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THE TURKISH MOSQUE IN THE PARIS EXPOSITION.—[See Next Page.]

The Mosque in the Champ de Mars, Paris.

On the preceding page is a large engraving of one of the many structures erected in the grounds of the Exposition, representing the peculiarities of architecture of the different nations. This feature of the exhibition is not the least interesting of the grand display. The engraving herewith presented is one of a number we have procured from Paris, representing scenes in the Exhibition, which we shall publish from time to time. We give a translation of the description of the mosque from *L'Exposition Universelle Illustrée*,

The name mosque is derived from the Arab word *mesdchid* (place of prayer), through the intermediate Italian word *moschea*. The most characteristic details of these edifices are the domes that surmount them as well as the towers decorated with crescents at their tops, known as minarets, and from whose hights a crier, the *muezzin*, calls the "faithful" to prayer. The mosques are generally of square form, in front of them there is ordinarily a courtyard furnished with all that is necessary for ablution—which forms such an important part of the worship of Islam. The interior is simply ornamented with arabesques entwined with verses from the Koran. The most rigid Mussulmen utterly proscribe the representation of any object, animate or inanimate, and their pr'ests instruct them that at the last judgment the figures delineated by designers, artists, or sculptors will come and demand of their authors to give them a soul under penalty of perdition. The ground floor of the mosque is covered with carpet and mats; as in Spanish countries one never finds any seats. At the southeastern part of the edifice a pulpit is raised for the priest, and the devout "faithful" should always turn their eyes in the direction of Mecca—which is indicated by a kind of niche. Mussulmen alone may enter the mosque; yet frequently in Turkey, Algiers, and the East Indies this rule is daily infringed, but of course not as often as is ventured on in the *Champ de Mars*.

Adjoining each mosque are a number of charitable establishments, such as schools, hospitals and kitchens for the poor. The expenses of worship and almsgiving are covered by the revenue from real estate that for this object is exempt from taxation.

The mosque of the *Champ de Mars* is simply an imitation on a small scale of the "Green" Mosque of Brusa. All the details of ornamentation have been copied with the most scrupulous care from those of the above named edifice. As to the proportions, they have been rigorously followed from principles adopted for the design of the monument called *Yéchil Turbé*—constructed at the same date as the Mosque of Brusa by the Sultan Mohamed I., one of the Ottoman sovereigns who, following the example of his predecessors Mourad and Bajezet, has largely contributed by his numerous pious endowments to constitute Turkish art—which is much more architectural than ornate.

In conformity with the usual custom, the plan of the Mosque of the Champ de Mars is square. The edifice is surmounted by a dome, supported by lozenge-shaped arches, thus uniting the circular portion to the square base. Preceding the principal hall is a vestibule for the purpose of receiving the shoes of the faithful—for with naked feet alone may they enter the holy place. The pavilion, situated on the right, and at an angle with the façade, contains the fountain (zibil), and in the corresponding one on the left, near the Minaret, are placed clocks to indicate the hours of prayer.

The minaret that surmounts the Mosque of the Champs de Mars gives but a feeble idea of that of the Mosque of Brusa, which towers 220 feet above the city and adjoining country.

In the interior of the principal hall you see the *mihrab*, near which they turn to worship, and the *miraber*, where the priest reads in a loud voice the verses of the Koran. The walls are covered with inscriptions, but can receive no images or other material objects.

The mosques are, in all Oriental countries, supported by the special endowments of private benevolence; consequently they are very varied in their proportions, as well as in the splendor of their ornamentation, thus following the fortunes of their founders.

Correspondence.

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

Mississippi Levees.--Views of an Old Planter.

Messrs. Editors:—I have noticed in your issue, No. 14, an article on the subject of the Mississippi levees, by Mr. Berry, of Port Gibson. The subject is one that has been considerably agitated of late, in numerous contributions to our local papers; and the discussions were to the address of our citizens who were, by their knowledge of localities, the best judges of their merits. When they contained sound views they were heeded, and, when preposterous or absurd, they were suffered to drift into oblivion. But when a contributor undertakes to enlighten the outside world, through the columns of a distant paper, and one calculated to exercise so much influence as the Scientific American, it becomes important to refute the errors which he may have committed. His argument is to the address of Congress, before which the question of the construction of levees on the Mississippi will be brought up again, and who will very naturally look for information to such persons as a "thirty years'" resident on the banks of the river, and an owner of lands. I hope, therefore, you will indulge a resident and planter of more than thirty years in stating the conclusions to which he had arrived from actual observations, and to suggest the manner in which the work should be done.

