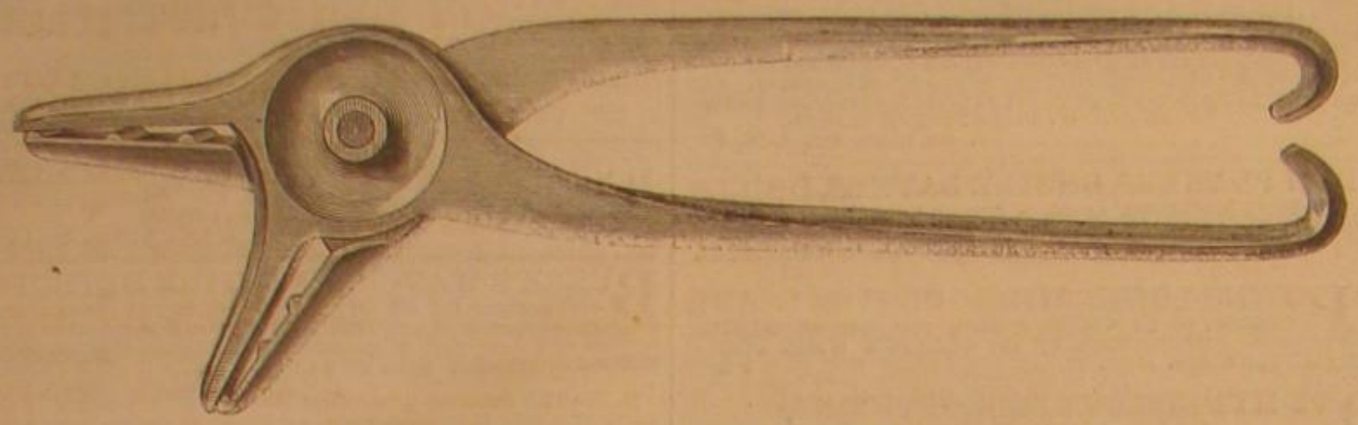
Improved Stove Tongs.

The engraving gives a view of a simple and handy implement for use about a stove. It is a pair of tongs furnished with double jaws, one side of each being corrugated, the better to seize and hold the rims of wired tin ware. It is made of cast or malleable iron, and can be applied to all the purposes of a cover lifter, tongs, hook, or ordinary holder. Its efficiency and its operation can be understood without reference to the parts by lettering.

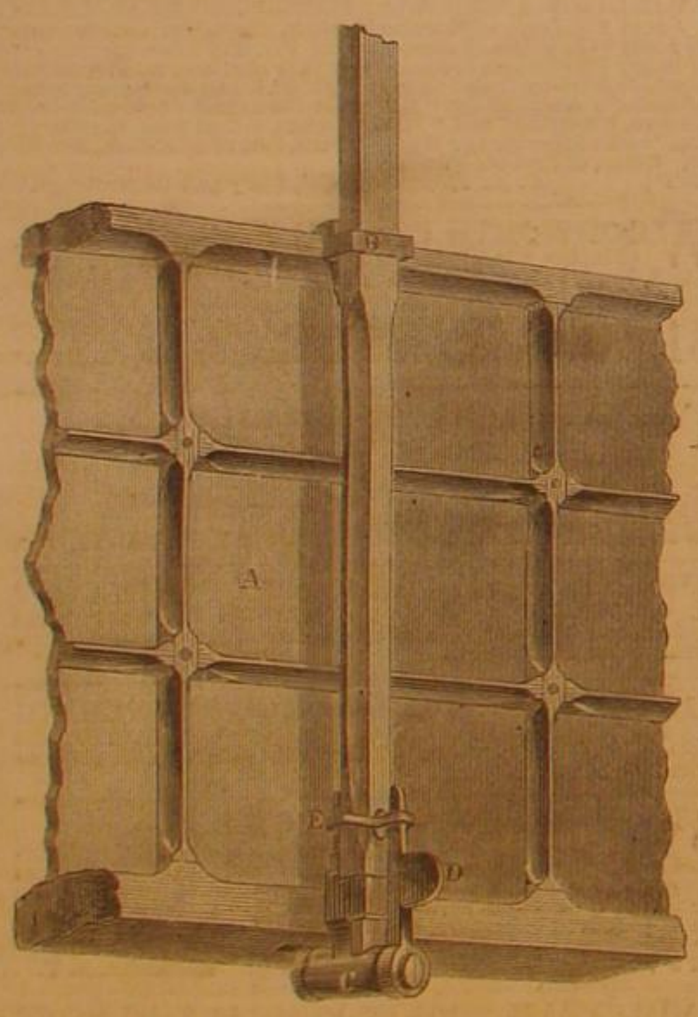


STILLWELL'S STOVE TONGS.

The combination of the two jaws, placed at an angle of forty-five degrees, is a great convenience, as articles of stove furniture in any position may be readily moved and lifted without trouble. It was patented Oct. 2, 1866, by E. R. Stilwell, of Dayton, Ohio, to whom apply for rights or for further information.

SCOTT'S IMPROVED FASTENING FOR WAGON BOWS.

Many of the most valuable improvements, for which patents have been issued, have been those whose apparent insignificance would have caused them to escape the notice of the superficial observer;



yet, in not a few instances, they have competed, in actual general value and in pecuniary profit, with some of much greater pretensions. Such is the character of that illustrated in the accompanying engraving. It is a new method of attaching the uprights and bows to a wagon frame.

A is a section of the side of a wagon. The staple, B, at the top rail, instead of being permanently fixed to the rail, is secured to the bow at a point corresponding with the hight of the top from the bottom rail, and is provided with a flange, fitting over and embracing two sides of the top rail. Of course it can be slipped along to any point desired. At the bottom of the upright is a clasp of metal having a socket, C, which envelopes the shaft of a lever cam, the inner edge of which is sharp, and, when the lever, D, is turned in a vertical position, holds the bow firmly in place. A sliding clasp, E, slips over the end of the lever and secures it.

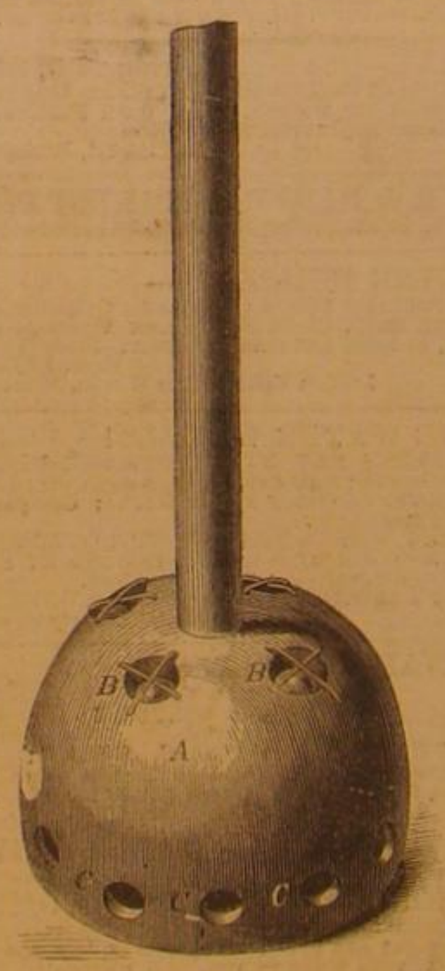
The upright or bow can be easily disengaged from any part of the rail and secured to any other portion; no holes are required to be bored in the wagon rails, thereby weakening them; if warped by the weather, there is no additional difficulty in moving the bows, as all the iron work goes with them; nothing about the device is liable to break; there is no rattling, and the wagon is greatly strengthened by having the upper and lower rails firmly bound and held together.

Patent issued Oct., 16, 1866, to Amos R. Scott, Bethel, Ohio, whom address for other information relating to the invention.

SPENCER'S CHURN DASHER.

The churn dasher herewith illustrated is intended to facilitate the mechanical and chemical change that takes place in separating the buttery particles of cream from the serum. It appears to have been designed on philosophical principles, and as though it was a decided improvement on the ordinary dasher.

The dasher proper, A, is an inverted, bowl-shaped piston, hollow, and furnished with holes around the periphery near the bottom. Other apertures are formed at the top, countersunk on the upper surface to receive ball valves, which may be marbles or the toy glass balls used by children. These are prevented from escaping by wires or staples stretched across the holes, as at B.



As the dasher descends into the cream its concavity carries down a quantity of atmospheric air, and as it descends still further the cream is forced laterally out of the lower apertures, C, and, by lifting the valves, through the holes B. When the dasher is raised the valves close, and the tendency is to form a vacuum inside the dasher until it has been raised above the surface of the cream. The effect is to violently agitate the cream and at the same time to mingle the atmosphere with it.

This dasher was patented through the Scientific American Patent Agency, Oct. 23, 1866, by N. H. Spencer, Canandaigua, N. Y., whom address for further information.

New Paste Wanted.—A correspondent writes us for a "combination for pasting paper without acting hygrometrically on the same, viz., not to extend it in pasting, and contract it again in drying."

The Boston Massachusetts Institute of Technology held their first meeting on the 15th of the present month in their spacious new building, now just finished, a gift from the liberal citizens of Boston and vicinity. Professor Wm. B. Rogers, the President of the Institute, welcomed the members to their new halls in a brief address, making mention of some of the prominent members and benefactors of the Institute who had died since the last meeting. He congratulated them upon their prosperity, the Society of Arts now numbering among its members many of the first scientists of the country, and the School of Practical Industrial Science about one hundred and fifty pupils. This school of practical instruction is rapidly being appreciated by students from all parts of the United States.

The English railways are assessed for poor rates by the local authorities of the several parishes through which they pass.

THE

Scientific American,

TO BE ENLARGED

For 1867.

This valuable journal enters upon its twenty-second year on the first of January next, at which time the Publishers have determined to considerably enlarge and otherwise improve it. The Scientific American is the oldest, and, by general consent, the most popular Journal of Science ever published; and, in point of circulation, it is safe to say that it exceeds the aggregate issues of all similar papers in this country and Great Britain combined.

The first number of the Scientific American, a folio of four pages, appeared in the summer of 1845. Soon after its appearance the form was changed to a quarto of eight pages. In 1859, encouraged by the great success which met their efforts, the Publishers determined to double its size to sixteen pages. But this enlargement has finally proved inadequate to the great demand upon its columns, and, in spite of the greatly enhanced cost of paper and all other materials, the Publishers have decided that their journal must be enlarged, *without any increase in the terms of subscription*, confident that their generous patrons will appreciate the benefits of the proposed change, and lend their influence to increase its subscription list. It has been the constant aim of the editors of this journal, who are aided by some of the best known scientific writers in the country, to discuss all subjects relating to the Industrial Arts and Sciences in a plain, practical, and attractive manner.

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It would be impossible within the limits of this Prospectus, to enumerate the great variety of subjects which are discussed and illustrated. A few only can be indicated, such as Steam Engineering, Fire-arms, Mechanics' Tools, Manufacturing Machines, Farm Implements, Hydraulic Engines, Wood-working Machines, Chemical Apparatus, Household Utensils, Curious Inventions, beside all the varied articles designed to lighten the labors of man in the Shop, Factory, Warehouse, and Household.

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FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN.

Scientific American.

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

Vol. XV.—No. 25. [NEW SERIES.]

NEW YORK, DECEMBER 15, 1866.

$3 per Annum, (IN ADVANCE.)

Improved Apparatus for Well Boring and Hoisting.

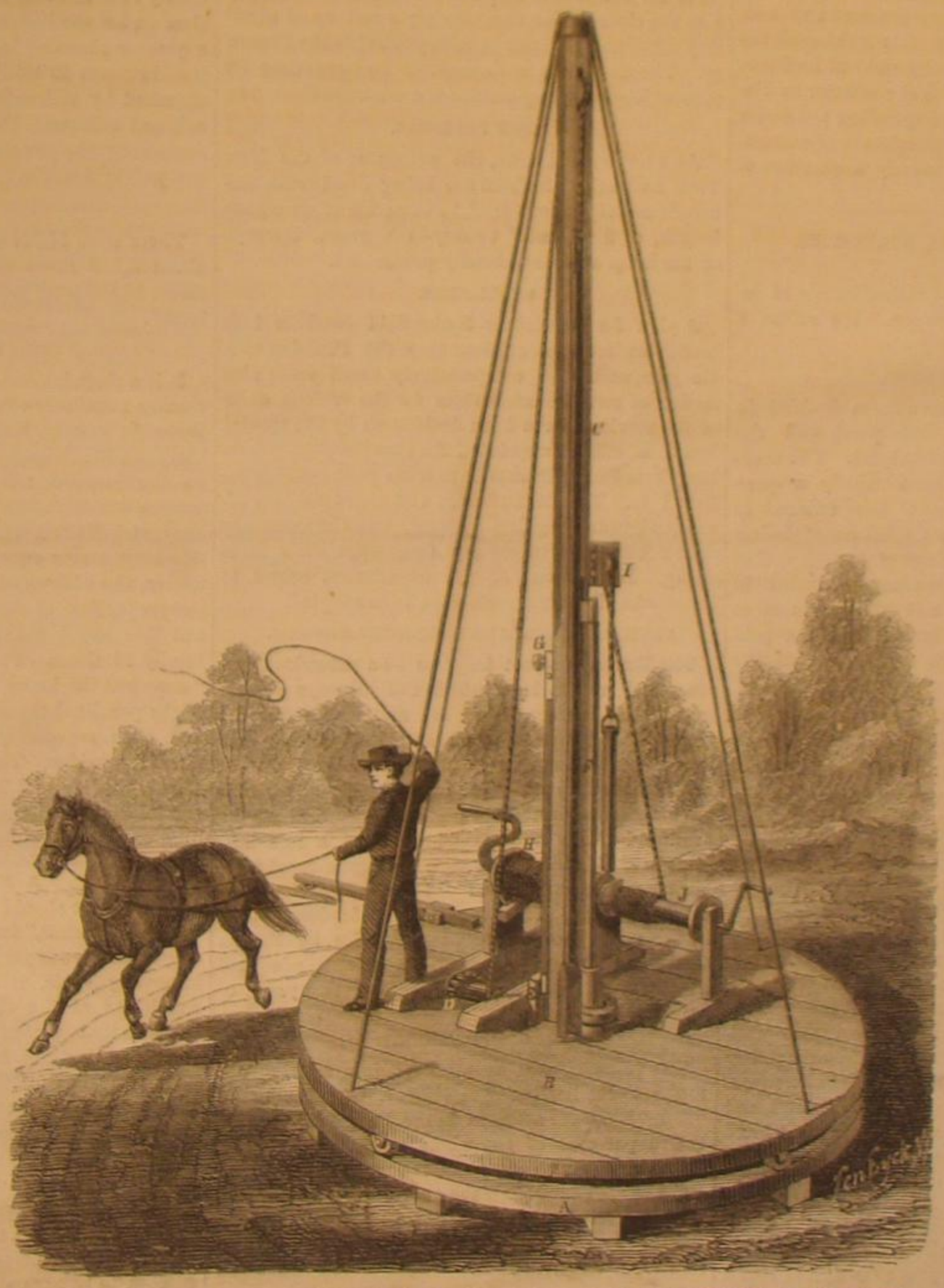
The discovery of the commercial value of mineral oil has greatly stimulated the efforts of inventors to improve upon the crude attempts first made to reach the buried treasures of the earth; yet the old walking beam and samson post are still adhered to, probably because of their simplicity and cheapness. The object of the apparatus herewith illustrated is to provide an improved device for boring wells. It is also adapted for pumping and hoisting purposes. Its operation is easily understood, as the parts are simple in character and few.

A level platform, A, circular in form, and either a disk or a rim, is laid upon the ground, and the platform, B, revolves upon it by means of trucks or rollers. At the center of this platform is a well-hole, and rising from its side is the upright, C. Under the platform, B, is a fixed gear wheel in which the wheel, D, meshes. The platform being rotated, by horse or any other power, its revolution gives motion to the wheel, D. On the same shaft with this gear is a double lever, having circumferential slots in either arm, at equal distances from the center. In front of this is a similar lever or double arm, E, having pins in its rear face which play in the segmental slots, and by which the arm, E, is carried around with the shaft of D. In this arm is a longitudinal slot, in which moves loosely a box to which the connecting rod, F, is pivoted, which is secured at the other end to a box which slides up and down in a corresponding slot in the upright, C.

As the shaft, D, rotates the arm, E, is carried around, and soon after the box carrying the connecting rod has passed the lower center it slides to the upper end of the arm, allowing the drill, F, to fall, when the continued revolution of the shaft again raises it, to fall again at the next half revolution By this means there are two full strokes given to each one revolution of the wheel, D. The drill may be attached to the upper block directly, or after the hole has progressed, to the knob, G, on the box by a rope passing over the pulley at the top of the uprights. The rope passes around the shaft, D, thence on the drum or winch, H, to be let out as demanded by the progress of the work. The sand-pump is always suspended ready for use from the hinged pulley block, I, by a rope winding on the barrel of the winch, J. The drill can easily be removed by the winch, H, and the sand-pump lowered into the well without the trouble of disconnecting the drill.

For pumping purposes this machine appears to be equally efficient. It can be worked very rapidly by having a large wheel under the platform, B, even when the horse or other motive power is traveling slowly. The rotation of the platform insures a gradual rotation of the drill, so that at every stroke it presents its cutting edge at a different angle, and the hole is always bored perfectly round.

A patent was issued March 6, 1866, to W. C. McGill and A. J. Gibson, of Cincinnati, Ohio. For further information address A. V. Stewart, No. 14 Public Landing, Cincinnati, Ohio, or W. C. McGill, No. 277 Walnut street, same city.



McGILL & GIBSON'S DRILLING, PUMPING, AND HOISTING MACHINE.

REDUCTION OF RAILWAY CHARGES.

Hon. Josiah Quincy delivered, last week, an address before the Boston Board of Trade warmly advocating the possession by the several States of all the important railway lines, believing that thereby the charges for passage and transportation of freight would be reduced to correspond with the mere cost of operation. The experience of English roads furnishes the data on which his statements are founded, and the Worcester and Western railways, between Boston and Albany, are those to which his remarks are specially applied.

Quoting from the report of the English Board of Trade, for the year 1863, the average expenditure per train, taking all the railroads in the United Kingdom, is placed at 2s. 7d., or 62 cents per mile. Of this sum the cost of maintaining the way and works, the locomotive power, and the repairs and renewals of cars, amounts to 1s. 2¼d., or 29 cents; the remaining items include the Government tax, compensation for personal injury, legal expenses and other expenditures which must be paid whether the trains run or not.

In regard to the traction of a locomotive, 1,000 passengers, or 500 tuns of freight, are considered as a fair maximum load on the majority of the English railways. When the track is laid, and the road is fully equipped, the results of full trains at the present prices would be, on the roads under discussion, 10,000 tuns on the five daily freight trains at $7, and 6,000 passengers, in six trains, at $6 each, giving a total of $106,000; but, by the estimate given above, the actual cost is only $124 for each train, yet, to cover all expenditures, call it $159. Then 27 passengers pay the total cost, and 973 are carried free. For freight alone, 23 tuns defray the whole expense, and 177 go free.

A prevalent opinion is that the charges on a railroad must be proportioned to the cost of construction. Now it is found that the English railways on which the greatest amount of capital per mile has been expended, are those on which the fares are the lowest. The Charing Cross Railway cost a million and a-half sterling, or $7,500,000 in gold, per mile, yet passengers are carried at a lower rate than on some roads constructed at a hundredth part of that cost. When the actual fares exceed the expense incurred in the conveyance, it becomes a mere question of numbers as to what fares best pay. English experience also proves that any decrease in price of transportation is immediately followed by a nearly corresponding increase in business.

The effect of reducing fares, on dividends, is seen in the contest between the Edinburgh and Glasgow, and the Caledonian railways, connecting these two cities, which, with their immediate vicinities, have a population of 600,000 inhabitants. During the contest the fares were reduced to one-eighth of the ordinary charges; the loss in dividends, resulting,

amounted in the one company to one, and in the other to less than one-half, per cent per annum.

Should the Worcester and Western roads lower their charges, not to one-eighth, but to one-sixth, with a similar increase of business, the difference to the shareholders would consist in receiving nine instead of ten per cent, annually, on their investments, a loss of $100,000 to the roads and a gain of millions to the community.

According to General Stark, freight is now carried by the tun on some of our Western roads for one cent per mile. At this rate a tun could be taken from Albany to Boston for two dollars, the cars in both cases returning empty. As a tun is equivalent to two passengers, they could be taken between the two cities for one dollar each.

However great may be the benefits accruing to the people from the low-fare system, they are unattainable under the present mode of management. The plan proposed for securing these advantages is the purchase of the roads referred to, for an equitable price, payment to be made by the issue of bonds for fifty years at five per cent; the grant of a permanent lease to the city of Boston—the city paying the interest on the loans—to keep the road and stock in repair, and to use the surplus after making all the facilities required by the enlargement of business.

Referring to a movement of like character in England, the address closed with expressing the desire that Massachusetts should inaugurate the movement whose universal adoption is merely a question of time.

INTERESTING OFFICIAL STATISTICS.

The departmental reports are rather barren of instruction appropriate to our pages. We collect a few items:

POSTAL MONEY ORDERS.

The money-order offices have been doubled in number (760 against 347 last year) and the business has been more than tripled. The number of orders issued has been nearly a quarter of a million (243,609), and the amount of money transmitted nearly four millions of dollars ($3,977,250 28), in sums averaging $16 32. The commissions paid on these orders amounted in round numbers to $35,000, and the expenses to $28,000; profits $7,000. The system has now paid an excess of $90 over all its expenses from the start.

SOUTHERN RAILROADS.

The domestic mail-service has been extended 38,581 miles; chiefly in the lately insurgent states. Nine tenths of the railroads in the South are now in operation, consisting of ninety roads with an aggregate length of 8,170 miles; leaving 14 roads, with a length of 696 miles, idle.

ACTIVE FOREIGN CORRESPONDENCE.

The foreign postage collected has been nearly half a million dollars greater than last year. Over nine millions of letters have been exchanged with foreign countries, about an equal number passing each way. The increase in the European correspondence over that of 1865, is remarkable, amounting to 1,851,330 letters. Over four millions of newspapers were exchanged with foreign countries, and more than two-thirds of these went *from* the United States: increase, only about 30,000.

CONSUMPTION OF POSTAGE STAMPS.

Twenty tuns, or, by superficial measurement, forty-eight and a half square miles, of postage stamps, have been used during the year: enough to roof a large township, with all its houses, barns, churches, gardens, forests and farms; or, if you choose to make a ribbon of them, enough to reach nearly from the equator to either pole, or twice the length of the Mississippi river. So that if everybody would be obliging enough to use the government stamp on the envelope itself, the mere omission of these little extra bits of paper would lighten the mail-bags by more than forty thousand pounds, and save in paper fifteen or twenty thousand dollars. The Postmaster General does not impart this information in so many words, but he assures us that nearly 350 millions of stamps have been sold in the year past, beside nearly forty millions of stamped envelopes; and a simple calculation reduces the story to the more tangible form we have given it.

THE NAVY.

Material and occasion for numerous suggestions of great interest might be found in the present state of naval affairs; but Secretary Welles is popularly supposed to be a man not easily roused, and his report is hardly of a rousing character. There is nothing new in the references made to our successful ocean monitors, or in the suggestions advanced on the subject. A great increase of ship-houses, building shops, dry docks and building materials, at the navy yards, the renovation of the yards at Norfolk and Pensacola, and the settlement of a fresh-water station for iron bottoms, are strongly urged. There is nothing worth mentioning about harbor defenses. The universal deterioration and decrease of seamen is referred to, and an improvement in their condition, which is indispensable to induce men in these days to seek the dangerous calling of sailors, is recommended in general terms. Economical management of the liberal war appropriations to the Navy Department has enabled it to complete all the vessels and engines contracted for before the close of the war, leaving a residue of about fifty millions which can be relinquished to the Treasury. The navy does not appear to be improving its present leisure by any service of a scientific character.

COAST DEFENSES.

As everybody knows, the entrances of the New York and other harbors are being lined with tremendous weights of metal, in batteries of enormous length, of fifteen and twenty-inch guns. Surveys of the lakes are energetically prosecuted.

SMALL-ARMS.

A plan for converting Springfield muskets into breech-loaders more efficient than the Prussian needle gun, and at a comparatively small cost; also models of new breech-loaders for the various arms of the service, have been decided on by the special Board of officers appointed for that purpose, whose lengthened experiments have often been publicly referred to. The manufacture and alteration are already vigorously going forward, but the Secretary does not deign to throw any light upon what he is doing. Nobody out of the department seems to know what improvements have been adopted.

FEVERISH PRICES AND ENFEEBLED GROWTH.

The Treasury report imputes to a redundant currency and a fallacious inflation of values, a decline in American enterprise, on sea and land, exhibited in the slow construction of needed dwellings and manufactories, in the abandonment or inactivity of most of our ship yards, and in a decrease of our tunnage clearances in foreign trade from upward of six millions in 1860 to less than three and a half millions in 1866, while the foreign tunnage cleared from our ports increased from two and a half to four and a half millions. The Secretary, that is, does not see in the stifling of our ocean enterprise by British Confederate privateers during the war, adequate cause for its continued torpor after two years of peace.

GOLD PRODUCT.

The value of gold assessed for Internal Revenue the past year has been $81,389,541. Of this amount, $70,032,805 were assessed on the Pacific side; twenty-five per cent of the whole product being estimated as having escaped assessment. Adding this, and allowing about half the gold assessed in the East to be foreign, the total domestic production is estimated at $93,219,374; an increase of $19,675,015, in comparison with 1865.

NATIONAL BANKING SYSTEM.

Only eleven banking institutions have been converted into national banks, in the year ending Oct. 1, 1866. Fifty-one new national banks have been organized. Sixteen are closing or closed, and 1,647 are in active operation. Aggregate capital paid in, about 418 millions of dollars; bonds to secure circulation, about 330 millions; circulation not quite 300 millions, being an increase of about 100 millions, reduced to about fifty millions by State circulation retired by converted banks. Total resources $1,525,493,960; liabilities for circulation and deposits $1,024,274,386: leaving a surplus of $501,221,574 for capital and earnings.

NEW YORK THE METROPOLIS.

Every national bank in the United States is obliged by the necessities of business, to keep an account in New York; and about 1,000 of them voluntarily redeem in New York, of all the seventeen cities from which they are allowed by law to choose. The necessary principle of requiring all national banks to receive each other's notes at par, while it would be manifestly unsound policy to compel private creditors to receive them as legal tender, throws great risk and periodical embarrassment upon the banks at the centers of trade where circulation accumulates, and furnishes an unanswerable reason, in the opinion of the Controller of the Currency, for requiring all national banks to redeem at one or another of the great centers—in New York, Boston, Philadelphia, or better still, in New York alone.

PUBLIC LANDS.

The whole public domain now contains nearly 1,500 millions of acres, of which only about one-third have been surveyed. Upward of four and a half millions have been disposed of in the year, of which only about 388,000 acres were sold, while nearly two millions of acres were taken up by settlers under the homestead act, nearly a million and a quarter of swamp lands were conceded to the States (making over 43 millions in all), and the rest were absorbed by railroads, military warrants and agricultural colleges. Measures are recommended for promoting the planting and growth of timber on the public domain.

PATENTS.

There were 14,039 applications for patents in 1866; about 3,000 more than in any previous year. Of these, 10,130 were granted, of which 8,716 have been issued.

PENSIONS.

It is a singular fact that although but one Revolutionary pensioner—Samuel Downing, of Edinburgh, Saratoga county, N. Y.—now survives, there are no less than 931 widows of Revolutionary soldiers still on the pension rolls. The greater longevity of women will not account for this enormous discrepancy, and the fact that pensioners and annuitants live long, seems equally in favor of both sexes. Of course, the widows of those killed in battle swelled the proportion of female pensioners very largely, but this could not have multiplied it 900 times, hardly 10 times. Probably, in consideration that "none but the brave deserve the fair" (not to speak of the pensions) the surviving heroes were generally and even repeatedly blessed with youthful and blooming brides. There are now, in round numbers, 45,000 invalids, and 70,000 widows and relatives on the rolls, at an annual cost of eleven and a-half millions of dollars.

A New Caustic.

Perhaps we should rather have headed this item "an old bleacher," instead of a new caustic. A Mr. Augustus Barnes proposes to take out a patent for removing spots, moles, nævi, and other diseased conditions of the skin, by the action of sunlight concentrated through a lens. Dr. P. W. Ellsworth, of Hartford, in the *Medical and Surgical Reporter*, vouches for the removal of a nævus covering four or five square inches of the face, of a deep cherry red color, approaching purple, and covered with knobs of condensed tissue an eighth of an inch high. After two applications, every knob had disappeared, the skin had gained a natural color, and, as a deformity, the nævus was practically cured. Mr. Barnes professes also to have removed small tumors, to have produced a true and healthy skin on the surface affected by ichthyosis, and to have high expectations in regard to lupus and incipient cancer. The prospects of the colored race also open a boundless field for speculation under the power of Mr. Barnes's magic lens.

BREAD, beer and buttermilk (and the same is partially true of butter), directly after being made, make a rapid exchange of carbon for oxygen, with a proportional improvement in wholesomeness. Bread, when thus ripened, is computed to contain twenty per cent, more of nutriment than when hot from the oven. The change in both taste and texture is very marked. It is important to have all

these articles ripen in a pure, clear atmosphere, as they absorb very freely the ill savors and unwholesome ingredients of the air around them.

[From our Foreign Correspondent.]

ROLLING STOCK OF ENGLISH RAILWAYS.

LONDON, Nov. 15, 1866.

Having, in my last letter, noticed the principal features of English railways in respect to "works of line" and permanent way, I now proceed to give some description of the rolling stock. Owing to the excellence of the permanent way, some arrangements, which on our roads are necessities, have not been as generally introduced in English locomotives; and while with us makers have settled on one or two types of engine exclusively, the variety of arrangement here is much greater. There are many lines, however, which of late have adopted several American ideas, such as the Bissell truck, the equalizing bar between coupled drivers, and placing the steam chest on the top of outside cylinders; and it is probable that the use of most of these will ere long become general. The English locomotive, however, though unfit for American roads, is nevertheless, for the roads on which it has to run, an excellent machine, and presents some points which we would do well to copy. For good engines the type most generally adopted is six coupled driving wheels, about five feet diameter, without other wheels. For an engine of twenty-seven tuns' weight, the amount on each pair of wheels would be about nine tuns on the forward pair, eleven and a half on the center or driving axle, and six and a half tuns on the after pair. Such an engine would have cylinders eighteen inches diameter by twenty-four-inch stroke, with a thousand square feet of heating surface in the boiler, and carry one hundred and twenty lbs. steam. For passenger engines there is greater variety. The majority have inside cylinders, though a respectable proportion have outside. A favorite plan has been to give but a single pair of driving wheels, of from six feet six inches to seven feet six inches diameter, with one pair of leading and one pair of trailing wheels, of three feet six inches diameter; cylinders sixteen inches or seventeen inches diameter by twenty-four-inch stroke. The driving wheels in these carry eleven or twelve tuns, but, as we should suppose, they are often deficient in adhesion. Four coupled wheels are now more in favor, either with a single pair of leading wheels, or with a four-wheel bogie. The largest diameter of coupled wheels is seven feet. There is hardly any arrangement of wheels that may not be found in quite general use, two pair of driving wheels alone, four drivers, and a pair of trailing wheels, four drivers and two pair of leading wheels, or a single pair of driving wheels and a bogie, but the first mentioned forms are perhaps the most usual. The boilers are made of seven-sixteenths-inch plates in the shell, five-eighths or three-fourths for the forward tube sheet, and copper fire-boxes half inch thick, except the tube sheet, which is three-fourths inch thick reduced to five-eighths inch below the tubes. The water spaces around the fire-box are two and a half inches to three inches wide. The circular seams of boilers, as a general thing, are single riveted, while the longitudinal ones are double riveted, three-fourths inch being the usual diameter for the rivets. As this plan is not generally followed with us, it is worth while to call attention to the reason why it is done here, and why it certainly is the right way to build boilers. The strain on any joint or section of a boiler is proportioned to the area acted upon by the steam divided by the amount of length of section of metal to resist the pressure. Now the pressure tending to tear asunder the circular seams is due to the area of the ends of the boiler, and is resisted by a length of section equal to the circumference. The pressure tending to rupture the longitudinal seams is due to the diameter of the boiler multiplied by any unit of length, and the resisting section of metal is twice that unit of length or the amount on each side of the barrel in that length. Now as the area of the end is equal to half the circumference multiplied by half the diameter, the strain on the circular seams, which is as this amount divided by the circumference, will be as the diameter divided by four, while on the longitudinal seams it is as the diameter divided by two, or twice as great per unit of length. If, in addition to this, we consider that the area of the heads taken up by the tubes, on which there can be no pressure, is very great beside the proportion of the strain that they themselves bear, we see that the circular seams always have a great excess of strength over the longitudinal ones, and hence the propriety of double riveting the latter. Angle iron is used in the construction of boilers to a larger extent than we should think advisable, though the best builders only use it for fastening the forward tube sheet to the shell.

The tubes are always of brass, and are set with steel ferrules at one or both ends. Steel is coming largely into use for boilers, on account of its great strength and the facility with which it can be flanged to any desired form. It may reasonably be expected, also, that the reduction ofthe thickness of the plates, consequent on the substitution of steel for iron, will remove a difficulty which is always found with English locomotive boilers, but which is unknown in America, viz., the grooving of the plates just at the end of the lap of the circular joints in the submerged part of the joint. This has always been a most serious trouble, since the plates are reduced to an unsafe thickness just at this part long before the remainder of the boiler is at all impaired by use. This cannot be due to bad calking, for it occurs in places where no calking is done. It is attributed by some to the strain caused by expansion, tending to buckle the plates, especially where, as in some cases, no expansion joint on the frame is provided; and if this be the cause it would no doubt be less serious with comparatively flexible thin plates than with the thicker ones. The adaptation of the fire-boxes to the burning of bituminous coal is generally very simple and quite effectual. On the London and South-western perhaps the most complete combustion of the gases is obtained by the use of large quantities of fire brick in the form of tubes, arches, and gratings, to insure the requisite heat for ignition after the air for combustion has been admitted; but as this system is very heavy, and not readily applied to existing boilers, it has not come into as general use as other less expensive and scarcely less perfect means. The most usual plan is to have an arch of fire brick projecting from just below the tubes, about half way across the fire-box, and under this air is admitted through two openings in the front of the fire-box seven inches square, provided with dampers by which the quantity can be regulated. Or the air may be introduced at the door, and thrown down toward the arch by a deflector of old sheet iron, in either case the air being obliged to mingle with the gas and ignite before entering the tubes. Sometimes the deflector is used without the fire-brick arch, and in some cases there is no fire door at all, though, unless the firing be constant, this must, I should think, admit too much air. In all arrangements an ample supply of air is provided, and some means for preventing it from entering the tubes without having combined with the gas. As this is a matter which greatly affects the coal bill of a railway, it is well worth the careful attention of those in charge of such matters with us. The fire door is now always made sliding, and consists merely of two plates, connected by links in such a way that they open and shut together by a simple push with the foot on a suitable lever. Beside being much handier and more out of the way, they have the advantage of not being blown open in case of the failure of a tube. The usual size of blast pipe is four and a half inches or five inches, always single. English engineers deem it very important that the boiler should be subjected to no strain other than that arising from the pressure of the steam. Accordingly the cylinders are fastened to the frame alone, and all the working strains are sustained by the framing, the boiler being simply carried on it. The frames consist of deep plates, one inch thick, running the length of the engine, with jaws forged on, wide enough to receive the axle boxes, and in some cases made deep enough at the forward end to completely encircle the steam chest of an outside cylinder (which is at the side of the cylinder, and projects inward through the frame) and allow of a goodly number of bolts being put through the frame and casting. This form of frame is, no doubt, very rigid and good.

With inside cylinders the two steam chests are turned toward each other and bolted together, the cylinders being bolted to the two frames by flanges on their opposite sides. This is an exceedingly inconvenient arrangement for taking care of the valve seats, as there is but a narrow space for getting at them to scrape them if necessary, yet there is but one line, the London and South-western, that has adopted our plan of using a rock shaft, and placing the valve chest where it is accessible. In regard to valve motion there is much greater variety than with us, for while we have generally agreed upon the shifting link of the curved slotted form, with knuckle joints for the eccentric rods behind, here there is not only a division between the shifting and stationary links, but in regard to form and positions of the centers there is every possible variety. In addition to these there is a form of link which has been largely adopted of late, from the cheapness with which it can be made, which is a combination of the two systems, the link being straight, and therefore easy to fit up, and is suspended from a weigh shaft which also carries at its opposite extremity the valve-rod link, so that when one is raised the other is lowered, and both move in the operation of reversing. This gives as good a distribution of the steam as the other forms, and in addition to its simplicity has the advantage of dispensing with the counterbalance, as the link and valve rod link counterbalance each other.

The reciprocating parts are now mostly made of Bessemer metal, to insure strength with lightness. The pistons are made in a much simpler manner than ours, and are equally good as regards tightness and smoothness of the cylinder. They are generally packed on Ramsbottom's patent, in which the piston is a light solid disk, with a flange to give width of bearing on the cylinder. In this flange are turned three square grooves five-sixteenths inch wide, and into these are spring rings of square steel wire of that size, cut carefully to exactly the proper length, so that the ends shall just come together when in working condition, having first been bent to the proper curve so that they shall be pressed out by their own elasticity to a steam-tight bearing. Nothing could be simpler or more efficient than this for a piston packing.

All locomotive wheels are of wrought iron, generally with steel tires. As already stated, the size of both driving and carrying wheels is larger than with us, and the same applies to the carriage wheels also, which gives an advantage in regard to ease of traction, at least where the roads are good enough, as they are here, to admit of them without danger of riding the rails. SLADE.

Patentees in France.

Commissioner General Beckwith, ina letter to the Secretary of State, says he addressed an inquiry to the Imperial Commission, some time since, concerning the legal right of foreigners holding French patents for their inventions, to exhibit and afterward sell the foreign-made products thus patented in France, without forfeiture of the French patent. The Imperial Commission referred the inquiry to the Minister of Commerce, and were informed that, in the opinion of the government, such exhibitions and sale, if duly authorized by the Minister of Commerce, would not operate a forfeiture of patent; but that the decision of questions touching such forfeiture belonged to the courts of law.

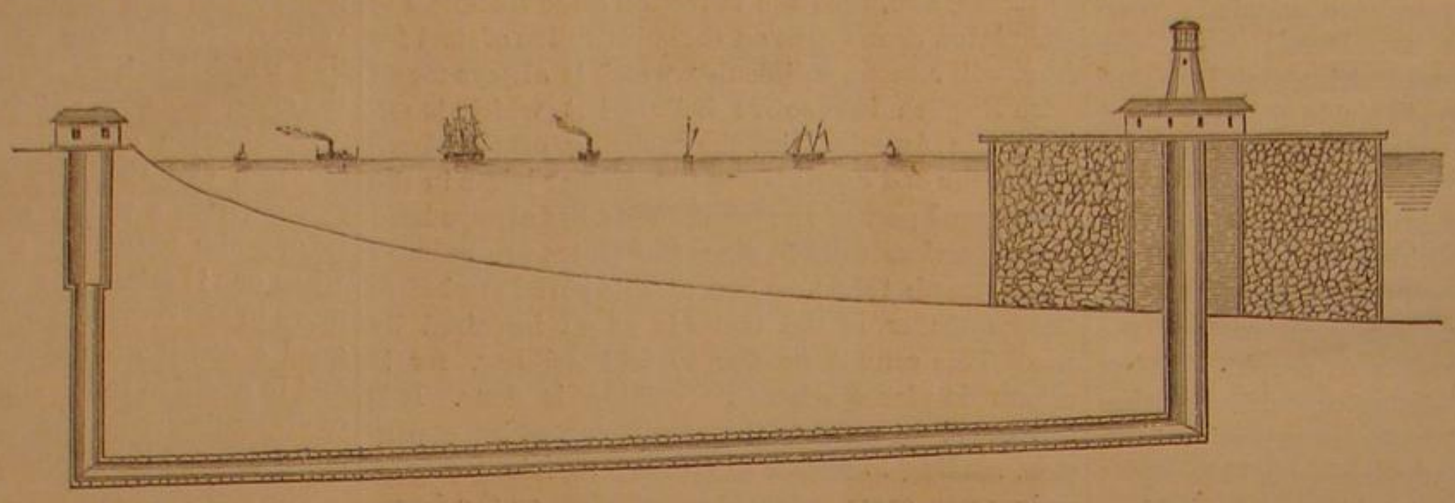
Just so, Mr. Beckwith. The reply of the Minister of Commerce decides nothing. That functionary refers the matter to the courts, where it properly belongs. He has no more power to upset the patent laws of France than Secretary Browning has to declare void the patent laws of the United States. The French law will invalidate a patent if the article is made abroad and sold there. To remedy this evil requires new legislation and not the *ipse dixit* of a Cabinet Minister, who is merely an executive officer.

TUNNEL UNDER THE ENGLISH CHANNEL.—Surveys are going forward in the bed of the English channel for the projected tunnel from Dover to Calais. The engineers have a steam tug especially fitted out with scientific apparatus and employed in this survey.

THE GREAT WATER TUNNEL UNDER LAKE MICHIGAN.

Our exchanges bring us, this week, accounts of the virtual completion of a work of American engineering, which, for boldness of conception, unerring skill, and uninterrupted success, deserves to be classed with the proudest achievements of the old world, or of any age.

The greatest produce market in the world, and the most energetic and enterprising city on even the American continent, Chicago has grown up in thirty-six years from a lair of wild beasts to a great metropolis, under some of the grossest natural disadvantages that ever taxed the resolution of any similar community. Its water supply—always miserable, since the drainage of a city begun to be mingled with the lake from which it was drawn—has been all this time growing execrable, until hardly fit to be tasted by man or beast. There the crystal waters of Lake Michigan, among the purest in the world, spread out before the tantalized citizen in all their beauty, beyond his reach, poisoned far along the shore by a ceaseless drench of abominations from the sewers of the city. It was impossible to conduct water from any point remote enough to be assured against this contamination; and in fact, the shore water from whatever point must always continue subject to every variation of impurity from attrition with the banks and from the deposits washed down by streams and rains. The pure and undisturbed depths of the mid-lake were the only source from which a supply of clean water could be obtained. It was resolved to reach those depths by a tunnel under the bed of the lake, tapping its bottom at a distance of two miles from the shore. Surveys of the lake-bed, by means of an auger inclosed in a tube, revealed the favorable circumstance of a continuous underlying stratum of hard blue clay. The contract for the bold undertaking was awarded in October, 1863, to James Gowan and James J. Dall, of Harrisburgh, Pa., at the sum of $315,139. They have already expended more than double this amount, mainly in consequence of the enhanced prices of labor and materials; and it is expected that, with all changes, improvements and finishing touches, the waterworks will not be completed for less than $1,000,000. The contractors have as yet received no relief; but their splendid success warrants the expectation that the city of Chicago will not suffer them to go either unrepaid or unrewarded.



CHICAGO WATER-WORKS TUNNEL.

Work was begun at both extremities—the shore end and the lake end—of the tunnel. At the latter point the great engineering difficulty and triumph occurred. The violent storms on the lake, it was thought by eminent engineers, would make it impossible to fix a permanent structure in the waters. A huge wooden crib, or coffer dam, was built, like a ship, on the shore, launched, and towed to its location. It was 40 feet deep, five-sided, 290 feet in circumference, and over 90 feet in diameter. Its angles were armored with iron two and a half inches thick. It had three distinct walls or shells, one within another, each constructed of twelve-inch square timber, caulked water-tight like a ship, and all three braced and girded together in every direction, with irons and timbers, to the utmost possible pitch of mechanical strength. The central area, or well, inclosed by the inner wall, was only twenty-five feet in diameter; leaving spaces about fifteen feet wide between the shells. Within these spaces were constructed fifteen caulked and water-tight compartments, which were filled with clean rubble stone, after the crib was placed in position. By this means the crib was sunk to the bottom, where it was firmly moored by cables reaching in every direction to huge screws forced ten feet into the bed of the lake. The water in which it was sunk was 35 feet deep, leaving five feet of the structure above the surface. This was in June, 1865. The crib had cost $100,000; consuming 618,625 feet of timber, 65 tuns of iron, and 400 bales of oakum.

The next business was to sink a water-tight shaft within the well of the crib, and into the bottom of the lake to a depth of some thirty feet further; making 66 feet in all below the surface of the water. Seven great iron cylinders were cast, each about 9 feet long, nine feet in diameter, 2½ inches thick, and weighing 30,000 pounds. One of these cylinders having been suspended in the well, another was placed upon it, the two were firmly bolted together with a water-tight joint, lowered, a third cylinder bolted to the second in the same manner, and so on until the shaft, a solid iron tube 64 feet deep, rested on the bottom, and forced its way by its own weight through the softer deposits into the hard blue clay beneath. The water was now pumped out, the top of the shaft was closed as nearly as possible air tight, and a powerful air-pump, driven by steam, commenced to exhaust the air also. As fast as a vacuum could be created, the atmospheric pressure, added to its own weight of over one hundred tuns, forced the huge shaft downward into the bed of the lake with inconceivable force. Thus a depth was reached and secured, at which it became perfectly safe to carry forward the excavation, and complete the shaft to the level at which the tunnel was to begin. The loose rubble stone is finally to be taken out of the water-tight compartments, one at a time, and they will be re-filled with piers of solid masonry, laid in hydraulic cement, and united above the surface in some manner, so as to present an immovable front on all sides against the force of storms. A light-house is to surmount the whole.

The process of constructing the rest of the tunnel was simple, though interesting. Three sections of great cast-iron tubing, like that used in the lake shaft, were let into the earth by simply excavating beneath them, and letting them sink as the earth was removed. Having thus worked through the sands, and into the blue clay, the shaft was now narrowed to eight feet, and completed and walled in the ordinary maner to a total depth of 77 feet. This shaft was sunk four feet further below the surface of the lake than the lake shaft; causing a descent of two feet to the mile in the tunnel, to facilitate emptying it when required.