1st, Regarding the outlets to be given to the river above the Balize. The principal one now existing is the Atchafalaya, below the mouth of Red River, which discharges a large volume of water. It has been on the increase for a number of years, and seems to promise in time to take all the waters of Red River. The old inhabitants say that the fords in it have disappeared. The only other one existing is Bayou Lafourche, about two hundred feet wide, by twenty-five feet deep; but the current is not rapid, and it will probably not increase in size on account of its filling up about fifty miles below. The Bayou Plaquemine was about double the size, but it has been stopped up lately, as well as the Manchac, a long time ago. The effect of the stopping up of Bayou Plaquemine was to reclaim from inundation thousands of acres of land of first quality. No doubt it was for a similar object that the Manchac was closed. The opening, if made now, would necessitate leveeing on both sides, a distance of about a hundred miles, to prevent the inundation of a large amount of land now in cultivation. Beside, the effects of such an outlet would be disastrous to some of the best interests of the State, and of New Orleans. It would destroy the fish and oysters from which the city is now supplied; it would change the watering places from salt to fresh water; it would, in a short time, cause a deposit of sand and mud, injuring or preventing the navigation of Lake Pontchartrain, which is now the means of transit of a large trade, and of the products of the forest, such as lumber, pine wood, bricks, sand, tar, rosin, etc.; and all this to economise a few feet of levee. This would be the only possible outlet of the river on the east. On the west it would be equally disastrous, by drowning out the richest portion of the State in sugar lands, and it would be impossible to levee such an outlet, because it would run through an innumerable number of lakes and bayous forming a connected network from the entrance of the Atchafalaya to the sea shore, from fifty to one hundred miles in width.

Mr. Berry takes it for granted that contracting the banks of the river would have the effect of filling up the bed, which would require the levees to be made higher every year, until they would come to the hight of 100 feet, and threaten drear destruction to all the country around. The picture that he draws is perfectly appalling. But I beg leave to differ in opinion with him. It is probable that if the outlets were closed, and the river contracted and kept within its banks by levees, that the water would rise higher; but let us see how much by adding up the amount of the outlets, including Bayou Plaquemine. Bayou Lafourche,5,000 square feet; Plaquemine, 10,000; the Atchafalaya, 40,000, or an aggregate of 55,000. Supposing the river to average one mile in width, it would be equal to a rise of nine feet (and this is an extreme case that could never occur), can it be doubted that the acceleration in the current would wash out the bottom, and make it deeper, instead of filling it up? An example in point, of the effect of the current in washing out the bottom, is what is seen yearly in Red River. Above Alexandria the river spreads into many lakes and a network of bayous, but at this point the waters are all united into one channel, because of a range of hills here crossing the river and forming what is called a fall. The water here rises to a hight of thirty feet. The rise in the river, as well as the fall, are very sudden, occurring in the space of eight or ten days. After a fall the old bed is filled up by a deposit of coarse sand, so that there is a depth of only two feet of water after the fall; but in a few days the channel is again cut out by the action of the current to a depth of eight or ten feet. I believe this law to be universal in rivers carrying much sand, and I see no reason why it should not apply to the Mississippi. And what is nine feet for the Mississippi when compared to thirty feet for Red River? In the latter is verified the fact that the current is not rapid in the bottom; but would a rise of nine feet in the Mississippi be sufficient to prevent a current in the bottom? But if the rule be that stopping outlets would cause a rise, it must not be taken for granted that the rule will work both ways. If outlets were made additional of equal capacity, it would not cause a fall of nine feet below the actual stage, nor approaching it. I have seen large breaks in the levee of a mile, where there was a high levee, through which the water flowed in a torrent, taking probably one third of the stream; the fall above was not more than from three to five feet a few miles up, and still less below.

But there is no necessity of contracting the banks of the Mississippi. The land is nearly level, with but a slight inclination from the river. Removing the levees further from the banks would be equivalent to an outlet of the same dimensions. And this plan would have a great advantage in this, that in a few years a deposit would take place between the bank of the river and the levee, and in many places I have seen it nearly as high as the levee, thereby diminishing considerably the risk of the levee giving way by the pressure of the water, and facilitating its stoppage in case it should break by accident. I say by accident, because with proper care and diligence a levee ought never to break. The causes of breaking in general are threefold: 1st, Crawfish holes from the water line to the land side, which gradually wash away a large excavation; they should be stopped on the water side. 2d, Washing away by the current when the levee is badly made. 3d, By caving, when made too near the edge where there is deep water. The usual way in which levees are made by contractors and incompetent superintendents is to pile up the dirt with wheel barrows, and for which the pay is so much per cubic yard. Levees made in this way will slide down with their own weight as soon as they are wet; example, what happened this last year for Grand Levee off Pointe Coupee. But the right way is to pack every alternate layer of about one foot in thickness by running over it with a horse and cart or with oxen. A levee made in this way with a proper base (about three feet for every perpendicular foot), is sure to be tight, and will perfectly well resist any pressure of water and the washing of the current, without any brick wall or wooden palisades. The present system requires to be changed radically wherever there is a bend, liable to be washed away or to cave. The levees are now generally too near the water. As for year after year they have been removed further back, it happens that in many places they have come up very close to buildings and valuable improvements, which has been the consideration for not placing them far enough.

It should be observed that in all streams the line of the current is longer than one running in the middle of the stream. The current in leaving a point strikes the bend on the opposite side, a mile or so below, from the next point the next bend, and so on alternately. So that the bends are always cutting away by abrasion, and, consequently, the river tending to get more crooked. This is exemplified in the many cut-offs which take place by a bend cutting a way across a peninsula; and generally the old bed fills up by a deposit of sand.

I know many old levees standing undisturbed for fifty years, not more than three or four feet high, some distance above the city of New Orleans; and actual measurements made at a distance of time of fifty years (the last made by Mr. Ellet, U. S. Survey) show no difference in the width, depth, or hight of the river, notwithstanding all the levees that have been above in that time.