Both shafts having been completed, the excavation of the tunnel was commenced from both ends. On the 16th ult. the opposite gangs of workmen were within two feet of each other; and on the following day, the Board of Public Works formally broke through this last natural obstruction to the passage of the pure waters of the mid-lake into the city of Chicago. The accuracy with which the two lines of excavation met was an admirable engineering success. The center lines coincided within nine and a-half inches, and the floors joined with a difference of only one inch. The tunnel is nearly a true cylinder, of five feet diameter in the clear, but worked two inches higher, vertically, on account of the keystone of the arch. It is lined with the best of brick and cement, 8 inches thick, laid lengthwise, in two shells, with toothing joints. The lining of the shore shaft consists of twelve inches of the same masonry, in three shells. About 4,000,000 of bricks were used.

Ground was first broken on the 17th of March, 1864; and the work has been continued with but slight interruption, night and day, and at all seasons. A narrow railway was laid from the foot of each shaft, as the work progressed, with turn-out chambers for the passage of meeting trains; and small cars, drawn by mules, conveyed the excavated earth to the hoisting apparatus, and brought back at every trip a load of brick and cement. The men worked in gangs of five, at the excavation; the foremost running a drift in the center of the tunnel, about two and a half feet wide, the second breaking down the sides of the drift, the third trimming up the work to proper shape and size, and the last two loading the earth into the cars. The bricklayers followed closely, only a few feet behind the miners. About a hundred and twenty-five men were employed in this work, in three relays, working eight hours each; the only cessation being from 12 o'clock Saturday night, to 12 o'clock Sunday night. A current of fresh air was constantly forced through the tunnel by machinery. It is remarkable that no accident from earth, gas, or water, occurred in the whole course of the work, sufficient to interrupt its progress.

Water is to be let into the lake shaft by three gates, on different sides, and at different hights. The lowest is five feet from the bottom of the lake; the next ten feet, and the highest fifteen feet. Flumes through the surrounding masonry, also closed by gates and gratings at their outward ends, will conduct the water to the shaft gates. All the gates can, of course, be opened and closed at pleasure. Chicago will boast—with how much reason unprejudiced water-drinkers must judge—of all other cities on the continent, the best supply of the best water, at a trifling cost for both construction and maintenance—if the work holds as good as it promises to—in comparison with some of her eastern sisters.

Galileo's Instruments.

About a year since, M. Boquillon, formerly librarian of the *Conservatoire des Arts et Metiers*, of Paris, and who enjoyed a high reputation as expert in connection with scientific questions before the French law courts, went to Italy commissioned to search the public libraries, museums, and private collections of that country, for all the documents throwing any light upon the labors of the great astronomer and natural philosopher, Galileo. It is said that the many works and dissertations published respecting the life and experiments of the illustrious Tuscan abound in grave errors, and that M. Boquillon has been fortunate to find authentic materials for correcting these errors. With the assistance of M. Mateucci, formerly Minister of Instruction in Italy, and M. Donati, the astronomer, M. Boquillon has had access to all the manuscripts of Galileo, and has been enabled to read, study, and compare them at his ease, and is now in a position to publish a complete work upon the subject. Some of the documents which will be embodied in this work are said never to have been made known to the scientific world. The museum called *La Specola*, in Florence, possesses a most precious and interesting collection of scientific relics, namely, the instruments which served for the experiments of Galileo and for those of the *Academy del Cimento*; they are preserved in that portion of the museum which is known as the Tribune of Galileo. The greater portion of these instruments are composed of extremely thin transparent glass, and they are said to be perfect marvels of the glass-blower's art. The whole of these have been carefully photographed, under the direction of M. Boquillon, by two of the ablest photographers of Italy, and it is said that these interesting reproductions of the instruments, which served for the famous experiments of Pisa, will be shown at the Exhibition in Paris next year. It is hardly possible to imagine a more attractive series of pictures than these will present to the scientific world.

A NOVEL and commendable feature of a recent fair in Canada consisted of two essays by young ladies on the qualifications of a farmer's wife.

English Hop Culture.

The culture of hops is becoming profitable and extensive in this country, in consequence of the great influx of beer-drinkers from abroad, and the growing fashion of beer-drinking among Americans. A few notes on the English hop plantations may therefore be of interest and use; conceding the disputed point, that beer is an addition to the sources of human welfare.

The hop culture in England is so extensive, particularly in the counties of Kent and Sussex, that the picking season draws throngs of laborers by railway and otherwise, from the great cities and all parts of the country, and keeps them profitably employed from three to six weeks. "Hop gathering," as most of our readers interested in the fine arts will remember, has been made the subject of a very pleasing picture by a modern English artist. The motley multitude of men, women and children, employed in hop gathering—encamped together as they are for weeks in the open fields, by night and day, in wild but crowded liberty—must open a yawning door for missionary work. Whether the long, promiscuous encampment be on the whole more demoralizing than the pure influences of nature are salutary, to these poor creatures, may be matter of doubt.

The heavily laden poles are first hauled out of their earthen sockets and placed in piles, by a class of hands employed for that purpose, and using a lifter with iron teeth, acting as a lever. The pickers throw the hops into canvas sheets, loosely hung within frames like a light bedstead. The measurers pass around and empty these receptacles as often as they are filled, leaving each picker checks indicating the number of bushels, according to which they are paid.

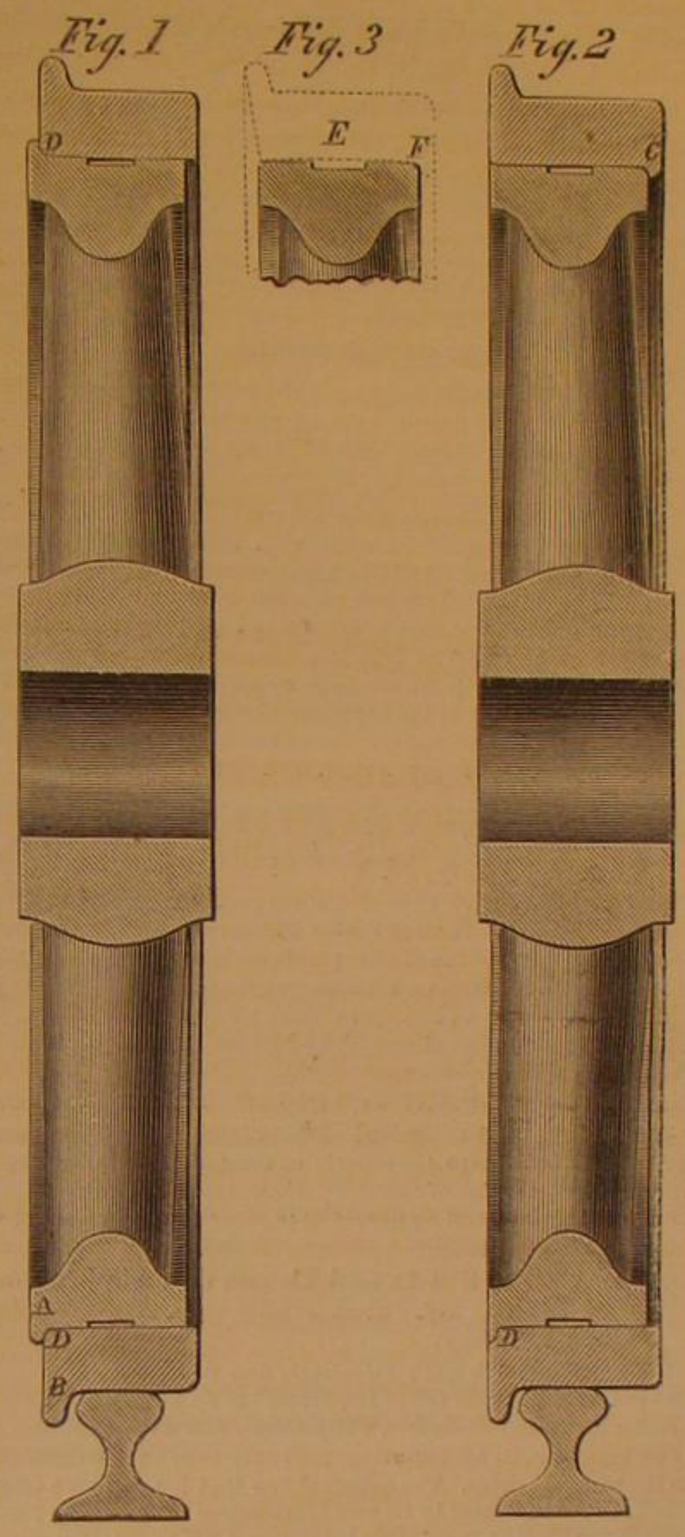
From the field, the hops go to the "oast house," or drying house. The word is of doubtful etymology: Webster only suggests a conjectural analogy to the latin *ustus*—burned. The oast house is a circular building from eight to eighteen feet in diameter, or very commonly a cluster of four such buildings, meeting in one at the center; each having a spiral roof, with an opening at the top covered with a revolving cowl, to secure a strong and uninterrupted outward draft. The first floor is occupied by fires, placed about the center, of charcoal and Welsh coal, causing little smoke. Roll sulphur is added at intervals, to give the hops the pale yellow tinge so much sought after. The second floor is made of horsehair to afford free and uniform passage to the heat and sulphurous fumes of the fires beneath, supported on a light framework of wood. Upon this horsehair floor the hops are emptied as they are brought from the plantation; spread, stirred and turned, from eight to eleven hours, until thoroughly dried by the heat; and afterward transferred to a cooling room. When cooled, they are compressed into bags, and branded for market.

MELLONS' IMPROVED LOCOMOTIVE TIRE.

The unavoidable working loose of the tires on locomotive driving wheels is a large annual bill of expense to all railroad companies. Usually dependence has been placed mainly on the adhesion of the tire to the wheel by shrinkage, with other mechanical devices. In time the tire becomes expanded by the continual pressure, combined with rolling, to which it is subjected, aided perhaps by the percussion incident to a defective permanent way, and the tire is loosened, endangering not only the locomotive, but the train with its passengers. Then comes the annoyance of removing and reheating the tire, "shimming up," and sometimes returning the surface. The inventor of the improvement under consideration attempts to remove these objections and obviate these difficulties. He does not hope to prevent the gradual stretching of the tire from use, but to prevent it when loose from moving from its seat, endangering life and property.

Figs. 1 and 2 in the engraving represent the improved method of forming and attaching the tire. Fig. 3 is a section of an ordinary tire worn and stretched by use. Fig. 1 shows a wheel and improved tire section, the wheel having on its inner edge a rim against which the edge of the tire sets firmly. It will be seen that the flange, A, on th periphery of the wheel prevents the tire, should it become loose, from slipping off at the inner side of the wheel, and the flange, B, of the tire prevents it from slipping off on the outer side.

The same result will be attained by having the inner surface of the tire at its outer edge provided with a flange, as at C, Fig. 2. It will be noticed that the inner edge of the tire, where it comes in contact with the wheel, is rounded, as at D, to prevent it from indenting or sinking into the substance of the wheel and rendering the removal of the tire difficult. In Fig. 3 is seen the result of the



spreading of the tires ordinarily used. The center of the tire is concave, as at E, while the edge, at F, has spread over the edge of the wheel. Frequently this overlapping compels the cutting of the tire in order to effect its removal. No bolts, rivets, nor keys are required to secure this improved tire. If it becomes loose while on the road, it will be safe until the terminus or shop is reached, as it cannot fly off, when it can be readily removed and replaced by another.

Patented through the Scientific American Patent Agency, Oct. 2, 1866, by Edward Mellon, of Scranton, Pa., to whom those interested should apply for additional information.

THE Commissioner of the General Land Office, at Washington, has received rich specimens of argentiferous galena from newly discovered veins in Colorado, within five miles of one of the finest coal veins in the territory. The discovery (says the *Intelligencer*) is important, as it indicates a continuation of the precious metallic veins in a north-easterly direction nearly if not quite to the plains, and in close proximity to the coal.

"THEIR Academy of Natural Sciences (says the *Enquirer*) has been for fifty years a pride to Philadelphians. No other city on the continent possesses so fine a collection." The specimens collected are said to be worth half a million of dollars. The Building Fund Committee are now making a final appeal for subscriptions to secure a fire-proof building worthy of the institution.

Correspondence

The Crank and Piston in Setting Valves.

MESSRS. EDITORS:—I trust you will excuse me if I respond to some editorial remarks appended to the letter of a correspondent in your issue of Nov. 24. In the communication referred to there is a diagram of the crank of a steam engine, giving the relative positions of crank and piston at various points of the stroke. Concerning the best method of finding this, much correspondence has been published in the SCIENTIFIC AMERICAN. In the remarks I criticise it is said, "the importance of a correct knowledge of the relative positions of the crank and piston will be conceded by those who have to set the valves of steam engines." I do not think this will be conceded, Messrs. Editors, for the following reasons:—

The crank has nothing whatever to do with setting the valves.

Any valve set with the crank as a guide is more apt to be wrong than right, for the reason that the relative distance moved over by the crank and piston vary with different points of the stroke, vary with different strokes, and with different lengths of connecting rod.

All valves that cut off steam at a given point of the stroke should have that given point measured from the end of the slide, not on the crank. The large number of badly-set valves you speak of is accounted for by guessing at the position of the crank and piston, or by measuring on the crank, which amount to the same thing.

Further, the expansion of bed plates and springing of valve and eccentric rods, always derange the lead, even when it is measured on the slide. It is much more liable to be deranged when measured on the crank, for the reason that the point of no motion on the slide, at or near which lead is given, cannot be found on the crank without much trouble, for when the piston is on the dead center the crank has freedom to move through a considerable arc, enough to disturb the lead very much.

It is not of any importance to know the relative position of the crank and piston in setting valves, but I do not see any harm in persons amusing themselves by making diagrams of it. The practice is akin to the problem of the celebrated ten-foot pole in the forty-acre lot, which casts a shadow at sunrise so many feet long; how long will it be at some other time?

It may be asserted, without fear of contradiction, that if we take care of the piston, the crank will take care of itself, for we measure divisions in the cylinder by the space occupied and traveled through by it, not by the movement of the crank.

EGBERT P. WATSON.

New York City, Dec. 21, 1866.

[We publish the above communication for the purpose of drawing attention to some erroneous opinions in it, which we believe are shared by a number of mechanics. The ordinary steam engine not only is a medium for transmitting the power of steam by the reciprocating movements of the piston, but is also a medium for converting those movements into a rotary motion by means of a crank with its connections. The movement of the piston is not often exactly coincident with that of the crank, varying, as our correspondent truly says, "with different points of the stroke, with different strokes, and with different lengths of connecting rod." It will be evident to any one who will sit down and analyze the diagram accompanying the article to our comments on which Mr. Watson takes exception, that the "crank *has* something to do with setting the valves," and that it *is* of some importance to "know the relative position of the crank and piston in setting valves." One of the uses of the indicator is to ascertain the difference between the action of the steam at either end of the cylinder and that at the other. We have seen diagrams taken by the indicator, from an engine built by a manufacturer whose name on an engine is a guarantee almost of perfection, which showed a difference amounting to one-eighth of the power exerted on the piston. Yet the valves were set, as our corre-

spondent advises, without regard to the position of the crank. The valves in this case had probably been shifted after being set by the manufacturer.

We have neither time nor space to enter into any lengthy explanation in regard to this matter, as it can be readily understood by an examination of a diagram similar to that published in our issue of the 24th ult.—EDS.

Water Spouts.

MESSRS. EDITORS:—In No. 22 of your journal I read with interest a very able article entitled "Water Spouts in the Mountains," signed "D C."

I propose to relate the appearance of something similar to what "D. C." describes as a "Water Spout in the Mountains," that I witnessed thirteen years ago. The place of its occurrence was upon Long Mountain, in New Milford, Conn. I do not know its exact elevation, but will call it nearly one thousand feet above the level of the sea.

It was on the 8th of August, 1853, the morning of which broke forth with unwonted splendor, though very hot. Before 10 o'clock, A. M., the wind had veered to every point of the compass, and had been especially partial to the N. W., W. and S. E., making several calls in rapid succession.

We had kept a close watch upon the high clouds which had been forming for the space of an hour, as it seemed, from every place in the horizon. They had a singular aspect and were incessantly rolling, tumbling and whirling, and then vanishing.

These clouds had almost wholly disappeared by noon, and it bade fair for good weather, but while at dinner some one observed "There's a shower in the west," and, looking, I beheld a large black cloud directly in the west looming up at a fearful rate, and in nearly half an hour from the first discovery of the cloud, a medium thunder shower was upon us. The cloud had not quite reached the zenith, barely obscuring the sun, when it commenced to rain. It was apparently a mile wide at its base, and gradually widened to its summit, which covered about 45°—a huge black, inverted trapezoid, every portion of which was trying to gain the peak. It was a grand and sublime sight.

The rest of the sky was clear for a time, when behold, two more black pillars arose simultaneously, the one in the north-west, while the other was directly opposite in the south-east.

These appeared in great haste, and spread in every direction rapidly. The electric fluid was constantly in motion from the first appearance of each cloud, and increased with the clouds, until it was but a constant blaze and roar, ten times more frightful than any battle scene that I ever witnessed, though I have shared the success and failure of many of the hottest contests of the late war.

I was out in the heaviest part of the storm; the sensation produced is difficult to describe; but there was an absence of pure air that made it almost impossible for one to breathe. The hail, rain, thunder and lightning seemed commingled, and descended apparently perpendicularly.

The storm was of about three hours' duration, and, as I ascertained, was principally terrific within a circle of one mile radius. Deep gulches had been washed in the mountain sides, huge boulders had been displaced, weighing many tuns, and in some instances carried to aconsiderable distance, large trees were uprooted, and the Housatonic Railroad Company lost four large culverts in as many miles. The exact amount of hail and rain that fell will probably never be known; but a neighbor of mine had set an empty flour barrel in the open air, near to which there was no other object, and, at the close of the storm it was full, and of course had been running over. It is evident that not less than thirty inches of water and ice fell upon the level during that shower.

D. B. D.

Gaylorsville, Conn.

EXTENSION NOTICES.

William Smith, of New York City, having petitioned for the extension of a patent granted to him the 5th day of April, 1853, for an improvement in weaving corded fabrics, for seven years from the expiration of said patent, which takes place on the 5th day of April, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of March next.

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 the reception of their funds.

NEW PUBLICATIONS.

POCKET-BOOK OF USEFUL FORMULÆ AND MEMORANDA FOR CIVIL AND MECHANICAL ENGINEERS. By Guilford L. Molesworth. Henry Carey Baird, 406 Walnut street, Philadelphia.

The title of this handy manual is sufficiently suggestive without more than an allusion to its contents, which comprise the data and formulæ which lie at the basis of engineering practice. Not pretending to the character of a treatise, which would be impossible in a volume so small, it gives facts, suggestions, hints, rules, and tables, serving not only as a convenient pocket reference for the thorough mechanic, but as a guide for ordinary workmen. Bound in flexible covers of Turkey morocco. For sale by D. Van Nostrand, 192 Broadway, New York.

THE FOREST-TREE CULTURIST. A Treatise on the Cultivation of American Forest Trees, with Notes of the Most Valuable Foreign Species. By Andrew S. Fuller, of the Horticulturist. Geo. E. & F. W. Woodward, 37 Park Row, New York.

A Timely and appropriate volume which, it is to be hoped, will in some measure, aid in arresting the wholesale and indiscriminate destruction of our forests. The author gives many useful directions in relation to the propagation and care of trees, which are as applicable to fruit as to shade trees. Apart from its value as a manual, it is a very entertaining volume.

MODERN PRACTICE OF AMERICAN MACHINISTS. By Egbert P. Watson, late of the Scientific American. H. C. Baird, 406 Walnut street, Philadelphia.

For apprentices and even for those further advanced, this book will be found invaluable. It teems with useful hints, excellent suggestions, and practical advice drawn mainly from personal experience. It is remarkably free from unexplained technicalities and algebraic formulæ, and is written in a plain, practical, and unassuming manner. The text is profusely illustrated with explanatory engravings, and although much of the matter treats on processes familiar to the experienced mechanic, he will find improved methods described which he could not otherwise learn except by personal communication with others.

IMPROVED PRACTICAL SYSTEM OF EDUCATING THE HORSE. By A. H. Rockwell, Harpersville, Broome county, N. Y.

Some of our readers have doubtless seen the author of this treatise driving his educated horses without reins. The manual contains full instructions as to the methods used in attaining that result, with information on the management of horses in general, and the correction of bad and vicious habits. It is illustrated with explanatory cuts. Price $5, to be obtained only of the author.

REPORT OF THE SMITHSONIAN INSTITUTION for 1865.

We have received the annual report of the above institution for 1865. In addition to the reports of the Secretaries, and a review of the condition of the institution, there are a number of exceedingly interesting papers on popular as well as scientific subjects.

ORIGIN OF THE STARS, and Causes of their Motion and Light. By Jacob Ennis. D. Appleton & Co., Broadway.

We have read this work attentively and with great interest. The points it discusses are of importance to all having any fondness for astronomical studies, while, simply as a work abounding in curious facts, its contents must prove attractive and beneficial to the general reader. The author shows that the earth is a true fixed star, once shining by its own independent light. In the first part of the book he thoroughly investigates the chemical theory of stellar light and heat. In the second part he advances the hypothesis, which he founds on facts, that the conversion or conservation of the atomic force of repulsion, which once held the solar system in a nebulous condition, is the force which prolongs the heat and light of the sun. The origin of the stars is treated of in the third part, while the fourth part shows Gravity to be the force which originally gave motion to the heavenly bodies.

Notes and Queries

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal Queries."

H. L. W., of Mass.—The foaming of boilers is the sudden rising of the water into the steam space in the form of spray or foam. It is seen exemplified, in a manner, by plunging a piece of hot metal into a vessel containing soapsuds. Its causes are not entirely understood. The presence of oil or grease in a tubular boiler, generally will cause it to foam, while in a flue boiler, with great water surface, its effect is directly the opposite. Soap will often cause boilers to foam and foaming is produced from many causes, some of which as yet seem to be unexplained. When a boiler foams it is known by the sudden rise of the water to the steam gage cock, and, as in priming, water frequently passes into the cylinder. The best remedy we know is careful, regular firing and frequent pumping. . . . We have known the water from a woolen mill where soap, soda, and acids were used, to be employed for steam boilers without injury. Acidulated water will oxidize the boiler, and the alkali and grease in soap may cause it to foam; but one may neutralize the other when mixed in proper proportions. We recommend in all cases the purest water for boilers.

W. M., of Ind.—If your specific for preventing the foaming of boilers will do what you affirm it is a valuable discovery.

W. F. D. of Conn., leads water from a spring over a very uneven surface, through galvanized iron pipe 225 rods long. The head of water, or the difference in hight of the surface of the spring and the delivery end of the pipe, is 35 feet. He is much disappointed in the quantity of water which flows through the pipe, and desires to know if he will get more by setting vertically near the spring an iron pipe 20 feet long and 20 inches in diameter, the upper end being level with the surface of the spring, and his inch conducting pipe being connected with the lower end. We answer: the pipe delivers slowly or the flow of water is retarded by friction of the water on the inner surface of the pipe. The 20-inch pipe at the spring will not help the matter at all. It will not increase the head of water, and it is that only which constitutes the moving force. Perhaps the head might be increased by banking or curbing up the spring.

E., of Conn.—The only reason we can give for your grate bars sinking, is that the bars are too near the crown sheets. You do not give the distance, but undoubtedly it is too small. Your grate to a boiler 48 inches diameter should not be less than 14 inches from the crown sheets. Look to your bridge walls also and see if the throats are not too small. Write particulars and we will answer by mail.

J. E. E., of N. J.—The date of the introduction of circular saws has never been ascertained. They have been used for cutting teeth of watch and clock wheels since the time of Dr. Hook, about the year 1700. Such saws were in use for sawing timber, it is certain, about the year 1790, but the exact date when, or by whom, they were first employed, is not recorded.

F. D., of N. Y., says that there are a number of new burning fluids which are claimed to be non explosive. He desires us to tell him the composition of these, and to explain why they are non-explosive. F. D. should indicate more particularly the fluids to which he refers. The danger of explosion from burning fluid arises from its volatility, and we know of no way of destroying that property. The construction and use of the lamp has much to do with the question of explosion.

F. G., of Mich.—There are pretty formidable difficulties in the way of heating cars by steam or water. But the advantages of a successful plan would be so great, that the subject is a very promising one for inventors. The present plan of heating surely needs reform. For some thoughts on the subject see page 297.

C. R., of N. Y.—We recommend for your purpose a gold lacquer composed as follows:—Seedlac, 8 oz.; turmeric, 1 oz.; dragon's blood, ½ oz.; alcohol, 1 pint. Dissolve by digestion and filter for use. . . . . A good way of platinizing the silver plate of the battery, is to connect the plate with a piece of zinc; place the zinc in a porous cup of acidulated water; now set the cup in the platinizing solution, and at the same time immerse the plate in the same.

G. R. asks:—Why do the lightest cutters on a planing cylinder do the most cutting when they are set out the same distance the heavy cutters are, and why do they get dull and worn out the soonest? Perhaps some of our readers will answer this question.

Business and Personal.

[The charge of insertion under this heading is 50 cts. a line.]

P. D. Frey, Chambersburg, Pa., requests information as to the best sizing for putting gold leaf upon glass; also the best manner of burnishing the gold.

Case, Thomas & Co., Waterbury, Vt., request information about coppering iron.

John S. Taxis, Hagerstown, Md., would like to be informed how to unite leather and rubber so as to make a strong and water-proof union.

Joseph H. Bancroft, 121 Hanover street, Boston, Mass., wishes to know where he can procure the safest, cheapest and most economical portable steam heater for a dwelling house of 15 rooms, price, etc.

Dr. J. B. Williams, Pittsburgh, Pa., wishes to know who has the patent for the U. S. of Rousonie's patent silicious concrete stone.

J. T. M. Barnes, Baltimore, Md., desires to procure machine for making paper bags. Give full particulars as to sizes, cost, etc.

W. R Tuttle, Knoxville, Tenn., wants a machine for breaking up stone for macadamizing roads; also the best brick machine.

W. McGuire, Edgefield Junction, Tenn., wants the best machine for making staves 60x4or5x 1-inch thick Also a cross-cut wood sawing machine, also circular saw, also bucket and tub machine. We can furnish Vols. 14 and 15 only bound, $3 75 per vol.

F. M. Patterson, Seymour, Ind., wants a small turning lathe, for wood.

J. W. Sever, Fredericksburg, Va., desires to obtain a good and reliable water meter.

P. Fagercrans, Princeton, Ill., would like to communicate with makers of belfry and tower clocks.

J. R. Carpenter, Salem, N. J., desires the address of Wm. H. Pinner, patentee of rendering pans.

S. Hewes, Boston, Mass., desires to know which of the various electro-magnetic machines for medical use yields the strongest electric current.

J. B. Whitehouse, Florence, Mass., wishes to know where he can purchase an instrument to ascertain the power of any machine, cost, etc.

Jno. H. Calklin, Troy, Pa., wishes to communicate with parties who manufacture small brass tubes; also with parties who would manufacture his patent oiler.

G. Watson, Lowell, Mass., desires information concerning the manufacture of Russia sheet iron.

Sanger, Henricks & Wells, Joliet, Ill., desire to communicate with parties who make nitro-glycerin.

James Foley, St. Joseph, Mo., wishes to communicate with the patentee of the screen used on well pipes, when the pipes are driven.

Ed. H. Bell, Antestown, Blair County, Pa., asks where Sopher's Registering Calipers can be obtained.

James Ross, New Orleans, La., wishes to know where he can order lenses in the rough. He proposes to finish them himself.

J. A. McNeil, Grand Rapids, Mich., wishes for information concerning the manufacture of articles from shells. What is the process in working up the shell of the "pearl oyster," for instance? Also the address of parties who are manufacturing articles from the shell of the pearl. Also the process of eating off the epidermis with acid?

Messrs. Editors:—Can you inform me where to buy the best molding machine. If manufacturers only knew how many business men search and read the SCIENTIFIC, they would advertise their place of business in your paper. Will you be so kind as to inform me the correct way of balancing pulleys, heads, etc. P. C.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

METHOD OF PREPARING PEAT, COAL DUST, AND OTHER SUBSTANCES FOR FUEL.—LOUIS S. ROBBINS, New York City.—This invention consists in drying and preparing peat, coal dust, and other substances, either separately or in combination, so that the material employed shall be economically and uniformly mixed and combined during the process of drying, and at the same time furnishing to the material employed highly concentrated and adhesive substances.

MACHINE FOR SCOURING LEATHER.—FRANKLIN DAVIS, Lawrence, Kansas.—This invention consists in constructing a machine by which the tedious and expensive process of scouring leather shall be accomplished by the use of power, either water, steam, or horse power, in a much more rapid, cheap and perfect manner than it has been done hitherto.

ROCK MOTION FOR HAND PRESS.—CHARLES WELLS, Cincinnati, Ohio.—This invention has for its object to gain power at the ends of the rack, where inertia and momentum are to be overcome in starting and stopping the rack.

SALT BLOCK.—NEWELL BARNARD and JOSEPH G. SPILLER, Saginaw City, Mich.—This invention has for its object to furnish an improvement to the salt block known as Chapin's Patent Salt Block.

MANUFACTURE OF SPRINGS.—J. F. DUBBER, Brooklyn, N. Y.—This invention consists in the use of a former of suitable shape for the purpose of drawing the temper of a spring after the same has been hardened, in such a manner that the said spring can be brought to the desired power or shape while being tempered, and the tedious operation of setting the spring after the temper has been drawn is avoided.

FILING SAW TEETH.—M. M. PETTES, Oxford, Mass.—This invention relates to an implement for the filing of saw teeth, and the invention consists in so arranging or hanging a guide for the file used upon a yoke or frame of suitable shape to be fitted over the saw-blade and moved along upon the same, as to be susceptible of such adjustments with regard to its length as may be necessary to produce the desired form, shape, size, or style of teeth to the saw.

CAST-IRON ARCHES FOR BRIDGES, TUNNELS, ETC.—GEORGE T. LAPE, Summit, N. Y.—This invention relates to an improvement in cast-iron arches for building bridges, aqueducts, roofs, trusses, and vaults for subterranean railroad tunnels and other similar purposes, and consists in making a cast-iron voussoir or section of an arch of such conformation that one voussoir shall constitute a unit of the whole structure.

WATER ELEVATOR.—ISAAC A. PINNELL, Galva, Ill.—This invention consists in providing machinery to elevate water from common wells in such a manner that one or more buckets may be used at the same time.

RAILROAD CAR BRAKE.—SAMUEL H. TIMMONS, Lafayette, Ind. This invention relates to a brake for railroad cars by which all the brakes of a train or series of cars may be simultaneously applied, and by a very simple means connected with the ordinary brakes in use.

PRINTER'S GALLEY.—ALEXANDER T. DE PUY (assignor in full to R. HOE & CO.), New York City.—The object of this invention is to attach the metallic strips or lining which protects the wooden side and end ledges or sides, forming the frame of a printer's galley, to said wooden side and end ledges in such a manner that they may be firmly secured without the means of screws, nails, or any other third material.

SPINNING MACHINE.—WILLIAM and JOSEPH LEACH, Stewartsville, Ind.—The object of this invention is to produce a machine which will take the place of the old-fashioned hand wheel, while it will not be expensive and cumbrous, like the jack.

LOOM.—JOHN WHITEHEAD, Oskaloosa, Iowa.—This invention consists in providing or constructing plates and attaching them to the lathe of a loom so that they may be adjusted in such a manner as to give a light or hard blow, as may be desired.

HOE.—A. C. KASSON, Milwaukee, Wis.—This invention consists in a hoe so constructed that the edge of the blade from the center to each outer corner describes an obtuse angle and the two sides of the blade from the center outward are bent toward each other and toward the handle.

FIRE-ARM.—GRANVILLE HENRY, Nazareth, Pa.—This invention consists in so constructing or forming the frame of a rifle or other fire-arm that the whole stock to be secured to it can be made in one piece, whereby the weight of the stock or but of the fire-arm is greatly decreased and at the same time its strength increased, and at less expense than by the ordinary construction of the frame and stock of a fire-arm.

OIL CAN AND LAMP.—ELIAS ASHCROFT, South Boston, Mass.—This invention consists in constructing an oil can with two spouts or nozzles, the one for pouring out the oil and the other for the insertion of a wick which can be lighted for the purpose of showing clearly where the oil is to be poured, the flame being near the end of the oil spout.

SCAFFOLD BRACKET.—HIRAM BECKWITH, Grass Lake, Mich.—The object of this invention is to prevent the occurrence of the accidents which so often happen to those engaged in erecting buildings in consequence of the insecure scaffolds upon which they stand.

GRAPE-VINE PROTECTOR.—JOHN WALTER, Princeton, Ill.—This invention relates to an apparatus which is designed to protect grape vines and other plants of similar nature from the injurious effects of the mildew in summer and from the frost in winter.

REVOLVING FLUE CLEANER.—G. E. BINGHAM, Milwaukee, Wis.—This invention has for its object to furnish an improved machine for cleaning lime scale, etc., from boiler flues.

CHUCK FOR POLISHING BUTTONS.—EDWIN RUSSELL, Naugatuck, Conn.—The object of this invention is to provide a chuck for holding buttons, such, for instance, as are made of vegetable ivory, so as to enable the workmen to polish them in a lathe, rotary motion being given to them by means of the chuck, and the body having the polishing surface being held against them.

CHURN.—ANDREW J. VANATTA, Vanatta, Ohio.—This invention consists in so constructing and combining a spur wheel and pinion as to give to the dasher of a churn both a rotary and vertical motion for the purpose of breaking the rotary current of the cream made by the rotary dashers, and at the same time agitate the inert cream around the center of the churn, by giving independent motions both to the rotary and vertical-moving dashers.

PENDULUM FOR CLOCKS.—W. D. WHALEN, Northville, Mich.—This invention consists of an improvement in the manner of constructing and attaching pendulums to clocks, by which many of the inconveniences and irregularities of the time-keepers now in use are obviated.

CARRIAGE BRAKE.—JOHN J. LOOK, Farmington, Me.—This invention relates to a brake which may be applied to wagons and carriages, and which is so constructed and applied that it acts automatically.

GAS RETORT.—G. W. HARRIS, Elizabeth, N. J.—This invention consists in a retort made of clay or other suitable material, and provided with return passages, either built into it after it is made or formed in its bottom while it is manufactured, in such a manner that steam passed through said passages will be superheated and distributed through the incandescent coal placed in the retort; it consists also in a superheater, made of fire clay or other suitable material, to be used in combination with the retort, in such a manner that the steam is superheated before it enters the retort and prevented from cooling the same, and furthermore, the effect of the steam on the incandescent coal in the retort is increased.

BOOK-MARK HOLDER.—PHILIP TOMPPERT, Jr., Louisville, Ky.—This invention consists in a metallic clasp, consisting of a bent strip of metal having slots or perforations made in its head portion, through which slots tapes or ribbons are passed, which, when the two legs of the device are clasped over a number of leaves of the book, can be thrown down between the leaves to keep a place of reference in a book.

HEATING STOVE.—LEWIS BRIDGE, York, Pa.—This invention relates to an improvement in parlor fireside stoves, adapted to either wood or coal, and is designed to utilize the heat by the more complete radiation into the apartment, or its diversion to an upper chamber through a flue attached to the stove.

CARRIER OR CLUTCH FOR LATHES.—RICHARD ALLEN, Jersey City, N. J.—This invention relates to a clutch for lathes of that class of clutches which are employed for the turning of bolts more particularly, and the invention consists in so constructing the said clutches that bolts of various sizes, whether with or without heads, may be properly held and secured within them.

HORSE RAKE.—FRANCIS M. SMITH and EDWIN BRAMFIELD, Albion, N. Y.—This invention consists in constructing the head of a horse rake in sections, which are united by means of suitable joints, so that the head of the rake, while it is at work, will readily accommodate itself to the unevenness of the surface of the ground.

STEAM VALVE.—W. B. ROBINSON, Detroit, Mich.—This invention consists in a counterbalance placed between two valves, in combination with the exhaust passages in the valves, in such a manner that the exhaust steam is passed in a direct course through the valve, counterbalance, and steam chest cover, and furthermore, the cost of the valve and of the engines is reduced, and steam is economized by shortening the posts in the cylinder to the thickness of sail cylinder or of the valve seat.

BROOM.—HENRY H. B. VINCENT, Oshkosh, Wis.—This invention consists in a broom head formed with downwardly-projecting side and edge arms, and in the combination of a sliding band and binding bars with each other and with the arms of the broom head.

CAR COUPLING.—CLEMENS WEAVER, Easton, Pa.—This is a device for coupling railroad cars, and consists of hooks suspended to the draw bar of the cars, which are adjusted by raising and lowering with side levers, so that they can act as self-coupling devices, and may be readily disconnected.

SURFACE-SIZING FIBROUS MATERIALS.—WILLIAM FUZZARD, Chelsea, Mass.—This invention relates to machinery for applying a glazing or size to fibrous substances, such as cotton wadding, etc.

LANTERN.—JOHN BELLERJEAU, Philadelphia, Pa.—The object of this invention is so to construct a lantern that the globe is well secured to the cap and base of the lantern without the use of cement, so that all the parts may be easily taken apart, at will.

FORMING CLOSE JOINTS.—THOMAS HANDY, Decatur, Ill.—This invention relates to a machine for grinding the edges of metal plates so that the same may be placed closely in contact and perfect joints formed. It is more especially designed for grinding the edges of the moldboards and shares of plows, but it may be advantageously used for other purposes.

LATHE.—LUTHER R. FAUGHT, PHILADELPHIA, PA.—This invention has for its object to furnish an improved means for tightening the spindle in lathe stocks.

SPADE HANDLE.—CHARLES DIMMICK, Brockport, N. Y.—This invention has for its object to form a spade or shovel handle from one piece of wood.

FRUIT HARVESTER.—ROBERTS & HARTZELL, Addison, Pa.—This invention has for its object to furnish an improved instrument by means of which apples, pears, peaches, and other fruit may be gathered from the tree rapidly, conveniently, and without bruising the fruit.

COTTON PICKER.—JOHN S. PAGE, Memphis, Tenn.—This invention relates to a device for separating dirt and foreign substances from cotton, and is more especially designed for separating such substances from long-staple cotton without cutting or breaking it. The invention consists of a series of revolving toothed or armed cylinders placed within a case or box, the bottom of which is provided with a series of perforated concaves, one underneath each cylinder. The cotton is fed into one end of the case or box, and the toothed or armed cylinders are rotated all in the same direction, and the cotton, by the action of the teeth or arms, passed or fed through the case or box, the fabric during this operation being drawn out and straightened and the dirt and foreign substances detached, dropping by their own gravity through the perforated concaves.

TWINE AND SMALL CORDAGE.—GEORGE A. TAYLOR, LESTER CRANDALL, HORACE L. CRANDALL, and JONATHAN LARKIN, Hopkinton, R. I.—This invention relates to mechanism for manufacturing twine and small cordage, and has for its object the twisting of a plurality of cords or lines simultaneously, or at one operation, with one attendant or operator only, and the latter allowed full control over each line or cord during the process of twisting.

DAMPER FOR STOVE PIPES.—CHARLES R. EVERSON, Palmyra, N. Y.—This invention relates to a damper for stove pipes, and it consists in providing a circular plate, hung on journals or pivots similar to the ordinary damper, with a valve, and also with a curved or semicircular perforated plate, all arranged in such a manner that when the damper is closed sufficient draft will be allowed to carry off the smoke, gas, etc., which would otherwise escape into the room, and when the damper is open the products of combustion be deflected to the side of the pipe, in order that the heat may be radiated therefrom.

PLANE.—JOHN SAWYER, Moravia, N. Y.—This invention has for its object to furnish an improved apparatus by means of which the ends of moldings may be cut at any desired bevel, so as to make a close joint.

BRIDGE.—O. G. LEOPOLD, Cincinnati, Ohio.—The construction of this bridge is based upon the theory of the neutral line or point of gravity of the cross section of a loaded beam, supported at its ends, and its parts are made double T-shaped in their cross section, as being the strongest, with reference to the amount of metal expended.

FENCE.—EDWARD C. GORDON, Sevastopol, Ind.—This invention consists principally in the combination of wire guys, keys, wedges, and anchoring blocks with each other, and with the fence panels.

BAG HOLDER.—J. V. HENRY MOTT, Guilderland N. Y.—This invention relates to a device for holding the mouth of a bag open while being filled, whereby it can be filled with readiness and dispatch.

OIL WELLS.—THOMAS M. FOSTER, Union Mills, Pa.—This invention relates particularly to the sucker rods, so called, used in oil wells, and its object it to preserve the tubing and economize expense.

BRIDLE.—A. H. ROCKWELL, Harpersville, N. Y.—The object which this invention is designed to secure is to provide a means by which a horse that is in any way vicious or inclined to be unruly, or to kick while being curried, or when in harness, or when being led out of his stall, or at any other time, can be brought to a complete state of control or subjugation, and in such a manner as not to produce the least injury to the mouth of the horse.

SAFETY LINE OR REIN FOR HARNESS.—A. H. ROCKWELL, Harpersville, N. Y.—The object of this invention is to prevent both kicking and biting in double or single harness; in the latter case it being especially desirable, as it then acts as a preventive against the kicking of the horse when at a rest or stop.

THE MARKETS.

The state of business is generally dull. Prices of most descriptions of merchandise are unsettled, but show a general decline. The money market shows the same deranged condition. Capitalists seem waiting for some expression by Congress, indicating the course to be pursued in regard to the contraction or expansion of currency, and previous to its reception, trade generally is likely to rule very quiet. The exports of gold from this city during the past week amount to $781,895, giving a total since January 1st, of $58,248,531, against $27,256,302, for the same time last year.

In the grain market, the limited arrivals, and news of failure of cereals in Europe, it was generally supposed, would tend to raise prices, but, on the other hand, we have to record a steady decline. The demand for home consumption is well supplied, there is no competition among buyers, and prices have fallen to effect sales.

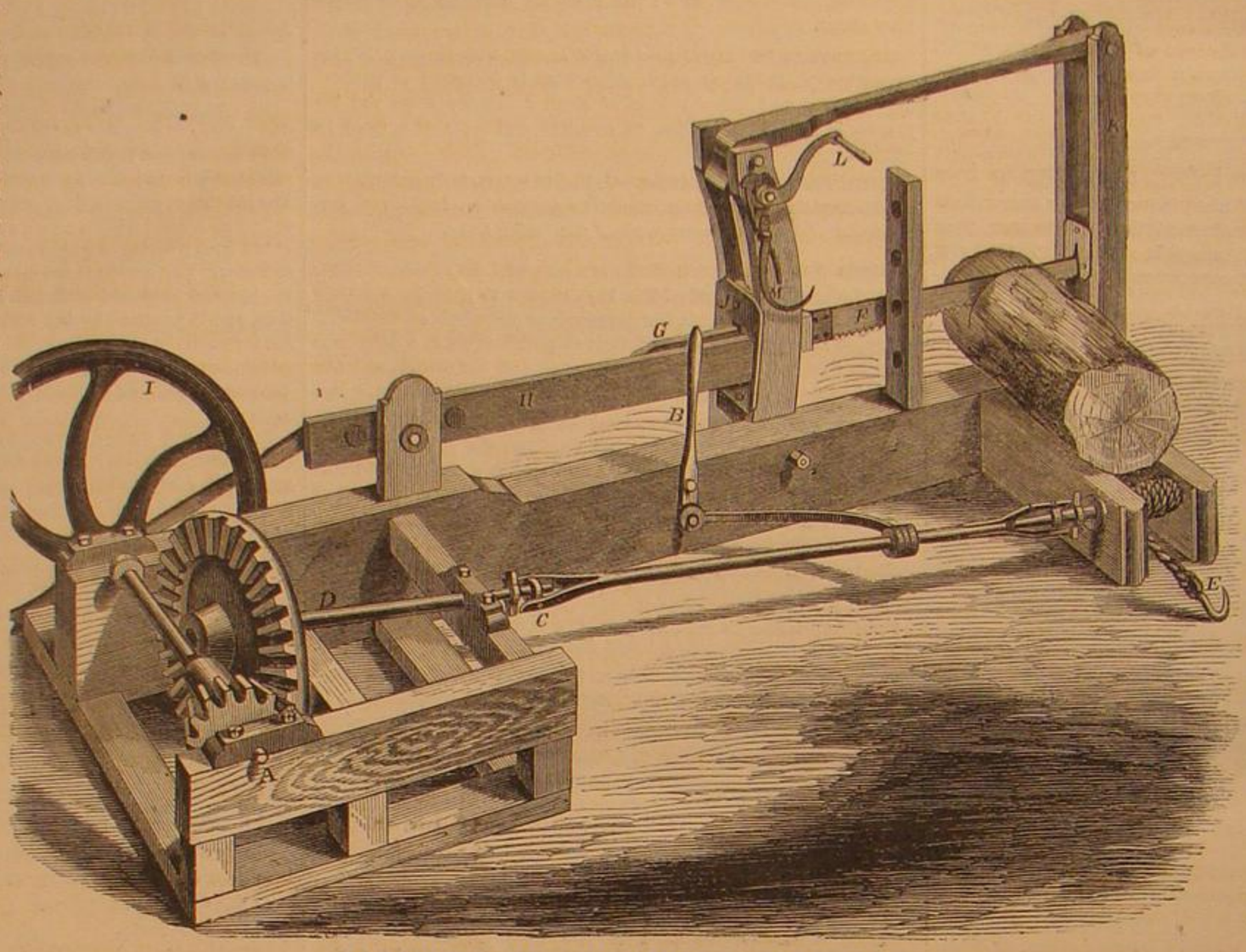
The cotton business, early in the past week, was quite active, chiefly for exports, but on receipt of less favorable European news, a decline in gold, and an easier money market, prices fell, and closed heavy, with considerable abatement in the demand.

The complete block of the coal trade, is of the highest importance. At the last semi-monthly auction sales of Scranton coal, a heavy decline was shown from previous prices, ranging from 45 cents to $1 40 per ton. This ruinous state of affairs, owing to a glut in market, can be traced to the backwardness of the severe winter season, and the long continuance of a remarkably mild temperature. Prices paid at this sale are less than the actual cost of transportation to market, leaving nothing to pay for the mining. Work will necessarily stop at the mines, as has already been the case with the collieries of the Schuylkill. The effect of this will soon show itself in diminished arrivals, the demand will steadily increase, and prices will advance as rapidly as has been the late fall.

Improved Portable Sawing Machine.

Many attempts have been made to bring the saw-mill to the timber, instead of taking the timber to the mill. They have not been uniformly successful. For the purposes of fuel, where the wood was not cut by the circular saw, the old-fashioned and laborious method of the "buck saw" and horse has been employed. This work is excellent exercise for dyspeptics, but preferable as an amusement or medicine rather than as a steady occupation.

In the accompanying engraving is an illustration of a very simple and, to some extent, a self-operating machine which is intended to be used in cutting up fallen timber, logs, and "fire-wood." It is applied to the cutting of stock for wheel hubs and bolts for shingles as well. It can be worked by hand or horse-power, as may be desired, and according to the size and capacity of the machine.



SALMON'S WOOD-SAWING MACHINE.

The machine being conveniently placed, the power is applied in any manner desired to the shaft, A, and by the lever, B, the clutch, C, is engaged with the shaft, D, when motion is given to the shaft at the log end of the frame, acting as a windlass, and by means of the rope and hook, E, bringing the log or block into position to be sawed. The clutch is then disconnected with the motive power, which is diverted to the driving of the saw, F. This is simply a straight saw blade, connected to the sliding bar, G, which is guided in a direct forward and backward movement by slides on the pivoted bar, H, and attached to the crank on the balance wheel, I, by a pitman or connecting rod. The bar, H, is secured to a box, J, which moves up or down in the curved frame, which is a segment of the circle of which the pivoted bar, H, is the radius. This frame is fastened to the sill of the machine and at the top is connected with the uprights, K, which carry a sliding weight, which guides the saw, and, at the same time, keeps it in contact with the log. By the crank, L, the box, J, is raised, through the intervention of a strap and roller. It retains the box and saw in an elevated position, when a log is being loaded, by a spring and ratchet. The lever, M, disengages the spring while the sawing is being performed.

By this machine it is claimed that, with the power of two horses, from forty to fifty cords of stove wood can be sawed in ten hours. It is so simple that it is not liable to get out of order, and necessary repairs could be made by any ordinary mechanic. It is easily managed by even unskillful hands.

A patent was granted through the Scientific American Patent Agency, July 5, 1864. For further information, and for district and State rights to vend and manufacture, address either W. M. Salmon, Westville, Laporte Co., Ind., or Joseph Salmon, agent and manufacturer, Monmouth, Warren Co., Ill.

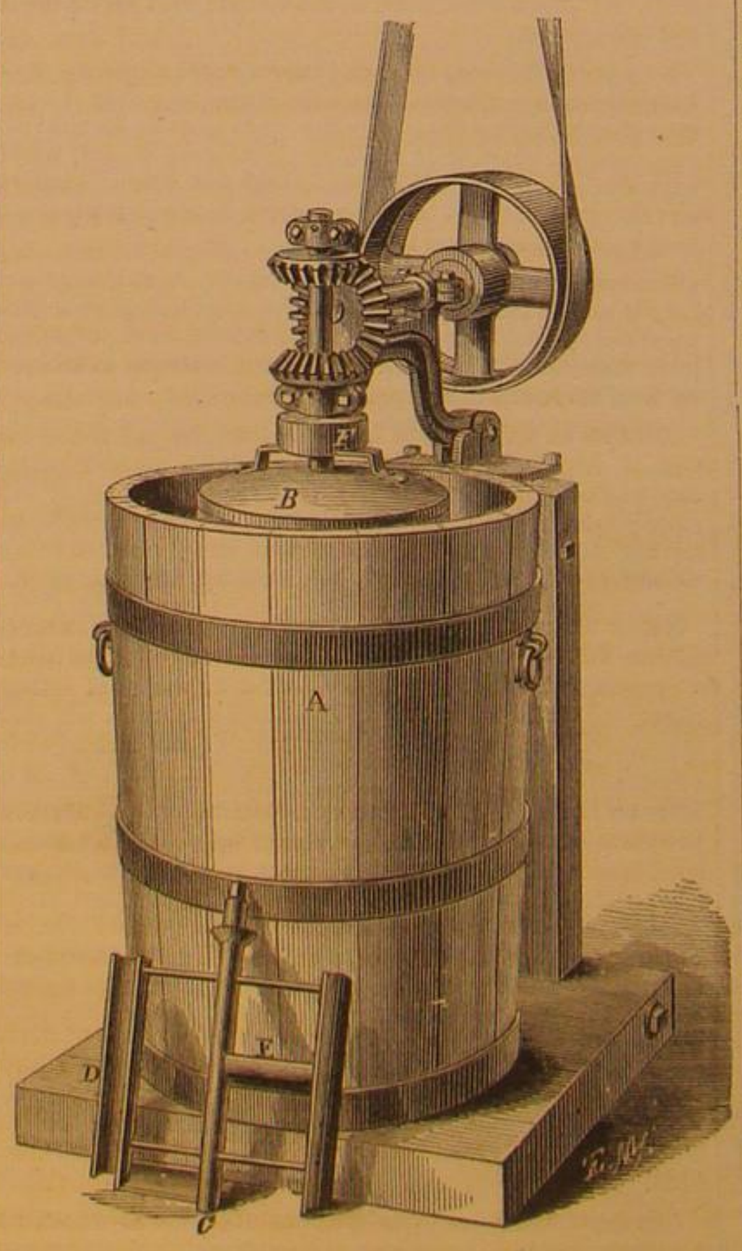
Photographs on Porcelain.

Mr. J. M. Herron, of this city, has so perfected the art of photographing on porcelain that the art of miniature painting on ivory, of which this takes the place, may be considered obsolete.

A recent visit to Mr. Herron's gallery, 227 Sixth Avenue, corner of Fifteenth street, suggested that many persons who are at their wit's end to know what to get their friends for the approaching holidays, might invest a small sum in a picture of themselves on porcelain, which would be as acceptable a present, in many cases, as could be given. We get nothing for this suggestion, nor do we charge our readers for the hint, but any who wish for faultless pictures of themselves or friends are recommended to examine Mr. Herron's specimens of the several different kinds of photographs which he executes.

CHAMPLIN'S PATENT ICE-CREAM FREEZER.

Ice cream is a modern luxury, but its palatableness and cooling properties, in the heat of summer, have so recommended it that its manufacture has become quite an important business. It is made in immense quantities for hotels and eating-houses, and a cream-freezer has become a part of household furnishing. The engraving herewith presented shows one on a new plan, which is claimed to be superior to any other in use.



A, in the engraving, represents the ice receptacle and B the cream can. By means of the combination of beveled gears motion is imparted, not only to the dasher, shown at C, but to the cream vessel. The two rotations, as may be seen by the combination of the gears, are in opposite directions, thus greatly aiding in the comminution of the particles and facilitating their congelation. The peculiar form of the dasher, also, assists in this "fining" and in the rapidity of the freezing process. The upright arms of the dasher are of longitudinal concave form, as at D, and midway on the dasher is a transverse concave arm, E, which lifts and mixes the cream. By these means twice the amount of energy is exerted in throwing the particles together as in ordinary freezers, where only the can or the dasher revolves, and the tendency in this is to throw the cream against the sides of the can in immediate contact with the freezing mixture.

By these appliances the inventor claims to freeze quicker and beat finer than with any other freezer in use. They are made in sizes varying from six quarts, for a family, to fifteen gallons, for large hotels, and are driven either by hand or power. The stand sustaining the gearing is pivoted so that it can be tipped back and swung to one side to enable the operator to remove the can without trouble. When designed to operate, a clutch, F, engages with the can cover to rotate the cream vessel, while the dasher is turned by a shaft passing through the clutch.

It was patented through the Scientific American Patent office, June, 26, 1866. For further information address, J. R. Champlin & Co., Laconia, N. H.

TORPEDO POWDER.—A new explosive mixture called *Poudre Fontaine*, used in the torpedoes which were tried against the hull of the *Vauban*, has been employed in blowing up the old quays of one of the basins at Toulon. A mine charged with five kilogrammes of the powder exploded with such effect that a charge of 100 kilogrammes of the ordinary gunpowder would have caused less destruction. The charge was purposely a small one, and the engineers congratulated themselves on having commenced so cautiously. A singular result of the explosion was the killing a quantity of fish. The workmen picked up 70 lbs. or 80 lbs. weight, which floated on the surface of the water. The same phenomenon had been remarked from the action of the torpedoes.

THE London *Mechanics' Magazine* has an article on what it terms vegetable leather, manufactured on a large scale by the firm of Spill & Co., Stepney Green. Its composition is rather vaguely referred to, as containing caoutchouc and naphtha; but from the remark that any desired thickness may be given it "by additional backings of linen, etc., cemented with the caoutchouc," one is led to infer that it is a modification of what is known as india-rubber cloth. The qualities attributed to it, however, go much beyond those of our American article. It is said to be of great strength in comparison with leather, and to be even better adapted to sewing; to be valuable for all kinds of harness, and an article of the most durable beauty, far superior to any leather, for book-binding.

A REGULAR running drill has been introduced into the British army. For the first two weeks of practice the daily run is not to exceed 300 yards, for the second two weeks, 600 yards, and for the third two weeks, 900. After that 1,000 yards are to be run, with and without arms, etc., on alternate days.

THE difference in expansibility between steel at its maximum and at its minimum of hardness, is calculated as 84 to 62.

THE
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NEW YORK, SATURDAY, DEC. 15, 1866.

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THE NEW VOLUME FOR 1867.

We intend to make the forthcoming Volume of the SCIENTIFIC AMERICAN worth to every subscriber tenfold more than the cost of subscription. Our energies will be taxed to the utmost to supply our readers with the most valuable information to be obtained in all the practical arts and sciences. The amount of reading matter will be more than double that of any similar paper in this country, and nearly equal to the largest in Great Britain. We have an active and intelligent correspondent now in Europe, who is engaged to furnish a letter once a fortnight, not simply made up of the odds and ends of newspaper clippings, but to present and discuss in a practical manner, the systems of mechanical Engineering and manufacturing industry as now practiced in Europe.

With the opening of the Great Exhibition of Industry of all Nations in Paris, next year, our correspondent will be in attendance, and will furnish a series of valuable letters descriptive of the wonders which will there be gathered from all parts of the world.

In addition to this, one of the principal Editors of the SCIENTIFIC AMERICAN will also be at the Exhibition in an official capacity, and will give personal attention to the interests of our journal while he remains abroad.

Our Engraving department will receive special attention, and we expect to add to it new and attractive features.

Our subscription list ought to be doubled. This can be done by a very simple sum in multiplication, "twice two are four." If each of our subscribers would get one additional name, the problem would be wrought out at once and very much to our satisfaction.

NO. 1 ADVERTISERS.

Parties who intend to advertise on the outside page of the first number of the new volume, should send their advertisments without delay. We cannot receive them after the 20th inst. The terms are seventy-five cents per line for each insertion. To enable advertisers to calculate how much they must remit, we will state that, independent of the head line, about seven words will make a line of agate type. It will be safe to estimate but four words for the head line.

Engravings will be inserted with advertisements at $1 a line for the back page and 75 cents a line on the inside. The rates for ordinary advertisements in the inside, 40 cents a line.

REALITY VERSUS SHAM.

"Whatever is worth doing is worth doing well." This is a truism that cannot be gainsayed. The mechanic who acts according to its spirit and who practices its wisdom will have a fame worthy of his profession and will deserve corresponding success. No sham or half-finished jobs should ever go out of a shop, or from the hands of a workman. While he may achieve a reputation for a hundred well-finished jobs, the one hundred-and-first may ruin him because it is shammed. Those whose custom is really worth any thing are men who want a good, rather than a cheap article. The best is the cheapest. An ephemeral success can possibly be attained by making and vending imitations and shams, but for a permanent business something valuable must be offered for the *quid pro quo*. "The burned child dreads the fire," and the cheated customer comes not again, but, on the contrary, is solicitous and careful to spread the benefit of the warning he has received.

If a mechanic desires the confidence of his employers, if a manufacturer values the respect of his customers; if a merchant wishes the continuance of his trade, he must "deal justly." We know of some who are so conscientious that they will not accept a job, nor assume a contract which debars them from fidelity to the principle of honor—which requires them to lower their status as workmen—for a present pecuniary benefit, however promising. There is more than worldly wisdom in this—more than the low motive of gain—it is an honorable spirit, which is the life of labor and the blood of true workmanship.

It is shameful to see the "tricks of trade" to which some resort. They are willing to ruin their reputation for a present benefit. If competition has compelled them to assume the responsibility of a contract, rather than lose the job they begin to contrive how they can ostensibly fulfill that contract while they really do not. They will put in poor material, or, if this is not possible, will turn out poor work. They may get their price, but it is not seldom that it is the price of blood as well as of reputation. Sham-built boilers, half finished machinery, insufficient material, coarse workmanship, and hurried manipulation are to be seen on all hands. The producers of such shams can at best but have a brief business existence. They are soon "known and read of all men." Cast iron is well in its way, so is the same material made malleable, but one will not long pass for steel, nor the other for wrought iron. Green timber may be best for some purposes, but it cannot equal for others seasoned stock. The mechanic and the manufacturer should be actuated by some other motive in addition to that of making money fast. Their own reputation and the credit of their craft should exert an influence.

Judging from many of our productions, one would suppose that the eye was the only organ to which our mechanics appealed in their work. If the iron work of a machine looks bright, or shines with deceptive paint, japan, and varnish, it can pass muster. "Deep scratches and high finish" is the machinist's designation for such work. There is too much of this style sent from manufactories all over the country. The forger ignores a "cold-shut" or an imperfect weld. He finishes his work by cold hammering, destroying the fiber of the iron, but giving it a fair surface. The machinist hides his faulty lathe work with the polish of emery and the abrasion of the file. The carpenter is satisfied with imperfect materials, unseasoned or water soaked, put together with glue, or cut nails, enough merely to keep the fabric in place until he can turn his back upon it. The cabinet-maker shams with his veneering, well enough in its place and properly applied to properly prepared stock, but worse than the plain and cheaper wood when not judiciously used. The builder puts up veneered houses, representing structures of solid stone by thin veneers of marble and even of cheap sandstone. These veneers he sets on edge and anchors by thin straps of iron to the true wall of brick, certain in case of a fire to drop on the heads of hard-working firemen. The mason puts sand in the place of lime because cheaper. Such work is valuable only for temporary purposes. Such buildings frequently do not outlive those who erected them.

The cant question "what is the price of putty?" has a deeper meaning than appears on its surface. Putty "covers a multitude of sins." The wood-worker shares its benefits with the worker in metals. It is used to fill holes made by the carelessness of the workmen, or belonging to the imperfect quality of the material. It smooths otherwise rough and unfinished surfaces, and is a humbug generally.

If the mechanic desires to give the future historian material which will be creditable to his craft and country; if he cares for personal reputation and consequent advantage; if he has regard to the welfare of his kind—he ought to leaven his work with professional honor and be sure that his productions cannot rise up in judgment against him.

THE DANGERS IN STORING PETROLEUM.

Shortly after the destructive fire at the Erie Railway Docks, in Jersey City, caused by the ignition of stored petroleum, we drew attention to the fact that in its crude state that substance is highly inflammable and explosive, and suggested what we then considered a remedy. Subsequent events and investigations have assured us that our opinion was well founded.

On the night of the 30th ult., another large fire occurred from the same cause; happily this time without loss of life, but still attended with the destruction of not less than $100,000 worth of property. The building in which the oil was stored at this last fire was deemed fire-proof, but it was as completely demolished by the intensity of the heat as a wooden building would have been by a fire from any other cause. Water will not extinguish burning petroleum. It serves only to spread its ravages by bearing on its surface the blazing mass. Depriving the fuel of all air, by smothering, seems to be the only known method of checking an oil fire. The most, therefore, that can be done in case of such a fire is to confine its ravages and allow it to burn itself out.

The ready inflammability of petroleum and its liability to explosion are not necessary qualities of the substance. They come from an ingredient the absence of which would really increase its value for all purposes to which it is now applied. Petroleum is a composition chemically blending substances varying in character, from solid paraffine to a highly volatile gas. In this latter, or in the volatile liquids from which it is evoked, lies the danger of fire and explosion. We are not prepared to say that these lighter oils, or the gases, are capable of spontaneous ignition or explosion; in fact, we are not aware that in the case of any one of the petroleum fires that have occurred such a hypothesis is necessary to account for their origin. But it is certain that petroleum at ordinary temperatures generates and throws off a gas as inflammable and dangerous as that used for illuminating purposes. This gas impregnates the air to a considerable distance, especially when the quantity of oil is large. It may be likened to a cloud overhanging and extending beyond the reservoir or vessels that contain the oil. It penetrates the fibers of wood, so that ordinary barrels do not prevent its escape. Here, then, is a source of very great danger. How shall it be removed?

That it can be removed is easily demonstrated. Indeed, one of the largest oil refineries in this vicinity distills no petroleum from which these volatile elements have not been removed at the place of production. This is easily accomplished. Only a very low heat is required for vaporizing these volatile constituents, which can be obtained from a coil of steam pipe placed in a suitable vessel. The product, after being condensed, can be placed in metallic air-tight receptacles and transported or stored without great danger. The oil for distillation into illuminating fluid or for lubricating purposes, would not at all be injured by this preparatory distillation. It has been stated that some unprincipled refiners mix a portion of the inflammable fluids with their illuminating oils; but whether this is so or not, it is certain that in nearly all of the qualities of crude

oil, except perhaps the heavy lubricating petroleums, these dangerous elements are present, in some oils reaching at least 20 per cent.

Some legislation appears to be necessary in regard to this matter for the proper protection of persons and property. We hope the attention of our legislators will speedily be directed to this subject, which must be conceded to be one of the first importance.

PARROTT GUN CASE DECIDED.

U. S. CIRCUIT COURT, SOUTHERN DISTRICT—BEFORE JUDGE NELSON.

The bill is filed by Treadwell against Parrott, maker of the well known Parrott gun, founded on Letters Patent granted Dec. 11, 1855, and reissued Feb. 4, 1862, for improvement in the manufacture of cannon, to restrain him from infringement. The invention claims, first, casting a cannon the walls of which are encased with wrought-iron rings, smaller than the part which they are to surround but enlarged by expansion, and by contraction bringing the particles of said body nearer together. Second, in securing the hoops, a female screw is cut on the inside to fit threads cut on the body of the gun, and are finished to 1-1000th part of the interior diameters less than the male screw to be encircled. The Barlow Law, to which the inventor refers as having furnished him with the principles leading to this invention, showed that "hollow cylinders of the same material, do not increase in strength in the ratio of increased thickness, but the power of resistance diminishes after considerable thickness is obtained." To obviate the elements of weakness, caused as above, and to obtain the strength of wrought instead of cast iron, the plan of construction before described is resorted to, and by this means a gun is made nearly four times stronger than a cast iron gun of the same weight.

The only material and difficult question is, whether or not the patentee is the original and first inventor of the improvement. After an attentive examination, and our best consideration, the conclusion seems clear that he is not.

A combined cast-iron gun and wrought-iron envelope was constructed by Thiery, a French officer, as early as 1834. It is seen from his description, that the hooping of cast-iron guns by wrought iron bands, much after the manner of the patentee, was then known to add to the power of resistance; that this was increased by the contraction of heated bands; and the difference in diameter was governed by the law of expansion of wrought iron.

In 1843, the Frith gun was patented in England, having a cast-iron barrel, that part most acted upon by the explosion being strengthened by strong wrought iron or steel bands, driven on while hot, so that the contraction thereof in cooling would produce firm adhesion. The question might here arise, whether the information in the description would enable an intelligent mechanic to make the proper difference between the interior diameter of the hoop and the exterior diameter of the gun's body. We are assured that any one having any knowledge in relation to this subject, is qualified to carry into effect in a scientific way the purpose and object of the patentee. This is also affirmed in detail by all the defendant's experts whose attention was called to the subject. The state of the art was familiar to Chambers in 1849, for by his own statements he determined the difference in diameter of the wrought-iron hoops used in his wrought-iron guns of that date, on the principle of the law of expansion of wrought iron. Another point should be noticed. The thickness of the walls of the Frith gun nearly correspond with the thickness of complainant's, and the same is true as to thickness of the hoops. Whether or not this inventor has a knowledge of Barlow's Law, cannot affect the question.

The point of superiority of finish of the defendant's cannon over the old Frith guns is not entitled to consideration. It is owing to the mechanic and not the inventor. Upon the whole, without pursuing the case furthur, we are compelled to the conclusion: That in view of the state of the art at the time, the improvement in the construction of cast-iron guns with wrought-iron hoops, claimed by the complainant, will be found in a description of the Frith patent, and upon this ground a decree must be entered for the defendant, dismissing the bill.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING DEC. 4, 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.

60,112.—RAILROAD RAILS.—Joseph Adams, Fairhaven, Vt.

I claim a railroad rail made in two parts, A A', with their top surfaces so shaped as to form a central longitudinal groove, c, and having said top surfaces highest at the points where the wheels will bear directly over the center of the neck of each half rail, the whole being arranged and constructed substantially in the manner and for the purpose set forth.

60,113.—LATHE CLUTCH.—Richard Allen, Jersey City, N. J.

I claim the carrier clutch, constructed and operating substantially as described.

60,114.—DRILLING MACHINE.—M. M. Ammidown, Boston, Mass.

First, I claim the combination of the collar, E, provided with the projection, e, and the grooved arm, F, substantially as and for the purpose specified.

Second, I also claim the combination of the slotted standard, B, and screw, D, with the collar, E, arm, F, and platen, C, as and for the purpose specified.

Third, I claim the grooved arm or holder, F, as and for the purpose specified.

60,115.—EMBOSSING MACHINE.—James C. Arms, Northampton, Mass.

First, I claim the embossing machine, constructed and arranged to operate as and for the purpose substantially as set forth.

Second, The heater, D, provided with the removable embossing plate, n, as shown and described.

60,116.—CHUCK.—T. G. Arnold, New York City.

I claim the arrangement of the expanding jaws, E, pivoted to the solid head piece, B, constructed and operating substantially as herein before set forth and for the purposes described.

60,117.—LUBRICATING OIL CAN AND LAMP.—Elias Ashcroft, South Boston, Mass. Antedated Nov. 29, 1866.

I claim the combination of the tube, D, tube, C, plate, B, and can, A, constructed and arranged in the manner and for the purpose herein specified.

60,118.—COOKING STOVE.—Frederick M. Baker, South Reading, Mass. Antedated Nov. 22, 1866.

I claim the combination as well as the arrangement of the flues, m and H, the dampers, D1 D2 and D3, and openings, a2 b2, with the auxiliary oven, G, its flue, F, and the main oven, and its flues, B B1 B2, and C, the whole being substantially as hereinbefore specified.

60,119.—PROCESS FOR MANUFACTURE OF GLASS.—Hayden M. Baker, Rochester, N. Y., assignor to himself and and Robert J. Lester.

I claim the application to manufacture of the processes herein described, for the production of "best flint glass" from a mixture of nitrate of potash, nitrate of lead, and silicic acid at elevated temperatures, and the recovery of the nitric acid employed by displacement and distillation in the manner herein described and set forth, or any other process substantially the same, and which produces the same intended effects or results.

60,120.—APPARATUS FOR THE MANUFACTURE OF SALT BLOCK.—Newell Barnard and J. G. Spiller, Saginaw City, Mich.

First, I claim admitting the brine at the forward end, or hottest part of the block, D, substantially as described and for the purpose set forth.

Second, Drawing off the bitter water at the rear end of the block, D, substantially as described and for the purpose set forth.

Third, The combination with the lower vat, c, with the block, D, and with the drying rack, B, of the trough, A, substantially as described and for the purpose set forth.

60,121.—BAG HOLDER.—Chas. J. Barney, Edgarton, Mass.

I claim the frame, A, provided with a platform, B, having an opening, C, made in it to receive the flange or lower part of the hinged hopper, D, and used in combination with a removable platform, E, substantially as and for the purpose specified.

60,122.—SCAFFOLD BRACKET.—Hiram Beckwith, Grass Lake, Mich.

I claim the tie, B, the rail, C, and the brace, D, when constructed and combined substantially as herein shown and described, for the purposes set forth.

60,123.—LANTERN.—John Bellerjeau, Philadelphia, Pa.

I claim the two-part guard, D D, and confining ring, I, when used in combination with projections, h, studs, i, or their equivalent, so as to constitute a means of connecting the cap and base of the lantern, substantially as described.

60,124.—STEAM-GENERATOR HEATERS.—Thomas E Belton, Buffalo, N. Y.

I claim the heater, F, provided with flues, g g, and conical discharge ports, O O, arranged in combination with a boiler and furnace, so as to operate substantially as set forth.

I also claim the mud shields, H H, provided with perforations, 11, in combination with the pipes, J, for discharging the mud and other sediment, substantially in the manner specified.

I also claim the deflecting and distributing plate, m, arranged and operated as described.

I also claim, in combination with the heater, F, constructed as described, and leg, c, of the boiler, when the same extends below the level of said heater, the pipe, q, arranged and operating substantially in the manner and for the purpose herein set forth.

60,125.—GRATE BAR FOR FURNACE.—Charles C. Bemis, San Francisco, Cal.

I claim a furnace grate with bridges or barrier plates, b c d e f, placed beneath the said grate at intervals, and increasing in depth to near the flue, the whole arranged and constructed substantially as described and for the purpose set forth.

60,126.—COMMUNICATING MOTION.—William Bicknell, Hartford, Maine.

I claim the new method of transmitting motion, consisting of the arrangement upon fly wheel, A, of cog or friction wheel, c, so constructed that a plane passing through the axis of either of them shall preserve the same angle with the horizon, throughout the revolution of wheel, A, said wheel, c, driving wheel, c', substantially as described.

60,127.—FENCE.—Benjamin Billings, Lyons, Iowa.

I claim the arrangement of the post, A, picket, P, cap, D, when constructed, arranged and operating substantially as and for the purpose set forth.

60,128.—REVOLVING FLUE CLEANER.—G. E. Bingham, Milwaukee, Wis.

I claim the revolving flue cleaner formed by the combination and arrangement of the heads, E, wooden bars, F and A, binding bands, B and C, binding rods, G, and shaft, I, substantially as herein described and for the purposes set forth.

60,129.—SOLAR CAMERA.—J. B. Blair, Philadelphia, Pa.

I claim the application of an adjustable piece, E, to the use and purpose substantially as set forth.

60,130.—WICK INSERTER FOR LAMPS.—William Y. A. Boardman, New Haven, Conn.

I claim the herein-described instrument for inserting wicks in lamp tubes as a new article of manufacture.

60,131.—ELASTIC STRAP FOR GARMENTS.—Jno. W. Boughton, Chicago, Ill.

I claim an elastic strap, A, having an attaching plate or its equivalent at each end for application to the garment, substantially as herein shown and described.

60,132.—HEATING STOVE.—Lewis Bridge, York, Pa.

I claim the arrangement of a parlor fireplace heating stove, with a vertical cold air space, D, around the back of the fire chamber, A, in combination with the surrounding hood, h h, for utilizing the heat radiated from the rear of the stove, and conducting it into the room, or to an upper chamber when desired, constructed and operating substantially as and for the purpose herein described.

60,133.—APPARATUS FOR DETACHING BOATS.—S. Brown and Leon Level, New York City.

We claim the standard, C, the bent lever, a, and the shackle hook, b, constructed, combined and operating as a detaching hook, substantially as herein shown and described, for launching boats and for other purposes.

60,134.—FURNACE FOR DESULPHURIZING ORES.—Wm. Bruckner, San Francisco, Cal.

I claim the internal screw ribs or rifles arranged spirally in opposite directions, so as to convey the ore alternately from end to end of the cylinder, and heat it uniformly.

60,135.—BUCKLE.—Angeline Button, Administratrix of Charles A. Button, deceased, Pontiac, Mich.

I claim the combination of the clasp, C, and body, or rim, A, constructed and connected substantially as and for the purpose herein specified.

60,136.—INSTRUMENT FOR DESTROYING EMBRYO CATERPILLARS.—Aaron Casebeer, Sipesville, Pa.

I claim a knife which is composed of two blades, C C, united to a contracted shank, b, to be used substantially as described.

60,137.—CAR REPLACER.—George Chambers, Ithaca, N. Y.

I claim, first, the truss, trunnion or tool, A, made with two surfaces, one for replacing a wheel from the inside, and the other from the outside of the track, and the duplicating the same in one instrument or trunnion, so as to fit any emergency and either direction of motion of the displaced wheel or wheels, as described.

Second, I claim on either a single or double-inclined plane, with a surface or surfaces suited to replacing a wheel off of the track, the placing or combining therewith an adjustable piece or part which, while it aids in replacing a wheel off on the inside of the track, is also useful in carrying the flange over the rail when the wheel is off on the outside of the track, as described, and all equivalents thereunto.

60,138.—CHUCK.—John C. Chapman, Cambridgeport, Mass., assignor to himself and David W. Weston, Boston.

I claim the beveled keys, A a, and the prevention pins, c c c, in combination with the collars, B b, operating substantially as above described.

I claim the beveled key, A, and the prevention pins, c c, in combination with the removable bushing, E, operating substantially as above described.

60,139.—LANTERN.—Richard Chester, Chicago, Ill.

I claim the combination and arrangement with a lantern and its globe, of the globe support, d, perforated jackets, c c', and diaphragm, e, arranged and operating as and for the purposes specified.

60,140.—LANTERN.—Richard Chester, Chicago, Ill.

I claim, First, The arrangement of perforations in the center of the bottom, E, and the perforated inclosure, F, arranged beneath the platform, C, for the lamp, as and for the purposes described.

Second, The horizontal tubes, H, provided with perforated cups and extending within the lantern top as shown, in combination with the diaphragm, G, having openings at the corners out of the range of said tubes, as herein specified and set forth.

60,141.—TOY BUILDING BLOCKS.—George H. Chinnock, New York City.

I claim the building blocks of the form of the half of a cube, having five sides, in combination with letters or numerals on their surfaces, which are whole in themselves or bisected diagonally, substantially as shown and described for the purposes specified.

60,142.—MANUFACTURE OF PARIS WHITE AND WHITING.—William W. Chipman (assignor to the Chipman Mining Company), New York City. Antedated November 22, 1866.

I claim the manufacture as herein described of Paris white and whiting from the earthy material known as marl.

60,143.—ANIMAL TRAP.—Greville E. Clarke, Racine, Wis.

I claim, First, The combination of the pivoted platform, E, and the arm, F, arranged and operating substantially as and for the purposes described.

Second, In combination with said platform, E, and arm, F, the ratchet wheel, G, provided with a finger, l, operating substantially as specified.

Third, In combination with said ratchet wheel, G, I claim the arrangement of the spring, s, to hold the wheel from moving back while the arm, F, recedes, in the manner described.

Fourth, The combination of the spur wheel, G, provided with the pin, l, and the lever, H, arranged and operating substantially in the manner and for the purposes described.

60,144.—VISE.—Emmett Coon, Kalamazoo, Mich.

I claim, First, The adjustable dies, F F, with cavities, b b, and keys, c c, as and for the purpose set forth.

Second, The adjustable dies, Figs. 4 and 5, made with the bevel, n, horn, d, and keys, c c, when used in combination with a vise.

60,145.—CENTRIFUGAL PUMP.—E. Hall Covel, New York City.

I claim, in pumps, the combination of a water wheel and screw elevator, when arranged substantially as and for the purpose described.

I also claim an angular or irregularly-shaped chamber, in combination with a pump cylinder, in which water or other fluid is elevated by a spiral or vertical motion, substantially as described for the purpose specified.

60,146.—FORCE PUMP.—W. G. Crutchfield (assignor to himself and James O. Atlick), Dayton, Ohio.

I claim the arrangement with the stem, A, of a force pump, of the pipe, C, with its cock and cup, substantially as and for the purpose specified.

60,147.—Seeding Machine.—H. D. Dann, Waupun, Wis.

I claim, First, The seeding cylinders, consisting of the parts, B and C, constructed and arranged to operate in combination, as herein described.

Second, Attaching the parts, B, permanently to the axle, O, and the parts, C, to the rod, a, for the purpose of adjusting the size of the cells, as set forth.

Third, The plates, E, provided with the opening, l, and the slides, m, attached to the bar, b, arranged to operate in combination therewith, as shown and described.

60,148.—Method of Treating Thread or Yarn Previous to Weaving.—John Davis, Manchester, England.

I claim caps or bobbins of yarn or thread saturated with a solution containing tanning matter, for the purpose specified.

60,149.—Machine for Scouring Leather.—Franklin Davis, Lawrence, Kansas.

I claim the cylinder, B, and the apron, C, constructed, arranged and operating substantially as described, in combination with the frame, A, and the water reservoir, D, for the purposes set forth.

60,150.—Sadiron Heaters.—Joseph S. Dennis, Chicago, Ill.

I claim the chambers, D and E, with the inlet and exit tubes, connecting pipes or jets, b, and orifices, a, constructed and operating substantially as herein described.

60,151.—Printer's Galley.—Alexander T. De Puy (assignor to R. Hoe & Company), New York City.

I claim the combination of the metal lining with the frame of a printer's galley, in the manner substantially as herein shown and described.

60,152.—Spade Handle.—Charles Dimmick, Brockport, N. Y.

I claim making a spade, or rather handle, from a straight piece of wood, formed and bent round in the manner substantially as herein shown and described and for the purposes set forth.

60,153.—Detachable Flanges for Privy Bowls.—Robert Diven, Brooklyn, N. Y.

I claim the water-closet hopper, constructed with a detached flange, B, substantially as herein set forth for the purpose specified, as a new article of manufacture.

60,154.—Ore Crusher.—M. B. Dodge, New York City.

I claim the application of soft wrought-iron faces to the jaws of a quartz crusher, substantially as and for the purpose specified

60,155.—Turning Lathes.—Reuben W. Drew, Lowell, Mass.

I claim making the front box or bearing, B, tapering, in the manner as and for the purpose set forth.

I also claim the spindle, D, with its check nuts, H I, in combination with the slitted box, C.

I also claim the slitted box, C, with its nut, l, in combination with the cap, J, and its set screw, j, for the purpose described.

60,156.—Sash Holder and Fastener.—E. F. Driggs, Brooklyn, N. Y.

I claim, in combination with a window sash, A, a ratchet, C, provided with teeth as described, and a spring dog or pawl, D, provided with a thumb piece, E, the whole constructed and operating substantially as described and specified.

60,157.—Manufacture of Springs.—J. F. Dubber, Brooklyn, N. Y.

I claim tempering steel springs and adjusting their shape by means of the former herein described, and in the manner set forth.

60,158.—Apparatus for Testing Spirits and Preventing Frauds on the Revenue.—John C. Dunlevy, Dayton, Ohio.

I claim the testing apparatus herein described, composed of the vessel, C, with the parts, f and g, or their equivalents, in combination with the pipe, A, and the stop cocks, D and E, all substantially as and for the purpose set forth and described.

60,159.—Horse Power.—George Eichenseer, Waterloo, Ill.

I claim, First, The arrangement of the shaft, B, for horizontal adjustment, thereby tightening the driving belt, H, substantially as set forth.

Second, The flexible joints of the parts, C and D, as set forth.

Third, The arrangement of the drum, E, in sections, e, and their combination with each other and with the arms, D, as set forth.

Fourth, The arrangement of the supporting casters, F, and their combination with the segments, e, as set forth.

Fifth, The caster shafts as a guide for the belt, H, after it has slipped, substantially as set forth.

60,160.—Stove-pipe Damper.—Charles R. Everson, Palmyra, N. Y.

I claim the combination of the arched plate, E², perforated at d d, with the annular plate, B, valve, C, loop, D, and shaft, E, all constructed and arranged as and for the purposes specified.

60,161.—Wagon Hay Rack.—Francis M. Everingham, Lafayette, N. Y.

I claim the lever, A, the drum, B, the flanges, C, the ratchet, D, the catches, E E, the winch, F, and the rope, G, when the same are constructed and operated substantially in the manner and for the purpose described.

60,162.—Burglar Alarm.—Willard Farnham, Janesville, Wis.

I claim the combination and arrangement of the wedge, A, base, B B, and spurs, a a, substantially as and for the purpose set forth.

Second, The combination and arrangement of the wedge, A, base, B B, tumbler, C, spring, D, hammer, E, dog, H, and nipple, F, substantially as and for the purpose set forth.

Third, The combination and arrangement of the wedge, A, base, B B, tumbler, c, spring, D, hammer, E, dog, H, and match holder, I, substantially as and for the purpose set forth.

60,163.—Turning Lathe.—Luther R. Faught, Philadelphia, Pa.

I claim an improved binder for lathe spindles, formed by combining the nut, E, and sleeve, D, constructed and arranged as herein described, with each other, and with the spindle, C, and stock, A, substantially as described and for the purpose set forth.

60,164.—Rotary Cultivator.—James C. Fitzgerald, Willet, N. Y.

I claim the arrangement of the spirally and inclined armed pulverizer, H, resting in the eccentric bearings, k, when said parts are combined with a vertically adjustable frame, G, suspended from the main frame and concentric with the axle, as set forth.

I also claim, in combination with the frames, G and C, the draft chains, M, and the gage arms, N, operating substantially as and for the purpose specified.

60,165.—Oil Wells.—Thomas M. Foster, Union Mills, Pa.

I claim the sleeve, B, sections, A A, couplings, a a, connecting piece, c, and ferrule, E, combined and operating substantially as described as and for the purpose specified.

60,166.—Distilling and Refining Oil, Wine, and other Liquids.—Andre Foubert, New York City.

First, I claim the column, c, containing the perforated diaphragms, d d, in combination with the worm or condenser, g, and pipe, m, passing back to the column, c, as and for the purposes set forth.

Second, I claim the flanges or divisions upon the perforated diaphragm to cause the liquid to circulate from the cup, l, to the pipe, c, in the manner specified.

60,167.—Machine for Sizing Fibrous Material.—William Fuzzard, Chelsea, Mass.

I claim the combination of the distributing roller, E, and the heated cylinder, C, arranged relatively with each other to operate substantially in the manner as and for the purpose set forth.

60,168.—Harness Saddle.—John Fye, Hamilton, Ohio.

I claim the combination of the detachable bisected bases with dovetailed rebates therein, with the turret feet, m m, and saddletree, when constructed and secured together in the manner and for the purpose specified.

Second, I claim the detachable water hook with its saddle, s s, in combination with the saddletree, when constructed and applied in the manner described.

Third, I claim the turrets with their bases and the water hook with its saddle in combination with the crupper loop and saddletree when the several parts are constructed and secured together in the manner and for the purposes set forth.

60,169.—Centering and Squaring Device.—Charles G. Gardiner, Springfield, Ohio.

I claim, First, The chuck, C, provided with the conical sectional rings or wedge, a, and nut, o, for centering and holding the drill, e, as shown and described.

Second, The sectional rings, n, and cap, D, in combination with the chuck, C, and spindle, r, arranged and operating as shown and described.

Third, I claim the grooved arm, E, attached to the body, C, and provided with the standard, C', for holding the chisel, H, when arranged in connection with the other parts as set forth.

Fourth, The hollow conical chuck, A, in combination with the detachable blades or jaws, b, all constructed and arranged as and for the purpose set forth.

60,170.—Cotton Planter.—William L. Gebby, New Richland, Ohio.

I claim, First, the wheel, H, droppers, b b, springs, d d, inclined planes, I and I', and apron, 12, constructed and operating substantially as and for the purposes set forth.

Second, The seed box, F, constructed substantially as described.

Third, The plunger, K, constructed and operated substantially as and for the purpose set forth.

Fourth, The cam, L, in combination with the lever, j, arms, i i, spring, o, and plunger, K, substantially as and for the purpose set forth.

Fifth, The combination of lever, s, arm, t, clutch, p, pin, N, and spring, u, constructed and operating substantially as and for the purpose set forth.

Sixth, The plows, N N, bars, R R, arms, S S and T T, and rods, x and y, in combination with the lever, 2', and arm, 2, substantially as described.

Seventh, The shaft, U, arm, 2, lever, 2', rods, 4 4, hooks, 6 6, and beams, P P, when used in combination, substantially as and for the purpose set forth.

Eighth, The bar, 7, in combination with the hounds, 8 8, for the purpose set forth.

60,171.—Gate.—Riley James Gilbert, Hanover, Wis.

I claim, First, The carrying beams, B and C, when constructed, arranged and used with or without the side cap, r, substantially as and for the purpose set forth.

Second, The combination and arrangement of the handles, N, levers, L, swinging fulcrums, M, carrying beams, B and C, connecting bar, D, gate, A, parts, F E R, and cross beam, F, substantially and for the purpose set forth.

60,172.—Plow.—Carlos Glidden, Milwaukee, Wis.

I claim coating or covering with porcelain or silicious enamelings, substantially as herein set forth, such portion of the metal surfaces of plows and other ground-paring or cultivating and planting implements as come in contact with the earth.

60,173.—Machine for Ornamenting Moldings.—Gottlieb F. Goetze, New York City.

I claim the arrangement of the pattern wheel, D, roller, F, springs, j and l, adjustable plate, E, carriage, G, slide, H, screws, n and o, and clamp, p, combined and operating in the manner and for the purpose herein specified.

60,174.—Fence.—E. C. Gordon, Sevastopol, Ind.

I claim the combination of the wire guys, D, keys, C, wedges, F, and anchoring blocks, E, with each other and with the panels, A, of the fence, when said guys, keys, wedges and blocks are constructed and arranged substantially as herein described and for the purposes set forth.

Second, The combination of the supporting blocks, B, with the panels, A, of the fence, when said blocks are constructed substantially as herein described and for the purpose set forth.

60,175.—Brick Machine.—G. Graezle, Hamilton, Ohio.

First, I claim the arrangement of the frame, L, and knife, L', in relation to the molds, G, when carried upon an endless apron, H, substantially as set forth.

Second, The combination of an endless apron, H, having cleats, I', with the revolving arms, I, when constructed and arranged substantially as and for the purpose set forth.

Third, The combination of the endless aprons, H, and molds, G, when respectively constructed and arranged substantially as set forth.

Fourth, The openings, A', when constructed with adjustable plates, K, operated substantially in the manner and for the purpose set forth.

60,176.—Machine for Picking Millstones.—J. H. Gray, Boston, Mass.

I claim a machine for the purpose specified, so arranged and organized that while the pick is guided and controlled as to the direction of its movement, each blow is effected and its force controlled by the operative, substantially as described.

Also, the arrangement and organization of a machine for picking millstones, complete and independent in itself, and fitted to be moved over, and to operate anywhere upon, the surface of such a stone, to produce lines in any direction, without attachment to the millstone center or spindle, substantially as described.

Also, the flange, j, when combined with the matter forming the second claiming clause herein, and arranged as and for the purpose specified.

Also, the combination with a frame, a a l q, of the two screws, b b, and means for simultaneous and equal rotation thereof, when said screws are provided with nuts, f f, arranged to move a shaft, E, which bears a pick helve.

Also, the combination with the shaft, g, of the conical sleeve, s, thereon, and the slotted hammer helve.

Also, the combination with a millstone picking machine, of a pick set, r, or guide, for the purpose described.

Also, the means described for securing the pick in position and to the pick helve.

60,177.—Mode of Treating Hemp, Flax, etc.—Thomas Gray, Union Road, Wandsworth, Eng.

I claim as my invention the new and useful and improved method of treating flax, hemp, grasses, and other like fibrous substances, for manufacturing and useful purposes, in removing the bark or skin and resinous or gummy mucilage and the boon or woody fibers of flax and other like plants while in a wet state, and in neutralizing the alkaline matter left in the fiber previous to bleaching in the manner hereinbefore set forth, and in bleaching the same with a combination of bleaching liquor and alkaline saponified fat or oil, or with an alkaline solution without the fat or oil, so that the fibers after the process of bleaching is completed are rendered stronger than they were in their natural or original state, and I also claim by my invention the permeating the fiber with saponified fat or oil, as herein set forth.

60,178.—Pipe Coupling.—Alfred Gwynne, New York City.

First, I claim the method of securing or fastening together the ends of water and other pipes, by means of the screws, 1 1 1, or their equivalents, arranged and operating substantially as and for the purposes set forth.

Second, In combination with such method of fastening the ends of such pipes, the use of an elastic ring packing, substantially as and for the purposes set forth.

60,179.—Method of Imparting Age to Wines.—Francois Haeck, Brussels, Belgium.

First, I claim the treatment, substantially as herein described, of wines, spirits, and other distilled liquors, by subjecting them to heat or heat and agitation combined, when the same is effected in a close vessel, or effected in a close vessel or chamber, D, gradually heated in the manner described, or in any other equivalent way, and the condensed vapors collected at or near the top of the wine chamber and run off therefrom, essentially as and for the purposes set forth.

Second, Gradually heating the vessel or chamber containing the wine or distilled liquor to be treated by means of steam and water combined, substantially as specified.

Third, The employment within the evaporating chamber, D, of a stirrer, E, in combination with a suitable heating device below said chamber and condensed vapor collecting channel or receptacle at or near the top thereof, essentially as herein set forth.

60,180.—Machine for Cutting Sickle Sections.—Samuel C. Hall, White Water, Wis.

First, I claim an improved machine which is adapted for sustaining sickle sections beneath a reciprocating chisel, in such position that the chisel will form serrations, or teeth, upon the beveled edges of said sections, constructed substantially as described.

Second, The combination of an adjustable table, I, with an adjustable way, C, a feeding screw, K, a half nut connection, S', and a file-cutting chisel, or a chisel which is adapted for cutting teeth upon sickle sections, substantially as described.

Third, The construction, substantially as described, of the adjustable way, C, for receiving and supporting a reciprocating table, and admitting of said table being adjusted at different angles with respect to the cutting edge of a chisel, C', substantially as described.

Fourth, The arrangement of the adjustable table, I, upon the adjustable way, C, so as to move at right angles to the chisel arm, B, beneath the chisel, C', substantially as described.

Fifth, Sustaining the adjustable table, I, upon the way, C, by means of adjustable bearings, substantially as described.

Sixth, In combination with an adjustable table, I, and an adjustable way, C, I claim the means substantially as described for feeding the said table with a fast or slow movement according to the size of the teeth required upon the beveled edges of the sickle sections, substantially as specified.