Mr. Berry admits that it is a law of all flowing streams to cut out a channel, but, "in a state of nature," before the water shed is divided by cultivation. This is very true to a certain extent, but very far from being universal. The law does not apply to streams like the Mississippi, the Missouri, and Red River, which flow in valleys of alluvion, where their beds are perpetually changing, not according to any known rule or law, but seemingly by mere caprice. Those streams bear large quantities of sand and mud in flowing through virgin countries where there is no cultivation. He refers to the levee system in Europe, "which demonstrates the fact that levees must be made higher and higher every year, until they will become several hundred feet higher than the original banks of the river!" It would be better to cite localities and examples. I have seen it stated somewhere, but I cannot vouch for the truth of it, and it is the only example that I know, that the bed of the river Po, in Italy, was raised higher than the adjoining lands by the effect of levees. The system there was probably commenced before the time of the Romans, and it happens to be a mountain stream, a perfect torrent, carrying heavy pebbles. Would it be fair to say that the same effects would occur for the Mississippi in our time?

No doubt, before the war, the planters were always in dread behind their levees. Why? Only because they were badly made. Without the war, I have no doubt they would be perfect now. But the work has become impossible by the planters, because they have been impoverished and deprived of the means of controlling labor to effect the work. A work of such magnitude, and essential to the interests of several States, is really a national work, and in justice should be made by the Government, especially when in some instances the levees were destroyed by the Government. I have worked in stopping crevasses or breaks in the levee, where I controlled the labor of six hundred men, above or in the foaming waters, day and night. It could not be done now, for love nor money. I think Mr. Berry's philosophical remedy rather an unfortunate one, *no es ben trovato*, suggesting deep cultivation, two to three feet, to absorb the excess of waters. He does not inform us where this excess of waters will go, except by evaporation; and, for my part, I think they must ultimately go to the river. He does not suppose that all the land is to be cultivated—hills, valleys, swamps, rocks, mountains, and all; from these places the water must certainly go to the river. So that the hope of relief, which he holds forth by rendering the waters of the Mississippi controllable by man, seems an illusion.

As to the question of canals for navigation, in connection with the outlets proposed, they are not wanted. There are natural ones enough, and some to spare; and the railroad is better and cheaper to make.

New Orleans, La. J. C. Delavigne.

Beam Engines Sticking on their Centers.

Messrs. Editors:—In your issue of October 5th, I noticed a quotation from "Engineering," criticising "American Beam" or single cylinder marine engines, with reference to their liability to being caught on their centers; also editorial remarks, closing as follows: "The invention alluded to is intended only for infrequent contingencies."

Being acquainted with the performance of the engines of the Pacific Mail Steamship Company—the finest of this class—as also with the object of the invention alluded to, a few words of explanation may not be out of place.

While the valves of these engines are worked by the eccentrics, or, in technical terms, "hooked on," no assistance is ever required is passing the centers; this is shown by the steamers' logs. But while moving in port, or working at the dock, with the eccentrics unhooked, and the valves worked by hand—so as to stop or reverse on the instant—they are liable to be caught. This danger increases with the size of the engine, or lack of skill on the part of the engineer working the valves. Occasionally there are causes over which the engineer has no control, as in working our ferry boats through ice which obstructs the wheel floats, stopping the engine at the point of least power.

While this invention of Messrs. Vanderbilt & Sims is at hand in any case of emergency, it is more especially designed for use in port, and to push the engine off the center after it has been placed there for adjustment, that being the only point at which the engine can be properly adjusted and "keyed up."

The use of these hydraulic jacks will prevent such serious

accidents as caused a man to have both legs broken on the steamer *Rising Star*, in the latter part of the summer; and another, more recently, to lose his life on the steamboat *Providence*. Both these accidents occurred while in port by prying the engines off the centers with levers in the wheel, as has been the usual custom.

Fear that the term "infrequent contingencies" might cause the owners of our steamers to neglect the safety of their employés, is my apology for having so far trespassed upon your valuable space. Respectfully yours,

New York city. J. W. COLE.

The Water Ram in Pump Pipes.

MESSRS. EDITORS:—It is a well known fact that all pumps that have long suction pipe and from twenty-five to thirty feet to raise the water below the pump, make a snap or jar at each revolution of the pump, and in time wear out or break off the flange of the pipe. But the remedy is not always known, although you may have published it and I not have seen it. The remedy is this: Take an awl or some instrument with which you can punch or drill a small hole in the pipe; go down near the surface of the water you wish to raise, and make a small hole in the pipe; then start the pump, and the water and air will mix and rise in the pipe to the pump together, and of course the water and air mixed, being lighter than the water, will take all the jar out of the pump and pipe. But the pump will not throw so much water. In most cases, however, for supplying water for steam purposes, the pump throws a surplus of water. Also where a pump does not make near a perfect vacuum, by letting in the air it will bring the water. This I have tried where the pump raised the water within five feet of the pump, and it would not come any further till I made a small hole in the pipe near the surface of the water; then the pump threw it in form of foam in sufficient quantity to supply the boiler. How much air to let in I cannot say, nor how far it will hold good, but make at first a very small hole, and keep increasing it till you get the snap out of your pipe and still have water enough. I have been using the above for twenty years, and now use it at my mill when the water is low in the river. JAMES BELL.