Seventh, Constructing the upper portion of the frame, A, with a vertical slot through it for receiving and guiding the chisel arm, B', and also for receiving a spring, G', upon which said arm strikes in its descending strokes, said slot being arranged directly over the axis of the way, C, substantially as described.

Eighth, The combination of the spring lateral, H, and treadle, I', with the means herein described for cutting sickle sections or files, substantially as and for the purpose set forth.

Ninth, The sliding adjustable table, I, with its clamp or clamps, N, its screws, L and M, nut, S', feed screw, K, in combination with the adjustable way of a machine for cutting sickle sections or files, substantially as described.

Tenth, The adjustable way, C, in combination with the frame, A, of the machine, both being constructed and arranged substantially as and for the purposes described.

60,181.—Device for Grinding Metal Plates.—Thomas Handy, Decatur, Ill.

First, I claim the combination of the carriage, E, carriage, G, ways, D, screws, F, clamp, H, and bars, e f, arranged and operating in the manner and for the purpose herein specified.

Second, I further claim the gages composed of the bars, e f, applied to the carriage, G, substantially as and for the purpose set forth.

60,182.—Skate Fastener.—Theodore Harcourt, Indianapolis, Ind.

First, I claim the heel plate, C, with the grooved ends, C C, section, I, made to the rings, E E, of the instep strap, F, as represented in the accompanying drawings.

Second, The combination of the heel plate, C, when attached to a skate runner and plate, as represented in section, I, and the drawings.

Third, The combination of the instep strap, F, the back strap, M, and the rings, E E, when constructed and used for the purposes substantially as set forth.

60,183.—Gas Retort.—George W. Harris, Elizabeth, N. J.

I claim the combination of the fire-clay retort, A, and superheater, B, when arranged as herein specified, to inject the superheated steam at the bottom of the bed of incandescent coal.

60,184.—Balance Weight.—Sandy Harris (assignor to C. Thornton Murphy), Philadelphia, Pa.

I claim combining the lever weights with the scale beam in the manner described.

60,185.—Machine for Gathering and Loading Flax, etc.—G. W. Hatch, Parkman, Ohio.

First, I claim the lag, g, hinged to the roller, N, in combination with the elevator, I, and roller, M, for the purpose and in the manner set forth.

Second, The right-angled lever, e, and cord, H, in combination with the lever, F, for the purpose and in the manner as substantially described.

60,186.—Surface and Depth Gage.—R. Hathaway, Chicopee, Mass.

I claim the holder, A, or its equivalent, in combination with the gage rod, B, hung in one end of a spindle, G, and set screw, F, and thumb nut, J, respectively, for the said gage rod, B, and spindle, G, when combined and arranged together substantially as and for the purpose described.

60,187.—Cotton Tie.—John W. Hedenberg, Chicago, Ill.

I claim a cotton tie, with one or more keys, C, so made and arranged as to require a lateral movement to clasp and to unclasp it, constructed and operated in the manner herein described.

60,188.—Fitting Lock Plate to Stock of Firearms.—Granville Henry, Nazareth, Pa.

I claim the stock, D, made in one piece, and cut out at G, in combination with the frame, C, having a shoulder, E, substantially as and for the purpose described.

60,189.—Seeding Machine.—Frank A. Hill, Marysville, Cal.

I claim the agitators, D D, in combination with the beveled gearing, B and C, and connecting rods, E E, substantially as described and for the purpose set forth.

60,190.—Apparatus for Preserving Milk.—Noah P. Holmes, Indianapolis, Ind.

I claim, in combination with the external and internal ice chambers, 6 and 8, the use of horizontal partitions for the subdivision of the preserving chamber into compartments for various uses, the entire apparatus being constructed substantially in the manner and for the purpose set forth.

60,191.—Safe.—Edwin B. Horn, Boston, Mass.

First, I claim, as an article of manufacture, a safe made substantially as described.

Second, I claim the holes or perforations in the space between the inner and outer safe, so as to afford an outlet for explosive material, substantially as described and for the purpose set forth.

Third, I claim the wing, H, in combination with the lock, L, and the loop, M, substantially as described and for the purpose set forth.

60,192.—Steam-engine Governor.—Reuben K. Huntoon, Boston, Mass.

I claim the combination of the bearing, C, its passage, c, and stop cock, d, with the shaft, B, the propeller, D, and the cistern or vessel, A, arranged as and for the purpose set forth.

I also claim the combination and arrangement of the deflector, e, with the cistern, A, the shaft, B, and the propeller, D, arranged as and for the purpose set forth.

I also claim the combination and arrangement of the wings, a, with the cistern, A, the shaft, B, and propeller, D, arranged as set forth.

60,193.—Seal Fastener.—Ralph S. Jennings, New York City.

I claim the implement, as a new article of manufacture, for sealing metallic seal envelopes, which is constructed with a spreading portion, c, and a closing or riveting portion, d, substantially as described.

60,194.—Fastening for Buttons.—John M. Johnson, New York City.

I claim a button whose collet is provided with a slot to admit the head of a shank, said collet having upon its inner side and at an angle to the slot a depression on one side and a hole on the other, or a hole upon each, in combination with a spear or T-shaped shank or stud, whose transverse end or ends are provided with a spur at right angles thereto, with or without a spring, J, substantially in the manner and for the purpose described.

60,195.—Hoe.—A. C. Kasson, Milwaukee, Wis., assignor to himself and Nelson C. Gridley.

I claim a hoe made substantially as herein shown and described, that is to say, constructing the edge proper at an angle, and setting the blade at such angle relatively with the handle that the two opposite sides of the hoe will operate upon the earth, substantially as and for the purpose specified.

60,196.—Baling Press.—Wendell R. King, Chicago, Ill.

I claim the combination of the gearing, J F and G I, with the screw, C, and boxes, A, when constructed and operating substantially as described.

60,197.—Comb.—Edward H. Knight, Washington, D. C., assignor to Ignatius Rice, New York City.

I claim, First, The combination with a comb of a strip of metal imbedded or inserted in the back of the comb, substantially as hereinabove set forth.

Second, The combination with a strip of metal, A, and the back of a comb, of the bands or hooks, D, substantially as and to the effect set forth.

Third, Returning the strip of metal, A, over the ends of the comb, substantially as herein above set forth.

60,198.—Boot and Shoe Irons.—John Knox, Auburn, N. Y.

I claim, First, Adjusting the space between the back and front guards, substantially in the manner and for the purpose set forth.

Second, The combination of the short back guard and long front guard with the long back guard and short front guard, substantially in the manner and for the purpose above specified.

Third, In fore-part irons holding the front guards in their place by means of a screw operated through the handle, as above set forth.

60,199.—Cast-iron Arch for Bridges, Vaults, etc.—George T. Lape, Summit, N. Y.

I claim a cast-iron voussoir for the construction of arches and vaults for bridges, subterranean railroads, and similar purposes, formed of a top plate, a, a rib or stem, b, and abutting ends, c c, and fastened with bolts, e, substantially as herein described.

60,200.—Hand Seed Planter.—John H. Latimer, Crystal Lake, Ill.

I claim a seed planter provided with one or two chambers, B C', and a chamber, L, provided with a hinged bottom, G, and a spring, S, or its equivalent, arranged with a slide, D, provided with one or more seed cavities, m c, operating substantially in the manner and for the purposes specified.

Second, In combination with the above, I claim the arrangement of the gages, d f, and the point, e, as and for the purposes specified.

Third, I claim providing the chamber, L, with the hinged bottom, G, and a spring, S, substantially as and for the purposes set forth.

60,201.—Substitute for Yeast for Baking Purposes.—John E. Lauer, New York City.

First, I claim the preparation of muriate of phosphate of lime herein described.

Second, The mixture of the above-described preparation of muriate of phosphate of lime with an alkaline carbonate, as a substitute for yeast in raising bread.

60,202.—Hand Spinning Machine.—Wm. Leach and Joseph Leach, Stewartsville, Ind.

First, We claim as an improvement in a hand spinning machine, the arrangement of two sets of twisters to each thread, each twister having three or more grooves for the purpose of varying the amount of twist to suit different kinds of wool, and the same being placed immediately behind the front and middle rollers, so as to retain the twist close up to said rollers, in the manner and for the purpose specified.

Second, We also claim raising and lowering the spools, J, by means of the platform, K, the connecting rods, P and M, the levers, O L, and the rock shaft, H, substantially as described.

60,203.—Cooling Glass Press.—Henry J. Leasure and James S. Gill, Wheeling, W. Virginia.

We claim cooling the plunger of a glass press with water or other liquid or atmospheric air, substantially as herein shown and described.

60,204.—Coffee Pot.—James H. Lee, Charlestown, Mass. Antedated Nov. 22, 1866.

I claim the combination and arrangement of the tubes, B and H, the boiler, A, the coffee pot, D, and the vessel, F.

I also claim the combination and arrangement of the tubes, B H and E, the boiler, A, the coffee pot, D, and the vessel, F.

I also claim the combination of the safety bell cover, G, and its spring, m, the cover, C, the coffee holder, F, the pipes, H E B, or their equivalents, the coffee pot, D, and the boiler, A.

I also claim the combination and arrangement of the seat, b, one or more openings, d, the flexile cap or washer, a, and the screws, f g, with the coffee pot, D, in boiler, A, and the tube, B, applied to such boiler and opening into it, as specified.

60,205.—Bridge.—O. G. Leopold, Cincinnati, Ohio.

First, I claim the general arrangement and combination of wrought angle iron and plate in a bridge, so as to present in the cross section of the girders and all other essential parts of the bridge, the double T form, substantially as described.

Second, The arrangement and adaptation of the bar, D, to the central rib, a3, in such a manner that the platform or the roadway of the bridge shall be located at or near the line of stability or neutral line of the girder, substantially as described.

Third, And in combination with the above I claim the lateral bracing for the support of the roadway, substantially as described.

Fourth, Making, in the combination of the double T of the bridge girder, the upper stringer or head of the same of either a flat bar or a hollow tube of any form, substantially as described.

Fifth, Making the sills or cross ties of the roadway of hollow wooden beams instead of solid timber, and covering the same with metal plate, substantially as described.

60,206.—Core Box Plane.—Elisha W. Lewis, Philadelphia, Pa.

I claim, in combination with the stock, A, the rotative tool holder, E, carrying a transversely-adjustable cutter, F, to which a circular feed motion is given by means of the worm, I, and worm wheel, H, or in any other equivalent manner.

60,207.—Countersink Bit.—Henry C. Lewis, Essex, Conn.

I claim a countersink bit constructed in the manner herein described, and so as to operate as and for the purpose specified.

60,208.—Grain Binder.—Sylvanus D. Locke, Janesville, Wis.

First, I claim the combination of a revolving twisting or tying device, and a reciprocating toothed rack with a vibrating driving arm, substantially as set forth.

Second, The combination of a reciprocating toothed rack and a vibrating driving arm, substantially as set forth.

Third, The combination of a revolving twisting or tying device with a scroll spring in such a manner that the former is returned to its original position by the latter, substantially as set forth.

Fourth, The combination of a reciprocating toothed rack with a scroll spring, in such a manner that each is alternately operated by the other, substantially as set forth.

Fifth, The combination of a revolving twisting or tying device and a scroll spring with a reciprocating cutting device, substantially as set forth.

60,209.—Wagon Brake.—John J. Look, Farmington, Maine.

I claim the pole, C, provided with the tapering enlargement, c, as described, in combination with the slotted bounds, D, brake bar, E, lateral braces, F F, and axle, A, when the parts are so arranged that by a lateral movement of the pole one of the shoes only is brought to bear on its corresponding wheel, substantially in the manner and for the purpose set forth.

60,210.—Window-blind Fastening.—J. Luther and A. Marsh, Worcester, Mass.

First, We claim the peculiar formation of spring, C, as shown and for the purposes stated.

Second, Making a blind fastening of two pieces, a spring, and main or bed piece, when the latter is constructed as described, so that it will receive and arrest the blind when opening or closing the same without injury to the spring.

Third, The combination with the main or bed piece, A, and spring, C, of screw, a, as shown and described, whereby the screw serves to hold the spring in place, and also answers as a fastening to the blind.

60,211.—Machine for Shearing Twisted Strands of Wool, etc.—Edward T. C. Sutton, Philadelphia, Pa.

I claim knives operating substantially as described in combination with the devices herein set forth, or their equivalents, for so guiding and turning twisted strands of fibrous material, that the same may be sheared by the said knives.

60,212.—Apparatus for Cooling and Disinfecting.—Sebeus C. Maine, Boston, Mass. Antedated Nov. 22, 1866.

I claim the employment of cloth or equivalent porous material for receiving and carrying the disinfecting and cooling liquid through or in contact with a current of air produced by a fan H, or equivalent device, substantially as described.

60,213.—Spring for Hat Brims.—George Mallory, Bridgeport, Conn.

I claim a hat, the brim of which is distended by a covered spring, having inclosed within its covering a cord or an equivalent therefor, substantially as herein set forth.

60,214.—Expanding Cylinder.—Philo Moltby, Kent, Ohio.

First, I claim the grooved center, H, in combination with the cylinder, A, and nuts, M, substantially as and for the purpose set forth.

Second, The cylinder, A, and sockets, B, in combination with the arms, C, and bars, D, substantially as and for the purpose described.

Third, The grooved centers, H, and slides, F, in combination with the screws, E, sockets, B, and arms, C, substantially as and for the purpose specified.

Fourth, The gib, N, and centers, H, in combination with the set screws, O, and cylinder, A, as and for the purpose set forth.

60,215.—Lamp Burner.—J. J. Marcy (assignor to Edward Miller), West Meriden, Conn.

First, I claim the combination of the tube, A, and the case, D, when the said case, D, is enlarged at its mouth, and the said outer case, D, constructed with perforation, d, met its base, substantially as and for the purpose specified.

Second, The combination of the wick tube, A, and case, D, perforated near its mouth, and above the wick tube, substantially as and for the purpose specified.

60,216.—Carpet Stretcher.—James Martindale, Newcastle, Ind.

I claim a carpet stretcher made with a roller covered with india-rubber with or without a roughhened surface, the pressure of which is regulated at pleasure by means of the brake, B, substantially as set forth.

60,217.—Button.—Paul Francois Mauvas, New York City.

First, I claim the combination with a button shank provided at or near its end with one or more laterally projecting teeth or studs, of a metal or other plate or equivalent device slotted and perforated as herein described, so that it may be adjusted to or removed from said shank, as and for the purpose set forth.

Second, I claim the combination with a button provided with a tubular shank and locking mechanism as described, of the fastening or buttoning device herein described, the same consisting of a plate provided with a shank secured to the cloth or other material in the manner above indicated, and with a stem grooved or flanged at its upper end so as to engage with the locking mechanism of the button, substantially as herein shown and set forth.

60,218.—Corn Planter.—Thomas B. McConaughey, Newark, Del.

I claim the slide or part, D, of the corn planter provided with an oblique opening, F, with a recess, e, above it for the purpose of stirring or agitating the seed and insuring the filling of F, as set forth, when this is combined with the attachment of the said slide to the part, A, by means of the band, E, and the motions of said slide are limited by the stops, b and c, as described.

60,219.—Furnace.—James T. McDougall, San Francisco, Cal.

First, I claim a smelting hearth of peculiar construction, A B, the sloping portion, A, inclining toward C, its lower portion forming the dam wall or ridge, B, running across the hearth of the furnace from side to side, substantially as described and for the purposes set forth.

Second, I claim the half-oval-shaped refining hearth, C, conforming in shape to the smelting hearth where they join, the sole of which has a slight inclination from the flue, D, toward B, where it has a lower level than the smelting hearth, A, for the purposes specified and set forth.

Third, I claim the manner of feeding the fuels and ores to the furnace by the use of the hoppers, V V, and grooved bars or rods, W W, substantially as described.

Fourth, I claim the devices for feeding the fuel to the furnace and depriving it of its moisture by the use of the cylinder, N, and conducting pipe, C (or their equivalents), as herein specified and shown.

Fifth, The arrangement of the door hearths, H H, for discharging the metal and slag, substantially as described.

Sixth, The manner of binding the said furnace with bands of iron secured to the casing of the furnace and keyed below it, when arranged substantially as described and for the purpose set forth.

Seventh, The concave rockers, R R R, and convex rails, S S S, with chimney shield, L, and lever sockets, d d.

Lastly, I claim the within-described improvements, whether employed singly or in combination, in smelting furnaces, substantially as and for the purposes herein specified.

60,220.—Fireplace.—William T. McMillen, Cincinnati, Ohio.

I claim the combination of the deflectors, K K, with the chamber, C, pipes, F F', caliducts, D E, and flue, H, all constructed and arranged as and for the purposes set forth.

60,221.—Broom Head.—Charles Messenger, Chicago, Ill.

I claim the socket, A, nut, E, and handle, A', perforated plate, C, arranged in combination with the hooks, b, and case, D, for the purpose and in the manner as specified.

60,222.—Steam-engine Condenser.—J. M. Miller, New York City.

First, I claim the combination of apparatus for transferring the water of condensation to the boiler highly heated by passing it through the case containing the condenser, said apparatus consisting of the vacuum pump case, e, and pump, n, that forces the water from the case, e, into the boiler, substantially as and for the purposes set forth.

I also claim arranging the coils of pipe, h, within the case, e above the base plate, f, and in combination with the chambers, a as specified.

I also claim the conjoint arrangement of pipes, h, and pipes, k, substantially as herein described.

I also claim the combination of the chambers, a b, case, e, vacuum and feed pumps, l and n, arranged and combined substantially as and for the purposes herein made known.

60,223.—Faucet.—Oscar F. Morrill, Chelsea, Mass. Antedated Nov. 21, 1866.

I claim, in combination with the metal valve, c, the metal diaphragm packing, h, extending over the faucet chamber and held down by the screw cap, g, substantially as described.

Also, in combination with the diaphragm, h, and valve, c, the spring lifter, b, operating to raise the valve from its seat as the follower is unscrewed, said spring being provided with legs or projections which serve to keep the valve in central position with respect to its seat, substantially as described.

Also, the relative arrangement of the valve, c, diaphragm, h, spring, l, shoe, o, and follower, i, to effect the raising of the valve from its seat and its closing thereupon, substantially as set forth.

60,224.—Hydro-carbon Heating Apparatus.—Oscar F. Morrill, Chelsea, Mass.

I claim giving to the metallic casing, d, surrounding and protecting the filling, c, the spheroidal form shown, for the purpose of obtaining large radiating surface from which to dissipate the heat received from the chimney, e.

Also, connecting the metallic covering, d, by the filling, c, with the outer wick tube, when the spaces, 1 and 2, intervene, so as to cut off metallic connection, substantially as and for the purpose specified.

Also, connecting the tube, f, with the inner wick tube, b, by filling in such a manner as to cut off metallic connection by the spaces, 3 and 4, substantially as described and for the purpose set forth.

And regulating irregularities of the length of the flame from the wick, by contracting the flue opening on one side and contracting it on the other, substantially as and for the purpose specified.

60,225.—Pruning Knives.—L. B. Morris, Hopkinsville, Ky.

I claim a knife having its blade provided with the notches or recesses, l and d, and a handle having the projections, i and n, arranged to fit therein, as shown and described.

60,226.—Blacking Brush.—Charles Mulchahey, Springfield, Mass. Antedated November 25, 1866.

First, I claim attaching to the top of an ordinary polishing brush for boots, shoes, etc., a blacking box fitted in a case, B formed to receive it.

Second, Attaching to this box, or to the case which is formed to receive it, the smaller spreading brush, c, by means of a rim or cover, arranged as shown and described.

60,227.—Car Spring.—David Myers, Chicago, Ill. Antedated September 24, 1866.

I claim the jointed hangers, F G, when operated by springs, substantially as and for the purposes herein specified and shown.

60,228.—Car Brake.—David Myers, Chicago, Ill.

First, I claim the combination of the cam wheel, C, shaft, m chain, D, and spring or springs, E, arranged and operating substantially as and for the purposes specified and shown.

Second, I claim, in combination with cam wheel, C, and shaft, m, the box, M, and shives, h, arranged substantially in the manner and for the purposes set forth.

Third, I claim, in combination with cam wheel, C, provided with a recess, c, the bar, B, and elbow lever, A, arranged and operating as described and for the purposes specified.

Fourth, I claim providing the ratchet wheel, H, with the smooth periphery or flange, N, when arranged in combination with the projection, u, upon the point, t, of the pawl, P, and operating substantially as described.

Fifth, I claim the arrangement of the arm, R, provided with a shoulder, as described, with the elbow lever, A, and pawl, P, operating substantially in the manner and for the purposes specified.

Sixth, I claim, in combination with said bar, R, the arrangement of the movable elastic support or spring, S, operating substantially as and for the purposes herein shown and described.

60,229.—Furnace for Steam Boiler.—John F. Myers, Kokomo, Ind.

First, I claim a furnace for a steam boiler, when constructed with a door or valve, B, for closing the throat of the furnace, and with doors through the exterior walls of the furnace for the admission of cold air to the surface of the boiler and flues, substantially in the manner and for the purpose set forth.

Second, In combination with a door or valve, B, as described, I claim the pipes, G, and valves, I, arranged to operate substantially as and for the purpose set forth.

60,230.—Hydrant.—Walter P. Newhall (assignor to himself and Harriet A. Davison), New York City.

First, I claim a hydrant in which two or more exterior basins, at different altitudes, are connected by pipes within the casing, substantially as described.

Second, Combining a fire hydrant with the said hydrant, substantially as described.

Third, Keeping the water in a live condition beneath the fire-plug valve, D, or cut off, by means of the auxiliary eduction pipe, F, or its equivalent, substantially as described.

60,231.—Brick Machine.—A. N. Newton, Richmond, Ind.

First, I claim, in a machine for making brick, a reciprocating lubricated plunger acting in combination with an exterior reciprocating cutter, substantially in the manner and for the purpose set forth.

Second, In combination with the plunger, L, and cutter, m, I claim the endless apron, C, stationary when the cutters are acting on the clay, and moving forward when the cutters are raised, substantially as set forth.

Third, I claim the actuating mechanism of the cutters, m, in combination with the same, when so arranged that the pressure shall be applied to the cutters by a spring which will yield to the resistance of solid substances, substantially as set forth.

Fourth, I claim the roller, E, when used in combination with the endless apron, C, and so geared that it shall revolve only with the forward motion of the same, substantially as and for the purpose set forth.

Fifth, I claim the reciprocating roller, F, when operated substantially in the manner and for the purpose set forth.

Sixth, In combination with the rod, I, and plunger, L, I claim the actuating cam, G3, when constructed substantially as and for the purpose set forth.

Seventh, The oscillating screw, O, when constructed and operated as and for the purpose set forth.

Eighth, I claim the vertical endless aprons, C, running lengthwise with the side of the hopper, when used in combination with the endless apron, C, and roller, E, substantially as and for the purpose set forth.

60,232.—Mechanical Movement for Operating Churns, etc.—John P. Nichols, New Richmond, Ohio.

I claim the arrangement and combination of the pallet levers, F F', levers, H H', and their connections, G G' S and T, with the ratchet wheel, D, and the dasher of a churn, operating substantially as and for the purpose specified.

60,233.—Bag Holder.—J. V. Henry Nott, Guilderland, N. Y.

I claim the frame, D, consisting of two bent or curved spring arms, F, each having an outward-projecting lip or flange, in combination with the post or standard, B, when arranged together so as to operate substantially in the manner described and for the purpose specified.

60,234.—Express Wagon.—W. D. Osborn, Boston, Mass.

I claim a wagon made with the rear part of its body offset and depending downward below the bottom of the front part thereof, when combined with a bent binder axle placed directly under the rear part of the body, and when the sides and front end of the

body rise above the bottom of that part, all substantially as and for the purpose specified.

Also, the construction with such a wagon body and bent hind axle, located as described, of springs, e, and bifurcated perch, c, as specified.

60,235.—Cotton Picker.—John G. Page, Memphis, Tenn.

I claim a series of toothed or armed cylinders, B B' B" B"', placed within a case or box, A, provided with a bottom composed of a series of perforated concaves, C, the cylinders gradually increasing in size from the feed to the discharge end of the case or box, and their speed of rotation increasing about in proportion to the increase of their dimensions, substantially as and for the purpose set forth.

60,236.—Spring for Hat Brim.—Samuel Peck, New Haven, Conn.

I claim forming springs for hat brims, so as to droop at the front and rear, by curving the wire, substantially as herein set forth.

60,237.—Machine for Filing Saw Teeth.—M. M. Pettes, Oxford, Mass.

I claim, First, So hanging the guide, A, or its equivalent, to and upon any frame or holder suitable for being secured upon a saw blade, that said guide can be adjusted to various angles with regard to the length of the blade, substantially as herein described and for the purpose specified.

Second, So hanging the guide, A, or its equivalent, to and upon any frame or holder suitable for being secured upon a saw blade, that the said guide can be adjusted in position to vary the pitch of the teeth of the saw blade, substantially as described.

Third, So hanging the guide, A, or its equivalent, to and upon any frame or holder suitable for being secured upon a saw blade that it can be adjusted both to various positions or angles with regard to the length of the blade, and also to accommodate it to various pitches of the teeth of the saw, substantially as and for the purpose described.

Fourth, So hanging the frame, E, or its equivalent, to which a guide, A, or its equivalent, is secured in any proper manner to a yoke or other frame suitable for being sawed upon a saw blade, so that it can be either raised or lowered, or so set as to more or less incline the said guide, A, or both, substantially as herein described and for the purposes specified.

Fifth, The guide, A, frame, E, with circular bar, G, and yoke, S, when arranged, combined and connected together so as to be susceptible of each and all the several adjustments hereinabove described, and substantially as and for the purposes specified.

Sixth, In combination with the above, I claim the spring pawl, Y, when arranged upon the yoke frame, S, or its equivalent, so as to operate substantially as and for the purpose described.

60,238.—Lathe Dog.—William Pimlott, Syracuse, N. Y.

I claim the bar, B, the screw, C, the nut of the jaws, D, the jaws, E E, the set nuts, F F, when the same are constructed and operated substantially in the manner and for the purpose described.

60,239.—Water Elevator.—Isaac A. Pinnell, Galva, Ill.

I claim, First, The bar, P, provided at the ends with slotted arms that engage the shafts of the drums, E E', for the purposes and substantially as described.

Second, The bar, P, provided with slotted arms, Q Q, in combination with the lever, N, substantially as and for the purposes herein described.

Third, In combination with the bar, P, and lever, N, the drums, E E', with the gear wheels, F F', and the ratchet wheels, D D', for the purposes and substantially as described.

Fourth, The wheel, B, provided with a ratchet upon its periphery and one upon the inside of the rim, in combination with the drums, E E', lever, N, and bar, P, substantially as herein set forth.

60,240.—Churn.—A. J. Pope, Strongsville, Ohio.

I claim the standard, C, pendulum, D, and handle, E, in combination with the arms, F, dasher, H, and beater, G, constructed and operated as and for the purpose set forth.

60,241.—Sewing Machine.—T. K. Reed, East Bridgewater, Mass.

I claim combining with the reciprocating shuttle and shuttle race of a sewing machine, a device or mechanism operated by the movement of the shuttle to regulate or change the tension of the shuttle thread, substantially as set forth.

60,242.—Mode of Defecating Cane Juice.—Lawrence Reid, New York City, and David Lyman, Middlefield, Conn., Administrator of the Estate of Edward H. Swift, deceased, assignors to Phineas L. Robinson and Joseph H. Parsons. Antedated Nov. 29, 1866.

We claim the mode herein described of defecating cane juice with superphosphate of lime and slaked lime introducing some of the superphosphate in advance of the lime as herein specified, with or without the final use of the prepared slightly alkaline phosphate of lime described to correct acidity and promote the crystallization of the sugar.

We also claim, in the defecation of cane juice, the alternate use of superphosphate of lime and slaked lime in small proportions, and in two or more successive increments, as described by us above.

We also claim the combination with the superphosphate of lime in the above described process of one or more of the other defecating agents set forth in patents issued to us of even date herewith.

60,243.—Mode of Defecating Cane Juice.—Lawrence Reid, New York City, and David Lyman, Middlefield, Conn., Administrator of the Estate of Edward H. Swift, deceased, assignors to Phineas L. Robinson and Joseph H. Parsons. Antedated Nov. 29, 1866.

We claim the mode herein described of defecating cane juice with acid and slaked lime, introducing some of the acid in advance of the lime, as herein specified.

60,244.—Method of Defecating Cane Juice.—Lawrence Reid, New York City, and David Lyman, Middlefield, Conn., Administrator of the Estate of Edward H. Swift, deceased, assignors to Phineas L. Robinson and Joseph H. Parsons. Antedated Nov. 29, 1866..

We claim defecating cane juice with lime and a liquid impregnated with carbonic acid gas, in the manner above specified.

We also claim defecating cane juice by slaked lime and the supercarbonate of lime or magnesia with carbonic acid gas, applied as above described.

We also claim the combination in the above described process of one or more of the other defecating agents set forth in patents issued to us of even date herewith, with a liquid containing carbonic acid gas, with or without the supercarbonates of lime and magnesia, applied as herein specified.

60,245.—Method of Defecating Cane Juice.—Lawrence Reid, New York City, and David Lyman, Middlefield, Conn., Administrator of the Estate of Edward H. Swift, deceased, assignors to Phineas L. Robinson and Joseph H. Parsons. Antedated Nov. 29, 1866.

We claim the within-described chemical compound adapted for use in the defecation of sugar cane juice, substantially as and for the purpose herein set forth.

60,246.—Method of Defecating Cane Juice.—Lawrence Reid, New York City, and David Lyman, Middlefield, Conn., Administrator of the Estate of Edward H. Swift, deceased, assignors to Phineas L. Robinson and Joseph H. Parsons. Antedated Nov. 29, 1866.

We claim in the defecation of sugar cane juice, the use of the compound of alcohol and sulphurous acid, prepared by impregnating alcohol with sulphurous acid gas, in the manner and for the purpose herein set forth.

We also claim the combination with the compound of alcohol and sulphurous acid in the above described process of one or more of the other defecating agents set forth in patents issued to us of even date herewith.

60,247.—Battle War Chess.—Charles Richardson, Richmond, Va.

I claim the board herein described and illustrated, in combination with movable figures representing cavalry, artillery, infantry, a supply train and a citadel, or base of supplies, substantially as shown and described and for the purpose set forth.

60,248.—Substance for Fuel.—Louis S. Robbins, New York City.

I claim saturating peat, coal dust, or other substances, either separately or in combination, with hot oleaginous vapors, substantially as herein described.

I also claim the drying and saturating the peat, coal dust or other substances either separately or in combination at one and the same operation, substantially as described.

I also claim the method herein described of drying the peat, coal dust, or other substances by the use of heated air, substantially as herein described.

60,249.—Fruit Gatherer.—C. R. Roberts and J. S. Hartzell, Addison, Pa.

We claim an improved fruit harvester formed by the combination of the movable jaw, F, lever, G, cords, H and K, receiving sack, J, stationary jaw, E, ring, A, shank, B, and socket, C, when said parts are constructed and arranged substantially as herein shown and described.

60,250.—Pole for Horse Railway Car.—Daniel S. Robinson, Boston, Mass.

I claim combining with the pole, a, coupling plate or bar, b, and brace rod or bar, c, the means or mechanism for adjusting the position of this brace bar relatively to the pole, substantially as set forth.

60,251.—Lubricator.—T. R. Robinson and R. E. Jones, Providence, R. I.

We claim a lubricating bolster having chamber, A, cap, C, with or without central perforation, E, and absorbent, B, substantially as described for the purpose set forth.

60,252.—Slide Valve.—W. B. Robinson, Detroit, Mich.

I claim the combination of the counter balance, E, having suitable packing rings, and the bridge, D, with its passage, b, and valve, C C', arranged with the valve chest, A, and cylinder, B, provided with post, a a, and operating substantially as described for the purpose specified.

60,253.—Safety Line for Harness.—A. H. Rockwell, Harpersville, N. Y.

I claim the overdraw strap, D, secured to the rings, G, sliding loosely on the joint bit, the check straps, C, secured to the end rings of the same bit, operating together in combination with the rein, B, in the manner as and for the purpose specified.

60,254.—Bridle.—A. H. Rockwell, Harpersville, N. Y.

I claim the combination of the double-ring bit, H, head stall, A, and strap, K, when all connected together and applied to a horse or other animal, substantially as and for the purpose specified.

60,255.—Traveling Bag.—E A. G. Roulstone, Roxbury, Mass.

I claim the combination and arrangement of the inner and outer plates, h i, making up one half of the frame, when so constructed and applied to the body, a, inserted between them, that from one or both of them a lip is turned down which shall protect or cover the edge of the body without either lip passing around or inclosing the edge, the plates and body being secured together substantially as shown and described.

I also claim the corner stay piece when constructed and applied substantially as described.

Also, the construction of the bearings, f, with a screw thread extending only partly through the bearing so as to secure and protect the hinge rod, substantially as described.

Also, so applying the lock to the frame that its bolt works in a slot in the frame, substantially as shown and described.

Also, in a bag made up of two parts, a a, applied to frame, c d, forming the bag body from one piece, substantially as set forth.

60,256.—Traveling Bag.—E. A. G. Roulstone, Roxbury, Mass.

I claim the arrangement and manner of connecting together the body, the frame, and the frame cover, substantially as shown and described.

I also claim combining with the frame and its covering and the body, the welt, f, secured to the frame covering and body, substantially as set forth.

60,257.—Lock.—E. A. G. Roulstone, Roxbury, Mass.

I claim the bolt, e, constructed to operate in connection with a locking mechanism, substantially as set forth.

60,258.—Chuck for Holding Buttons.—Edwin Russell, Naugatuck, Conn.

I claim the chuck, A, made substantially as above described, with an elastic center, B, as set forth.

60,259.—Machine for Turning Shafting.—Robt. Safely, Cohoes, N. Y.

First, I claim an improved machine which is adapted for turning and finishing shafts, when they are supported in an upright position, said machine being constructed and operating substantially as herein specified

Second, The combination of the horizontal chuck support, E, and sliding shaft holder, C, with devices for feeding, turning, and finishing shafts, that are arranged in an upright or vertical position, substantially as described.

60,260.—Machine for Straightening Shafting.—Robert Safely, Cohoes, N. Y.

First, I claim the combination of a reciprocating slide, D, which is vertically adjustable with the bed plate, A, for the purpose of straightening rods or shafts, substantially as described.

Second, Supporting the ends of the slide, D, by means of guides, E E, having adjusting screws, g g, and steadying screws, h h, applied to them, substantially as and for the purposes described.

60,261.—Drill for Wells.—Henry W. Safford, Philadelphia, Pa.

I claim providing the stem or shank, a3, of the drill, A B, or other boring or cutting tool used in making deep wells, with a fixed projecting shoulder or supplementary boss, b1, between the upper boss, a2, and the cutting end, a4, substantially as and for the purpose described.

60,262.—Sheep Chair.—Cyrus W. Saladee and Jesse R. Moore, Newark, Ohio.

I claim the combination of box, A, and bench, S, as described, and pin, E, in combination with box, A, constructed and operating as specified and for the purposes set forth.

60,263.—Lamp Burner.—John F. Sanford, Keokuk, Iowa.

First, I claim the application of a wick spur stem, d, to adjustable bearings, in such a manner that this stem, with its spurs, can be removed from the burner at pleasure, substantially as described.

Second, Constructing the body of the burner of two sections, A B, in combination with the wick spurs, which are so applied that they can be detached from their bearings, c1 c2, at pleasure, substantially as described.

60,264.—Composition of Matter for Polishing Metals.—A. M. Sawyer, Athol, Mass.

First, I claim the polishing compound of emery and soft vulcanized rubber malle, substantially as described.

Second, The forming of the surfaces of polishing or scouring devices by means of a thin layer of the polishing compound before described, united to a backing of soft vulcanized rubber, substantially as described.

60,265.—Miter Plane.—John Sawyer, Moravia, N. Y.

I claim the grooved and slotted plate, B, and pivoted guide bars, C, when used in combination with the plane, A, having its iron, a1 a2, inclined in opposite directions, substantially as described and for the purpose specified.

60,266.—Tool Rest for Lathes.—James Service, Greenvile, Conn.

I claim the combination of the screw, D, and pinion and spur wheels, B E, with the lathe tool rest, arranged and operating substantially in the manner and for the purpose herein described.

60,267.—Window Fastener.—Warren Shailer, Deep River, Conn.

I claim the window fastener substantially as herein described and represented by Figs. 3, 4, and 5.

60,268.—Excavator.—Benjamin Slusser, Sidney, Ohio.

First, I claim the combination of the spool, L, chain, M, wheel, N, pinion, O, and crank, P, when used to regulate the hight of the shovel, A, adjustably sustained by the front axle, substantially as and for the purpose set forth.

Second, In combination with the driver's seat, Q, I claim the cord, I'", and rope, G', or their equivalents, for opening and closing the driver's seat, the hinged doors, F, in the bottom of the box, E, substantially as set forth.

Third, The doors, F, latches, H, and inclined faces, H', in combination, when constructed and arranged substantially as set forth.

Fourth, In combination with the doors, F, I claim the latch, I, lever, I', arm, I", and bar, K, substantially as set forth.

60,269.—Friction Pulley.—Charles B. Smith (assignor to Wright and Smith), Newark, N. J.

I claim the combination of levers, E' and E", block, B, sliding block, J, wedge, H, or its equivalent, bolt, F, and set screws, I' and I", for the purpose set forth.

60,270.—Horse Rake.—Francis M. Smith and Edwin Brumfield, Albion, N. Y.

We claim the combination of the jointed latches, C, straps, N N, pendants, I, spring braces, J, flanged plate, K, jointed head, B, and teeth, L, arranged and operating substantially as described and for the purpose specified.

60,271.—Hay Rack for Wagons.—George T. Smith, Plainfield, Ill.

First, I claim the combination and arrangement of the hooks, 1, and eye or eye bolt, 2, with the cross pieces, B, and bed pieces, A, substantially as and for the purposes described.

Second, The combination and arrangement of the hooks, 3, and eyes, 7, with the beams, C, and bed pieces, A, substantially as and for the purposes set forth.

Third, The combination and arrangement of the hooks, 6, the straps, 5, bolts, 4, with the beams, C, and raves, D and E, when constructed and operating substantially as and for the purpose described.

60,272.—Machine for Cutting Bungs.—John E. Smith, Buffalo, N. Y. Antedated Nov. 16, 1866.

I claim the ring, J, and nut, K, in combination with the groove, T, and the flange or ring, L, when constructed as and for the purposes described.

60,273.—Potato Digger.—John P. Smith, Hudson, N. Y. Antedated Nov. 22, 1866.

First, I claim the inclined digging screen, A, furnished with shares, C, and combined with the shaking screen, L, substantially as herein set forth for the purpose specified.

Second, The pitman, R, cranked lever, P, and sliding bar, N, arranged in relation with each other and with the shaking screen, L, driving wheel or wheels, H, and digging screen, A, substantially as herein set forth for the purpose specified.

Third, The sled, C J, arranged in rear of the digging screen, A, and underneath the shaking screen, L, substantially as herein set forth for the purpose specified.

Fourth, The arrangement with reference to the digging screen, A, of the arched braces, D, beam, E, transverse bar, F, and wheels, H, substantially as herein set forth for the purpose specified.

60,274.—Machine for Felting Hat Bodies.—Philip W. Somers, Danbury, Conn.

I claim, in combination with the endless moving platform of grooved bars or slats, the stationary, yielding, adjustable lower bed concave and upper bed, the whole constructed and arranged to yield and be adjusted substantially as described.

In combination with the lower bed and endless moving bed, the sliding bed with its two inclined concaves, one of them forming, in connection with an endless platform, an adjustable throat, and the other being a receiving table to receive the rolls thrown out of the machine.

The valve located at the entrance of the throat of the machine, in combination with the endless bed, throat, and receiving table, substantially as described and for the purposes set forth.

60,275.—Roll for Felting or Sizing Hat Bodies by Machinery.—Philip W. Somers, Danbury, Conn.

I claim the new roll adopted for working hat bodies in the roll by machinery, wherein the coils or folds of the body or bodies rolled up within the covering cloth are in a reverse direction from the coils or folds of the covering cloth, substantially as and for the purposes hereinbefore set forth.

60,276.—Steering Apparatus.—Reuben Sparks, Buffalo, N. Y.

I claim the arrangement of the vertical shaft, B, having a pinion, D, on the lower end thereof, with the pinions, E and F, and spur wheel, G, connected with the drum, H, and chain, I I', connecting with the drum, H, and wheel, H', substantially as described.

60,277.—Machine for Rolling Leather.—Quincy Stoddard, Jackson, Mich.

I claim the combination of two pairs of plain and corrugated rollers, D D', resting in swing frames, C C, so arranged that they may be turned to opposite positions to roll plain, round, or half round leather, as herein set forth.

I also claim forming the corrugated rollers with the independent spools, b b, operating in the manner and for the purpose specified.

60,278.—Machine for Boxing Paper Collars.—Daniel Stoner and John Sigwalt, Chicago, Ill. Antedated Nov. 21, 1866.

First, We claim a cylindrical form, F G, and face plate, E, in combination with a rotating shaft, or its equivalent, for imparting a rotating motion thereto, substantially as and for the purposes described.

Second, We claim, in combination with said face plate and cylindrical form, the adjustable bar, H, operating as and for the purposes set forth.

60,279.—Steam Generator.—D. B. Tanger, Bellfontaine, Ohio.

I claim, First, The pipes, E F H, in combination with the fire box, D, and boiler, A, constructed and operating substantially as and for the purpose described.

Second, The pipes, I J K, in combination with the fire box, D, and boiler, A, constructed and operating substantially as and for the purpose set forth.

60,280.—Machine for Making Twine and Small Cordage.—George A. Taylor, Lester Crandall, Horace L. Crandall, and Jonathan Larkin, Hopkinton, R. I.

We claim the elevated way or rail, A, provided with the suspended carriage, B, having the top bar, C, attached, all arranged substantially as and for the purpose set forth.

60,281.—Refrigerator.—Henry R. Taylor, Roxbury, Mass.

I claim a refrigerator provided with a drawer so arranged that when pulled out it will close the opening in which it slides and exclude the external air from the interior of the refrigerator, substantially as described.

60,282.—Tobacco Pipe.—Ferdinand Tellgmann (assignor to Ellsworth Fox and W. L. Smith), Stamford, Conn.

I claim a tobacco pipe having a nicotine chamber, C, interposed between the tobacco chamber of the pipe, and its stem, when such chamber is provided with a valve stem or plug, G, arranged so as to operate substantially as and for the purpose described.

I also claim the valve stem, G, when so constructed and arranged in combination with the aperture, a, in the bottom of the pipe bowl, as to close and clear the same as it is opened, substantially as described for the purpose specified.

60,283.—Bottle Stopper.—Nathan Thompson, London, England.

I claim, First, A stopper made of hollow wood capped with metal, substantially such as described.

Second, A stopper made of hollow wood capped with metal with a layer of material, substantially such as specified, interposed between the wood and the metal, the complete stopper being substantially such as described.

60,284.—Car Brake.—Samuel H. Timmons, Lafayette, Ind.

I claim, First, The connecting of the brakes of a train or series of cars by means of rods, N N', or their equivalents, in such a manner that by applying the brakes to the wheels of any one of the cars, the pull of the locomotive or draft will be transmitted through said connections to the several brakes, and the latter all applied, substantially as shown and described.

Second, The rods, N N', or their equivalents, when applied in such a manner as to serve the double purpose of a brake connection and a car coupling, substantially as set forth.

Third, The screws, S, and nuts, T, applied to the rods, N N', for the purpose of operating or applying power to the brakes, substantially as set forth.

60,285.—Book-mark Holder.—Phil. Tomppert, Louisville, Ky.

I claim the ribbon-receiving slots, a, in the book marker herein described, whereby a place of reference may be marked and opened by the ribbon, as and for the purpose specified.

60,286.—Fence.—Simeon P. Tuttle, Decatur, Mich.

I claim the post, C, provided with the L-shaped screws or staples, D D, and cap, F, when used in combination with the fence sections, A or B, constructed as described to form a portable fence, when arranged and used as and for the purposes set forth.

60,287.—Drag for Vessels.—George L. Upton, Milbridge, Me.

I claim the combination of the shaft, A, hub, B, beveled wings, D, braces, F, slide, E, constructed substantially as and for the purpose as specified.

60,288.—Trunk.—Samuel W. Valentine, Bristol, Conn.

I claim a trunk as made with a sealing strap, A, and loop, B, to be combined or connected by an eyelet, C, or a rivet, substantially as and for the purpose specified.

60,289.—Churn.—Andrew J. Vanatta, Vanatta, Ohio.

I claim, First, The combination of the wheel, D, and wheel, P with the pinions, H and Q, for the purpose of giving the beaters, N, both a vertical and rotary motion at the same time so as to break the rotary current of the cream at the sides of the churn, substantially as shown and described.

Second, I claim the dasher, N, having a bearing, Y, on the rod, M, so as to have a rotary motion, at the same time a vertical motion, substantially as shown and described.

Third, The beater, O, in combination with beater, N, substantially as and for the purpose described.

60,290.—Refining Petroleum.—Henry C. Van Tine, Pittsburgh, Pa.

I claim the refining of petroleum or carbon oil without the aid of artificial heat, by means of the series of operations hereinbefore described, consisting substantially of the use of sulphuric acid, sulphate of zinc, sugar of lead, and bichromate of potash, or their equivalents, for separating the heavy carbons and impurities, the neutralizing of the acid, and washing with water, combined with the subsequent exposure of the oil thus heated in shallow pans to the action of the atmosphere, substantially in the manner and for the purposes hereinbefore described.

60,291.—Broom Head.—H. H. B. Vincent, Oshkosh, Wis.

I claim the combination of the projecting sides and edge arms with the sliding band, H, and binding rods, I, substantially as and for the purpose set forth.

60,292.—Lathe Chuck.—Louis Von Gunten, Cincinnati, Ohio.

I claim the grasping jaws, h h h h, formed upon a stem, F, guided by collars, J J', and operated by a nut, E e, confined within the chambered spindle, A, which is formed with scollops, a a, to afford access to the milled head, e, of the nut, all constructed and combined substantially as herein described and for the purposes specified.

60,293.—Window-sash Fastener.—Z. B. Wakeman, Rockford, Ill.

I claim the combination of the roller, lever arm, D, secured to it, fixed staple or guide, G, and stop or rest pin, K, when arranged together, as and for the purpose described.

60,294.—Apparatus to be Attached to Stills to Prevent Fraud.—W. J. Walker, Baltimore, Md.

I claim, First, The combination of a vessel or tube containing a hydrometer, or a hydrometer and thermometer, with a system of pipes and stop cocks, so as to test spirits, and pass it to its proper tank, substantially as described.

Second, The waste pipe for safety and escape of gas and air in combination with a testing apparatus, as described.

Third, The combination of stop codks and pipes for testing and distributing the spirits, as described.

60,295.—Steering Apparatus.—Samuel L. Walkinshaw, Baden, Pa.

I claim the combination and arrangement of the shaft, D and g, wheels, 1 2 3 4 and C, coupling sleeve, 5, jointed lever, m, friction pulley, f, and pilot wheel, B, constructed, arranged and operating in the manner and for the purpose herein described and set forth.

60,296.—Attaching Thills to Carriages.—Samuel H. Ward, Altona, Ill.

I claim, In combination with the thills, E, lugs, C, and removable bolt, F, the employment of the spring, G, provided with a lip, H, when arranged so as to secure the bolt from slipping out, and also to prevent rattling and wear of the same, as herein set forth.

60,297.—Sawing Machine.—A. E. and J. V. Warner, Norwalk, Ohio.

We claim, First, The special arrangement of the levers, p p, cross piece, T, and lever, V, in combination with the racks, J J, and saw frame, as and for the purpose set forth.

Second, We claim the guide, m, and spring, n, in combination with the slide, I, spring catch, L, and catch, l', as and for the purpose set forth.

60,298.—Tobacco Press.—William T. Watson, Nottingham, Md.

I claim, First, The combination of the sills, G, sliding bars, I, and rods, I', for confining the keg in a tobacco press, substantially as described.

Second, In combination with above parts and the main frame, A, I claim the rack, B, pinions, D and D', shafts, E', and wheels, E, together with the ratchet and wheel, F F', arranged to operate substantially as set forth.

60,299.—Car Coupling.—Clemens Weaver, Easton, Pa.

I claim the arrangement of the loop and hook coupling bars a a, pivoted to the car frame, and connected with the lever, f, when applied to railroad cars for coupling them together, substantially as herein described.

60,300.—Cotton-seed Cleaner.—A. Wells, Morgantown, West Va.

First, I claim the reciprocating slide, C, used in connection with the inclined trough, A, substantially as and for the purpose herein specified.

Second, The arrangement of the slide, C, and board, D, as constructed on their under sides with the bar, G, guide, F, and trough, A, as and for the purpose herein specified.

Third, Providing the under side of the slide with an elastic covering for the purpose of rolling the seed between it and the bottom of the trough, as and for the purpose set forth.

60,301.—Rack Motion for Hand Press.—Charles Wells, Cincinnati, Ohio.

I claim the rack, C, having curved ends, E E, in combination with the eccentric pinion, F, and ordinary pinion, D, of larger diameter, the whole being constructed, arranged and operated in the manner and for the purpose set forth.

60,302.—Buckle.—William Welsh (assignor to himself and Ora C. Colby), McHenry, Ill.

I claim the combination and arrangement of the buckle frame, A B C, with one or more tongues, E, and corresponding cross bars, b, operating substantially as and for the purposes specified.

60,303.—Pendulum for Clocks.—W. D. Whalen, Northville, Mich.

First, I claim a horizontal pendulum vibrating in a vertical plane, and suspended and operating substantially as and for the purpose specified.

Second, I claim, in combination with the above, the adjustable balls, G, applied in the manner and for the purpose specified.

60,304.—Washboard and Wringer.—John Wheeler, Augusta, Me.

I claim the combination of the wringer and washboard in connection with the folding frame, as and for the purposes herein named.

60,305.—Hand Loom.—John Whitehead, Oskaloosa, Iowa.

I claim the combination of the adjustable flanged plates, b b, attached to the lay and the notched plates, c c, applied to the top of the loom forming, as herein described and for the purpose set forth.

60,306.—Mode of Training Hops.—Levi H. Whitney, Vallejo, Cal.

First, I claim the device herein described for training grapes, hops, etc., in such manner as to retain them separate to any desirable width or distance from each other, and to carry them horizontally across the space to the next row opposite, substantially as described.

Second, The shackles or device herein described for securing the strings or cords, when constructed and used in the manner described.

Third, Constructing the shackles, b b b, with longer arms than those of c c c, to allow them to drop lower than the latter, to which the upper ends of the cords are attached.

Fourth, The device constructed and arranged as described, for securing the lower ends of the cords over the hills of vines, for the purpose described.

60,307.—Melting Furnace.—Samuel A. Whitney, Glassboro, N. J.

First, I claim a furnace composed of the lower portion, A, containing the fire places and central flue, C, and the superstructure containing the central chamber, C', and crucible chambers communcating with each other through contracted passages, all substantially as described.

Second, The combination and arrangement substantially as described of the central distributing chamber, C', passages, H h, and crucible chamber, G'.

Third, The projections arranged as a support for the crucibles, substantially as and for the purpose described.

Fourth, The dome-shaped structure, F, depressed in the middle and arranged to cover the central chamber, C', and crucible chamber, G', in the manner and for the purpose specified.

60,308.—Butter Dish.—William M. Whittaker (assignor to himself and B. Church), Wallingford, Conn.

I claim the combination of the pivot, d, and the ears, c and a, when constructed and arranged so as to operate substantially in the manner herein set forth.

60,309.—Composition for Furniture and Other Purposes.—Jay J. Wiggin, Cincinnati, Ohio.

I claim the compound produced by boiling a mixture of sand, lime and clay in coal tar or pitch, in the manner and for the purpose substantially as specified.

60,310.—Mold for Plastic Material.—Jay J. Wiggin, Cincinnati, Ohio.

I claim the within-described mold, constructed with removable partitions, in the manner and for the purpose shown and described.

60,311.—Well and Cistern Filter.—William H. Wiley, Fredonia, N. Y.

I claim a portable well and cistern filter composed of the sub-plate, E, filtering cylinder, F G, disk, d, met or fastening, j, and perforated central tube, C, combined with and attached to the pump tube, B, the whole constructed and arranged substantially as and for the purposes set forth.

I also claim the partially perforated sides, F and G, when constructed as described, in combination with the porous packing, L, base plates, D E, and tubes, C and B, arranged and operating substantially in the manner and for the purpose described.

60,312.—Pessary.—J. P. Willens, Baltimore, Md.

I claim the lobes, A, opening forwardly relatively to the person, and operated by a swiveled screw and stem between the arms, B, substantially as described and represented.

60,313.—Mode of Conveying Grain.—S. W. Wood, Cornwall, N. Y.

I claim the combination of a pump, A B, exhaust pipe, C, and conveying pipe, D, arranged and operating substantially as and for the purpose herein specified.

60,314.—Stone Drill.—Thomas Woods, Jessamine County, Ky.

First, I claim the eye for the drill rope passing from the ordinary eye of the spindle in front of the bearing through the side of the spindles, and then through the pulley in the line of the radius to the groove on the circumference, as described.

Second, I claim, also, the arrangement of the rachet wheel and pawl on the spool and spindle, in combination with the band wheel, g, on the stool, for the purpose of producing the feed motion of the drill, as herein described.

Third, I claim also the arrangement of the small pulleys on the arms of the flyers, and the pulley at the eye for the rope.

Fourth, I claim the combination of the flyers, the drill, and the other improvements, as herein described.

60,315.—Scale Pencil.—Benjamin Worcester, Waltham, Mass.

First, I claim the combination of a fixed and a sliding point with a pencil, substantially as and for the purposes set forth.

Second, The construction of the marking point with a thin, curved edge, and so arranged as to cover and protect the other point when not in use, substantially as and for the purposes set forth.

Third, The combination of pencil, scale, and points as an article of manufacture, substantially as and for the purposes set forth.

60,316.—Apparatus for Tying and Packing Wool Fleeces.—James M. Worcester, Oberlin, Ohio.

I claim the sliding heads, E, weights, J, grooved bars, D, and the adjustable levers, C, as arranged, in combination with the lever, M, and rollers, K and H, in the manner and for the purpose set forth.

60,317.—Wood Lathes.—William H. Wussow, Aurora, Ill.

First, So constructing and arranging the cutting and guiding frame that its forward end, without the aid of extraneous devices, bears with a preponderating force down upon the work to be turned, while the rear end is caused to bear up against the pattern, substantially in the manner herein described.

Second, The construction of the cutter with two circular saws and intermediate finishing cutters, all arranged and operating substantially as described.

Third, The arrangement of the device, y y', with the longitudinally-moving frame, H, and the vertically-swinging and longitudinally-moving cutter frame, K, substantially as herein described.

60,318.—Corn Harvester.—Thomas Yates, Dubuque, Iowa.

First, I claim the fixed or stationary fingers, f, at the front part of the bed of a wagon, and having a reciprocating cutter, composed of a series of knives, g, working underneath it, in combination with the double draft pole, composed of two parts, b b, connected by a bow-shaped bar, e, at their front ends, substantially as described and for the purpose specified.

Second, The pivoted or turning rear axle, B', with forked bar, D, attached, in connection with the catches, i i, on the bar, E, substantially as and for the purpose specified.

REISSUES.

2,405.—Railroad Frog.—E. G. Allen, Boston, Mass. Patented Sept. 25, 1866.

First, I claim the combination and arrangement of the plates, A and B, with their supports, H and F, with or without the elastic packing, u, connected together substantially as and for the purpose specified.

Second, In a truss railroad frog, constructed substantially as herein set forth, I claim the use of the supports, H and F, recessed to receive and hold the elastic material, u, as set forth.

Third, I claim the plate, f, at the point of the toe piece, E, fitted in the hole in plate, A, and secured to the support, H', by means of bolts, all arranged as shown and described.

2,406.—Apparatus for Supplying and Measuring Sirups in Soda Water.—Edmund Bigelow, Springfield, Mass. Patented April 6, 1858. Reissued May 4, 1858.

I claim the employment of reservoirs in permanent cases or stands, revolving or otherwise, as herein described, with registering faucets, substantially as and for the purposes herein set forth.

I also claim a self-registering apparatus with an air tube or vent, substantially as herein set forth, combined with a reservoir, as and for the purposes herein described.

2,407.—Valve Gear for Steam Engines.—Adam S. Cameron, New York City. Patented Oct. 3, 1865.

First, I claim the valves, I I', in the heads of the main steam cylinder, A, to be operated by the direct action of the main piston, B, substantially as and for the purpose set forth.

Second, The construction of the stems of the valves, I I', at each end of the cylinder, in such a manner that said valves shall be moved, reversing the main valve before the piston reaches the end of the cylinder, so as to cushion or arrest the motion of the piston, as set forth.

Third, The valve chambers, H H', and valves, I I', in the heads of the main cylinder, A, in combination with supplementary cylinders, E E', pistons, F F', and main valve, C, constructed and operating substantially as and for the purpose described.

2,408.—Clothes Wringer.—Colby Brothers & Co. (assignees to George J. Colby), Waterbury Vt. Patented Dec. 4, 1860.

First, We claim the frame, A I, of a wringing machine, with elastic rollers, C J, and the springs, F, or their equivalents, so as to be self-adjusting in regard to mutual pressure of the rollers, without the use of wedges, cams, or screws, substantially as and for the purpose set forth.

Second, The construction of clothes wringers with the tongs, E E, pivoted arms, I I, and rollers, C J, or their equivalents, arranged so that the act of compressing the clothes between the rollers will cause the device to clamp itself firmly to the tub or other article, substantially as herein shown and set forth.

2,409.—Fire Alarm.—Charles Dion, Montreal, Canada. Patented April 3, 1866.

I claim the expansion piece, A or a', and bed plate or tube, B, or other equivalents, as shown in the different modifications, in combination with the tilting lever, D, or its equivalent, and with the falling weight, F, or its equivalent, constructed and operating substantially as and for the purpose described.

2,410.—Hydraulic Governor.—The Gillespie Governor Company, Boston, Mass., assignees of James E. Gillespie. Patented Jan. 7, 1862.

I claim the combination with a valve or with a water gate, and for the purpose of automatically governing or controlling the position thereof, in order to regulate the flow of liquid past such valve or gate, of a pump, a cylinder, and its piston, and a notched bar, or the equivalent of these, operating substantially as described.

2,411.—Artificial Denture.—Julius Guttman, Great Falls, N. H. Patented March 6, 1866.

First, I claim an artificial tooth or set of teeth provided with pins set in a zigzag line, substantially as and for the purpose set forth.

Second, Loading sections of artificial teeth previous to making them up in sets, substantially as and for the purpose described.

2,412.—Lamp Burners.—Edward Miller, Meriden, Conn., assignee of John J. Marcy. Patented July 21, 1863.

I claim the combination with the hinge, C, of the rigid curved rod, F, fixed to the cone, B, projecting downward through the shell, A, between the hinge and the wick tube, and provided with a bent end or equivalent stop, b, which, coming in contact with the under side of the said shell, operates by a tensional strain upon the rod, F, to limit the turning of the chimney, all as herein described.

2,413.—Machine for Boring and Drilling Gun-Stocks.—The New York Engraving and Carving Company (assignees by mesne assignments of John G. Pusey), New York City. Patented February 17, 1863.

First, We claim arranging a series of tool stocks to radiate from a common center, in combination with a series of tracers, substantially as specified, whereby all the tools and tracers may be moved together in mortising, boring, or carving, but the tools not in use will, by their divergence, be out of the way, as set forth.

Second, The arrangement of the pulley, m, in the middle of the circular head, k, and of the fork, p', or its equivalent, for receiving and changing the belt, d', in the manner set forth.

Third, The parallel bars, e e', each jointed at one end by a universal joint to a fixed support, and at the other end to a movable head, in combination with a cutter and a guide or tracer, substantially as specified, whereby the said cutter and tracer may be freely moved in carving, substantially as set forth.

Fourth, The frame, n, on centers, 10, at right angles, or nearly so, to its length, and receiving the pattern and gun stock, or other article, substantially as specified, whereby the pattern and article to be acted upon can be reversed to present either side to the tool and tracer, as set forth.

Fifth, A holder fitted on centers, and carrying the pattern and gun stock or other article, and arranged substantially as specified, to swing on said centers while the tool is inletting or cutting the curved parts, in order that said tool may act at right angles to the surface, for the purposes specified.

Sixth, Rotating the pattern and the article to be carved in parallel planes, at right angles to the axis on which they are supported, substantially as and for the purposes set forth.

DESIGNS.

2,514.—Ornamental Picture for Animal Studies.—Charles A. Foster, North Providence, R. I.

2,515.—Floor Oil Cloth.—Robert Haskin, Brooklyn, N. Y., assignor to Edward C. Sampson, New York City.

2,516 to 2,520.—Stove.—William Resor, Cincinnati, Ohio. Five Patents.

2,521.—Group of Figures.—John Rogers, New York City.

2,522.—Bottle.—W. H. Ware, Philadelphia, Pa.

Note.—In the above list of patents we recognize Fifty-two whose cases were solicited through the Scientific American Patent Agency.

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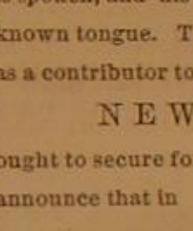

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The charm and excitement of coasting is one which will never lose its attraction to the young, and is one of the last of childhood's pleasures to fade from the memory of the man. Even the weariness attendant upon its exercise, the dangers of collisions, the sudden capsizing into the snow bank, are all elements of the youngster's enjoyment. The abrasion of boot toes worn out by steering is, perhaps, the only drawback to unmixed pleasure. The device herewith shown is intended to obviate the necessity for steering the sled at the expense of heel and toe. Its operation is easily understood. On the outside of the runner, or of the side rail, a curved lever is pivoted, as at A, the short end reaching the snow, and being shod with iron or steel, and the long end reaching to the front of the sled and guided by a clasp, B.

These levers are operated by the drawing cord, which is divided at the ends, one part attached in the usual manner to the runner and the other to the end of the lever. The relative length of these ends is so arranged that when drawing the sled the shod ends of the levers are kept free of the ground. In use the sled can be steered by pulling upon either line, or brought to a stop by holding in on both. The advantages claimed are that the dangers of collisions are lessened by the more perfect control over the course and velocity of the sled, that there is no wear of shoe leather, and that the rider can maintain an upright position. This contrivance can be easily applied to any sled used, whether frame or box.

LINDERGREEN'S SLED GUIDE.

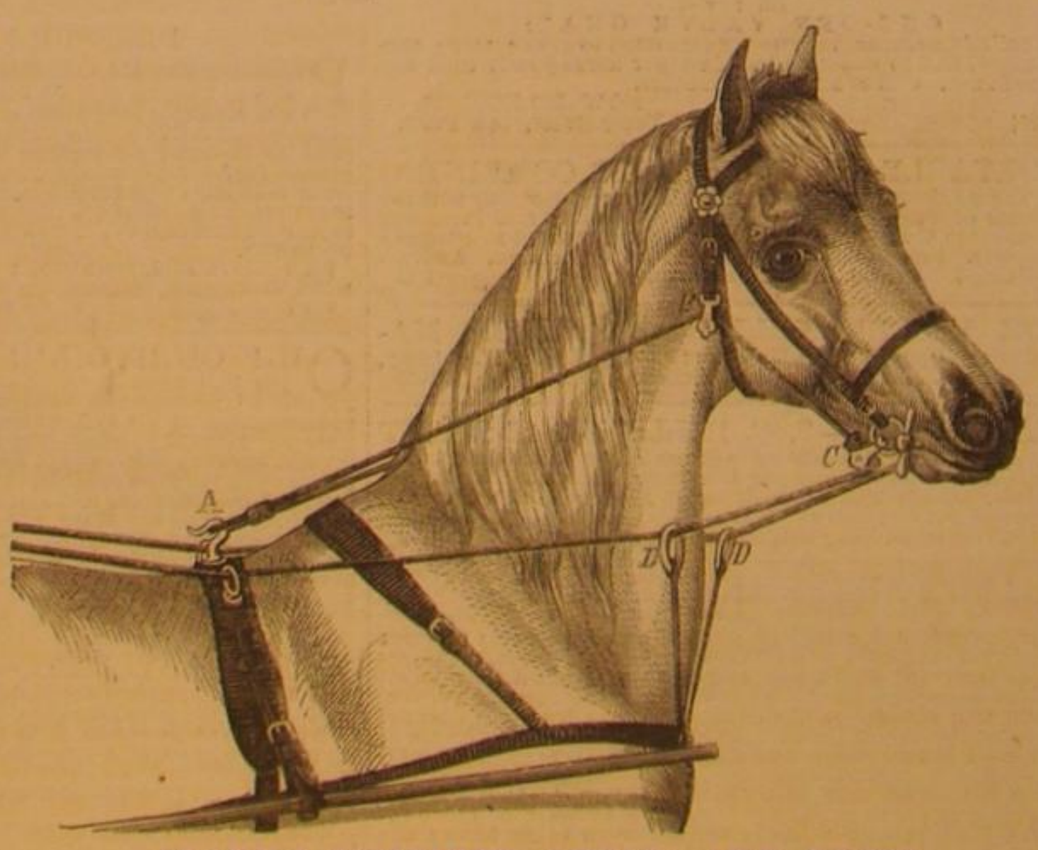
A patent was issued through the Scientific American Patent Agency, to N. P. Lindergreen, of Boston, Mass., Aug. 21, 1866, whom address at No. 7 Commercial Wharf, Boston, for State, county, and manufacturer's rights.

Improved Driving Reins and Check.

Many humane people, and some societies for the prevention of cruelty to animals, have had their attention drawn to the barbarous use of the check-rein on man's faithful servant and favorite companion, the horse. The matter has been agitated in our newspapers, and so far as it directed attention to the evil, and thus removed the first obstacle to improvement, it was well. But some practical and feasible mode of abolishing the check-rein, or preventing its abuse, should follow. The engraving accompanying shows how this can be accomplished without injuring the appearance or style of the horse, and at the same time relieving the animal from the absolute and relentless bondage of the check-rein.

In the engraving it will be seen that the check is but a part of the guiding reins. The loop of the reins is placed on the hook of the saddle at A, and united by a sheath just in front of the hook. The reins then divide and pass on either side of the head through the runner, B, provided with a pulley, and through an attachment to the bit at C, also provided with pulleys. From the bit the reins pass through the martingale rings at D, thence through the saddle rings, as in ordinary harnesses.

It will be seen that the elevation of the horse's head is always under the control of the driver. By drawing on the reins the horse's head will be raised, and by slacking the reins he can lower his head even enough to drink, which will obviate the necessity of getting out of the carriage to unhook the check-rein. The pulleys give entire control over a hard-bitted horse, while at the same time the most tender-mouthed horse need not receive injury. If the horse pulls on the bit to relieve himself of the strain, the driver can give him rein, and thus at all times he is more perfectly *en rapport* with his horse than by the ordinary check and rein. The simplicity, utility, and advantages of this arrangement can be understood at a glance.



CLARK'S COMBINED CHECK AND REINS.

Patented through the Scientific American Patent Agency Nov. 20th, 1866, by Rev. William Clark, of Valatie, Columbia Co., N. Y., whom address for particulars.

A CORRESPONDENT writing from Jordan, N. Y. says they make more skates up there than the establishment at Worcester, which we noticed some time ago. The Worcester concern report 25,000 pairs per annum, and they employ 35 hands. The Jordan concern reports 55,000 pairs made this year and only 23 hands. So far as heard from, Jordan is ahead.

A CORRESPONDENT at Washington questions the statement made by Capt. Norton, and published in our last number wherein he claims to be the original inventor of elongated projectiles for rifled ordnance.

PROF. DUSSAUCE of the Chemical Laboratory, New Lebanon, N. Y., has been appointed one of the Commissioners to the Paris Exhibition. We hope to have the pleasure to publish some correspondence from the Professor while he is at Paris.

THE

Scientific American,

TO BE ENLARGED

For 1867.

This valuable journal enters upon its twenty-second year on the first of January next, at which time the Publishers have determined to considerably enlarge and otherwise improve it. The SCIENTIFIC AMERICAN is the oldest, and, by general consent, the most popular Journal of Science ever published; and, in point of circulation, it is safe to say that it exceeds the aggregate issues of all similar papers in this country and Great Britain combined.

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Vol. XV.---No. 26. [NEW SERIES.]

NEW YORK, DECEMBER 22, 1866.

$3 per Annum [IN ADVANCE.]

Improved Steam Boiler.

The grand *desideratum* in the construction of steam boilers, apart from their security against accidents, is to utilize the heat and to make steam rapidly with the smallest expenditure of fuel. To accomplish this there should be large heating surface, not too much water, and plenty of steam room. These are the objects sought in the invention herewith illustrated.

Fig. 1 presents a front elevation of the generator, part of which is left, in the engravings, uninclosed by masonry, to show the iron work. Fig. 2 is a perspective view from the side, one wall down for convenience of illustration. The device consists simply in parallel layers of pipes, of any number that may be desired, set on an incline, the rear end being depressed, and the front, over the fire box, elevated. Water is supposed to fill the lower ends of all the tubes and the upper ends of the lower tier.

Fig. 1

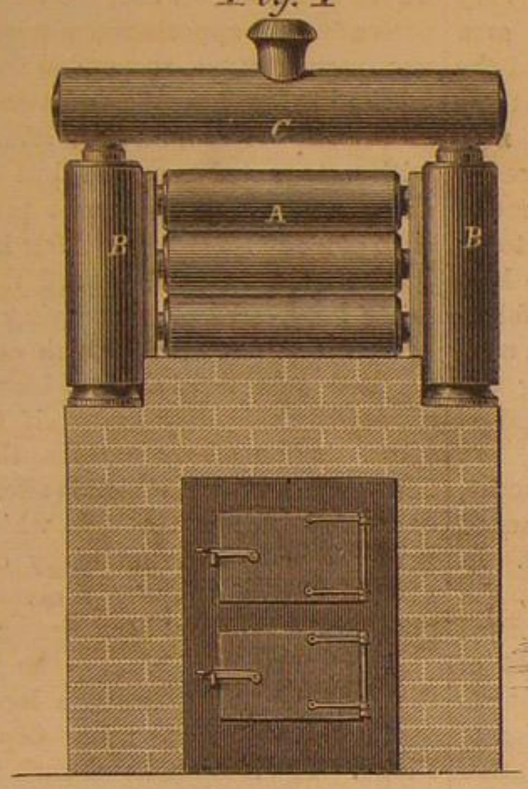
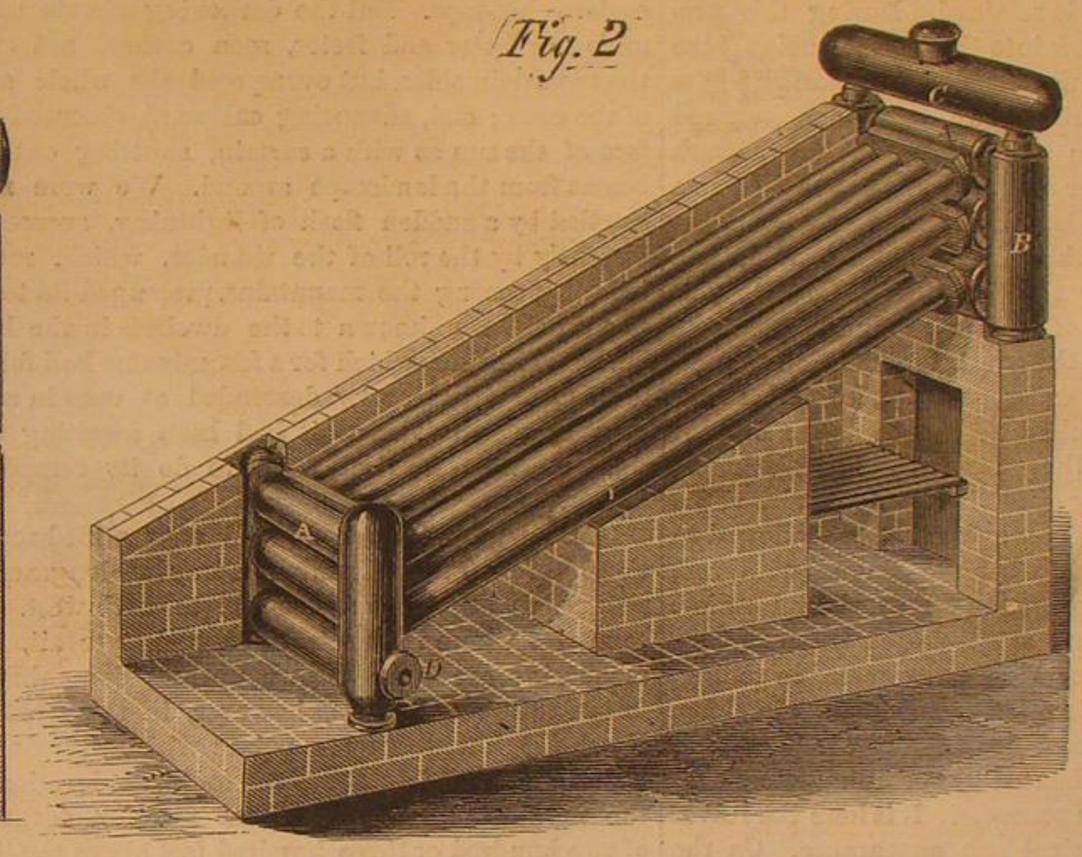


Fig. 2



BELL'S PATENT STEAM GENERATOR.

The tubes, A, are of cast or wrought iron, preferably of the latter material, having right-hand threads cut on one end and left-hand threads on the other, which engage with tapped holes in suitable projections on the horizontal cylinders, A. These are connected with upright cylinders, B, which, at the upper end, sustain the steam dome, C, of any convenient form. The safety valve and steam pipe are attached to this dome. The water inlet is at D, the lowest point.

It is claimed that by this form of generator simplicity and cheapness are secured; a large heating surface obtained, and perfect circulation of the water insured. The patent for this improvement was obtained Sept. 11, 1866, for C. S. Bell, of Hillsboro', Ohio, through the Scientific American Patent Agency. All communications relative to the invention should be addressed to Bell & Marlay, Hillsboro', Ohio.

BAYLISS'S IMPROVED TWEER IRON.

In scarcely any department of iron working has here been more attempted improvements than in that relating to the mechanism connected with the air-blast for furnaces and forges. To a superficial observer nothing could appear more simple than the introduction of air, or oxygen, to a fire, by means of an artificial blast; but, in practice few things are attended with more difficulty. A cold blast deadens the fire and hinders free combustion, while a hot blast quickens and forwards the ignition of the fuel. This is the principle of the construction of the tweer herewith represented.

Fig. 1 shows a perspective view of the device, A being the induction pipe for the blast. As seen by the arrows, the air impinges upon the front, which is in contact with the fire, and finds its way, after being heated, through the bent pipe, B, Fig. 2, to the tweer proper, C. Fig. 2 is a view of the under side of the tweer, showing the construction of the

Fig. 1

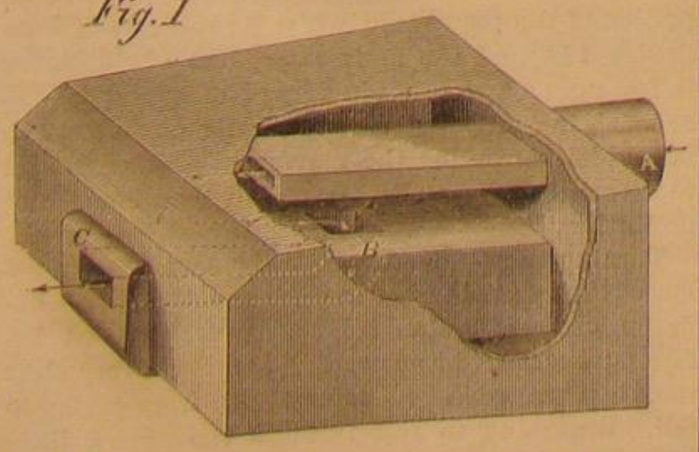
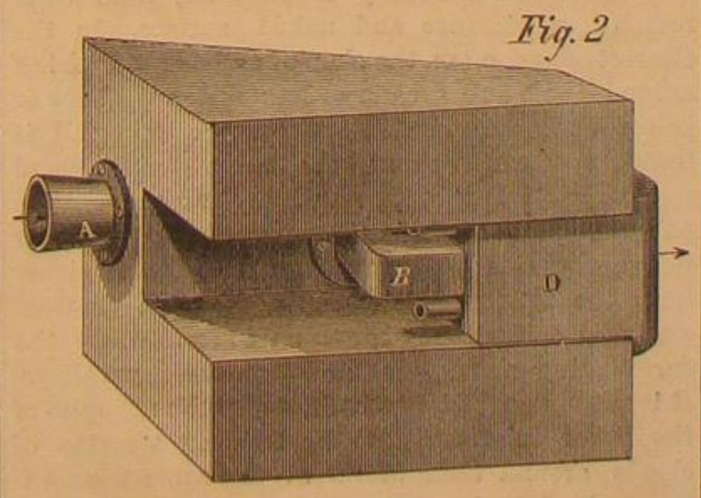


Fig. 2



water box at the back of the air outlet. This box, D, is hollow to the face, C, and has two pipes, seen on either side of B, which are connected, one with the bottom and the other with the top of a reservoir of water, not shown. The water pipe keeps the tweer box filled at all times with cold water, keeping the face of the iron cool, while the other pipe conveys the steam, which may be made by contact of the cold water with the heated surface of the box, back to the reservoir, there to be condensed.

The result is a cool face to the tweer proper, and at the same time a hot blast for the fire, both of them advantages to those who work at blast furnaces or common forges. By this contrivance it is claimed that there can be no making of slag in the mouth of the tweer, and that at all times the blast will be open and clear. Evidently, the idea which lies at the foundation of this contrivance is a correct one.

The improvement was patented through the Scientific American Patent Agency, Aug. 7th, 1866, by John Bayliss, of New York City, corner 54th Street and Lexington Avenue, to whom all applications for rights or information should be made.

Tea Culture in America.

Liebig, in one of his lectures, observes, 'We shall certainly never be able to discover how men were led to the use of a hot infusion of the leaves of a certain shrub, or a decoction of the roasted coffee seeds.' Fully accepting the assertion of the able chemist as to the hopelessness of the investigation, yet some cause there must be that will explain why the practice has become a seeming necessity to whole nations. The rapidly-increasing demand which followed the introduction of the herb into England, clearly showed the supply of a popular want, and what was at first a hazardous experiment of the East India Company, is now a traffic astounding in its proportions. Competent authorities state that London alone imports 70,000,000 pounds of tea annually; if to this, the receipts of one English port, we add the ceaseless demand of the civilized world, we obtain some idea of the fabulous magnitude of this commerce.

China, from the date of its introduction, and in later years Japan, enjoy the sole monopoly of furnishing the world with tea. Yet this fortune resides in no favorable conditions of climate or soil peculiar to the Celestial Empire. The plant, contrary to general opinion, does not require a tropical temperature; its culture has never been successful in southern China, and it is really a plant indigenous to the warm, temperate regions. The English in India, and the Dutch on the island of Java, have attempted the cultivation of tea on the mountains whose elevation has given the requisite temperature so as to make it a success in this otherwise tropical climate.

We mentioned some weeks since that the tea plant was now being grown in Georgia with highly favorable results. This is not the date of its first introduction into the United States; the attempt was made by Dr. Junius Smith, of South Carolina, twenty years ago. Plants of five or seven years' growth were imported, and a small plantation in the mountainous parts of that State was stocked with them. They were planted in the most favorable situations, the soil and climate being all that could be desired, and the lack of experience appears to have been the only reason for their want of success.

In a communication to the *Southerner*, Wm. Jones, of Liberty county, the experimentist of Georgia above referred to, details his mode of preparing both black and green tea for market.

After several unsuccessful attempts, in March,

1860, he became the possessor of fifty flourishing young plants. These were set out in a loose, sandy soil, in rows five feet apart; they grew finely for two years, when the first leaves were picked, and from that time to the present the yield has been from five to six pounds yearly. To estimate the quantity which one acre of land planted in tea would make, a medium-sized plant was selected, and yielded one-quarter of a pound. The number of plants to an acre would be 1,764, giving 441 pounds of tea to the acre. An advantage of this crop is that neither cold nor heat, dry or wet, hail, winds, or insects, injure it. The process of drying is as follows:—

The leaves when picked are to be spread out on tables for ten or twelve hours, then they are to be rolled between the hands till the watery juices are expressed, again exposed to the sun for one hour, and rolled till each leaf is curled upon itself. Having undergone this operation, the process is completed by being placed in pans moderately heated and stirred with the finger till perfectly dry.

To make green tea, the leaves are not to be rolled, as in the above preparation of black, but are roasted immediately after the first drying, whereby the original green color is retained. During this process, the Chinese throw into the pan Prussian blue and gypsum, finely powdered, in proportions of a half pound of the mixture to every one hundred pounds of tea. When thoroughly diffused through the mass, this powder causes the leaves to assume a deeper and more brilliant hue.

According to a work published by Mr. Ball, late inspector of teas for the East India Company, in China, both varieties of tea are produced from the same plant, without the admixture of coloring matter, and the striking difference in color and flavor is due to the more violent and rapid action of heat employed in drying the green teas. For black tea, the leaves are slowly dried in the open air, sifted and tossed in large trays, and afterward allowed to lie until they begin to become tinged with red, when they are immediately roasted and rolled. Roasting and rolling are repeated three or four times, until juices are no longer expressed in rolling, when the final desiccation is commenced, in sieves placed over a charcoal fire in a common chafing dish. The fire is moderated by spreading ashes over it, as the evaporation proceeds. It is here the leaves begin to assume their black appearance. On the contrary, for the production of green teas, the leaves are immediately roasted after gathering, in a sort of iron kiln, which is heated red hot, about half a pound of leaves being thrown in at a time, and kept actively in motion. They are rolled and roasted alternately three times, and at the final roasting, begin to take on the tint of bluish green which distinguishes this description of teas.

Mr. Jones seems to have thoroughly mastered the art of preparing his teas in most approved Chinese style, and, according to his statements, his experiments must be a success. Whether the cultivation of the tea plant will attain any considerable importance in this country is still an open question. To prove profitable, we shall have to contend against the experienced labor of the Chinese, and if even the crop becomes one of our staples, it will be when the ingenuity of inventors has devised some more expeditious way to supersede the present tedious and primitive mode of curing the leaves; we may then hope to contend successfully against the exceedingly low price at which labor is rated in China.

FOGS, CLOUDS, AND RAIN, IN THE MOUNTAINS.

For the Scientific American.

A sojourn of a few summers in the southwest Alleghanies afforded me an opportunity of witnessing some of the interesting scenes, frequently occurring, in which fog and rain play their part. One morning, about 7 o'clock, while awaiting breakfast, I seated myself in front of the log cabin of Edward Delozier, with whom I had tarried over night. The house is located in Tuskegee cove, Cherokee county, North Carolina, and is surrounded on three sides, north, south, and west, by mountains, one of which ascends in a peak, fourteen hundred and fifty feet, and another eighteen hundred and fifty feet, above the Tuskegee Creek—the highest one having an altitude of about four thousand feet above the sea level. To the eastward there is a wide opening, in which hills of a moderate elevation only are interposed. On the south, a gap in the mountain affords an outlet to the horseman, and on the west a deep notch serves a like purpose.

Suddenly, a few misty flakes of fog came moving slowly through the notch, from the Chevah valley, on the west. Presently, larger masses followed, and these, again, were succeeded by still more extensive volumes. Breakfast over, we resumed our seats, Mr. Delozier warning me not to set out upon my journey. The fog was now rolling through the notch tumultuously, and filing off gracefully to the right and left, like soldiers passing a defile and preparing to attack an enemy, by extending the wings of their battalions.

From our position, the fog wore the appearance of gigantic fleeces of the whitest wool. Onward, and still onward, its masses rolled along, the foremost seeming to be impelled forward, not by the winds, for it was calm, but by the fog in the rear; or rather, perhaps, by the force of an upper current in the atmosphere, or the changing condition of the air from the warming influence of the sun's rays, now shining fully into Tuskegee cove, over the eastern hill-tops. But the darkening clouds accumulating faster and faster, soon covered not only the mountain sides, but overspread the whole area of the cove; and, advancing eastward, obscured the face of the sun as with a curtain, shutting out his beams from the landscape around. We were now startled by a sudden flash of lightning, succeeded instantly by the roll of the thunder, which, reverberating among the mountains, prolonged its tones to a duration unknown to the dwellers in the lowlands. The rain, which for a few minutes had fallen in a feeble drizzle, now descended at once in a copious shower, as though it had been awaiting the signal of the electrical flash, to do its errand of mercy.

Like all mountains composed of stratified rocks, those of North Carolina run in lengthened ranges, mainly, from north-east to south-west. In countries where the unstratified rocks prevail, the mountains are often thrown up into dome-shaped forms. Here and there, however, in this part of North Carolina, there are points which rise dome-like, a thousand feet above the ordinary elevation of the mountains. Some of them reach an elevation of two hundred or three hundred feet above the line at which the ordinary forest trees can grow, and are destitute of timber, though covered with grasses and flowers.

These elevated domes have much to do with the formation of clouds and the production of rain. The philosophical explanation of this fact is presented in the previous article on water spouts. These domes are locally called *balls*, from their rounded appearance and naked surface. In the clearest days, often, the clouds can be seen forming around them at a greater or less distance above or below their summits. At times the rain fall is limited to the area around the ball, where the cloud spends itself, so that its remaining vapor is drifted off or dissolved again in the atmosphere. At other times, the clouds accumulate largely, and either from the influence of currents of wind, or from electrical action, they move off so as to water the surrounding mountains and intervening valleys It is not unusual for two balls, or for the summits of the lower mountains, to be forming wreaths of clouds around their brows at the same moment. These clouds, not unfrequently, are attracted toward each other, and thus the vegetation of the intervening districts has an additional chance of receiving new life and vigor from the rains yielded by this means.

In 1857, in the month of July, I set out on foot from the head of Valley River, a branch of Hiwassee River, to measure, with Lock's level, the hight of the Valley River Ball. The distance was five miles, and the proximate hight above the Hiwassee proved to be within a fraction of three thousand feet. Before reaching the top of the main ball, a cloud came sweeping along from the direction of the Tusquitta Mountain, to the south-west, pouring down its rain as it progressed. This we could see very distinctly. It reached us in our elevated position in the form of a dense fog, as all clouds appear when one is in their midst. It first struck our mountain at a point about five hundred feet below its summit, and rolled along, greatly agitated, amid the trees to the top of the ball. While hovering there, as a hen over her brood, it sent an arm down the eastern side of the mountain, above the tree tops, to a distance of several hundred feet; and then, as if reluctant to lose any part of its mass, this arm was drawn up again into the bosom of the cloud. Rendered light and airy, from the loss of its rain, the cloud soon swept off to the eastward, so that our measurements could be completed.

Nearly all the balls in sight, more than a half-dozen in number, and many of the higher portions of the lower ranges of these mountains, were repeatedly covered by rain clouds during the day, which were either formed upon them, or floated to them from one or another of the surrounding elevated points. Four or five of these clouds passed up Valley River toward us, but were generally exhausted of their rain before reaching our positions. These showers presented varied appearances, as they succeeded each other. The first was from a cloud, the margins of which were equal in depth and density to the main part of its body. Its breadth was nearly equal to the width of the valley. There being little wind, the rain fell vertically, and presented the appearance of a large curtain, of semi-transparent gauze, suspended from the cloud to the earth, having a length of two thousand feet. A second shower fell, an hour afterward, from a cloud with attenuated margins but dense center. The sheet of water falling from it presented the appearance of a semi-transparent fog in its center; but it gradually shaded off, toward the margins, into a misty haze, scarcely obscuring the objects in the background. A third, which occurred during our descent, was from a dense black cloud that overshadowed the valley and half the adjacent mountains. It had also great length to the westward. The body of water which it afforded was so dense, and the distance through which the eye had to penetrate so great, that every object in the background was as completely obscured as though the pall of midnight had been drawn across the valley.

A phenomenon of a very strange nature occurs at Clayton, Ga. This town is located a little to the south of Rabun Gap—a low depression in the Blue Ridge. The mountains on each side of this gap rise to the hight of fifteen hundred feet. The sun was just rising on the morning after my arrival at this town. Looking toward the north, I beheld a vast volume of fog, filling Rabun Gap from base to summit, and occasionally extending even above the highest parts of the mountains on either side. It was as white as snow, and resembled a vast deluge of cotton as it falls loosely from the gin. In front of the main gap, and between it and the town, there stands a small mountain, detached from the principal range, with a gap upon each side. The fog, as it rolled through the main gap, was deflected into the smaller gap, to the east of the little mountain.

On viewing it for a few minutes, I was soon startled by noticing that, though the whole immense volume of the fog was rolling forward at quite an observable rate of speed, yet it never passed much beyond the southern side of the little mountain. Onward it came, with a sufficient force and bulk to overwhelm, in its shadow, the whole southern side of the Blue Ridge; but beyond the line named it could never pass. A barrier existed there, in the different conditions of the atmosphere, which at once dissolved the fog, and left the air beyond as transparent as ever. Once in a while a small portion of the fog would whirl forward, a few hundred feet beyond the main mass, like a bold leader in front of an army, but in vain; leader and follower being instantly involved in a common fate. The law which controlled the movement of the fog, said to it emphatically: "Hitherto shalt thou come, but no further."

Turning to my friend, who had patiently watched me while I was absorbed in contemplating this wonderful scene, I inquired if it had ever occurred before. "Yes, sir," he answered," it occurs every clear morning, preceded by a calm night, from spring to fall. Beginning to roll through the gap a little before sunrise, it continues till eight o'clock sometimes, and as late as ten at others; and this it re-

peats every clear morning, as I said, and has repeated, doubtless, ever since the dry land appeared, and the mountains and the rivers were formed."

A word or two, only, of explanation: Saussure and Kratzenstein have investigated the nature of fogs and mists. The vapor in this condition, is found to consist of minute globules, upon which rings of prismatic colors were discovered like those seen upon soap bubbles, but which are never observed upon drops of water. From this discovery it was concluded that the globules are hollow, and filled with air or gas. The size of these globules is greatest when the atmosphere is very humid, and least when it is dry. With this explanation, the phenomena of the fog at Clayton can be readily understood.

The Little Tennessee River takes its rise in Rabun Gap, and run north-west. It is walled in on each side by mountains of fifteen hundred to twenty-five hundred feet in hight. The sun during the hottest hours of the day, teems down its rays into the valley, and imparts a great amount of heat to the waters of the river, as well as to the rocks among which it runs. The temperature of the water is thus kept up during the night, while, at the same time, the surrounding mountains cool the overhanging air. The vapor which rises rapidly from the heated water, coming into contact with the cold atmosphere above, is converted into fog. As the sun rises in the morning, his rays at once act upon the air south of the gap, where no obstruction exists; but his heat cannot affect that of the narrow valley of the Tennessee, till the sun attains a sufficient elevation to overcome the altitude of the mountain upon its eastern side. The rarefaction of the atmosphere on the south side of the Blue Ridge, while that of the Tennessee valley remains at a lower temperature, produces a current of air from north to south that bears the fog along with it through Rabun Gap. But here the increased heat, expanding the air or gas in the globules of vapor composing the fog, bursts the bubbles as fast as they advance, and the fog is dissolved by absorption into the warmer atmosphere, as transparent vapor. D. C.

THE CULTIVATION AND USES OF FOREST TREES.

Something must soon be done in the oldest settled portions of this country to encourage the growth of our forests and to prevent the indiscriminate and wholesale destruction to which they appear to be exposed. The annihilation of forests has within a few generations greatly injured the productiveness of some soils, dried up the springs, and cut off the sources of streams. The same causes which have in the old world turned fruitful plains into sterile deserts, will work in time a similiar result here. For this reason we welcome such sound advice as the following from the "Forest Tree Culturist," lately published by Geo. E. and F. W. Woodward, 37 Park Row, New York.