Ullin, Ill.

[Your method of preventing the "snap" or water hammer in your pump pipes is rather primitive—not within forty years of the present hydraulic engineering. The proper way to make any pump work is to put on the supply pipe a vacuum chamber of a capacity of double or more that of your chamber. This will not only stop the water hammering but save power, inasmuch as the momentum of the ascending column will be utilized by being stored for the next stroke instead of expending its force in the destruction of the pipes.

[EDS.

The Colors of Soap Bubbles.

MESSRS. EDITORS:—Reading in your valuable paper I noticed an extract from Sir David Brewster regarding the colors of the soap bubble. His theory regarding the mode in which these colors are formed recalled some experiments made by me last fall and substantiate the conclusions then arrived at. The old theory, and the one now taught is, that the colors are formed by the varying thickness of film or body of the bubble. Brewster's theory is, that the colors are formed by the flowing of secretions formed from the bubble itself over the film.

My experiments demonstrate to all appearance this theory. A preparation of oleate of soda carefully prepared was put into solution in pure water and a given percentage of pure glycerin added. Bubbles blown from this solution were very brilliant, and the colors seemed to flow over the film from the part attached to the pipe toward the lower part of the globe in irregular belts and streamers, beginning with the most brilliant hues, and tints, and shadows and gradually fading away as the menstrum ceased flowing, into a deep blue and ending with the bursting of the bubble. The belts or streamers rippled like tiny waves on the surface of a pond and from these ripples seemed to flash out the broken rays of light, changing constantly. The thicker the medium the more brilliant the display.

My attention was called at the time to this fact, but as my experiments were concluded for other ends, I forgot the facts and they were only recalled by the article referred to. I remember remarking at the time that the colors followed the flow of the menstrum from which the bubbles were made from the pipe down to the lower point, where it gathered in small drops and fell off. ALFRED C. POPE.

Binghamton, N. Y.

Gravity, Inertia and Momentum.

MESSRS. EDITORS:—The following ideas of a conflicting nature have suggested themselves. Will you be so good as to throw some light upon the difficulties proposed? It is known that within the surface of the earth the force of gravity varies directly as the distance from the center, hence at the center there is no weight. Let us take the formula,—"Momentum=Quantity of matter into velocity," and examine it in relation to a heavy body, supposed to be let fall into a shaft passing through the earth and its center of gravity. The question, (no matter how the books have settled it), presents many interesting phases. Would the body thus let fall oscillate about the center and gradually come to rest there, or would it come to rest immediately on arriving at the center of gravity?

Putting our formula into a mathematical form we have $M=Wt.\times V$. It is evident that weight at the center of the earth is equal to zero, that is $Wt.=0$, hence

$M=0\times V \therefore M=0 \therefore 0=0\times V$, and hence $V=0\div 0$, which is the symbol of indetermination. It is not clear, therefore, whether $V=0$, or whether it is equal to some finite quantity.

At the center of the earth, since a body is without weight, how can it have momentum? or how can it have inertia, since the inertia of a body is in proportion to its weight? What reason can be assigned, therefore, for the cessation of motion, if the body have lost its weight, and with its weight consequently its inertia? Or, on the other hand, what reason can be given for the continuance of motion, since it is clearly without both momentum and inertia?

The same logic will apply to a cannon ball shot down into such a shaft. That is its weight becoming zero, its momentum also must become zero, and its inertia gone too, what tendency could there be either to go on, or to stop on arriving at the earth's center?

If the motion should cease at this point what becomes of the initial force given to the ball? If it should continue to go on then it must have weight, momentum and inertia at the moment it arrives at the center of gravity, a supposition contrary to the facts of the case. A little light upon this singular question will be received with much interest by a reader of the SCIENTIFIC AMERICAN. J. A. S.

Newville, Pa.

[The fallacy of the above consists in using W (weight) in the mathematical formula. It should be M (mass). On the earth mass is measured by gravity but below the surface or far from it the relation is very different.—EDS.

Interesting Facts about the Great Pyramid.

MESSRS. EDITORS:—I noticed in a late number of the SCIENTIFIC AMERICAN a short article on the "Great Pyramid," and some of the remarkable deductions which have been made on its dimensions, ratios of parts, its structure, etc. But what was in that article is but a drop in the bucket compared with the many wonderful and startling facts brought to light and admirably set forth in a work by Prof. C. Piazzi Smyth, Astronomer Royal for Scotland, entitled "Our Inheritance in the Great Pyramid." It is an exceedingly interesting work, and contains some valuable information in regard to British weights and measures. He gives a new system of each, very similar to our present ones but modified and corrected by the standards found in the pyramid. The French unit of measure (the meter) is equal to one ten millionth of a quadrant of the earth's surface. But within the last few years the progress in the science of geology has enabled us to determine "that the earth's equator is not a circle, but a rather irregular curvilinear triangle, so that it has many different equatorial axes, and therefore also different lengths of quadrants in different longitudes."

This you see throws their unit of length in a very unsatisfactory light, making it very empirical and even more arbitrary than our own or the British present standard.

The pyramidal inch is one five hundred millionth of the earth's polar diameter, a length which is invariable, of which there is but one, and consequently no possibility for mistake. There is no possibility, apparent at the present time, of introducing the French system at the time specified by Congress when it is to go into effect, and I hope it never will. It is unhandy, and will always be a source of annoyance to the common workman.

Let us have a system based on plain and already established principles which every one can comprehend, and after we have it, know that we have got that which is correct and will stand the test for ages to come. The English language is the dominant language of the world, and let us have an English system of weights and measures. The change necessary to pass from our present system to the improved one is only to lengthen our present inch 0·00099 of itself, or an amount almost inappreciable except in the nicer and most accurate kinds of mathematical instrument making.

I would advise you to procure the book I speak of and give it a careful reading, and I feel quite certain that you will think much better of the systems proposed there than the much overestimated "French system." I will gladly condense the principal deductions and conclusions arrived at by Prof. Smyth, to be published in the SCIENTIFIC AMERICAN, if you wish it, and let my work go for what it may be worth toward procuring for the noble and honorable working classes of mechanics, farmers, merchants, etc., a simple, reliable, and convenient system of weights and measures. C. B. COLE.

Chester, Ill.

[Probably our correspondent could select and arrange some of the facts to which he refers, so that they would be of interest to our readers.—[EDS.

Lightning Conductors---Their Proper Form.

MESSRS. EDITORS:—Your correspondent "Electron," in No. 15, page 227, current volume, is mistaken when he says that the conducting power of a lightning rod is as the area of the cross section, and the remark that he quotes from a former issue, that a strip is equal to a solid rod of the same surface, is also erroneous.

Electricity of high tension passes on the surface of conductors on account of its self-repulsive tendency, and for the same reason it will pass on the edges of a flat conductor. In the Agricultural Report of the Commissioner of Patents for 1859, there is an article by Professor Joseph Henry, that explains the whole subject. On page 483 there is an experiment illustrated showing that the discharge is by the surface and not by the whole substance; and on page 521 it is explained why a flat form is imperfect. Every departure from the form of a true cylinder is wrong in theory, and it is probably immaterial whether the rod is hollow or solid. If properly made and put up a lightning rod will as certainly carry off the electricity of a thunder storm as a rain conductor will the water. SAMUEL P. GARY.

Oshkosh, Wis.

A Singular Cave.

MESSRS. EDITORS:—I take the liberty of asking you a question; you may answer it if you deem it proper. About four kilometres from the town of Pontgibaud and twenty-two from the city of Clermont in the department of the Puy-de-Dome France, there is a grotto which has been formed by volcanic lava; it is funnel shaped, about six or seven meters wide on the top and two at the bottom and four meters deep; in the bottom there is a little spring running between the lava; in the summer that spring is frozen hard, no water, and in the winter the grotto is filled up with steam, and no ice. The colder the weather the denser the steam. Now can you tell why ice is formed in the summer and steam in the winter?

M. A. D.

Wellsboro, Tioga county, Pa.

[We doubt the alleged facts. Speculation is idle till they are authenticated, and more details are given.—EDS.

Cleaning Cider Barrels.

MESSRS. EDITORS:—I see among the questions in your paper the query "how to clean cider barrels." Take lime water and a trace chain and put them in the barrel through the bung hole, first securing a strong twine to the chain to draw it out with. Then shake the barrel about until the chain wears or scours off all mold or pummace remaining in the barrel. Then rinse well with water; after throwing out the rinsing water put in a little whiskey, turning the barrel to bring it in contact with every part and pour out all you can. Your barrel will be sweet. J. McD.

Mamaroneck, N. Y.

Mount Hood.

The hight of this peak of the Rocky Mountain chain has never yet been satisfactorily determined, the latest measurements not being considered sufficiently reliable to settle the controversy which during the last year has been carried on by the California and Oregon papers, with considerable animation. In 1842, Lieutenant, now Rear-Admiral Wilkes, measured the mountain, and called it about 23,000 feet high. Fremont, the next year, made it between 19,000 and 20,000 feet. Those calculations were made by triangulation, and were necessarily imperfect and not much relied upon for strict accuracy. In August of last year Professor Wood, of California, ascended the mountain and reported its hight to be 17,600 feet. This was regarded as the most reliable measurement so far had, and still left it the highest mountain in the United States. As Oregon has the westernmost point of land (Cape Blanco) in the Union, they were also inclined to plume themselves on having the highest mountain peak. But California with its Shasta of 15,000 feet objected to this, and their Professor Whitney declared Mount Hood to be only 12,000 feet. Thus the matter stood till this September, when Lieutenant Williamson, of the Topographical Engineers, United States Army, ascended the mountain, better prepared to measure it, as is supposed, than any of his predecessors. He has not published any report, nor pretended to give the precise hight, but places it about 11,000 feet. In all this scientific conflict the unscientific public are left in as much doubt as ever, and inclined to think that they know as much about the hight of Mount Hood as formerly.