"I know many large land-owners who have been toiling for the past thirty years to lay up something to keep them in their old age and leave a balance to their children. They have worn themselves out as well as their land, and that something for which, they have so arduously labored has not been obtained and their children are likely to inherit a poor, worn-out farm instead of that competency which their father expected to have left them. Suppose These men had left one half their farms covered with the original forest, or if it was already cleared when they came into possession, they had planted one half with forest trees, and then expended all their labor upon the other half, they would have produced better crops and with more profit; one half of their farms would have been rich, and the other half covered with a forest that would be a fortune worth inheriting.

"Thousands of men are toiling this day to lay up wealth for their children, when if they would invest a small amount in land, and then plant a few acres of our best forest trees, their money would grow into a fortune by the time their children had grown into manhood. To some this may appear visionary; but the writer has lived long enough to see trees grow from saplings that would hardly bear his weight at ten years old, up to great trees two feet in diameter, and he has scarcely passed the half-way house of three-score and ten.

"In many portions of our country we need forests, not only for supplying us with timber, but for protection against winds and hurricanes. The farmer's grain is often prostrated by winds that never reached his fields until these protecting forests were destroyed. Fruit-growers are seeking the best means of shelter for their orchards, and a remedy for that dry atmosphere which sweeps through their gardens, shriveling up their finest specimens, checking, if not entirely annihilating, their ardor for fruit-growing.

"The little stream that formerly came singing and dancing down from the great wood on the hill is now seen only for a few weeks in the early spring and fall, and then there is nothing left but its dry, pebbly track. Is it not time we beagn to retrace our steps and again cover our now barren hill-sides and many of our valleys with those trees which were not only an ornament and blessing to our land, but would now be a source of incalculable wealth?

"The great West, with its wide-reaching, treeless prairies, feels the need of forests even more than we do in the Atlantic States. The farmer on the prairies needs a shelter from the winds, the value of which no one but those who have experienced the want can appreciate. In no way can such a protection be provided better or cheaper than by a belt of trees. Then the convenience of having timber near at hand for building fences, stakes for vines, trees, and a thousand little necessities for which wood is indispensable.

"A farmer who has provided a belt of trees around his farm, has protected his fields from winds, and his grain will remain standing until ready to harvest. His fruit remains on the trees until ripe; and in a great measure his buildings are safe against those fearful hurricanes which frequently rush with such destructive force across those level plains. If people will persist in residing on those prairies, they certainly ought to be protected, but they should learn how to do it themselves, and not expect that Nature will rear it merely for the asking, without putting forth an effort on their part.

"I have a vivid recollection of spending several years near those grand old prairies where the wind went and came without hindrance. One afternoon, on coming home, I found my house unroofed, and the place where a greenhouse stood in the morning swept clean, not a flower-pot, brick, or piece of glass left to show that I ever possessed a conservatory of fine plants. I can call to mind several instances of like character, each of which leads me to think that a strong protection is often required to enable the settler in the West to keep his foothold after he has obtained one.

"The question is, How shall protection be the most readily provided?—how shall we get the trees we need? My only answer is, *Grow them!* This will require time and expense, most certainly—and what blessing does not? It takes time to get wealth, unless you are so fortunate, or unfortunate, as the case may be, as to have it given you; if so, it probably required time for the giver to obtain it. The great and important truth which I wish could be impressed upon the mind of every land-owner in America is, if you want improvements, *begin*, yes, begin them now! Do not put it off because you have no time to attend to it at present, nor because it will take so many years, and a little outlay at the start. You may say, 'I cannot wait so long.' Who asks you to wait? Time moves in spite of you. Plant the seeds to-day, and while you are making up your mind whether you will wait a few years for them or not, the trees will be growing."

THE McCALL AND SLOPER PROCESS FOR PRESERVING FRESH MEATS.

We have several times called attention to the results of the above process as shown in experiments on a large scale, the products of which were discussed, a few weeks ago, at a banquet given by the managers of the enterprise, in London. Knowing that our readers would be interested in ascertaining the *modus operandi*, we have procured from the English Patent Office a copy of the specification. It will be recollected that at the banquet referred to, beef, from the South American pampas, was served up in steaks, roasts, joints, boiled, in soups, and in every style of cooking, and was pronounced good by all who partook. It was claimed on that occasion that good fresh beef could be brought to London and sold at retail for four pence per pound. The following are the specifications and claims in the patent of John McCall and Bevan George Sloper:

"Our improvements relate to preserving fresh meat, poultry, game, and fish. We treat such food in one or other of the following methods:—We immerse in or surround the meat for a short time, say from ten to fifteen minutes, more or less, with a solution of bisulphite of soda or potash, in the case or vessel in which it is to be preserved, and which must be capable of being made air-tight. By this immersion we remove the air which filled the vacant spaces in the case; we then withdraw the solution and replace it by carbonic acid gas; we repeat these immersions and supplies of gas occasionally as required. We introduce into the case containing the food a regulated quantity of dilute sulphurous acid, and an equivalent quantity of carbonate or bicarbonate of soda or potash separately. The acid and alkaline salt do not come into contact until the case is hermetically closed, when they are brought into contact by agitation, and the liquid resulting charged with carbonic acid bathes the surface of and impregnates the meat; or the acid and salt may be brought into contact before the case is closed; or we place the meat in a case provided with two stop-cocks, one in or near the bottom, the other in the lid. By the lower stop-cock we introduce a solution of bisulphite of soda or potash, filling the vacant spaces in the case; we then close the stop-cock in the lid and exhaust the case of its liquid contents by powerful hydraulic suction, or by the action of an air-pump. We leave the meat under this exhausting suction and thus draw out from the meat as much air as it will yield up, which we then expel from the case by the introduction of a solution of bisulphite of soda or potash, which we afterward withdraw and replace by carbonic acid gas. We repeat at intervals these alternate introductions of the alkaline solution and carbonic acid gas.

"When metallic cases are used either for preserving or packing the food we use a lining both for the top, bottom, and sides of a non-metallic nature, such as thin matting, wickerwork, veneers of wood, cloth, or other suitable materials.

"We preserve poultry, game, and fish in the same manner as that described for meat.

"And having now described the nature of our said invention, and in what manner the same is to be performed, we declare that we claim as our improvements in preserving fresh meat, poultry, game, and fish—

"First, the employment of bisulphites of soda and potash, substantially in manner hereinbefore described.

"Second, the process hereinbefore described whatever the antiseptic salt employed.

"Third, the employment of an alkaline salt together with carbonic acid, or the substances producing the same, sulphurous acid and carbonate or bicarbonate of soda or potash, acting in manner hereinbefore described.

"And we claim as our improvement in the vessels employed in preserving fresh meat, poultry, game, and fish, by any of the methods hereinbefore described, the lining of the same with matting, wickerwork, or other like suitable material to protect the substance being preserved from contact with the vessels."

In a note on the employment of a double wire rheometer in experiments on radiant heat, sent to the Academy of Sciences by M. P. Desains, the author states that he employs a kind of differential apparatus essentially composed of a single source of heat, of two piles, of a double wire rheometer, and finally of a rheostat. The apparatus is so arranged that the equilibrium, once obtained, remains uniform however the heat from the source varies; but if the smallest variation takes place in one of the radiations the needle quits the zero point. M. Desains has applied this apparatus to the examination of the absorption of heat by transparent gases, and finds that it gives very delicate and certain indications.

AMERICAN INSTITUTE---POLYTECHNIC BRANCH

The usual weekly meeting of this association was held on Thursday evening, Dec. 6th, Prof. Tillman presiding.

After the reading by the Chairman of the usual summary of scientific news, Prof. Fleury presented a new application of the old reacting steam engine, described by Hiero of Alexandria, 130 years B. C.

IMPROVED EOLIPILE.

The object to be attained by the use of this apparatus is purifying the vitiated air of churches, theaters, and crowded lecture rooms. The engine consists of a metallic disk-shaped vessel provided with four horizontal jet pipes, the open ends bent at right angles, the whole revolving on a vertical axis. On the application of heat, perfumed water within the vessel is given off as steam, which, disseminated by the rotation throughout the apartment, absorbs and precipitates the poisonous matters present. The apparatus may be made serviceable in other ways, such as destroying flies, mosquitoes, and moths, by projecting into the air steam from liquid preparations poisonous to these insects, but harmless when inhaled by man.

Mr. F. W. Bacon, of 84 John street, New York, described the construction and operation of the

STEAM ENGINE INDICATOR.

As the stethoscope shows to the skillful physician the secret workings of the inner system, and detects any minute derangement, so this instrument is valued by the engineer as furnishing similar information for the steam engine. Its employment determines whether his valves are set so as to take and relieve the steam at the proper moment; it notes the pressure in the cylinder at each point of the piston's stroke, at what part the cut-off begins, and demonstrates the advantages of using steam expansively. Coeval with Watt, the infrequency of its employment at present has been owing to inaccuracy in results at high pressures, but within the past five years the instrument has been brought to a high degree of perfection, and its use is now as satisfactory, with a rapid velocity of piston and high pressure of steam, as was the old McNaughton indicator applied to slow-working engines. The leading points in construction are, first, a piston having an area of exactly one-half square inch, moving without friction in a cylinder, the motion being restricted by a spring of known rigidity. The varying pressure of steam is recorded by a pencil as a continuous line drawn on paper placed on a drum, which latter revolves by a connection with the crosshead or point coincident in motion with the piston. The invention was ascribed to Watt, by the speaker; the chairman dissenting, a debate arose as to how much credit Watt was deserving of as an original inventor. As the subject required more time for discussion, it was appointed as a special topic to be taken up at some future meeting.

OCEAN CURRENTS.

Dr. Stevens re-opened this subject. In the investigation of the unknown, fragmentary truths are gathered and serve as a skeleton from which speculative minds form theories or hypotheses.

The origin of this earth has been a fruitful theme of investigation for philosophers. A brief reference was made by the speaker to the views advanced and defended at different times by able theorists, one school believing the planet to have assumed the spheroidal state while in a molten mass; that, losing heat by radiation, a crust was formed on the outside; that this crust fell in on the formation of a vacuum beneath, the surface then appearing as ridges, or mountain chains. Herschel, Laplace, and, later, Herbert Spencer, accepted the nebular theory or the condensation of nebulous matter into definite forms. The Plutonic theory of Hutton ascribes the origin of mountains to the action of internal fire.

The ocean, in either case, held no creative power, but its action was, change and reform. "Anthony's Nose" on the Hudson, the Iron Mountain of Missouri, and an important peak among the Rocky Mountains, were the leading features of our continent in the earliest times. The tidal wave was the agent by which the intervening areas were filled, carrying and depositing the debris from the dissolution of a previously existing continent.

Further elaboration of the speaker's view was not permitted owing to a misunderstanding on the part of Prof. Grimes, who, believing that the remarks were intended in some way as objections to his views, occupied the remainder of the evening until a late hour with a re-statement of his theory of ocean currents, presented at the last meeting, and fully laid before our readers in a previous report.

THE LAW OF MARIOTTE---ITS RELATIONS TO THE LIQUEFACTION OF GASES.

We receive sometimes inquiries about the pressure of air under certain circumstances, which indicate that the above mentioned law is not as universally understood as it deserves to be.

The law of Mariotte is this: *The volume of a given weight of gas is inversely as the pressure to which it is exposed;* that is, the greater the pressure the smaller the volume, and *vice versa*; so if the volume is reduced to one-half, the pressure will be double, if the volume is reduced to one-tenth of the original bulk, the pressure will be ten times greater, etc.

Applying this to air and gases of which the mean pressure is 15 lbs. to the square inch, we find that by reducing the volume to one-half we have 30 lbs., to one quarter 60 lbs., to one-tenth 150 lbs., and to one-fortieth we have 600 lbs. pressure to the square inch, and this rule is correct for common use; but when great accuracy is required, deviations have been found, differing among themselves for different kinds of gases.

In the first place, in those gases which will liquefy by increased pressure, the law is only tolerably correct as as long the pressure keeps the gas far enough from its point of liquefaction; but the compressibility will strongly increase when the gases reach the point; that means, the volume will be less than the law would deduce from the pressure, as soon as the gas is about to be liquefied.

We may arrange the gases which have been liquefied by pressure into a table, adding this pressure in atmospheres and in pounds to the square inch, at the temperature of 32° Fah.:

Name of gas	Pressure in atmospheres.	Pressure in lb to square in.
Sulphurous acid	1·5	23
Cyanogen	2·4	36
Hydriodic acid	4	60
Ammonia	4·4	66
Chlorine	9	135
Sulphureted hyd'n	26	330
Nitrous oxide	30	450
Carbonic acid	40	600

If the temperature be higher than 32° Fah. the pressure will be greater (at 90° it will be about double); if the temperature be lower the pressure will be less, therefore during the liquefaction process cold is always employed in addition to the pressure.

Not only have these gases and several others been liquefied, but these liquids have been frozen; we give here the temperatures at which liquefied gases freeze below zero:

	Deg. Fah.
Cyanogen	31
Hydriodic acid	58
Carbonic acid	76
Ammonia	103
Sulphurous acid	105
Sulphureted hydrogen	125
Nitrous oxide	150

Quite recently experiments have been made by Natterer with powerful condensing apparatus, by which he exerted a pressure of 3,000 atmospheres, or 45,000 pounds to the square inch; it was found that only 7 gases are left which withstood the pressure without being liquefied, out of some 40 which were liquefied. These uncondensable gases are:—air, oxygen, nitrogen, hydrogen, carbonic oxide, marsh gas, and nitric oxide.

It was also proved that these gases, at moderate pressures, followed the law tolerably correct, but at very strong pressures, say of 100 or more atmospheres, their volume was much larger than after Mariotte's law the pressure would require, so that at 1,000 atmospheres' pressure, it is only one five-hundredth part, and at 3,000 atmospheres only one seven-hundredth to one-thousandth part of the original volume.

In our next article we shall treat the relations of Mariotte's law to steam pressure.

AREA OF STEAM PORTS.

The proper area of a steam port, or any passage between a boiler and its engine, depends mainly on the following facts:—

First—That the boiler makes the steam at a uniform rate, say as many cylinder fulls as the engine makes strokes in a minute, if we take the cylinder as the unit of measure.

Second—That the rate at which the engine uses this steam at any point of the stroke depends upon the corresponding position of the crank and connecting rod with each other; for example, when the crank and connecting rod are in the same straight line the engine is using no steam, and when the rank and connecting rod are square with each other the engine is using steam fastest.

Third—That the pressure of steam must be the same in the cylinder and boiler during the admission, or until it is cut off, in order to have the engine work economically.

Fourth—If the port is so small as to cause the steam to move through it faster than at the rate of one hundred feet in a second (about one-twentieth of the velocity with which steam would rush into a vacuum) the steam will be "wire drawn," that is, the pressure of steam in the cylinder will be less than that in the boiler.

From the above it is plain that the port should be large enough to allow the steam to pass through it at a rate not exceeding one hundred feet in a second when the piston is at about the middle of its stroke, or at the moment when the speed of piston is the same as that of the crank pin. It is also plain that the proper area of the port is directly proportional to the area of the cylinder and speed of the crank pin, and inversely proportional to the *proper* speed of the steam when passing through the port *fastest*.

Therefore we can get the proper area of a port by multiplying the area of the cylinder by the number of feet that the crank pin passes through in one second, and dividing by one hundred (or simply cutting the two right hand figures from the product).

Example—What size should the port of a steam cylinder be, which is twelve feet stroke and seventy inches in diameter, in order that the engine may make seventeen revolutions in a minute? Area cylinder=70×70×7,854=3,848 square inches. Speed of crank pin=12×3½×17÷60=10½ feet per second. Area steam port=3,848×10½÷100=404, square inches.

The Canada Gold.

The recent gold discovery at Madoc, C. W., is the subject of increasing excitement. Miners, speculators, and prospectors throng into the little village at the rate of a hundred in a day, filling up the inns and farm houses for miles around; and one Yankee is preparing to put up a large hotel. Several thousand acres of land have been taken up by speculators, in Madoc, Hungerford, Huntington, Tudor, Marmora, and other neighboring townships. The noteworthy peculiarity of this region is that the discoveries of gold have all been made in the surface quartz on the hill tops; an extraordinary circumstance, from which is inferred the existence of very rich deposits at a proper depth, as well as of rich placers in the valleys. The latter are too much obstructed by water at present to allow of prospecting. It is remarked that in this instance, not for the first time, the prognostics of geologists in respect to gold were at fault, a professional survey having not long since resulted in a decision that gold did not exist in this region. It lies in Hastings county, about fifty miles north of Lake Ontario, and twenty-eight miles north of Belleville on the Grand Trunk Railway. It constitutes but a small portion of a country of similar general character, covering the shore of Lake Ontario for a hundred and fifty miles, and extending as far to the interior; broken, rugged, and filled with innumerable little lakes and streams. Probably the whole of this region will be alive with exploration and excitement, next season, if the rich reports of the two or three openings made at Madoc should be fully confirmed.

A bridge on the Mississippi is to be commenced at Quincy, Ills., in January.

Correspondence

To Measure Belting.

MESSRS. EDITORS:—The subjoined is a very convenient rule for checking invoices of machinery belting, and far more expeditious than the ordinary method of measurement. It is derived directly from the equation of the spiral.

Rule.—Length of belt (in feet) equals the sum of the diameters of the roll and eye (in inches) multiplied by the number of turns in the roll; and this product multiplied by the decimal ·1309.

Example.—Roll of 3 feet belting, the mean diameters of roll and eye are 36 and 4 inches. Number of turns equal 73.

	36
	4
	—
	40
	73
	——
	2,920
	·1309
	——
Total length	382·23 feet.

To insure a perfectly correct result the diameters must be measured with great accuracy.

W. S. A.

It Inspires the Habit of Thinking.

MESSRS EDITORS:—I was a subscriber to your paper for several years, until my eyesight and health failed, and I am in honor bound to say that it would "pay" for every family to take, read, and study it. Reading your paper inspires the habit of thinking how to do anything to save time and labor.

In 1848 I moved on a farm and hired a man to build me a barn. I assisted him to haul the sills by "doubling teams," that is, hitching my horses in front of his. We swung one end of the sill under the hind wheels of a wagon and "snaked" it to the barn, but broke one axle and wheel. I have since built another barn, and when doing so, used to send my two boys, then aged 11 and 14 years, with two horses only, who brought the sills with ease, in half the time required on the first barn. This was the result of mixing a little of the SCIENTIFIC AMERICAN with brains.

J. L. H.

[For the Scientific American.]

Position of the Piston when the Crank is Vertical.

An advice I always used to give to young persons studying the mathematical sciences was, not to commence geometry before being perfectly familiar with arithmetic, and not to commence trigonometry before knowing well geometry and elementary algebra. All my colleagues in the department of mathematical instruction agree that the great drawback in this profession is the unsatisfactory preparation of the young men under their charge in the elementary branches, impeding powerfully, and sometimes checking entirely, their progress. Mr. H. W. S., from Cincinnati (who imprudently asserts, page 351, current volume, SCIENTIFIC AMERICAN, that the rule given by me, page 268, is incorrect), is a case illustrating this point. He appears to understand trigonometry without understanding plain geometry, otherwise he would have found the demonstration of my rule in place of doubting its correctness, which doubt was originated by his deficiency in arithmetic and elementary algebra, as is proved by the errors he committed in applying my formula; when he corrects his errors, he will find that the results perfectly agree with the trigonometrical calculations.

This problem is, in fact, one of my old examination questions, and some of my former students may give the demonstration which I omitted, not wishing to burden your paper with an unnecessary woodcut, supposing it simple enough to be found by any one acquainted with elementary geometry, not expecting that some one would think that I could possibly publish a rule at random, found by guessing at it.

It appears he found my rule correct in one particular case, because he accidentally committed no mistake this time; but his statement that for all lengths of connecting rod my rule gives exactly the same result, is as absurd as his assertion that no formula can be given.

DEMONSTRATION OF THE RULE GIVEN PAGE 268.—In this figure the piston rod is omitted for simplicity's sake, *eo*, *co*, and *do* is the crank, and *cd* or *ab* the length of the stroke, *ge* the connecting rod which, for the sake of argument, I take quite long. Let the end of the connecting rod be in *a* and in *b*, when it is on the center, and in *g* when the crank *eo* is vertical, we will have

$$ac=bd=ge$$

in the rectangular triangle *goe* we have

$$ge^2=go^2+oe^2 \text{ or } go^2=ge^2-oe^2$$

and consequently

$$go=\sqrt{(ge^2-oe^2)} \qquad (1)$$

but $$go=ac+oc-ag$$

or $$go=ge+oe-ag \qquad (2)$$

making an equation of these two values of *go* obtained at (1) and (2) we have

$$ge+oe-ag=\sqrt{(ge^2-oe^2)}$$

from which $$ag=ge+oe-\sqrt{(ge^2-oe^2)}$$

Call now, for simplicity's sake, *ge* the connecting rod *m*, and *oe* the crank *n*, we have for *ag* or the distance of the piston from the further end of cylinder

$$m+n-\sqrt{(m^2-n^2)}$$

which is the rule given page 268, and "a perfect formula for all cases."

Let us now apply this rule in the cases Mr. H. W. S. mentions. Stroke, 4, connecting rod, 8, crank, 2, or $m=8$, $n=2$, we have

$$8+2-\sqrt{(64-4)} \text{ or } 10-\sqrt{60}=2·254033$$

the same as by trigonometry, and not 2,54 nor 2,265

For connecting rod, $m=4$, and crank, $n=2$ we have

$$4+2-\sqrt{(16-4)} \text{ or } 6-\sqrt{12}=2·535898.$$

For connecting rod, $m=3$, and crank, $n=2$, we have

$$3+2-\sqrt{(9-4)}, \text{ or } 5-\sqrt{5}=2·763932.$$

For connecting rod, $m=2$, and crank, $n=2$, we have

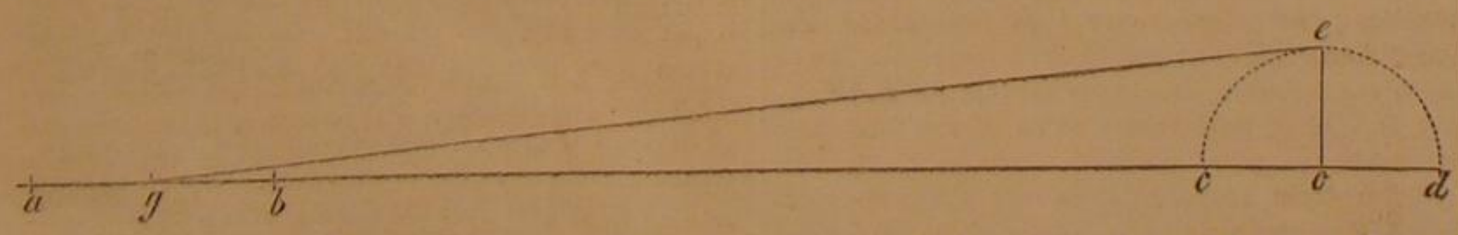
$$2+2-\sqrt{(4-4)}=4$$

showing that the piston is at the end of the stroke when the crank is vertical.

For connecting rod, $m=2$, and crank, $n=3$, we have

$$2+3-\sqrt{(4-9)}, \text{ or } 5-\sqrt{-5}$$

As the square root of a negative number is impossible, this result of the application of our formula agrees with the fact that the machine becomes impossible when the crank is longer than the connecting rod.



It is seen that for the solution of the problem in question, the resort to trigonometrical calculation is unnecessary, and a round-about way, but we may go a step further, and propose a new problem, namely:

TO FIND THE ANGLE OF INCLINATION OF THE CRANK FOR EVERY GIVEN PORTION OF THE STROKE.—Mr. H. W. S. has given us, page 353, the figure for this problem, without any demonstration, only communicating a few results of the trigonometrical calculation, stating that "no formula can be given for all cases." I will give the formula deduced from that figure but as this article is long enough, I postpone it to a later number.

P. H. VANDER WEYDE, M. D.

Formerly Professor of Higher Mathematics and Mechanics at the Cooper Institute, New York City.

Philadelphia, Nov. 25, 1866.

Goulding's Patent.

MESSRS. EDITORS:—Your issue of Nov. 10th, contained a notice of the late decree of the U. S. Circuit Court in the case of Jordan *vs.* Agawam Woolen Company, involving the validity of the "Goulding Patent."

This case has already been appealed to the Supreme Court; therefore your statement that the decision of the Circuit Judge was a final one, was erroneous, and as this is, undoubtedly, as you characterize it, "in its effect one of the most important cases ever argued in this circuit," you will doubtless be gratified to give correct information on this point to the many soo deeply interested who look to your columns almost as authority on such subjects.

T. QUINCY BROWNE, Chairman of Committee.

Boston, Dec. 1, 1866.

The Cotton Manufacture.

MESSRS. MUNN & Co., GENTLEMEN:—I am in receipt of your circular, and will make an effort. I have been a reader of your paper ever since 1849, with an intermission of four bloody years. I am superintendent of a large cotton mill—the only one out of eight left standing by Sherman. I took charge of this mill nine years ago, at a salary sufficient to support myself and family of eight persons, and am now paid by the company five hundred per cent more wages than at that time. I attribute this result to the fact of my being a constant reader of your paper, as no mechanic can read a single number without learning much.

I am glad to see you contemplate enlarging it. Without the advertisements it would not be complete. I will give you an illustration: A few months back we wanted a water wheel and advertised for one in the SCIENTIFIC AMERICAN and received about twenty-five circulars. After waiting four or five weeks to let them come in, we made our selection, and about a week thereafter came a letter from Paterson, N. J., containing a circular, which attracted our attention, and had it come to hand in time, the party would probably have sold a wheel. I wrote, advising him to subscribe to and advertise in your paper.

I wish to call your attention to a subject, that of cotton factories—cotton manufacturing in all its branches. For instance, our mill contains 2,400 spindles (will be increased to 5,000), and 45 looms; we turn off 45 yards per loom, 44 picks to the inch, 4-4 wide, No. 16½ yarn; we turn off 6 ounces to the spindle per day, No. 16½ yarn. Can any of your Eastern mills beat this? Now we want machinery that will do the most work well, with the least waste; our waste amounts to about 12½ per cent. Give this subject your attention, and I am confident you will see results very satisfactory. Although the above subject has been neglected, still, with all that, your paper is the best the world has produced.

I will write you again, entering into the subject more fully, and enable you to start the wheel.

HENRY G. HALL.

Fayetteville, N. C., Nov., 1866.

[Our correspondent has merely anticipated our own action. We have contemplated for some time giving some attention to the important subject of the cotton manufacture. We can, from our own knowledge of the business, give some items on this subject of a general nature, but possibly our correspondent may, by his contributions, add much to the interest of the matter.—EDS.

Rifle Practice.

MESSRS. EDITORS:—In perusing an article in your paper of Nov. 24th, on the needle gun, I find Mr. Wiard advances one or two statements which seem to me utterly at variance with my own experience in rifle practice.

In the first place he states that weight toward the muzzle is an advantage, as securing greater steadiness of aim; it may be so, if a man's left arm be of cast-iron, but otherwise it would, especially in rapid firing with a breech-loader, unsteady the hand, by overtaxing its strength, and render good shooting impossible. I have tried both ways, with the weight well forward in a heavy muzzle-loader, with thirty-six inch barrel, which I discarded on that account, partially, for my present weapon, a Wesson breech-loader, which has the weight well back, and which I find infinitely superior to the other both in comfort and accuracy of firing. He also considers a straight stock an advantage, as requiring less muscular effort to bring it into aiming position.

Now I think if he would try shooting twenty shots, first from a sporting rifle with a crooked stock which should "fit" him, and then with any army rifle, the needle gun, or other (they are all too straight), he would find a decided difference in the comfort and ease of aiming in favor of the former, and immediately abandon his position.

P. S. YENDELL.

Dorchester, Mass., Nov., 1866.

[Our report of Mr. Wiard's remarks on the Prussian needle gun was only a report. We no more indorsed his views than those of any one who presents them before the association. We believe the ideas of our correspondent to be correct. We have had some experience with fire-arms, and do not accept the opinions of any one man as conclusive. In regard to the heavy muzzle, we do not agree with Mr. Wiard, nor in his advocacy of a nearly straight stock. He says that "in the ordinary musket a considerable angle is formed (between the barrel and end of the breech), and in consequence a muscular effort is required to bring the gun into position for taking aim, and the force of the recoil is not so easily resisted.

We believe, with our correspondent, that the angle of the "ordinary musket," instead of being too great, is not enough. Certainly it is easier to bring the eye to a sight when this angle approaches the difference betwen the hight of the shoulder and that of the eye, than otherwise. As to the recoil, also, we differ from him. In a straight-stocked piece the recoil is delivered from the breech of the barrel directly to the shoulder, while in a curved stock it must traverse the curve of the stock, which then acts as a spring, receiving and holding a portion of the recoil.

Mr. Wiard, however, approved of a straighter stock because it compelled more care in taking aim. We do not agree with him in giving the Prussian needle gun any advantages over American breech-loaders.—EDS.

Scattering Shot-Gun.

MESSRS. EDITORS:—In your issue of Oct. 27th, a correspondent gives his remedy for a scattering shot-gun. For the benefit of those who may think of trying the discovery, I will give my experience. I was induced to try it on one barrel of a double duck gun with thick barrels, No. 11 gage. I accordingly followed the direction by tinning the muzzle to the depth of a quarter of an inch, then ground it true and even to the thickness of thin card paper. On testing the gun with No. 5 shot, I found the shot not well distributed, but in clusters. The tin lining was much grooved and roughened by the discharge. On a second trial, the distribution of the shot was more satisfactory. The third time I discharged with No. 2 shot. The result was, the cross-piece between the muzzles which retains the ramrod was carried away, and the muzzles, as far as the extent of the tin, expanded out the whole circumference as true as it could be formed by hand; at the same time the interior of the muzzle was restored to its original size. I doubt if in all cases so perfect a bell-muzzle as the gun now has, after removing the tin, could be so easily obtained without incurring the risk of a scattering in the opposite direction to the one aimed at. H. P.

Boston, Nov. 26, 1866.

Liquefaction of Carbonic Acid Gas.

In answer to the inquiry of a subscriber, we give the following information on the subject of liquefaction of carbonic acid gas. When carbonic acid gas is compressed at the temperature of the freezing point of water, with a power of 40 atmospheres, that is, 600 pounds to the square inch, it liquefies, 500 pints being compressed to the volume of a single pint; consequently the space allowed for the liquefied gas must be only one 500th part of the volume of the gas developed, and it takes exceedingly strong vessels to hold it, as its pressure at our summer temperature is double that amount, namely 1,200 lbs. for the square inch at 90° Fah., a tension far exceeding the resistance of our strongest high-pressure steam boilers.

The apparatus commonly used for the liquefaction of carbonic acid, consists of two very strong closed retorts, made of heavy copper, lined inside with lead, and outside strengthened with iron; one retort serves to receive the charge of bicarbonate of soda and sulphuric acid, the other to receive the developing gas, by means of stopcocks and connecting tube; this retort being placed in ice, condenses the gas to its liquid state. It is a very dangerous experiment when not made with a perfect apparatus. Hervy, in Paris, was killed by the explosion of a very strong iron retort of which the sides were more than an inch in thickness; it burst like a bombshell, by the pressure of the too rapidly developing gas. The enormous rate of condensation will not cause surprise, when we consider that the condensation of steam into water is more than three times as great; namely, to one 1700th part of its volume.

The liquefied carbonic acid gas is lighter than water, on which it floats, and which it freezes at once, when brought in contact with it; it shows in the most exalted degree the cooling properties of all very volatile liquids, as alcohol, ether, gasolin, etc. When drawn from the retort by means of a stopcock, the carbonic acid partially retakes its gaseous state, but in this change it robs so much heat from the remaining liquid, that its temperature descends so low, that its further evaporation is most powerfully checked, and the result is the solidification or freezing of about one-quarter of the gas escaping. This snowy-like substance will retain a temperature of about 100° below zero, Fah., and when it is dissolved in ether and thus forced to melt, the temperature will go lower still (to 140°) for the same reason that the temperature of common ice and snow is lowered (to 0°) by forcing it to melt by the addition of salt. This mixture of solidified carbonic acid and ether will produce the same sensation to the skin as a red hot iron; it coagulates and hardens the blood instantly by the intense cold, producing a blister and intense inflammation.

European Railway Tariffs.

It appears from a report prepared for the British Royal Commission on Railways, on a comparison of the fares charged per hundred miles on the railways of the principal European states, that the average rates of Great Britain and Ireland for first, second or third-class cars, are greater than on either of the continental lines.

In the first-class carriages traveling is cheapest in Bavaria, where the fare is but $2 25 per hundred miles. This is nearly one dollar less than the aver age first-class tariff of the eighteen countries mentioned. Other states that charge below the average, are Prussia, the Rhine, Sweden, Belgium, Wirtemberg, Denmark, Saxony, Switzerland and Portugal; while Russia, Norway, Spain, Austria, Italy, Holland, France and Great Britain, exceed it. In the last named Kingdom the excess nearly equals the average, the rates being $4 62 per hundred miles.

Traveling in second-class cars is cheapest in Wirtemberg, being 1·66 cent sper mile; the English charging nearly four times that amount for the same distance. The average is 2·33 censt—the list of countries exceeding, and those falling short, being, with few exceptions, the same as of the first-class carriages.

The fares in the third-class cars range from 75 cents per hundred miles, in Russia, to $2 00 for the same distance in the United Kingdom; the average is $1 50.

In the report, Prussia, Sweden, Italy, and England, are noted as having express trains, for first and second-class carriages only. Traveling on these trains is enjoyed at an additional expense of two English shillings over the regular fares. It should be stated concerning those countries where charges are so low, that if the roads do not actually belong to the state, the shareholders receive considerable government assistance, in consideration of their being obliged to adopt a low tariff.

A NEW mechanical excitant of vital action is called the "iron treatment." It consists in incasing the limbs in iron "tights" to which one or two thousand oscillations per minute are communicated by machinery. The operation sends the blood to the extremities with almost intolerable force and heat, and must be very easily overdone. Gov. Morton of Indiana, is said to be trying the experiment with apparent benefit.

MISCELLANEOUS SUMMARY.

A MICROSCOPE, with double the power of any previously constructed, has lately been completed in England, magnifying 15,000 diameters.

TEN or eleven distinct shocks of earthquake were recently experienced at Sorel, C. E., occupying a period of 30 or 40 seconds altogether.

THE Government standard of penetration for the Enfield rifle ball is twelve half-inch elm planks which have been soaked forty-eight hours in water; distance 30 yards.

THE great suspension bridge over the Ohio river, from Cincinnati to Covington, Ky., was opened to foot passengers on the 1st inst. It will not be fully completed for vehicles until the first of January.

THE principle of rotation in tanning vats is again attracting the attention of leather-manufacturers. It is asserted that the action of tannin is increased 500 per cent by keeping the hide slowly moving through the liquor.

THE total earnings of railways in the United Kingdom, says the London *Times*, amount to a good £40,000,000 a year; and if we allow even fifty per cent for working expenses, there will remain £20,000,000 to represent profits.

THE revolution in trade anticipated through the working of the Atlantic telegraph, begins already to be realized. English orders on the California markets for wheat pass under ocean and over land, and advices of the purchase return by the same path, within the business hours of a single day.

A FLOATING railway, the invention of M. Freland, of Bordeaux, has just been patented in France. It is described as likely to be of considerable service in loading and unloading vessels in ports having insufficient quayage accommodation, or where the depth of water does not permit ships of heavy tunnage to enter, except at high tide.

VAST as are the dock works at Birkenhead, the present dock space can be easily increased by some additional 90 acres of water space, with 18,000 yards of lineal quay space, which would afford loading berths of 3 000 feet each to upward of sixty vessels. Upward of a million and a half has been spent in dock works at Birkenhead since 1863.

THE project of a ship canal to connect Lake Huron with Lake Ontario, by way of Lake Simcoe and the Severn river, is again looking up. The county of Simcoe has guaranteed half a million of dollars to aid in the work. By cutting across an isthmus about forty miles wide, the upper lakes will be brought from 300 to 400 miles further eastward.

THE Prussian War Office has published a statement to show that it was not the superiority of the needle-gun, but of the men who carried it, that gave victory to the Prussian arms in the late war. The total consumption of cartridges during the campaign was only seven to each infantry soldier. In the bitterest engagement the highest figure was 13 per man of those present. During the war 900 cannon were brought into play, and each gun fired 40 rounds.

THE New Orleans *Times* announces a large manufacturing scheme in the South-west. The "Chatawa Water Power and Manufacturing Company," organized under a charter from the State of Mississippi, has secured nearly all the water power on the Tangipahoe river, sufficient to turn innumerable spindles. This little stream empties into Lake Ponchartrain, about 30 miles north-west of New Orleans. The first enterprise proposed is a paper mill, which will be pioneer in that part of the Union.

THE Agricultural committee of Sologne, France, has awarded the gold medal offered some time since to the inventor of a process which should enable French wines to be conveyed by land and sea, and preserved in any climate, without alteration in flavor. M. Pasteur, who receives the award, has succeeded in establishing the fact that the heating of ordinary wine to the extent of 50 degrees centigrade, is sufficient to kill all microscopic vegetation, or the ferments by which it is produced, without affecting color or flavor, and to insure the preservation of the wine in closed vessels, for an indefinite period. The various morbid changes in wines are found to be due to various stages or phases of microscopic vegetation, which M. Pasteur has accurately described.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

THREADING SEWING-MACHINE NEEDLES.—M. B. FOOTE, Northampton, Mass.—This invention relates to an extremely useful implement for the threading of sewing-machine needles, whereby they can be threaded with the utmost ease, facility and rapidity.

STREET LANTERN.—A. R. and E. A. HENRY, Newark, N. J.—This invention consists in forming the supporting frame of a street lantern, for the glass, of cast-iron, and in such a manner that the several parts of the same can be either secured together or taken apart, in a most expeditious manner, and when together, be sufficiently firm and strong for all practical purposes.

VENTILATOR AND PUMP.—J. W. FOARD, San Francisco, Cal.—This instrument is for the production of a partial vacuum by means of a current of air being passed through it, and whereby air or water, as the case may be, may be raised as by means of a suction pump, this instrument constituting a ventilator for the ventilation of ships and other like vessels, chimneys, houses, mines and other places, as also a pump for raising water.

STOVEPIPE ELBOW.—JAMES WILSON, Wilmington, Del.—This invention has for its object to furnish an improved stovepipe elbow, which when choked up by burning soft coal or other soot producing fuel, can be readily cleaned and the soot removed.

ROTARY CUTTING MACHINE.—J. J. BUTLER, Cincinnati, Ohio.—The object of this invention is to so construct a machine that disks of any material may be rapidly cut in the same.

PINS.—R. J. NUNN, Savannah, Ga.—The object of this invention is to construct a pin for securing together parts of garments and other articles in such manner that it will not be so liable to casually slip out of place as the ordinary style of pins.

FORGE ROLLING MACHINE.—HUGH BAINES, Manchester, England.—This invention consists of a perforated movable table, and two or more hollow and perforated rollers, having sectional perforated and engraved rings fitting around the same. These rings are made so as to be easily removed and changed, to forge and roll different kinds of work, according to the patterns engraved, cast or otherwise properly secured upon the rings. The rollers and table are supported by a strong and suitable frame, and worked by reversible gearing or straps.

COMBINED LUMBER PLANING, SAWING, AND TONGUING AND GROOVING MACHINE.—OTIS BRIDGEMAN, Steuben, N. Y.—This invention consists in combining in one and the same machine, a revolving cutter head for planing, a circular saw for sawing, and suitable revolving cutter heads for tonguing and grooving, in such manner, and in such positions with regard to each other, that by properly feeding the lumber into the machine at one end, it will be in turn subjected to the action of the respective parts of the same, one after another, in the order above mentioned, so that when it passes out of the machine at the opposite end, the board will have been planed, sawed, tongued upon one edge and grooved upon the other, and thus ready for use.

ARTIFICAL BREASTS.—JOHN STADERMANN, New York City, and HENRY SAUERBIER, Newark, N.J.—This invention consists in constructing artificial breasts out of wire cloth or wire gauze, swaged or struck up by dies, or other suitable means, in such a manner that the two breasts will form projections on one and the same piece of wire cloth made to conform to the chest of the wearer.

DRYING APPARATUS.—G. D. JONES, New York City.—This invention relates to a new and improved apparatus or device for drying substances, and is more especially designed for drying earthy materials used in the arts which are ground in water or are rendered plastic or tempered in the same, such, for instance, as whiting, clay, etc.

COTTON GIN.—F. M. MCMEEKIN, Morrison's Mills, Florida.—This invention relates to a new and useful improvement in that class of cotton gins in which rollers are employed for separating the lint or fiber from the seed, and which are commonly termed "roller gins," and has for its object the thorough and rapid separation of the lint or fiber from the seed without injuring or breaking the former.

HEAD BLOCK FOR SAWMILLS.—B. F. MCKINLEY, Cincinnati, Ohio.—This invention relates to a new and improved head block for sawmills, and it consists in a novel means employed for operating or moving the knee, whereby the log is set to the saw, and by which the log may be set with accuracy and so as to cause the log to be sawed into boards or planks of varying thicknesses, as may required.

LEVELING OR GRADING INSTRUMENT.—S. L. DONNELL, Spring Creek, Tenn.—This invention relates to improvements in a leveling or grading instrument, and secured to by Letters Patent bearing date September, 11, A. D. 1860, and it consists in a novel arrangement and construction of the leveling or grading instrument, whereby simplicity and efficiency are secured and the instrument also susceptible of a much easier and a more ready adjustment of its several parts, as may be desired or found necessary.

BALING PRESS.—G. D. HOWE, Lewisport, Ky.—This invention has for its object to furnish a baling press by means of which two bales may be pressed at the same time, and which may be built and operated in a less space than is required for the presses now in use.

CIRCULAR SAW MILL.—J. A. HOLFORD, Guionsville Ind.—This invention relates to certain improvements in circular saw mills, by which the whole machine will work automatically in all its parts, and by which a log when placed upon the carriage, is cut into boards of the requisite thickness without requiring the least attention from any man.

STUMP EXTRACTOR.—N. M. HEALY, Flushing Mich.—This invention consists in so arranging an upright hoisting bar and levers on an upright frame, and operating them by chains and ropes that a very great lifting power shall be imparted to the bar, thereby enabling one to extract stumps from the ground in a cheap and simple manner.

SPRING TOY.—JOHN H. BROWN, New York City.—This invention relates to a spring toy which is operated by means of a spiral or tension spring in contradistinction to the coiled spring heretofore used. One end of this spiral spring is connected to a cord which winds on a drum provided with a ratchet wheel and pawl in such a manner that by turning said drum the tension of the spring can be regulated at pleasure. The opposite end of the spring connects to a lever which is rigidly attached to the body of the horse, and which is provided with two or more holes to receive the spring in such a manner that by changing the point of connection between said spring and lever the leverage of the spring can be accommodated to the greater or smaller weight of the child occupying the toy. By the use of said lever the hind legs are relieved from all strain, and a strong and durable toy is obtained.

GRINDING MILL.—JOHN M. MILLER, Hamilton, Ohio—This invention consists in the arrangement of a suction blower in combination with the case inclosing the millstones of a grinding mill, and with a suitable receiver in such a manner that by the action of said suction blower the dirt, flower, vapor, and hot air created by the action of the grinders are removed and the grinders enabled to work free and without danger of heating. Suitable slides in the case serve to regulate the power of the draft created by the suction blower, and the receiving box into which the dust, vapor, etc., are driven, is provided with an escape opening for the wind.

CAST-IRON CHAIN PULLEY.—JAMES BIRD, New York City.—The object of this invention is to construct chain pulleys in such a way that they will be more enduring and better able to resist the wear to which they are subjected.

TWEER IRON.—T. E. C. BRINLEY, Louisville, Ky.—This invention consists in the combination of hooks secured to the cap of a tweer iron with lugs or ears secured to the side of the body or chamber of the tweer so that the cap may be readily removed in order that access may be had to the interior of the air chamber for the purpose of removing the cinders that may have collected there.

BRICK MACHINE.—WILLIAM C. BARTOL, Huntingdon, Pa.—This invention consists in an improved brick machine so constructed and arranged that the empty molds may be raised automatically from the lower to the upper part of the machine and lowered, passed beneath the hopper, filled, and passed out upon shelves at the other end of the machine ready for removal to the drying floor, while the machine is being drawn back and forth between the clay pit and drying floor.

SLED BRAKE.—R. B. DUTTON, Iron Hill, Iowa.—This invention consists principally in the combination and arrangement of the jointed dog clasp, lever, fulcrum rod, ratchet bar, and spring with each other and with the rave and runner of the sled.

JEWELING WATCHES.—A. C. CROSBY, Union, Pa.—This invention is designed to facilitate the setting of jewels in watch plates by avoiding the comparatively tedious burnishing operation and forming the burr over the jewel at a single operation.

BRACES FOR WAGON SPRINGS.—JAMES H. LOCKIE, Humphrey, N. Y.—This invention has for its object to prevent the backward and forward swaying and the consequent twisting and breaking of wagon, carriage, and buggy springs.

ROLL CARDING MACHINE.—GEORGE BRUCE, Corydon, Ind.—This invention principally consists in the simplicity and novelty of the feed works, they being so constructed as to be nearly automatic in their operation of spreading and feeding the wool from the apron to the machine, and to require but little aid or assitance.

PROPELLING HORSE.—JOHN H. BROWN, New York City.—This invention relates to a propelling horse, the front wheel of which is placed out of the center so that by its action the cantering motion of a horse is imitated. The hind wheels are rigidly attached to a double crank shaft and the cranks connect with two hand levers in such a manner that by the action of each hand lever the tractive power of both wheels is utilized and the horse can be propelled with considerable speed. The hand levers pass through the body of the horse, which also incloses the connecting rods and cranks, so that the propelling mechanism does not interfere with the child's limbs or clothes.

WASHING MACHINE.—E. BECKWITH, Smith Pass, Ill.—The object of this invention is to provide a machine by which fabrics may be washed easily and in the most perfect manner and without injury.