In this connection we copy from an exchange the following graphic account of an ascent of this peak which was made by one of its correspondents:

"Monday morning, at ten minutes after six, we left our camp, armed with pikes, hooks, ropes, and such other things as we thought would lessen the danger and facilitate our journey to the top of the mountain. We carried with us a thermometer cup, spirit lamp, and glass. A ride of an hour, and we stood at the foot an immense snow field that sweeps around the south and west sides of the mountain, extending to the summit. Here we left our horses, and, after lashing ourselves together with a rope fifty feet in length, commenced our march directly toward the summit. As we proceeded, loose crags of rock kept dashing past us and plowing their way through the snow and ice toward the base of the mountain. A toilsome journey of an hour, and we stood on the edge of the crater, from which constantly rises steam and sulphurous vapor, at times making the air difficult to breathe. Here commences the peril of the ascent. We made our way toward the northeast on a narrow ridge of snow, sloping on the right to the foot of the mountain, and on the left into the crater. On this ridge we traveled until we reached a chasm about 600 feet from the summit, varying in width from 5 to 50 feet, and of an unknown depth. Along this we proceeded to the east under a perpendicular wall of ice and snow, in search of a place to cross the chasm, which we found where a snow slide had made a bridge, upon which we crossed.

"The ascent from this point was difficult and dangerous. Instead of snow, we here found ice, making our steps uncertain. The lightness of the air and the burning rays of the sun made it difficult to proceed more than a few feet without rest. Inspired by hope and a determination to succeed, steps were multiplied and hight after hight gained, until ten minutes after eleven o'clock, and five hours after leaving camp, we stood on the summit.

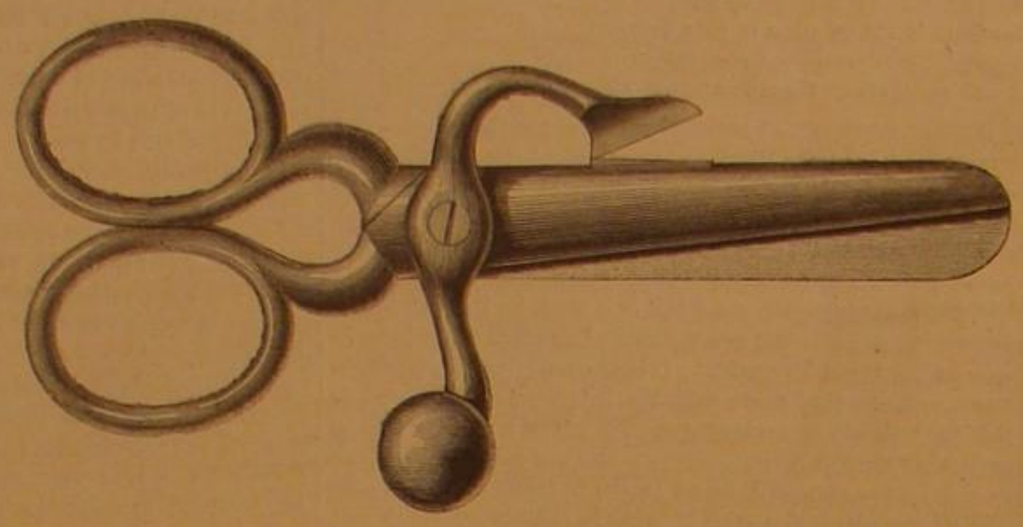
"An attempt to describe the scene is useless. Those who would have an idea of the grandeur and feel the thrill of joy and wonder inspired by the map of nature opened before them, must contemplate the scene from that etherial region. From the mountains in the east the waters of the Columbia come coursing, apparently at our feet, and flow on until lost in the waves of the Pacific. Far off the Coast Range seemed to rise against the sky. On the north Mounts Rainier, St. Helen and Adams stand like massy columns. On the south, and far beyond Mounts Jefferson, the Three Sisters and Diamond Peak, the dense forests fade from sight or seem to blend

with the firmament beyond. Within a few feet of the summit, on a large rock, we found some papers deposited, and among them two copies of the *Pacific Christian Advocate*, dated July 21, 1866, and others dated August 2, 1867. These with some buttons and small pieces of coin, were the only articles found. The papers were well preserved, having no appearance of being damp since deposited.

"A cold wind blew from the east and was disagreeable, the mercury standing almost at zero. Water boiled at 180°, making the hight of the mountain 17,600 feet, at a point 30 feet below the summit. Having completed our observations we began the descent, after being on the mountain one hour and fifteen minutes, and reached camp in two hours, thankful that we had been permitted to stand on those isolated cliffs and view a portion of the works of Him 'who doeth all things well.'"

Improvement in Scissors Combined with Buttonhole Cutter.

The engraving gives a perspective view of a pair of ordinary scissors with a blade for cutting buttonholes. The same rivet connects the two blades of the scissors proper and the buttonhole cutter, the edge of which passes by a piece inserted in one of the blades or impinges on the edge of a portion of the back of the blade prepared for the purpose. This device is actuated by the finger of the operator, the end of the cutting lever being formed into a ball, as in the engraving, which by its weight brings the blade back after being used, or into a ring to be controlled by the finger. While this attachment does not interfere with the ordinary use of the scissors, yet the implement can be readily used to cut the buttonholes in any description of fabric. Its representation is so perfect that no difficulty will be experienced in understanding its construction or operation. It appears to be well adapted to the purposes for which it is intended.