MANNER OF ATTACHING HANDLES TO TEAPOTS AND OTHER VESSELS.—JOHN H. BROWN, New York City.—This invention has for its object the attachment of handles to teapots or other vessels of similar nature in such a manner that the said handle can be freely turned on its bearings, while the pot is standing, but as soon as suspended on the handle it will not be able to swing free.

CIRCULAR SAWING MACHINE.—LEWIS FOSSEE, Jeffersonville, Ind.—This invention consists in devices to operate in connection with a circular saw for sawing plank with beveled edges or with curved edges or sides when required, as well as straight edges and sides. The machine is particularly designed for use in ship yards for edging plank of all kinds, and sawing in curved lines and outgage, so that bottom plank of vessels may be finished upon the circular-saw table.

OIL CAN.—WILLIAM C. NEWKIRK, Piqua, Ohio.—This invention consists in constructing an oil can in such a manner that coal oil and other oils or liquids of like nature can be handled and used without the disagreeable necessity of soiling every spot where the oil can is placed, as is almost invariably the case with the common oil can.

CORSET.—MRS. CLEMENTINE D. RUTHERFORD, Brooklyn, N. Y.—The object of the present invention is to so construct and form the corset, that while sufficient support is imparted by it to the waist and form of the person by whom it is worn, yet it will be comfortable and cool to the wearer; such corsets being especially adapted for use during the summer season.

CORN PLANTER.—J. G. WALKINSHAW, Leavenworth, Kansas.—This invention relates to improvements in the construction of an implement for planting corn, and consists of devices for dropping the corn evenly in hills at regular distances apart, in connection with an arrangement for dropping at the same time either a small quantity of guano or other similar fertilizing material, or planting beans with corn.

SPRING BOTTOM FOR SEATS, ETC.—WM. J. HASWELL, Waverly, N. Y.—This invention relates to a bedstead or other frame, the side and end pieces of which are slotted and provided with a series of rollers. Over these rollers are drawn a series of straps which connect at their upper ends with a piece of canvas or other suitable flexible material, and at their lower ends with springs retained by rods which extend along the lower edges of the side and end pieces of the bedstead, being retained by suitable buttons. By these means a bottom for beds, chairs, sofas, etc., is obtained, the tension of which can be easily regulated, and which is free to accommodate itself to the form of the body.

STEAM VALVE.—G. G. HUNT, Bridgeport, Conn.—This invention has for its object the construction of a valve in such a manner that it will serve as a perfect regulator as regards the admission of steam to the cylinder of an engine, and admit of the governor operating perfectly to regulate the admission of steam, when applied to an engine of any size and power.

COAL SCUTTLE.—EDGAR ELTINGE, Kingston, N. Y.—This invention relates to an improvement in the construction of coal scuttles, and it consists substantially in providing them with self-adjusting covers or shields, having on their sides flanges that extend over and outside the edges of the scuttles, as low as desirable, for the purpose of controlling and guiding the coal or other contents of the scuttles to the place of discharge, preventing it from passing over the sides of the scuttles. The covers or shields are hinged to ears which also hold the ends of the bails.

WATER WHEEL.—SAMUEL HICKS, Orangeville, Ind.—This invention relates to a new and useful improvement in that class of water wheels which are placed on a vertical shaft, and are commonly termed horizontal water wheels. The invention consists in a novel manner of constructing the wheel and the scroll, and arranging said parts within a penstock, whereby a very simple, economical, and efficient wheel is obtained, one which will give out a large per centage of the power of the water, and will operate favorably in back water.

SCHOOL AND FAMILY SLATE.—JOHN H. FRENCH, Geddes, N. Y.—This invention relates to a slate, the frame of which is made in two compartments, one of which contains a slate, while the other is so constructed as to admit of the insertion of any convenient number of cards of pasteboard, paper or other material, upon which are printed, drawn, painted, or photographed lessons or copies for writing, printing, marking, or drawing, and exercises in arithmetic, either, any, or all combined in such a manner that the pupil is enabled to copy the lessons upon the slate in the other part of the frame below, and that he has a great variety of exercises always in convenient reach. The operation of copying the lessons is materially facilitated by horizontal, perpendicular, or slope lines, permanently pressed, drawn, marked, stamped, printed, ruled, or cut upon a part or the whole of one or both surfaces of the slate as guide lines, whereby the pupil is enabled to make his letters, figures, or drawings of the proper proportionate hights, widths, and slope.

SELF-REGULATING TENSION.—THEODORE ZINCK, New York City.—This invention relates to a tension, which is applicable to the thread of sewing machines or to ropes, telegraph cables, or other strands which are wound off from a bobbin, and the tension of which is to be kept as nearly as possible uniform. Said tension consists of a friction spring bearing on the bobbin from which the thread or strand is to be unwound, in combination with an arm which is secured to the spring, and over which the thread or strand passes, in such a manner that whenever, from any cause whatever, the tension of said strand increases, the friction spring is forced back and the bobbin is relieved, and by those means the tension is equalized and rendered self-regulating.

PISTON PACKING.—BARKER LOWE, Fall River, Mass.—This invention relates to a piston packing in which a spiral spring is used, which is beveled off from the center toward both ends, so that the operation of inserting the spring in its place is facilitated. The rings which surround the spring are so formed that they in case the head and follower of the piston, and they are provided with an internal flange which is surfaced to the inner surface of the head or follower, in such a manner that the escape of steam is prevented, and the head and follower are not allowed to come in contact with the cylinder.

Business and Personal.

D. W. Johnson, 469 Broadway, wishes a good second hand hydraulic press, of three to four hundred tuns.

J. J. Detwiller, Easton, Pa., wants market for large quantities of kaolin or china clay.

V. H. Lyon, Plainfield, Ind., wishes to obtain one of Powell & Lealand's Microscopes, described in Vol. 12 SCIENTIFIC AMERICAN.

Information upon enameling castiron is requested by Jno. B. Overton, Frederick, Md.

J. E. Treat, Oxford, Mich., wants to become an engraver; wants to put himself under the instructions of an engraver; wants the address of all glyphographic engravers; also wants the address of all engravers generally.

Where he can learn Scientific farming is asked by J. E. Peaslee, Dover, N. H.

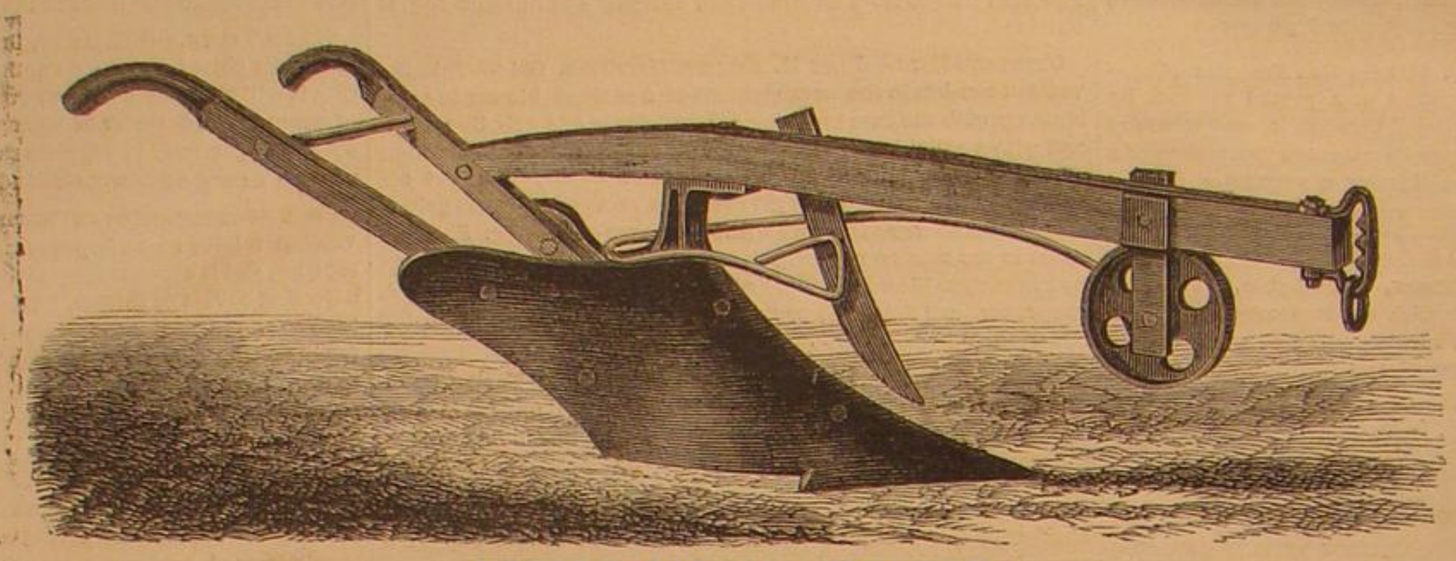
W. S. T. wants to purchase the best Peat Machine, and thinks that if owners of such machines would advertise in the SCIENTIFIC AMERICAN, they would find it to their advantage.

Makers of Morrison's Shingle Machine please address, H. P. Guilford, Reading, Mass.

Device for Clearing Stubble from Plows.

In using the ordinary plow, especially on stubble fields, or in heavy grass land, the angle between the colter and beam frequently becomes choked to such an extent as to raise the share from its proper depth, and necessitate stopping the team and removing the obstacle by hand. In the accompanying engraving there is represented a very simple contrivance designed to remedy this difficulty.

In the guide wheel is placed a stud or pin, which forms a crank, and to this pin is pivoted the end of a rod of iron, which is carried along under the beam and around the lug of the share to the colter, as seen in the engraving. As the guide wheel rotates, a reciprocating with a vertical motion is given to this vibrating rod, so that as the rod advances to the front of the colter edge it pushes the stubble from the blade and throws it down into the furrow.

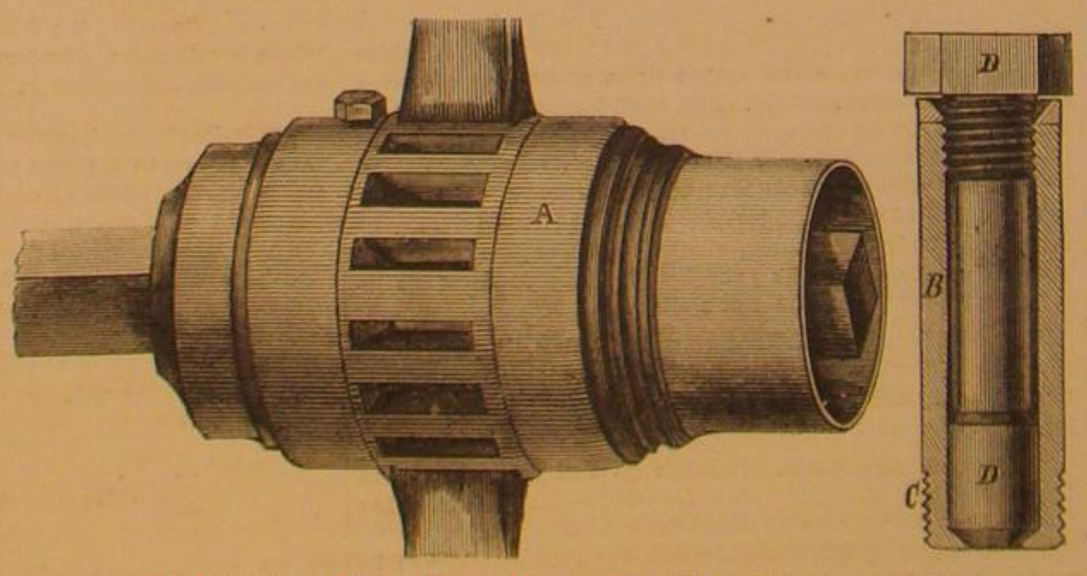


VEBER'S COLTER CLEARER.

Patented through the Scientific American Patent Agency, September 25, 1866, by William Veber, Jr., Shingle Creek, St. Lawrence Co., New York, whom address for further facts.

Device for Lubricating Axles of Vehicles.

This engraving represents a new device for applying oil to the axles of vehicles, without the usual troublesome and laborious operation of taking off the wheels. It is very simple and effective, accomplishing the delivery of the lubricating material upon the axle as certainly as if the wheels were removed. A vehicle provided with it can be lubricated in two minutes' time, by a single person, whether standing in the shed or on the road. It saves oil as well as labor and time, and it renders the process of oiling a wagon neat and clean, and vehicles provided with it will doubtless be oiled much oftener, and wear much longer for that reason. A represents the hub of a carriage with the lubricating apparatus inserted, showing only the cap; B represents a section of the apparatus itself, which is secured to its place by the screw thread, C. To lubricate a vehicle, the cap and piston, D, is unscrewed and removed, and the oil introduced through the tube, which is of the same diameter inside the whole length except just at the bottom, where it is finished like a valve seat. The cap and piston is then replaced and screwed fast, which presses the lower part of the piston tight against the bottom of the tube, preventing the oil in the axle-box from returning. As frequently the oil is thick (being congealed by cold and other causes), the lower part of the piston is made to fit the tube exactly, and when the oil is placed in the tube, the replacing of the piston and cap will always force the oil through the hub and deliver it on the axle. This improvement can be easily applied to any vehicle, old or new, and would not weaken or disfigure any wheel, even of the finest carriage; and, being of very moderate cost, will doubtless prove popular.



PARSONS'S DEVICE FOR LUBRICATING AXLES.

It was patented November 27th, 1866. Rights are for sale. For further information, address the Patentee, Geo. W. Parsons, 424 Market St., Harrisburg, Pa.

Life of Steel and Iron Rails.

An examination of the steel rails laid down two years and a half since in the Woodhead tunnel of the Manchester, Sheffield and Lincolnshire railway, resulted in a striking illustration of the relative endurance of steel and iron rails. This tunnel is about three miles long, with a station at each end, where trains generally stop, and where the wear of the rails is extraordinary, from the starting of heavy trains with the aid of sand on iron constantly wet with drippings from the roof. The life of an iron rail at these stations was but about five months on one head, and three or four months on the other after turning. The new rails are 75 lbs. Bessemer steel, double-headed, 2½ inch face, ⅝ inch stem, and 5 inches deep. Rails were taken out at the places of greatest wear, at each end of the tunnel, and on being carefully measured and compared with the original templates from which they were made, were found to have lost as nearly as possible one-eighth of an inch in the thirty months' use under at least 8,000,000 tuns of traffic as computed from the books of the station. The rails were in admirable condition, and good for five times as much further wear, both heads together; making, in insurance phrase, an "expectation of life," equal to fifteen years, or *twenty times* as long as that of iron.

Coffee and its Adulterations.

The report of the Internal Revenue Commission shows that the usual yearly consumption of coffee in the United States has been about 200 millions of pounds. Allowing the small modicum of one quarter of a pound per week to each person using coffee, it is seen that the number of coffee-drinkers in the whole country can hardly exceed fifteen millions, or less than one half the population. But the consumption of coffee in the four years, 1862-5, averaged only half the usual amount, owing, in great part, to the extensive adulteration compelled by the war prices. Chiccory root, peas and rye, are familiar ingredients of artificial coffee; burnt bread-crust is also a well-known domestic substitute, and the Revenue Commission has revealed the important fact that all kinds of spoiled, condemned, and refuse bread, and especially the surplus stock of stale black bread brought ashore by emigrants from Europe, supply a favorite material for adulterating both coffee and black pepper. Unmerchantable or very inferior sugar and molasses are also collected and reduced to caramel for the purpose of coloring the adulterations of coffee. These de-appetizing considerations will probably send the consumers of ground coffee in a rush to the hardware stores where hand coffee-mills are sold. The properties of the grand ingredient, chiccory, if understood according to the medical authorities, would lend additional impulse to the hand-coffee-mill trade. Prof. Johnston says that its prolonged use produces among other things, heart-burn, loss of appetite, nervous affections, constipation with intermittent diarrhea. A writer in the *Journal of Materia Medica*, gives observations showing its decidedly aperient effect; for which, in fact, it is in domestic use in France and Germany. This tendency, in connection with the presence of cholera, and in view of the free and universal use of the chiccory-coffee among the poorer classes, seems to deserve the careful attention of the sanitary authorities.

Practical Hints.

To Clean a Foul Gun.—I hand you the following as a reliable fact—the reason I leave to others. In hunting, a gun often becomes foul from use, and the exploding of a cap will fail to ignite the powder. With a knife sharpen a piece of dry pine wood—or common match wood will answer; drive the splint right into the nipple of the gun, cut off the bruised part of the wood even with the top of the nipple; put on a cap, and it will not fail to explode the gun. Any one wishing can test this by putting a little powder in his gun, then driving snugly the plug—it will go every time. For a reason.

Quien Sabe.

WELLINGTON'S PATENT WATER CLOSET.

"Modern Improvements" comprehend all appliances that tend to the convenience and advantage of man. Among these is the water closet in dwellings and offices. The one herewith illustrated seems to be admirably adapted, from its simplicity, to security against injury, unfailing operation, cleanliness, and freedom from noxious effluvia.

The cup, A, can be raised or lowered to adjust it to any hight by a set screw, not shown, in the projection, B, and the pull lengthened or shortened by adjusting the bolt in the slot of the weight, C. The stop, D, prevents turning the pan more than 90 degrees, sufficient to entirely empty it. The water is introduced through the pipe and valve, E, shown as disconnected with the bowl pipe, F. The valve is always, in this closet, directly under the seat and in front, so that it can be reached for repairs without disturbing the wood-work and without disconnecting the supply pipes. No water stands in the pipe between the valve and the bowl, as, immediately after using, the water runs into the receiving pan. The drippings from the couplings also all find their way to the same receptacle, so that there can be no disarrangement of the parts in moving, nor any annoyances from leakage in use. The manufacturers make every part in duplicate, and when repairs are needed, parts can be readily obtained which absolutely fit.

Patented Nov. 15, 1859. Hayden, Gere & Co., 84 Beekman street, New York, are the manufacturers, to whom orders should be addressed. Dalton & Ingersoll, 19 Union street, Boston, Mass., can furnish the closet.

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EXPIRING SUBSCRIPTIONS.

The present number closes the volume, and in accordance with our usual custom, we discontinue the paper upon expiration of the time for which the subscription was paid. We expect to keep all our old subscribers, and to add largely to our list on the new volume.

NO. 1 ADVERTISERS.

Parties who intend to advertise on the outside page of the first number of the new volume, should send their advertisements without delay. The terms are seventy-five cents per line for each insertion. To enable advertisers to calculate how much they must remit, we will state that, independent of the head line, about seven words will make a line of agate type. It will be safe to estimate but four words for the head line.

Engravings will be inserted with advertisements at $1 a line for the back page and 75 cents a line on the inside. The rates for ordinary advertisements in the inside, 40 cents a line.

BRING OUT YOUR INVENTIONS.

The enlargement of the SCIENTIFIC AMERICAN, commencing with the next issue, will enable us to insert in each issue a much larger number of engravings than our limited space has heretofore admitted. We have increased our force of designers on wood, so that orders for engraving of new inventions and machines can be filled more promptly than heretofore.

There is no way in which any new invention can be so extensively and advantageously brought to the attention of the public as by having good engravings of it published, with a description, in the SCIENTIFIC AMERICAN. Thousands who have tried it can testify to this fact.

To patentees, and those who wish to have their inventions illustrated in this Journal, the following general directions will be their guide:—

In preparing engravings for publication in the SCIENTIFIC AMERICAN, the use of a model from which to make the design, is preferred. If it is inconvenient, however, to send a model, a well-executed photograph, taken from a machine or model, will usually answer the purpose. The Letters Patent should be sent with a statement of the advantages claimed for the invention. After the order is received the engraving will be prepared and published, and the model, patent, and engraving returned by express. For further information address Publishers of this paper.

IMPORTANT SUGGESTIONS.

The enlargement of the SCIENTIFIC AMERICAN will enable us to publish all the patent claims in each regular issue, and obviate the necessity of the extra claim sheet, which we have lately been obliged to add.

Other important improvements are to be made which will render the paper more attractive than any publication of its class heretofore published. Subscribers, whose time expire with this issue, should renew their subscription at once, so as to be sure of all the numbers.

We shall endeavor to print enough of the few first numbers to supply all demands, but the great rate at which new subscribers are coming in renders it difficult for the Publishers to determine the extent of the edition to print at first.

THE VALUE OF A SCIENTIFIC AND MECHANICAL JOURNAL.

Before the advent of railroads and the establishment of the telegraph, when travelers went from point to point by the stage-coach or by private conveyance, information was as slow and uncertain in transmission as passengers. The knowledge gathered by one man, under circumstances and by experiences not common, but liable to all, was his own personal property to be transmitted to his children, or mayhap to die with him. There were secrets in every trade and profession (there are too many now), and he who obtained the lore gained from the niggardly teacher, experience, was compelled to pay a price wrung from his golden years and laborious sinews.

To a certain extent this is true now, but knowledge is like the water poured into an overflowing bucket. He who has not capacity to hold, or capability to use, must let it go from him, although when it has only moistened his lips, it fills and satisfies others. Mystery in mechanics has had its day. The cabalistic formulæ of the chemists have been interpreted, and all who choose, may walk the road of knowledge, gleaning here and gathering there; in fact, stopping at stations by the way, and drawing from magazines filled with the experiences of ages and enriched with the experiments of those who have but just preceded them.

These magazines of valuable information for the scientist and mechanic, are the journals devoted to scientific and mechanical subjects. In these the stray and floating particles of knowledge are gathered, sifted, and presented in their real character. If some of them are but froth on the sea of knowledge, they are dissipated in the rays of true science; if real and valuable, they are divested of the barnacles of prejudice, egotism, persiflage, and trash, and shown as they really are.

This work of sifting, choosing, and preparing is the proper business of the journalist—the editor of a scientific paper. He saves the seeker after knowledge from the dreary labor of searching records, the impossible task of endless correspondence, and the continual inquiry after "some new thing." To the scientific student, the beginner in mechanics, the seeker after the hidden wisdom of nature's laws, and the practical worker in accordance with those laws, the scientific and mechanical periodical is an ever-present friend and assistant. It saves him hours of hard thinking, days of fruitless labor, the shame and vexation of unaccomplished endeavor, and periods of weary waiting. It assists him in his attempts at discovery, unravels hard knots in his line of theory, gives him valuable hints in his attempt to use the forces of nature, shows him his error, and points to the right road. By knowing the errors and failures of others, he is enabled to steer clear of obstacles, or by understanding the methods used by others, he is assisted in surmounting them. If a practical man, he is periodically informed of what is being done in his specialty, and thus kept from wasting his energies on labors already accomplished, and is enabled to utilize the brains and labors of others. In short, a "live" mechanic must as certainly keep up with the times as a politician or a statesman. To do this there is but one course, and that is to read a journal which is devoted to the recording and elucidating of the truths necessary for him to know.

IMPROVED PIER AND WAREHOUSE SYSTEM FOR NEW YORK.

The pending legislative inquiry into the harbor accommodations of our great seaport cannot be considered premature. The character of its wharfage is a drag and a disgrace to the prosperity of a commercial metropolis like this. Rude, primitive, rotten structures of logs, crowded and choked, exposed and insecure, infested with thieves, and more or less embanked with ship-stranding mud, are not the sort of accommodations to which the commerce of the world should be invited. The want of proper space and apparatus prolongs the discharge and taking in of cargoes, often four-fold. The entire absence of wharf storage involves a constant waste of time and expense, and an aggravated obstruction of the streets, in transporting merchandise back and forth between the shipping and the warehouses. Warehouses scattered all over town, and interspersed among other buildings, hazardous in every degree, involve the frequent destruction of vast amounts of merchandise by fire. The ill-constructed water-front promotes instead of preventing the obstruction of the docks and channels, and the detention of a pestilential sewerage. The whole system, wretched as it is, instead of being a profit, is a constant expense to the city treasury.

It is to be hoped that the labors of the legislative commission will not be completed without the adoption of a mature system of wharfage, uniform, and adequate to meet the wants and remedy the evils now so severely felt, together with a business-like plan for carrying the improvement into effect without creating inordinate monopolies, whether moneyed or municipal.

The comprehensive and convenient plan of wharf structures put forth by the projector of "The New York Pier and Warehouse Company" (Mr. G. Burrows Hyde), seems eminently worthy of consideration. It may be stated in a very few words. A continuous bulkhead of durable stone masonry is to define the water front, and act as a deflector for the discharges and deposits which now accumulate in the slips. Piers are to be built of prescribed dimensions, according to the requirements of the channel and tides, resting upon great hollow pillars of iron, exhausted and driven down by pneumatic pressure, and then filled with masonry or concrete under pressure, so as to form artificial stone. The space between these pillars will allow a free flow of the tides and deposits, and will be sufficient also to admit of dredging. The pier will support a fire-proof warehouse of iron, five stories high: the first story, on the street level, being open on all sides as a wharf, yet covered from the weather, and capable of being securely closed at night by iron gates or rolling shutters, and furnished with steam hoisting apparatus for the rapid discharge and loading of vessels, and dispatch of carts. The second floor may be used, where necessary to avoid obstructing the pier, for the temporary deposit of goods awaiting stowage or removal; and the whole warehouse proper will afford secure storage for merchandise, on the spot, to any required extent, at the least of expense and inconvenience to parties or the public. The steam, always up in these warehouses for hoisting purposes, would also be available in connection with powerful stationary fire engines, for extinguishing fires among the shipping, which have been so calamitous in repeated instances. Wharf thieving and smuggling could also be effectually circumvented. It is evident that the profits of warehousing and wharfage on this plan would attract abundant capital for the construction of the buildings, in accordance with proper legislative regulations, and

under a profitable water rent to the city. Thrown open on safe and liberal terms to the enterprise of all, in lots of some limited extent, and under supervision of government, a perfect system of piers and warehouses may be made a public benefit without becoming a public charge, a center of monopoly, or a source of corruption.

The trouble now-a-days with about every new project of a public character, is, that the promoters start off with a gigantic stock operation; we have heard this objection raised to the New York Pier and Warehouse Company's scheme, which we hope is not true.

Volkman's Self-holding Plow.

Our attention has recently been called to a novel self-holding plow which seems to possess much merit. The peculiarity of the plow is such that the share will keep in the furrow without being guided. A boy old enough to drive a team is capable of managing the implement; or rather the plow will take care of itself without the attention of the driver. The share and beam are similar in construction to the ordinary plow. The front end of the beam rests in a light carriage and is so arranged as to turn freely in every direction. When in use, the plow is set so that it points slightly toward the land side, the draft being from the opposite direction, which renders it impossible, with the arrangement for supporting it in position, to be thrown out of the furrow unless it strikes some obstruction, and then as soon as passed it resumes its former position. Any depth may be plowed by setting the implement the desired scale before starting.

If we are not mistaken Mr. Volkman's patent plow will come into quite general use. For further information see advertisement in another column.

LYNN contains 220 manufactories, turning out an aggregate of not far from twelve million dollars' worth of boots and shoes, annually.

THE Agricultural College of Massachusetts is to be opened for students on the first of September next. Five buildings are to be erected, including a chemical laboratory and a model barn, at a cost of $65,000.

THE exhaustion of the British coal-fields proceeds at the rate of nearly one hundred million tons per annum, or five times the present product of the American mines. On the other hand, the extent of the American coal-fields is more than twelve times that of the British.

AN extensive system of adult schools has been inaugurated in France, under the auspices of the Minister of Public Instruction. Last winter, nearly 5000 such schools were opened, with 30,000 teachers, and about 600,000 pupils of both sexes; nearly half of whom were unable to read.

PITTSBURGH contains five hundred large manufacturing establishments. It has fifty glass factories and sixteen potteries, forty-six iron founderies, thirty-one rolling-mills, thirty-three machinery establishments, and fifty-eight oil refineries; beside miscellaneous works of almost every variety; the whole turning out an annual product worth $100,000,000.

THE Public School System of Lower Canada, by a recent report, comprises 10 universities and professional institutions, with 818 students; 210 secondary institutions, as classical and industrial colleges and academies, with 28,613 students; 3 normal schools; 4 special schools; and 3,479 primary schools, with 172,733 pupils. The total amount levied for the support of this system, in 1865, was nearly $600,000.

SUBTERRANEAN PHOTOGRAPHY.—A firm in Cincinnati have obtained the exclusive right of taking views in the Mammoth Cave of Kentucky, for five years. The process successfully used in taking pictures of the interior of the Great Pyramid is adopted, using the magnesium light. The dampness of the cave, the smoke arising in the consumption of large quantities of magnesium, the divergency of the artificial light, and the magnitude and proximity of the objects to be photographed, present a number of serious difficulties. Powerful reflectors are used to throw a flood of light upon the object, and the plate is allowed about twice the exposure required by the light of the sun.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING DEC. 11, 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.

60,319.—HAME FASTENING.—W. J. Alexander, Manchester, Iowa.

First, I claim the hame fastening consisting of the catch piece, B, and the socket, C, with the spring catch, D, and notches, E, respectively, and united to the loops of the hames, substantially as and for the purpose described.

Second, The arrangement of the button, F, shaft, G, eccentric, H, and spring, M, operating as described.

Third, The pin, L, as and for the purpose described.

60,320.—MANUFACTURE OF BRICK OR BUILDING BLOCKS.—Henry W. Angell, Waukesha, Wis.

I claim a brick composed of lime, sand, small stones, and gravel, prepared and molded in the manner described.

60,321.—SAW.—James E. Atwood, Trenton, N. J.

I claim the teeth, H H, when inserted and secured in the manner herein described and for the purposes set forth.

60,322.—MACHINE FOR ROLLING METAL.—Hugh Baines, Manchester, England.

First, I claim the combination of the hollow perforated rollers, c^*, with the reversible gearing, H^* I^*, when constructed, arranged, and connected together so as to operate substantially in the manner described and for the purposes set forth.

Second, In combination with the above, the movable table, 7, arranged and operating substantially as and for the purpose specified.

60,323.—BRICK MACHINE.—William C. Bartol, Huntingdon, Pa.

First, I claim operating the machinery for molding brick from the drive or supporting wheel or wheels of the machine, substantially in the manner herein shown and described.

Second, The combination of the slides, H, racks, C', cog wheels, G, and shaft, D, with each other, substantially as herein shown and described, for the purpose of raising and lowering the shelves and molds, as set forth.

Third, The combination of the catches, E', spring, G', and arms, H' I', with each other and with the racks, C', and wheels, G, substantially as herein shown and described and for the purpose set forth.

Fourth, The combination of the racks, A', and cog wheels, I, with each other and with the molds, J, and shaft, D, substantially as herein shown and described and for the purpose set forth.

Fifth, The combination of the pins, B', connecting rods, M', pivoted levers, K', and springs, L', with each other and with the projections, J', of the racks, C', substantially as herein shown and described and for the purpose set forth.

60,324.—BATTING AND WADDING.—Samuel Baxendale, Boston, Mass.

I claim the batting or wadding composed of a layer of fibrous material attached by any adhesive substance to opposite sides of a sheet of paper, as herein described, the same being a new article of manufacture.

60,325.—ROAD SCRAPER.—J. B. Beall and B. F. Grime, Westerville, Ohio.

First, I claim, in a reversible road scraper, constructing the latch, c, to a loosely-turning handle piece, b', by means which will allow of the movement of said latch by turning the handle piece without removing the hands from either of the handles, substantially as described.

Second, The combination of a vibrating latch, c, a sliding spring latch, d, and a movable hand piece, b', substantially as described, with a reversible scraper.

60,326.—WASHING MACHINE.—E. Beckwith, South Pass, Ill.

The combination of the pendulum, J, with the bar, K, counterpoise, L, uprights, G, and rubber, E, substantially as and for the purpose herein shown and described.

Second, I claim the levers, C, in combination with the board, B, and rubber, E, all constructed and operating substantially as herein shown and described.

60,327.—APPARATUS FOR DISTILLING GRAIN.—J. B. Beebe and T. F. Lloyd, Albany, N. Y.

First, We claim the generator, C, constructed with two or more chambers, C' C'' C''', for the purpose set forth substantially as described

Second, We claim the drop pipe, i, in combination with the encasing pipe, h, for the purpose set forth substantially as described.

Third, We claim the indicator, E, combinining the pipes, n n' and q, together with the permanent hydrometer, x, and thermometer, t, the bell glass or dome, o, and the cock, r, for the purpose set forth substantially as described.

Fourth, We claim the combination of the registering meter, s, or its equivalent, with the indicator, for the purpose set forth substantially as described.

60,328.—SOAP.—S. J. Beeler, Wales, Ill.

I claim the use of the ingredients herein named in the proportions and manner substantially as set forth, for the manufacture of soap.

60,329.—CAST-IRON CHAIN PULLEY.—James Bird, New York City.

I claim, in cast-metal chain pulleys, making their projections, which hold the links of the chain, with a "chill," substantially as and for the purpose above described.

60,330.—MASH MACHINE.—M. Brand and C. P. Hoffmann, Chicago, Ill.

First, We claim the adjustable scraper on bottom of tub.

Second, The vertical propeller-shaped wings in combination with the machine.

60,331.—FENCE GATE.—W. W. Bratt, Ottawa, Ill.

First, I claim the two rollers, G G, on which the gate slides sidewise.

Second, The guide board, K, fitting in the circular grooves of the rollers, G G.

Third, The guide, I, at the lower end of the swinging post, B.

Fourth, The part, L, of the gate, H, back of the rollers, G G, lying against the fence when closed, substantially as and for the purpose described in the foregoing specification.

60,332.—PLANING MACHINE.—Otis Bridgeman, Addison, N. Y.

First, I claim the arrangement of the cutter head, K, adjustable rollers, A3, saw, N, feed table, U, cutter head, S and T, frame, L2, and its flange, S2, strip, P2, screw shaft, O2, arms, A3, and feed rollers, V2, substantially as described for the purpose set forth.

Second, The arrangement of the frame, L2, carrying the circular saw blade, N, and revolving cutter head, suitable either for tonguing or grooving, substantially as described and for the purpose specified.

60,333.—TWEER.—T. E. Brinley, Louisville, Ky.

I claim the cap, E, provided with a flange, a, and hooks, e e e, body, A, with the raised center forming an annular air chamber, C, and ears, n n n, when arranged as herein set forth, and operating as and for the purpose specified.

60,334.—GRATE FOR STOVE.—Albert Brown, Troy N. Y.

First, I claim the permanent bar, G, in combination with the frame, F, and convex center, E, or equivalents, as and for the purposes specified.

Second, I claim the cavity, C, in combination with the cross pin, I, and the convex center, E, as and for the purpose set forth.

Third, I claim the grate, B, working upon the center, E, so arranged as to dump on a line with the shank, J, at any point within the sphere of its movement, as and for the purpose set forth.

60,335.—PROPELLING HORSE.—John H. Brown, New York City.

I claim the combination and arrangement of the wheel, B, axle, c, horse, A, wheels, D, shaft, E, and levers, F F, as herein set forth, operating in the manner and for the purpose specified.

60,336.—SPRING TOY.—John H. Brown, New York City.

First, I claim the lever, C, spring, D, and regulating drum, b, in combination with the toy, A, constructed and operating substantially as and for the purpose set forth.

Second, Graduating the lever, C, so that the leverage of the spring can be accommodated to the weight of the child occupying the toy.

Third, Supporting the toy on a fulcrum, a, at its back end, substantially as and for the purpose described.

60,337.—MODE OF ATTACHING HANDLES TO BOILERS AND OTHER VESSELS.—John H. Brown, New York City.

I claim the pear-shaped slots in the ears, a, in combination with the flattened ends of the bail or handle of the kettle, A, constructed and operating substantially as and for the purpose described.

60,338.—FEEDING DEVICE FOR CARDING ENGINES.—George Bruce, Corydon, Ind.

First, I claim the pitman, G, pawl, L, ratchet wheel, M, toothed wheels, O P, and pinions, Q and R, in combination with the aprons, B and B', for the purposes and substantially as herein described.

Third, I claim the manner of accelerating or reducing the feed by lengthening or shortening the stroke of the pawl, L, by means of the lever, G, and cord, J, substantially as herein set forth.

60,339.—COMBINED TABLE AND BEDSTEAD.—Sanford S. Burr, Dedham, Mass.

I claim the combination of the table top, I, and its connections, with the slat frame, H, and box, A B C D E F and G, for the purpose and operating substantially as above described.

I also claim a combination of the sides of the table, L M and b, with the tops, I, and the leaf, N, so constructed and arranged by means of the pin sliding in the groove, E, that the same can at will be transformed into the bottom end and support of the bed, in the manner and for the purposes substantially as herein described.

I also claim the combination of a table with a bedstead, in one piece of furniture, adjustable at the will of the operator by means of the pin sliding in the groove, E, constructed and operating substantially as herein described.

60,340.—MODE OF FASTENING AND UNFASTENING DROP DOORS IN COAL CARS.—William Burt, Marquette, Mich.

I claim the combination of the lever, B, shaft, L, cams, C, attached to the said shafts, L, pins, P, with drop doors, a, when the same are constructed and arranged in the manner and for the purpose set forth.

60,341.—ROTARY CUTTING MACHINE.—James J. Butler, Cincinnati, Ohio.

I claim, First, The rotary knife or cutter, M, and arm, L, in combination with the mandrels, C and G, for the purposes and substantially as described.

Second, I claim the bevel gearing attached to a crank for driving the mandrels, to which the cutter or knife is attached, substantially and for the purpose set forth.

Third, I claim the upright screw, D, in connection with the mandrel pressing on the disk, i, or material, substantially as herein shown and described.

60,342.—TAP BORER.—Silas S. Crocker (assignor to himself and D. R. Crocker), Maquoketa, Iowa.

I claim the volute shaped tool with a sharpened, salient, spiral edge, with the gimlet point, substantially as described.

60,343.—TOOL FOR SETTING JEWELS IN WATCHES.—A. C. Crosby, Union, Pa.

I claim the securing or setting jewels in watch plates by means of a die or tool constructed in the manner substantially as shown and described.

60,344.—MEASURING LIQUIDS.—George W. Devoe, New York, city.

I claim, First, The suspension and arrangement of the weighted funnels, M, in relation with the series of measuring vessels, E, and with the cans, C, as they are pushed under the said funnels, substantially as herein set forth for the purpose specified.

Second, A measuring apparatus consisting of one or more measuring vessels, E, arranged in relation with a reservoir, B, and furnished with inlet and outlet valves or stop cocks, F K, and with a suspended funnel or funnels, M, and a whistle or whistles, e, substantially as herein set forth.

60,345.—FEATHERING PADDLE WHEEL.—John V. Dinsmore (assignor to himself and M. Harris), Milford, Mass.

I claim the combination for operating each of the paddles while the wheel is revolving, the same consisting of the cam, G, the sliding and rotary shaft, F, its bearing, b, stud, g, notch f, shoulders, d e, arm, m, cams, n and g, and the arm, p, and the roller, o, or the equivalent thereof, the paddle being applied eccentrically upon the shaft, and the whole being in other respects substantially as hereinbefore described.

I also claim the cam, G, as made in two parts hinged together, and applied to the side of the vessel, so that one of them may be stationary thereon, and the other movable, as and to produce with the wheel, results as above set forth.

60,346.—GRADING INSTRUMENT.—Samuel L. Donnell, Spring Creek, Tenn.

I claim the bubble block, D, mounted upon a collar, G, swiveled upon the stand, A, or its equivalent, in combination with the balance ball or weight, H, suspended from the said block, and about and around the stand, A, substantially as herein described and for the purpose specified.

Second, In combination with the above, arranging either one or both of the legs, J J2, in the bubble block, D, from which the balance ball, H, is suspended in such a manner as to be susceptible of being adjusted therein, substantially as and for the purpose described.

Third, The combination with the sights of the bubble block of the thumb or set screws, R, and fixed pointer, U, arranged substantially as described and for the purpose set forth.

Fourth, The use of a transverse swiveled block, V, for the purpose described.

60,347.—POTATO DIGGER.—M. T. Drake, Pleasant Ridge, Ohio.

I claim, First, The main frame, A, vibrating inner frame, A' gaging frame, A'', and axle, B, constructed substantially as above described and for the purpose specified.

Second, The levelers, m, constructed and operating as above described and for the purpose set forth.

Third, The levelers, m, and cutters, k, in combination with gaging frame, A", substantially as above described and set forth.

Fourth, The plow, F, consisting of shovel, q, share, r, and mold boards, s, as above described when used for the purpose set forth.

Fifth, The shovel, q, in combination with the vibrating inner frame, A, constructed and operating as above described and for the purpose set forth.

Sixth, The endless bucket elevator, D, constructed substantially as above described.

Seventh, The pulverizing board, 8, in combination with the endless bucket elevator, D, for the purpose specified.

Eighth, The irregularly reciprocating screen, 1, in combination with the crank shaft, 5, constructed and operating as above described and for the purpose set forth.

Ninth, The dumping box, 9, in combination with rod, 10, and lever, 11, constructed and operating substantially as above described and for the purpose set forth.

Tenth, The clutch gearing, f and x, in combination with the levers, y and y', and eccentric, z, as above described and for the purposes set forth.

Eleventh, The frames, A A' and A", levelers, m, circular cutters, K, plow, F, endless bucket elevator, D, pulverizing board, 8, irregularly reciprocating screen, 1, dumping box, 9, and clutch gearings, f and x, combined and operating as above described, and for the purpose set forth.

60,348.—Sled Brake.—R. B. Dutton (assignor to himself and N. C. White), Iron Hill, Iowa.

I claim the combination and arrangement of the jointed dog, G, clash, H, lever, F, fulcrum rod, E, ratchet bar, I, and spring, K, with each other, and with the rave, D, and runner, A, of the sled, the whole being constructed and operated substantially as herein described, and for the purpose set forth.

60,349.—Coal Scuttle.—Edgar Eltinge, Kingston, New York.

I claim the shield, D, when constructed, as described and applied as and for the purpose specified.

60,350.—Blower.—John A. Evarts, Meriden, Ct.

I claim the combination of the outer cylinder, A, the inner cylinder, C, and the plate, F, when the said plate, F, is connected by a strap or straps, G, to and so as to be operated by the inner cylinder, and the whole constructed and arranged substantially in the manner and for the purpose specified.

60,351.—Bed Clothes Clamp.—William Fisher, Ripon, Wis.

I claim the combination with the spring lever arms, E, hinged and jointed together in pairs, of the jaw rails or bars, C, connecting the several pairs of said levers, substantially as described for the purpose specified.

60,352.—Vacuum Ventilator.—J. W. Foard, San Francisco, Cal.

I claim the apparatus above described for raising fluids, gaseous or liquid, by means of natural or artificial currents of air composed of horizontal tubes or pipes, a c, which are supported by means of the collar, b, upon the vertical pipe, e, so as to be free to revolve thereon, and which are guided and maintained in proper position by means of supplementary pipe, d, that extends from pipe, a, into said vertical pipe, e, substantially as above shown.

60,353.—Needle Threader for Sewing Machines.—M. B. Foote, Northampton, Mass.

I claim the frame, A, with its handle, B, springs, D, and the arms, C, to the lower one of which the slotted eye, E, is secured in combination with the slotted right-angular gage, G, all operating substantially as described for the purpose specified.

60,354.—Circular Sawing Machine.—Lewis Fossee, Jeffersonville, Ind.

First, I claim the adjustable slotted frame, G, and set screw, f, for canting the saw, arranged and operating substantially for the purpose specified.

Second, Slueing the plank by means of the segment racks, F F, wheels, G G', radiating shafts, m m', guide rod, H, and dogs, I I', substantially as described for the purpose specified.

60,355.—Potato Masher.—Vincent Fountain, Jr., Castleton, N. Y.

I claim as a new article of manufacture, a potato masher constructed as described to wit: the cylinder or tubular receptacle, A, provided with the detachable perforated bottom, B, and handles, one in each side, and the plunger, C, all as shown and set forth.

60,356.—School and Family Slate.—John H. French, Geddes, N. Y.

First, I claim the frame, A, made with two compartments, one of which contains a slate, while the other is so constructed, as to admit of the insertion of any convenient number of cards of pasteboard or other material containing lessons or copies for writing, printing, marking or drawing, and exercises in arithmetic, either any or all combined, substantially as and for the purpose described.

Second, The arrangement in one or both surfaces of a slate of permanent perpendicular and slope lines, in combination with the ordinary horizontal lines, substantially as and for the purpose set forth.

60,357.—Crib for Children.—William L. Gerard, Fort Wayne, Ind.

I claim the panels, A, in combination with the elastic hinges, B, and the mat, C, the whole being arranged and constructed in the manner and for the purpose described and set forth.

60,358.—Fence.—Thomas Glover, Woodbury, N. J.

First, I claim the post, A, and plate, a, in combination with the braces, b b, and detachable blot, d, or its equivalent, the whole being constructed and arranged substantially as and for the purpose described.

Second, The post, A, and plate, a, with its slots, x x, in combination with the detachable braces, b b, enlarged at the lower ends for the purposes set forth.

Third, The shoulder, e, on the post, A, for the purpose specified.

60,359.—Machine for Pulling Hemp and Cotton Stalks.—Artemus W. Goddard, Clinton, Mass.

First, I claim the sectional flexible wheels, d d, of the form substantially as herein described, or their equivalent, arranged together and operated as described.

Second, The spur belts, e e, for carrying the tops of the stalks to the rear, or their equivalent, substantially as described.

Third, The rollers, 1 1 1 1, and frames, f f, for keeping the sectional flexible wheels together, arranged as and for the purpose specified.

Fourth, The combination of the whole consisting of the sectional flexible wheels, d d, the spur belts, e e, the rollers, 1 1 1 1, and the frames, f f, arranged together as and for the purpose specified.

60,360.—Sewing-machine Guide.—H. C. Goodrich, Chicago, Ill.

First, I claim the rigid plate, B, having its under surface corrugated, as shown when hinged to the guide plate, A, as herein set forth, so that it can be folded over back on the plate, A, when not in use.

Second, I claim the plate, B, hinged as shown to the plate, A, and having its inner end made heavier than its outer end, substantially as and for the purpose set forth.

60,361.—Grappling Tool.—N. W. Green, Cortland Village, N. Y.

First, I claim the self-adjusting grapple, B B, the adjustable fulcra, c c, in combination of the levers, D D.

Second, I claim the frame, F F F, including the standard, A A, in combination with the grapple, B B, the adjustable fulcra, c c, and the lever, D D, for the purpose described.