ALTHOUSE'S COMBINED SCISSORS AND BUTTONHOLE CUTTER.

A patent for this was obtained through the Scientific American Patent Agency, Oct. 8, 1867, by J. A. Althouse, of New Harmony, Ind., who will reply to all inquiries relative to the invention.

Science Familiarly Illustrated.

Salts and other Foreign Matter in Water.

Owing to its extensive solvent powers, water is never met with naturally in a state of purity. Rain water, collected after a long continuance of wet weather, approaches nearest to it, but even that always contains atmospheric air, and the gases floating in the air, to the extent of about 2½ cubic inches of air in 100 of water.

Spring water, although it may be perfectly transparent, always contains more or less of saline matter dissolved in it; the nature of these salts will of course vary with the character of the soil through which the water percolates. The most usual saline impurities are carbonate of calcium, common salt, sulphate of calcium, and sulphate and carbonate of magnesium. The waters of the New Red Sandstone are impregnated to a greater or less extent with sulphate of calcium. Most spring waters are charged with a notable proportion of carbonic acid, which dissolves a considerable amount of carbonate of calcium; the calcareous springs in the chalk districts around London contain from 18 to 20 grains of chalk per gallon, 6 or 8 grains of which become separated by exposure of the water to the atmosphere, so that a running stream will seldom contain more than 12 or 14 grains of chalk per gallon in solution. Waters which have filtered through a bed of chalk also often contain carbonate of sodium in considerable quantity, as is the case with the deep-well waters of London.

Mineral waters are impregnated with a large proportion of any one of the above named salts, or with some substance not so commonly met with; such waters are usually reputed to possess medicinal qualities, which vary with the nature of the salt in solution. Many of these springs are of a temperature considerably higher than that of the surface of the earth where they make their appearance. At Carlsbad and Aix-la-Chapelle this temperature varies rrom 160° to 190°. Such hot springs either occur in the vicinity of volcanoes, in which case they generally abound in carbonic acid, as well as in common salt and other salts of sodium; or they spring from great depths in the rocks of the earliest geological periods, and contain chlorides of calcium and magnesium, and almost always traces of sulphureted hydrogen. (Berzelius.)

Many mineral waters contain salts of iron in solution, which impart to them an inky taste; they are then frequently termed chalybeate waters; some of the Cheltenham springs are of this kind. In other instances carbonic acid is very abundant, giving the brisk effervescent character noticed in Seltzer water. Less frequently, as in the Harrowgate water, sulphureted hydrogen is the predominating ingredient, giving the nauseous taste and smell to such sulphureous waters. In other instances the springs are merely saline, and contain purgative salts, like the springs at Epsom, which abound in sulphate of magnesium, and at Cheltenham, where common salt and sulphate of sodium are the predominant constituents. Many of these saline springs also contain small quantities of iodine and bromine, which add greatly to their therapeutic activity.

River water is less fitted for drinking than ordinary spring water, although it often contains a smaller amount of salts; for it usually holds in solution a much larger proportion of organic matter of vegetable origin, derived from the extensive surface of country which has been drained by the stream. If the sewerage of large towns, situated on the banks, be allowed to pass into the stream, it is of course less fit for domestic use. Running water is, however, endowed with a self-purifying power of the highest importance; the continual exposure of fresh surfaces to the action of the atmosphere promotes the oxidation of the organic matter, and if the stream be unpolluted by the influx of the sewerage of a large town, this process is fully adequate to preserve it in a wholesome state. River water almost always requires filtration through sand before it is fit for domestic use; and if water works designed to supply such water be properly constructed, provision is made for this filtration. Suspended matters, such as weeds, fish spawn, leaves, and finely divided silt or mud, are thus removed; but vegetable coloring matter in solution, salts, and other bodies, when once they are dissolved cannot be arrested by such a filter.

In the gradual percolation of water through the porous strata of the earth, many even of these soluble impurities are removed, particularly those of organic origin, partly by adhesion to the surface of the filtering material, but chiefly by a slow oxidation in the pores of the soil.

The magnetic oxide of iron, indeed, seems to exert a peculiar influence in promoting the oxidation of organic matter contained in water which is allowed to percolate through it, and it appears to be probable that this action, to which Mr. Spencer has particularly called attention, may furnish a valuable auxiliary to the methods of filtration at present in use. Filtration through beds of iron turnings has likewise been practiced in some cases with advantages of a similar description, but the oxygen is in this case in great measure absorbed from the water by the iron.

The presence of organic matter in water is easily ascertained by the reducing influence which it exerts upon chloride of silver or of gold, or upon permanganate of potassium, when boiled with them. The chloride of silver becomes purplish; and chloride of gold imparts a brown tint to the water under such circumstances, owing to the precipitation of metallic gold. A very dilute solution of permanganate of potassium is rendered colorless, whilst a brown precipitate of hydrated peroxide of manganese is formed.