60,362.—Portable Wash Stand.—Samuel B. Guernsey (assignor to himself and Richard S. Pain), Chicago, Ill. Antedated Nov. 26, 1866.

I claim, in combination with a portable wash stand, a water reservoir permanently attached thereto, having two compartments, C D, and a recess, E, beneath one of them, substantially as and for the purposes specified.

Second, I claim, as arranged with the foregoing, the wash basin, H, pipes, I J, cover, K, and can, L, as and for the purposes specified.

60,363.—Churn Dasher.—A. W. Hall, New York City.

I claim an atmospheric churn dasher constructed with a series of inverted funnels or hollow cones arranged one above the other and attached firmly and air-tight to the stem of the common dasher, in combination with the plate, B, at bottom of the stem, substantially as shown and described.

60,364.—Dish Mop.—Aaron S. Hadley, Boston, Mass.

I claim the combination and arrangement of the auxiliary or internal mass of the fibrous material, C, projecting from the end of the socketed handle, A, with such handle and either or both the masses, D E, of fibrous material extended from the periphery of the head of such handle, as set forth.

60,365.—Rotary Pump and Engine.—Dexter D. Hardy (assignor to Thomas H. Foulds), Cincinnati, Ohio.

I claim the rotary pistons, B B', whose peripheries are formed by quarter circles, a a' and b b', of different diameters, connected by suitable sides, c, in the described combination with the two central inner tongues, D D', of the case, A, as and for the purpose specified.

60,366.—Rotary Pump and Engine.—D. D. Hardy and J. J. Morris, Cincinnati, Ohio.

We claim, First, constructing the rotary pistons, B B', of arcs of circles, a a' b b', of different diameters, connected by epicycloid faces, c', in the described combination with the elastic gibs, G', as and for the purpose specified.

Second, We claim, as arranged with the above combination, the set screws, J, for preventing lateral play of the shafts and pistons, as set forth.

60,367.—Tool for Inserting Screw Eyes.—Benjamin T. Harris, Brooklyn, N. Y.

I claim the device for inserting screw eyes in picture frames, etc., consisting of the eye holder, e, formed substantially as specified, and rotated by the mechanism herein described, substantially as set forth.

60,368.—Bed Bottom.—W. J. Haswell, Waverly, N. Y.

I claim the springs, d, passing down through mortises in the sides and ends of the bedstead or frame, A, in combination with movable rods, e, straps, c, and the flexible bottom, B, all constructed and operating substantially in the manner and for the purpose set forth.

60,369.—Packing Revolving Joints.—Jonathan Hatch (assignor to himself, C. Smith, and H. Winchester), South Windham, Conn.

I claim the combination with the stuffing box, b, and gland, C, of the pipe, B, formed with a collar, e, and provided with packing, f f', on each side or face of said collar, substantially as and for the purpose or purposes herein set forth.

60,370.—Condensed Extract of Malt.—Thomas Hawks, Rochester, N. Y.

I claim condensing the extract or infusion of malt by evaporation in vacuo, for the manufacture of ale, beer, and other liquors, substantially as set forth.

I also claim, as a new product, the extract of malt when condensed to a solid or nearly solid substance, substantially in the manner and for the purposes herein set forth.

I also claim, as a new product, the extract of malt, either with or without the addition of hops when condensed in vacuo, substantially in the manner and for the purposes set forth.

60,371.—Sawhorse or Buck.—Henry M. Hayward, Boston, Mass.

I claim the improved sawhorse, as constructed with stop joints, as described.

I also claim the application or arrangement of the roller with a sawhorse so as to operate or turn on its middle connecting rod or bar, in manner and for the purpose as hereinbefore set forth.

60,372.—Stump Extractor.—Nathan M. Healy, Flushing, Mich.

I claim the hold-fast bars, E', slotted blocks, C', levers, F, and chains, G, in combination with the notched bar, E, cap piece, C, uprights, D, inclined supports, B, and runners, A, arranged and operating substantially as herein shown and described.

60,373.—Water Wheel.—Samuel Hicks, Orangeville, Ind.

I claim the wheel having an inverted conical head, D, with buckets, E, attached, curved at the lower ends, and secured to a ring or annular bar, F, substantially as described for the purposes specified.

60,374.—Sawmill.—James A. Holford, Guionsville, Ind.

First, I claim the automatic log-setting device consisting of the head blocks, I and K, pinions, o and p, shaft, L, ratchet wheel, r, pawls, r', lever, r'', adjustable rest, t, and incline, S, all constructed substantially as and for the purpose herein shown and described.

Second, I claim the automatic feeding device, consisting of the carriage, H, reversing lever, h1, spring, m, and stop levers, h2 and h3, constructed substantially in the manner and for the purpose herein shown and described.

60,375.—Corn Sheller.—Michael and Simeon Housman, Huntington, Ind.

We claim the pin passing through the jaws or blades, and the coiled spring around the same, constructed and arranged as hereinbefore described and substantially set forth.

60,376.—Baling Press.—Guy D. Howe, Lewisport, Ky.

I claim the movable boxes, C, when used in combination with a suitable press, constructed and operating in the manner and for the purpose herein specified.

60,377.—Street Lantern.—A. R. and E. A. Hunt, Newark, N. J.

We claim a street lantern having its various side frames, H, and top frames, P, made of cast iron, and constructed and joined together, substantially in the manner and for the purpose described.

60,378.—Steam Valve.—G. G. Hunt, Bridgeport, Conn.

I claim the arm, G, applied to the valve rod, F, and secured thereto by means of a set screw, g, in connection with the slotted plate, b, attached to the stuffing box, f, substantially as and for the purpose specified.

60,379.—Steam Pipe.—G. A. Jasper, Charlestown, Mass.

I claim the register as a device to be used in combination with a steam apparatus, for the purpose of more efficiently controlling and utilizing the steam, substantially as described.

60,380.—Tool for Cutting Tubes.—John V. Jepson, Brooklyn, N. Y.

I claim the combination of the stationary knife, D, with the adjustable knife, F, and the jaw, A, of the wrench, constructed and arranged substantially as described.

60,381.—Fire-proof Felt for Roofing and Other Purposes.—Moses A. Johnson, Lowell, Mass.

I claim a felted fabric of hair or other material, covered on one or both of its sides with paper, and with silicate of soda or soluble glass, and whether painted or otherwise, rendered water-proof or not, as herein described.

60,382.—Drying Artists' Materials.—Gilbert D. Jones, New York City.

I claim the rotating heated drum or cylinder, A, having its periphery partially inclosed by a jacket, C, forming a hot-air passage, a, in connection with a spreading knife or trowel, G, and a scraper or discharging knife, H, all arranged to operate in the manner substantially as and for the purpose set forth.

I further claim the roller, F, when used in connection with the heated drum or cylinder, A, and trowel, G, to operate substantially as and for the purpose herein set forth.

60,383.—Basket.—Horace C. Jones, Dowagiac, Mich.

First, I claim the combination of the inside hoop or band, g with the outside hoop or band, g', in the construction of the stave basket, substantially in the manner described.

Second, The manner, herein shown and described, of securing handles, G G, to the basket.

60,384.—Car Coupling.—Elias H. Keith, Peoria, Ill.

First, I claim the swinging loop, B, with projections, g, and limited by stops, i and k, as described, and for the purpose set forth.

Second, The combination of the hook, C, crank, D, and rod, d, and reversing bar, a, in mortise, m, or their equivalents, as and for the purpose set forth.

60,385.—Hominy Mill.—Bernard Kemp, Knoxville, Md.

I claim the arrangement of the frame, A, with its case, D, screens, H, doors, I, board, J, fan, C, arms, E E, and teeth, G, in the manner substantially as and for the purposes herein specified.

60,386.—Wool-oiling Apparatus for Carding Engines.—P. C. Kirk and M. Pendergast, Lawrence, Mass.

First, We claim operating the supply cocks of a wool-oiling apparatus by the traveling motion of the reservoir, substantially as set forth.

Second, We also claim operating the cocks, j k, by the pinions, l m, and rack, I, substantially in the manner and for the purpose described.

Third, We also claim the pipe, K, with its cock, n, for admitting air into the passage between the cocks, j k, substantially as set forth.

Fourth, We also claim the agitator or mixer, o, when operated by contact with the pin, p, projecting from the railing, L, for the purpose set forth.

60,387.—Machine for Opening and Cleaning Cotton.—Richard Kitson, Lowell, Mass.

First, I claim the fender, D, arranged beneath the seed rack, substantially in the manner and for the purpose set forth.

Second, Forming the communication between the seed chamber, C, and throat, E, so as to allow the air to pass from the seed chambers to the dust trunks, K, giving vent to the seed chamber, C, and preventing the seed being sucked back again with the cotton, substantially as set forth.

60,388.—Narrow-ware Looms.—L. J. Knowles, Warren, Mass.

I claim the combination of the slot, v, or its equivalent, with the mechanism, substantially for operating the lay rack as set forth, such mechanism consisting not only of the link, l, the straps, e e, and their guide wheels as applied to the lay and its rack, substantially as described, but of the crank, n, the shaft, o, and the bevel gears, t u, or their mechanical equivalent or equivalents, operated by the cranked shaft of the lay.

I also claim the above-described mode of making each of the series of take-up rollers, viz: of two heads a series of annular and cross bars or connectors, as set forth.

I also claim the application of each of the top or pressure rollers to the loom, viz: by means of an inclined hanger, to operate substantially as described.

I also claim the application of one series of take-up rollers to the other series thereof, substantially in the manner as described, that is, by means of the head, c', the journal, a', socket, d', and stud, f', arranged and applied to the two series as set forth.

60,389.—Baby Chair and Table.—John Kopp, Bridgeport, Conn.

I claim the combination of the reversible chair with the table, whereby the chair may be used either as a high or a low chair, substantially as herein described.

60,390.—Fire Shield.—Joel Lee, Galesburg, Ill.

I claim the arrangement of the pulleys, C C, supports and guides, B B, chains, G G, and stay braces, D D, with the metallic plates, A, substantially in the manner and for the purpose specified.

60,391.—Churn.—George H. Lenher, Richmond, Va. Antedated Nov. 30, 1866.

First, I claim the arrangement of the hollow spindle, L, perforated rotating tube, M, and vertical fixed counter dashers, o o, constructed and operating in the manner and for the purpose herein specified.

Second, I also claim fastening on the covers of churns by means of hooks on opposite sides of their bodies, and of revolving cams on the edges of the covers, substantially as described.

60,392.—Harvester Rake.—Samuel K. Lighter, Hamilton, Ohio. Antedated October 28, 1866.

I claim the arrangement of rake, E, universal joint or fulcrum, F, limber heel, G, fixed cam, H, pitman, J, and guide, K k, the whole being constructed, combined and adapted to operate in the manner set forth.

60,393.—Braces for Wagon Springs.—James H. Lockie, Humphrey, N. Y.

I claim the combination of the short levers, C, the connecting rods, D and F, and the T braces, E and G, with each other and with the reach, A, and box frame, B, of the wagon, substantially as herein shown and described and for the purpose set forth.

60,394.—Mode of Disinfecting Noxious Vapors from Rendering Houses, Hospitals, etc.—Radcliffe B. Lockwood (assignor to Lockwood & Everett), New York City.

I claim controlling, disinfecting and deodorizing the noxious gases or vapors generated in rendering houses, slaughter houses, hospitals or sewers, by forcing or drawing said gas or vapors from said building, houses, or sewers through a superheating or other furnace, or through a chamber, charged with a disinfecting and deodorizing material, by which said gases or vapors are disorganized and rendered innoxious and inodorous, or are consumed.

60,395.—Piston Packing.—Barker Lowe, Fall River, Mass.

I claim the rings, a b, incasing the head and follower, and provided with the flanges, a' b', in combination with the beveled spiral spring, c, constructed as described, substantially as and for the purpose specified.

60,396.—Process of Distilling Petroleum Oils and Other Substances.—Orazio Lugo and T. O. L. Schrader, New York City.

First, We claim the admission of air or gas into the still at a temperature equal to or greater than that of the oil or substance undergoing the distilling process, substantially as herein described.

Second, The heating of the air or gas previous to its admission into the still, by the same means or medium employed for the heating of the still itself, and in such manner that the temperatures of the substance undergoing distillation and that of the air or gas admitted to the still will increase or decrease in or nearly in the same ratio, substantially as herein described.

Third, The utilization of the waste heat from the still by its employment to effect a preparatory heating of the air or gas which is to be admitted into the still, substantially as herein set forth.

Fourth, Causing the air or gas while in the heated state, but before its admission into the still, to pass through or in contact with an oil of suitable character, substantially as herein specified.

60,397.—Peat Machine.—James B. Lyons, Cornwall, Conn.

I claim the construction of the molds, c c, they having racks

b b, on both sides for the action of the pinions, a a, to convey them into and through the receiving box, D, as arranged, and operating substantially in the manner and for the purposes herein set forth.

60,398.—Apparatus for Grinding Peat.—James B. Lyons, Cornwall, Conn.

I claim the perforated end cylinder, H, in combination with the wiping wings, I I I, cutting and grinding mechanism, F F h h, operating to discharge the pulverized mass, substantially as and for the purposes herein set forth.

60,399.—Making Butter from Cheese Whey.—Homer C. Markham (assignor to himself and Charles G. Riggs), West Turin, N. Y.

I claim the separation of cream or butter from wheys by the means of heat and in the use of an acid liquid, substantially as herein described.

60,400.—Folding Lounge.—James W. McDonough, Chicago, Ill.

I claim the rails, A A, of the frame of the folding lounge, constructed and operating substantially in the manner herein described and specified, and the folding head, H, of the lounge constructed and operating substantially as herein described and specified.

60,401.—Head Block for Saw Mills.—B. F. McKinley (assignor to himself and H. R. Mathias), Cincinnati, Ohio.

I claim the regulating of the movement of the slide, B, and knee, C, by means of the adjustable head, N, or its equivalent, on bar, L, substantially as and for the purpose specified.

I further claim so adjusting head, N, or its equivalent, on bar, L, as to bring the pivot centers of link, M, and the fulcrum of lever, K, all on line when starting in combination with a similar arrangement of levers or links on head block, A, the centers of which are brought in line in stopping, and the slide, I, pawls, H H, and rack bar, G, all arranged substantially as and for the purpose set forth.

60,402.—Cotton Gin.—F. M. McMeekin, Morrison's Mills, Florida.

I claim the combination of the roller, C, roller, D, with adjustable bearings, slotted plate, E, reciprocating rake, G, and teeth, F, as described, and brush, I, arranged and operating substantially as and for the purpose specified.

60,403.—Knuckle Joint.—J. H. Mears and C. W. Yale, Oshkosh, Wis.

I claim the pentagonal socket, Fig. 1, in combination with the head, Fig. 2, substantially as set forth.

60,404.—Grinding Mill.—John M. Miller, Hamilton, Ohio.

I claim the arrangement of the tube, G, blower case, H, and receiving box, K, in combination with the case, E, provided with regulating slide, b, operating substantially as and for the purpose described.

60,405.—Safe.—L. H. Miller, Baltimore, Md.

First, A burglar proof wall for safe and other similar purposes, of wrought and cast metal, made and held together by secret studs, a a, all constructed substantially as described.

Second, The studs a a, projecting from the inner surface of one of the wrought metal plates, but not extending to the inner surface of a contiguous plate, in combination with a cast metal filling between said plates, substantially as described.

60,406.—Tags.—Charles A. Moore, West Brook, Conn.

I claim the interposing or placing between metallic fastenings, the thread, tape, or twine, substantially as specified and for the purpose herein set forth.

60,407.—Tatting Shuttle Winder.—James D. Moore, Grinnell, Iowa.

I claim the frame, A, formed of a single piece of metal, and bent into form substantially as described, in conbination with the wheel, G, and H, and spool, B, supported in said frame as set forth.

I also claim in combination with said frame the spring, I, which holds the shuttle in its place, and opens the jaws of the shuttle to receive the thread freely, substantially as specified.

60,408.—Water Wheel.—Henry G. Nelson, Lockport, N. Y.

First, I claim making the arms of the bridge tree grooved for the purpose of conducting water into the step for lubrication, substantially as described.

Second, The adjustable hub, E, in combination with the hub, D, for the purpose and substantially as described.

Third, A water-wheel bucket having the parts, f1 f2 f3 and f4, in combination substantially as set forth.

Fourth, The stationary scrolls, J, and horizontally-moving gates, L, when arranged with a segment ring, N, operating gear and arms, Q, and friction rollers, S, as a means of opening and closing the gates, L, substantially as described.

60,409.—Oil Can.—William C. Newkirk, Piqua, Ohio.

I claim an oil can with a projecting rim around the outside, either at the bottom or above it, forming a channel, substantially as described for the purpose herein set forth.

I claim the extra spout, B, in combination with the said channel, substantially as described.

60,410.—Washing Machine.—L. L. Newman, Jackson, Mich., assignor to himself and A. C. Zearing, Dayton, Ohio.

I claim the combination of the parts, C C and F, with their several rollers, pieces, D, the shaft and box, A, when arranged and operated substantially as described.

60,411.—Pin for Attaching Wearing Apparel.—R. J. Nunn, Savannah, Ga.

I claim a pin consisting of a shank, a disk, ball, oval, or other head, an enlarged portion and a retaining shoulder, substantially as described.

60,412.—Damper or Draft Regulator for Stoves.—Solomon Oppenheimer, Peru, Ind.

I claim the cup, A, constructed as shown, and provided with the discharge cap, E, or its equivalent.

I also claim, in combination with the above, the arm, C, and the handle, D, and the connecting rod.

60,413.—Dumping Wagon.—J. L. Ordner, Cleveland, Ohio.

I claim the rollers, c, and frame, F, when constructed and arranged in relation to each other as set forth, in combination with the described box, A, provided with fastenings, n, the whole supported upon the bolsters, G, when used conjointly in the manner and for the purpose set forth.

60,414.—Churn.—V. Palmer, Castalia, Ohio.

I claim the perforated dasher, I, the adjustable wings, I', and checks, d, as arranged in combination with the links, H and G, and the handle, F, in themanner and for the purpose set forth.

60,415.—Farm Gate.—Enos H. Peck, Brownhelm, Ohio.

I claim the cap, d, inclined plane, h i, and balls, j k, in combination with the center post, B, brace, C, and counter balance gate, as and for the purpose set forth.

60,416.—Lamp.—John M. Perkins and Mark W. House, Cleveland, Ohio.

First, We claim the combination of the annular reservoir, A, the annular air chamber, D, the burning chamber, B, the supply pipes, P, and vent tubes, V, constructed and arranged substantially as and for the purposes described.

Second, We also claim the collar, C, in combination with the perforated burner, G, when both are so constructed and arranged as to extend the cold air chamber, D, up around the perforated portion of the burner, substantially as shown and described.

60,417.—Apparatus for Charging Air with Gasolin.—Barton Pickering, Milton, Ohio.

First, I claim the tube, O2, to supply mixed air or gas to the vessel, C, from the vessel, D, connected substantially as described, for the purpose set forth.

Second, I claim the supply tube, O3, connecting the vessels, C and D, substantially as described and for the purpose set forth.

Third, I claim arranging the supply vessel, C, within the vessel, A, substantially as described.

Fourth, I claim the construction of the generating vessel, D, with the partitions, i i i, bagging or other suitable material on these surfaces, the orifices, k k k, giving an alternating direction to each, the air and gasolin, as described and for the purposes set forth.

Fifth, I claim the vessels, A and A1, vessels, B and B1, the vessel C, the vessel, D, the tubes, e f g h n, the stop cocks o1 o2 o3 o4, the whole being constructed and combined substantially for the purposes set forth.

60,418.—Sewing Machine.—Francis A. Pratt, Hartfort, Conn.

I claim the employment of the gib or shoe, d, and cross head, a, with the way, c, substantially as and for the purpose described.

60,419.—Stove Boiler.—Miles Pratt, Boston, Mass.

I claim the improved boiler as made, with the flue arranged against its sides r rear.

60,420.—Welding of Iron and Steel.—John P. Price (assignor to Frank K. Hipple), Philadelphia, Pa.

I claim the welding of iron or steel by the aid of kryolite, as set forth.

60,421.—Dice Box.—Edmund W. Quincy, Lacon, Ill.

I claim the arrangement of the disk, D, and its connection with the flat spring, E, by means of the piston or rod, C, and the open bottom which enables an easy renewal of the spring when necessary, all as and for the purposes set forth.

60,422.—Cultivator.—Barbery S. Rich, Pennfield, N. Y., Administratrix of the Estate of J. C. Rich, deceased.

First, I claim the standard frame, C, provided with the lugs, l', at the top, and the parts, h h l n, at the bottom, when combined with expanding arms, E E, of a flexible metallic cultivator, the whole operating substantially as and for the purpose specified.

Second, The gage wheel stirrups, composed of two counterparts, r r, and provided with the projections, t t, when combined with the flat side, a, of the cultivator frame, as herein set forth.

60,423.—Hydrant.—J. P. Riley, Philadelphia, Pa.

First, I claim the hollow plug, H, and shank, h, in combination with the box, G, substantially as described for the purpose specified.

Second, The combination and arrangement of the stock, D, base, B, cap, C, section, A, key, K, and its shield, plug, H, as described, and box, G, substantially as described, as and for the purpose specified.

60,424.—Bottle Stopper.—Daniel T. Robinson (assignor to himself and Nathaniel Jenkins), Boston, Mass.

I claim the improved bottle stopper fastening as composed of the slotted stopper or plug, B, the cammed lever, C, or its equivalent, and the wire, c, the whole being arranged and combined together in manner and to operate as specified.

And in combination with the above described arrangements of parts, I claim the rubber masher or covering, h, essentially in manner and for the purpose as described.

60,425.—Mode of Constructing Buildings.—Frederick O. Rogers, Niles, Mich.

I claim constructing the walls and roofs of wooden buildings, whole or in sections, by the union of two or more series, or layers, of laths or battens, crossing each other transversely, the said walls and roofs, or sections thereof, being united so as to form a firm structure without the use of additional walls, frame work, or braces, substantially as and for the purpose herein specified.

60,426.—Curtain Fixture.—Levi Ross (assignor to himself and Oliver K. Phillips), Springfield, Mass. Antedated Nov. 24, 1866.

I claim the mode of hanging window curtains herein described by means of the two rolls, A B, connected with the curtain by the tapes, E E F F, when combined with the two cords, G H, and their respective rollers or pulleys, c d, arranged and operated substantially as herein set forth.

60,427.—Harvester.—Nathaniel Rowe, Emmittsburg, Md. Antedated Dec. 4, 1866.

First, I claim arranging the entire gearing at the center of the machine and surrounding it with a casing, E, the gearing and casing being constructed and arranged substantially as set forth.

Second, I claim the detachable piece, P, in combination with the shaft, N, and casing, E, when the latter is constructed with a movable cap that covers the gearing on the axle and the pieces, P, substantially as and for the purpose set forth.

Third, I claim attaching the braces of the tongue, T, by a collar to a flange, E2, projecting from and being a part of the casing, E, substantially in the manner set forth.

Fourth, I claim the combination of the driver's seat, V, and springs, V2, with the standards, U, when the same are permanently attached to and on the opposite side of the axle from the braces of the tongue.

Fifth, I claim the slotted and bifurcated lever, S, when connected with the cutter-bar in front and rear, substantially as and for the purpose set forth.

60,428.—Corset.—C. D. Rutherford, Brooklyn, N. Y.

I claim a corset made of a skeleton or open form, in combination with the net work, F F, the whole being constructed substantially as herein described and for the purpose specified.

60,429.—Oil Can.—Stephen Sargent, Lowell, Mass.

I claim the combination of the venting chamber, A, venting tube, C, passage, c or g, or their equivalent, with the oil can, the whole arranged substantially as and for the purpose set forth.

60,430.—Machine For Cutting Bungs for Barrels.—John George Schmidt, Rochester, N. Y.

I claim adjusting the cutters of a bung cutter by means of the screws, g, springs, f, and pins, K, so as to enable it to cut bungs of different sizes and taper, substantially as described.

60,431.—Skate.—George Scott and John W. Smith (assignors to themselves and James Smith), Boston, Mass.

We claim, as our invention, the arrangement as well as the combination of the rocker, B, and the two runners, C C, and the foot rest, A.

We also claim the combination of the foot rest with the inclined toe beak, a, arranged on it, and to operate with the beak, c, when applied thereto, substantially as set forth.

We also claim the mode of applying the heel screw to the skate, viz., by extending it up through the foot rest, and supporting its head in a bearing to extend into the nick of the screw, as described.

60,432.—Magnet for Telegraphs.—Tal. P. Shaffner, Louisville, Ky. Antedated Nov. 25, 1866.

I claim making an electro magnet of the armature by means of a current induced by the main circuit, substantially as herein set forth, in connection with the electro magnet, A A, or its equivalent, for telegraphic purposes.

60,433.—Sewing Machine.—Isaac Merritt Singer, Yonkers, N. Y.

First, I claim the combination in a sewing machine of the following instrumentalities, viz.: the reciprocating needle carrier and an oscillating shuttle, having its delivery eye coincident with its center of oscillation, substantially as set forth.

Second, The shuttle oscillating substantially as described, having a delivery eye arranged at one side of the plane of oscillation of the shuttle point, substantially as set forth.

Third, The combination in a sewing machine of the following instrumentalities, viz.: the shuttle, spring holder, and stop for the spring holder, substantially as set forth.

Fourth, The combination in a sewing machine of the following instrumentalities, viz.: the block for holding the shuttle in place at one side, and a shuttle guide for holding the shuttle at its other side, so arranged that it guides the shuttle only when its point is in the vicinity of the needle, leaving it free at other times, substantially as set forth.

Fifth, The combination in a sewing machine of the following instrumentalities, viz.: the oscillating shuttle drivers, reciprocating connecting rod, and spring acting crosswise to said rod, substantially as set forth.

Sixth, The combination in a sewing machine of the following instrumentalities, viz.: the needle holder, oscillating shuttle, take-up lever, cam, and spring, substantially as set forth.

Seventh, The combination and arrangement in a sewing machine of the following instrumentalities, viz.: the spool support, thread tension, and thread-slackening mechanism, substantially as set forth.

Eighth, The combination in a sewing machine of the following instrumentalities, viz.: the feeding instrument, bar reciprocating crosswise to the movement of said instrument, and turning, slotted, regulating plate, with its slot extended at opposite sides of the center on which it turns, substantially as set forth.

Ninth, The combination in a sewing machine of the following instrumentalities, viz.: the reversing and regulating lever that controls the feed, and two stops, substantially as set forth.

60,434.—Bridge.—Frederick H. Smith, Baltimore, Md.

I claim constructing a suspension truss in such a manner that all posts other than the center one, C, shall be supported by bars or braces, one of which, as D2, extends from the foot of the post, C', to be supported to an end of the straining beam, B, and the other bar or brace, D', supporting said post, C', being in a prolongation of the line of the bar or brace, D, supporting the center post, C, from the opposite end of the straining beam, substantially as described.

60,435.—Gate.—Stephen Spoor, Phelps, N. Y. Antedated Nov. 21, 1866.

I claim the combination with a vertically-revolving roller supporting the upper rail, of a roller support, C, having a horizontal joint and composed of guards, k k, recessed standards, i i, and bearings, h h, socket, b, and conical bearing pin, c, constructed and arranged substantially as shown and described.

60,436.—Breast Protector.—John Stadermann, New York City, and Henry Sauerbier, Newark, N. J.

We claim artificial breasts formed by swaging or striking up, out of one and the same piece of wire gauze or wire cloth, two protuberances of proper dimensions, and having the other portion of the wire gauze or cloth swaged or struck up to conform to the shape of the chest of the wearer, substantially as shown and described.

60,437.—Meter for Gas and Liquids.—Homer H. Stuart, Jamaica, N. Y.

I claim, as my invention, rotating the axle of a meter by vanes that are alternately extended and folded or retracted, substantially as described.

And I also claim by this invention to measure a fluid body by passing it transversely through a cylinder or other circular vessels containing vanes revolving in said cylinder or circular vessel, in such a manner that the said vanes, while moving in the direction of the flowing body, are radii of a circle as large as the inner surface of the cylinder, and while returning through the lower part of the cylinder to the point where the fluid is received they are folded or retracted so as to be the radii of a circle smaller than the periphery of the cylinder.

60,438.—Cheese Press.—William Thomas and William Rhoades, Mukwonago, Wis.

We claim the combination of the notched levers, I and K, with the pawls, T T, arms, V V, bed piece, M, and cross beam, B.

60,439.—Stamp for Marking Sheep.—Asahel Todd, Pultneyville, N. Y.

I claim as an improved article of manufacture, the metallic skeleton marking stamps, constructed as and for the purposes herein shown and described.

60,440.—Cupola Furnace.—Charles Truesdale (assignor to William Resor & Co.), Cincinnati, Ohio.

I claim the provision in a cupola or blast furnace of the several tiers of tweers in an ascending series with diminished issues, substantially as set forth.

60,441.—Elevator.—Otis Tufts, Boston, Mass.

I claim attachment of a suspending rope of an elevator car by means of an intermediate device, f, adjustable with reference to the car or drum, substantially as described.

Also, in combination with an elevator car, its winding drum, and two or more ropes or chains for hoisting or lowering the car, means for relative mechanical manipulatory adjustment of the length and tension of said ropes or chains, arranged to operate substantially as described.

Also, in combination with a winding drum of two rope bed curves reversed in position with respect to each other as set forth.

60,442.—Elevator.—Otis Tufts, Boston, Mass.

I claim, for the purpose of automatically adjusting the strain upon the ropes or chains, b b, the mechanism herein described, when arranged to operate substantially as specified.

60,443.—Elevator Guide.—Otis Tufts, Boston, Mass.

I claim combining the suspended car of an elevator with the ways or rails which confine it, by means of guides kept by springs constantly in contact with said ways or rails, when said guides are so arranged as to be capable of motion toward and from the rails.

Also, combining with the car and rails of an elevator, guide wheels provided with soft-surfaced peripheries, so as to operate as set forth.

Also, combining with the car and rails of an elevator, guide wheels having elastic peripheries, for the purpose specified.

Also, the rails or ways, a, provided with ratchet teeth, b, re-enforced by flanges, c c.

60,444.—Means for Oiling Bodies Rotating around Shafts.—Otis Tufts, Boston, Mass.

I claim the construction, substantially as shown, of a loose pulley, clutch, or other similar device, or the hub thereof, with a removable head or heads, when the removable head or heads are provided with suitable packing, so as to form a closed cavity for containing lubricant directly around the parts to be lubricated.

Also the oil cups, h, when arranged within the cavity aforesaid, so as to operate as described.

60,445.—Continuous Percolator and Filtering Machine.—P. H. Vander Weyde, Philadelphia, Pa.

I claim, First, The above-described upward-acting percolators, into each of which the liquid enters below the solid material and overflows at the top into the next one.

Second, The placing of them on steps so that the liquid flows from the more exhausted solid material into that which is later added, coming in its course all the time in contact with fresher material.

Third, The manner described of displacing a series of any number of them on the incline rail track by turning the wheels, A and B, in order to remove only the vessel above containing exhausted solid material, and supplying one with fresh material at the lower end, without interrupting the operation, thus effecting a saving in material as well as of time.

60,446.—Cooking Stove.—Geo. W. Walker, Boston, Mass.

I claim the construction, substantially as shown and described by which the space above the ordinary high hearth or ash pit of

the fire box of the common form of cooking stove is utilized for the purpose specified; said construction consisting of the extension of the top and sides of the stove over and to the front of said hearth or ash pit, when provided with doors which inclose the space and retain the heat therein while capable of being opened for the various purposes connected with the utilization of said space.

Also, in combination with such an inclosed space over the aforesaid hearth or ash pit, of the inclosure of the space below the same so as thereby to increase the capacity of the oven of the stove, substantially as described.

And I also claim in a cooking stove the arrangement of the oven with side and front doors and double walls or plates on either side and at the front of the oven between the front and side doors thereof, when the spaces inclosed between said double walls open into the lower flue so as to become charged with heated air and thus heating the oven as well as affording the strength needed in the structure of the stove.

60,447.—Corn Planter.—J. C. Walkinshaw (assignor to himself and Jos. W. McGonigle), Leavenworth, Kansas.

First, I claim the arrangement of the cams, b b, on the driving wheels, A A, in combination with the dropping bar, F, the vertical slides, k k, the seed compartments, a a, and the conductors, g g', constructed and operating substantially as and for the purposes herein described.

Second, The lever frame, l l, connected with the plows, h h, for raising and lowering them, constructed and arranged substantially as shown and described herein.

60,448.—Traveling-bag Frame.—Cornelius and Zachariah Walsh, Newark, N. J., assignors to Cornelius Walsh.

I claim the combination of jaws, A A', with the ends, a, as described, the bar, B, with tenons, c, secured in the jaw, A, all constructed and arranged in the manner and for the purpose herein specified.

60,449.—Cultivator.—William T. Watson, Nottingham, Md.

First, I claim the teeth, C, of a cultivator, when constructed as set forth.

Second, The combination of the frame, A, teeth, C, and metallic sockets, D, when said several parts are respectivhly constructed and the whole arranged substantially as set forth.

60,450.—Type-dressing Machine.—Patrick Welch, New York City.

First, I claim setting up the types in lines standing upon their feet in the manner described to prepare them to be fed to the machine, substantially as herein set forth.

Second, The combination with a table or bed having a channel for the types formed upon it, substantially as described, of the knives, M M, and feed bar, D, as and for the purpose set forth.

Third, The combination with the knife beds, L L, forming a portion of a channel for the types of an adjustable support, W, substantially as herein set forth.

Fourth, The combination of the knives, N N, with the knives, M M, and feed bar, D, substantially as set forth.

Fifth, The combination of the movable guide, U, and the pusher, V, with the knife beds, L L, forming a channel for the types, and knives, M M, substantially as described.

Sixth, The combination of the feed bar, D, with the frame or pusher, J, the said pusher being operated substantially as described.

Seventh, The combination of the stop, u, with the feed bar, D, and pusher, t, substantially as herein set forth.

Eighth, The combination with the movable guide, U, and pusher, V, of the yielding guard, y, and adjustable guard, u', substantially as set forth.

Ninth, The combination with the puncher, V, and adjustable guard, u', of the stop or holder, t', substantially as herein described.

60,451.—Lathe Carrier for Dog.—L. P. Wilcox, Brooklyn, N. Y.

I claim the saddle or supplementary block, B, constructed and fitted to the carrier, substantially as herein set forth for the purpose specified.

60,452.—Lantern.—Samuel R. Wilmot, Bridgeport, Ct.

I claim the construction of the base of the lantern with an internal oil reservoir and with cavities, s, on opposite sides of the said reservoir for the reception and manipulation of the spring catches a, by which the base is attached to the body of the lantern, substantially as herein set forth for the purpose specified.

60,453.—Stovepipe Elbow.—James Wilson, Wilmington, Del.

First, I claim an improved stovepipe elbow formed by combining the door frame and door, C D, the plates A and B, and the part, E, with each other, substantially as described and for the purpose set forth.

Second, The combination of the sliding damper, F, with the elbow, substantially as described and for the purpose set forth.

60,454.—Padlock.—John E. Wootten, Cresson, Pa.

First, The combination of the case, A, cylinder, B, and its arm, C, with the hasp, E, and the catch on the end of the same adapted to a catch on the end of the arm, C, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The combination of the cylinder, B, circular tumblers and their projections, the hollow cylinder, h, and the cylinder, H with its wards, the whole being arranged and adapted to the casing, A, substantially as and for the purpose herein described.

60,455.—Hydrocarbon Burner for Heating Purposes.—James Youmans and John Reed, Davenport, Iowa.

We claim a gas generator constructed with a chamber, C, divided by a partition, D, into two compartments, E and F, and having also a pipe, I, burners, L, disk, m, and stem, N, said several parts being respectively constructed and arranged in relation one to another substantially as set forth.

60,456.—Self-regulating Tension for Sewing Machines, etc.—Theodore Zinck (assignor to himself and F. W. Kalbfleisch), New York City.

I claim the arm, C, in combination with the friction spring, B, and bobbin, A, constructed and operating substantially as and for the purpose described.

REISSUES.

2,414.—Machine for Pulverizing Clay.—George F. Blake and P. Hubbell (assignees of George F. Blake), Boston, Mass. Patented November 26, 1863.

First, We claim, in combination with a machine for cleaning and pulverizing clay or other plastic material, the reciprocating wipe or plunger, W, constructed and operating substantially as described.

Second, The revolving grate, constructed and operating as described.

Third, The stationary fingers, w, constructed, arranged and operating as set forth.

Fourth, The arrangement for conjoint operation of the inclined blades or sweeps, G, with the horizontal grate, G', in the manner described.

Fifth, We claim the arrangement for conjoint operation of reciprocating, oscillating, or rotating wipes, blades or sweeps, with rotating or stationary screens or gratings, substantially in the manner and for the purpose set forth.

2,415.—Carpet Lining.—George W. Chipman (assignee by mesne assignments of John R. Harrington), Boston, Mass. Patented April 1, 1856.

I claim, as a new article of manufacture, a carpet lining made up of a long or continuous sheet or sheets of stout paper, and a layer or layers of fibrous material applied thereto, substantially as set forth.

2,416.—Machine for Making Carpet Lining.—George W. Chipman (assignee by mesne assignments of John R. Harrington), Boston, Mass. Patented April 1, 1856.

I claim the process of making a carpet lining by progressively bringing into contact a sheet or sheets of stout paper, and a sheet or sheets of batting or soft fibrous material, so that upon contact of the contiguous surfaces they shall be caused to adhere together, substantially as described.

Also, in combining with a roll or rolls upon which the sheet or sheets of paper are wound, feed and presser rollers, operating to compress together and feed the paper and batting, substantially as set forth.

Also, in combination with the paper roll or rolls and feeding and compressing rolls, a paste or cement-applying mechanism, operating substantially as described.

Also, in combination with a wadding-forming apparatus, creasing or fold-forming rolls, operating as and for the purpose substantially as set forth.

Also, in combination with such fold-forming mechanism, the box or platform into which the wadding is delivered in folds, and from which it is removed for baling by letting down the fall, substantially as described.

2,417.—Hoop Lock for Cotton Bales.—E. Victor Fassman, New Orleans, La. Patented April 18, 1865.

I claim the plate provided with slots, when the same is constructed with ridges or projections on both side of the plate, substantially as set forth.

2,418.—Tanning.—Sanford A. Hickel, Roane County, W. Va., Calvin, James, and Benj. F. Armstrong, Jackson Court House, West Va., assignees of Sanford A. Hickel. Patented November 7, 1865.

We claim the employment or use of manure, in combination with bark or other tanning material, substantially as and for the purpose set forth.

DESIGNS.

2,523.—Picture Frame.—John H. Bellamy, Charlestown, Mass.

2,524.—Bracket.—John H. Bellamy, Charlestown, Mass.

2,525 and 2,526.—Clock Case.—William A. Giles, Chicago, Ill. Two Cases.

2,527.—Trade Mark.—Daniel B. Kimball, New York City.

2,528.—Shafting Hanger.—C. C. Klein (assignor to Thomas Wood), Philadelphia, Pa.

2,529.—Buggy.—John Reynolds, Washington, D. C.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

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2,187.—Breech-loading Fire-arm.—Thomas J. Vail, Hartford, Conn. Aug. 25, 1866.

2,470.—Composition and Production of Artificial Stone Cement, etc.—George E. Vanderburg, New York City. Sept. 25, 1866.

2,517.—Apparatus for Fitting Garments.—Silas O. Brigham, San Francisco, Cal. Sept. 28, 1866.

2,575.—Construction of Lamps for Burning Volatile Oils or Spirits, etc.—Philip Lieutens Nadt, New York City. Oct. 6, 1866.

2,687.—Means for Preventing, Indicating, and Correcting an Undue Degree of Superheating of Steam in Steam Boilers, etc.—Norman Wiard, residing at present in New York City. Oct. 17, 1866.

2,718.—Sewing Machinery.—Lewis B. Bruen, New York City. Oct. 20, 1866.

2,739.—Machinery for Manufacturing Cartridges.—Timothy J. Powers, New York City. Oct. 23, 1866.

2,740.—Sewing Machine.—Henry W. Fuller, New York City. Oct. 23, 1866.

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Reissue No. 392.—Bomb Lance for Killing Whales.—C. C. Brand, Norwich, Conn. Letters Patent Dated June 22, 1852. Reissued August 26, 1856.

I claim so making or applying them to the shaft shank, or to the body of the bomb that not only may they be folded or moved down, so as to be capable of entering with the shaft the bore of the gun, but each have an elastic property or spring, such as will cause it to unfold, or be thrown outward immediately after the projectile may be discharged from the gun. Such wings, being made of vulcanized india-rubber or any substance or substances which may be deemed an equivalent thereto, in as much as such may possess the requisites, as above specified.

9,041.—Sewing Machine.—Allen B. Wilson, Waterbury, Conn.—Letters Patent Dated June 15 1852.

First, I claim the combination of the bobbin, F, for carrying one thread, with a rotating hook, which is of such form, or forms part of a disk, or its equivalent, of such form, as to extend the loop on the other thread, and pass it completely over the said bobbin, whereby the two threads are interlaced together, the parts being arranged and operating in any way, substantially as herein set forth.

9,039.—Label Card.—James Sharp, Brooklyn, N. Y. Letters Patent Dated June 15, 1852.

I claim the manufacture of label cards, or tickets, of cloth and paper stuck and pressed together, substantially as above described.

Reissue No. 572.—Sewing Machine.—William O. Grover, Boston, Mass., and William E. Baker, Roxbury, Mass., assignors to the Grover & Baker Sewing Machine Company, Boston, Mass. Letters Patent Dated June 22, 1852. Reissued July 6, 1858.

First, We claim, in combination with an upper needle, or eye-pointed perforating instrument, a non-perforating eye-pointed instrument, so shaped and moved, substantially as specified, that it shall spread a loop of the thread it governs while advancing through a loop of the upper-needle thread, substantially in the manner and for the purpose specified.

Second, We claim, in combination with an eye-pointed upper needle, a non-perforating instrument, having the function, substantially in the manner specified, of carrying the loop of the upper-needle thread out of the location or position in which it was originally seized, for the purpose substantially as set forth.

Third, We claim, in combination with an eye-pointed perforating instrument, an eye-pointed non-perforating instrument, substantially such as is described, and performing the two offices of spreading a loop of its own thread while advancing through a loop of the upper-needle thread, and of changing the locality of the loop of the upper thread that it has seized, both offices being performed substantially in the manner and for the purpose hereinbefore described.

Fourth, We claim an eye-pointed upper needle, and an eye-pointed needle, so arranged and operating as to make a stitch, substantially such as is herein represented, in combination with a feed apparatus, one surface of which has motion in four different directions, substantially in the manner and for the purposes described.

9,109.—Railroad-Car Brake.—George O. Way, Claremont, Minn., administrator of the estate of L. F. Thompson, deceased, and A. B. Bachelder, Lowell, Mass., assignors to H. Tanner. Letters Patent Dated July 6, 1852.

We claim to so combine the brakes of the two trucks, with the operative windlasses, or their equivalents, at both ends of the car, by means of the vibrating lever, 'A', or its equivalent, or mechanism essentially as specified, as to enable the brakeman by operating either of the windlasses, to simultaneously apply the brakes of both trucks, or bring or force them against their respective wheels, and whether he be at the forward or rear end of the car.

Reissue No. 1,975.—Harvester.—Eliakin B. Forbush, Buffalo, N. Y. Letters Patent Dated July 20, 1852. Reissued July 8, 1856, again April 19, 1859. Reissued May 23, 1865.

First, I claim in combination with a cutting apparatus and a quadrant-shaped grain platform, and both located in the rear of a line drawn through the front of the driving wheel, a rake supported by a pivoted connection on the main frame in the rear of the axis of the driving wheel, and so arranged that it will sweep over the platform and deliver the grain in the rear of the main frame, substantially as set forth.

Second, A movable fulcrum upon which the rake is suspended and operated, in the manner substantially as described.

Reissue No. 12, whole No. 1,117.—Grass Harvester.—Jesse S. and David Lake, Smith's Landing, N. J. Letters Patent Dated July 20, 1852. Reissued January 1, 1861.

First, We claim the combination of the coupling piece, I, and finger support, G, with an intermediate metallic connection or lever, H, for the purposes stated.

Second, We claim the metallic connection or lever, H, both as a hinge and a support to the cutting apparatus and finger support.

Third, We claim the combination of the finger support, and the metallic connection or lever, H, in such a manner that their lower surfaces shall be flush, for the purposes set forth.

Fourth, We claim, in combination with the main frame of a grass harvester, a finger or guard support, whatever it may be called, having two independently-acting hinges or yielding connections interposed between it and the main frame, in such a manner as that said finger or guard support, as it is advanced by means of its hinges or yielding connections, shall be free to rise above or fall below the plane on which the carrying or driving wheel or wheels are passing.

Fifth, We claim so hinging that part of a mowing machine to which the guards or fingers are attached as that it may oscillate, or turn on a line at right angles to the line of motion of the machine, for the purpose of raising the points of the guards to adapt the cutting apparatus to the conditions of the ground, while it is also free to roll, rock, or wabble on a line parallel to the line of motion of the machine.

Sixth, We claim the combination with the main frame, finger support, and cutting apparatus of a mowing machine, of a lever with an adjustable weight thereon, whereby the pressure of the finger support and cutting apparatus upon the ground can be regulated by simply moving said weight upon its lever.

Seventh, We also claim the combination of a counterpoise weight or the equivalent thereof, with that part of a mowing machine, whatever it may be called, to which the guard fingers are attached, to diminish its presue upon the ground and thus obviate side draught and friction.

Reissue No. 303.—Vault Cover.—Thaddeus Hyatt, New York City. Letters Patent Dated November 12, 1845. Reissued April 3, 1855, extended by Act of Congress.

I claim, in covers for openings to vaults in floors, decks, etc., making them of a metallic grating or perforated metallic plate with the apertures so small that persons or bodies passing over or falling on them may be entirely sustained by the metal, substantially as described, but this I only claim when the apertures are protected by glass, substantially as and for the purpose specified.

And I also claim, in combination with the grating or perforated cover and glass fitted thereto, the knobs or protuberances on the upper surface of the grating or perforated plate for preventing the abrasion or scratching of the glass, substantially as specified.

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