Water is familiarly spoken of as hard or soft, according to its action on soap. Those waters which contain compounds of calcium or magnesium occasion a curdling of the soap, as these bodies produce with the fatty acid contained in the soap a substance not soluble in water. Soft waters do not contain these salts, and dissolve the soap without difficulty. Many hard waters become softer by boiling; in such cases the carbonic acid is expelled, and the carbonate and part of the sulphate of calcium which were held in solution are deposited, and cause a fur or incrustation upon the side of the boiler.

Sea water is largely impregnated with common salt, and with chloride of magnesium, to which it owes its saline bitter taste. It might be supposed that the quantity of salts which it contains is continually on the increase, as the sea is the receptacle for all the fixed contents of the rivers discharged into the ocean, since pure water alone evaporates from its surface; but here also there is a return to the surface of the soil provided for in the marine plants, the fish, and their representative guano, which are perpetually being raised from its depths by the force of storms, by predatory birds, and by the industry of man. The specific gravity of sea water is subject to trifling variations, according to the part of the globe from which it is taken. The waters of the Baltic and of the Black Sea are less salt than the average, while those of the Mediterranean are more so. The waters of the Mediterranean in the Levant are more salt than those of the same sea near the Straits of Gibraltar. The mean specific gravity of sea water is 1·027, and the quantity of salts ranges from 3·5 to 4 per cent.

Tyrian Purple.

The Tyrians were probably the only people of antiquity who made dyeing their chief occupation, and the staple of their commerce. The opulence of Tyre seems to have proceeded, in a great measure, from the sale of its rich and durable purple. It is unanimously asserted by all writers, that a Tyrian was the inventor of the purple dye, about 1,500 years before the birth of Christ, and that the King of Phœnicia was so captivated with the color, that he made purple one of his principal ornaments, and that, for many centuries after, Tyrian purple became a badge of royalty. So highly prized was this color, that in the time of Augustus, a pound of wool dyed with it, cost at Rome, a sum nearly equal to thirty pounds sterling. The Tyrian purple is now generally believed to have been derived from two different kinds of shell fish, described by Pliny under the names *purpura* and *buccinum*, and was extracted from a small vessel or sac in their throats to the amount of one drop from each animal; but an inferior substance was obtained by crushing the whole substance of the *buccinum*. At first it is a colorless liquid, but by exposure to air and light it assumes successively a citron yellow, green, azure, red, and, in the course of forty-eight hours, a brilliant purple hue. If the liquid be evaporated to dryness soon after being collected, the residue does not become tinged in this manner. These circumstances correspond with the minute description of the manner of catching the purple dye fish given in the work of an eye witness, Eudocia Macrembolitissa, daughter of the Emperor Constantine the Eighth, who lived in the eleventh century. The color is remarkable for its durability. Plutarch observes, in his life of Alexander, that, at the taking of Susa, the Greeks found, in the Royal treasury of Darius, a quantity of purple cloth, of the value of five thousand talents, which still retained its beauty, though it had lain there one hundred and ninety years. This color resists the action even of alkalies, and most acids.

Pliny states that the Tyrians gave the first ground of their purple dye by the unprepared liquor of the *purpura*, and then improved or hightened it by the liquor of the *buccinum*. In this manner they prepared their double-dyed purple—*purpura dibapha*—which was so called, either because it was immersed in two different liquors, or because it was first dyed in the wool and then in the yarn.—*Prof. Dussauce.*

ALUMINUM—ITS PROPERTIES AND USES.

The discovery of this metal dates back only to 1827, when Wöhler, a German chemist succeeded in extracting it from clay. It is a white metal, not like silver, but having a bluish tinge. Its specific gravity is from 2·5 to 2·67 according to its purity. It is considerably lighter than flint glass, being, as seen above, only about two-and-a-half times heavier than water. Bulk for bulk it is four times as light as silver and a little more than quarter the weight of copper. It is nearly as hard as iron, but can be softened by annealing; has great rigidity and tenacity; can be turned, chased, and filed with ease, never clogging the file; and can be drawn into wire as fine as a hair and rolled or beaten into sheets whose thinness can be surpassed only by those from gold or silver.

For mustard and egg spoons it would be an excellent material, as, unlike silver, it it not affected by sulphureted hydrogen or other sulphureted compounds. It retains its luster in the ordinary atmosphere and is not affected by boiling water, diluted sulphuric, or strong nitric acid, which attacks silver, but has no action upon aluminum when cold, and it is not affected when plunged into melted niter, potass, or sulphuret of potassium, a test which even gold or platinum cannot withstand. It is dissolved, however, in muriatic acid and has a powerful attraction for chlorine.

It has been used in France and England for ornamental purposes, as finger rings, brooches, chains, etc. A cup made of it, although very thin, was not indented by falling from the hand to the pavement. These peculiar properties would seem to make it a proper material for light field guns, cuirasses, helmets and coins, but for the cost of extracting it from its earthy base of argil or clay.

When the inventive genius of man has discovered a cheap and rapid process of extracting aluminum we may expect it to assume a much more important position in the useful, as well as the ornamental arts, than it occupies at present. A beautiful compound is now manufactured in France and England composed of aluminum 10 and copper 90 parts. We have seen a paper cutter, the blade and handle made of this, which had a beautiful yellow or deep straw color, was elastic, tough, and of a very fine finish. Its color is more grateful to the eye than gold and its luster brilliant. The earth metals, of which aluminum may be considered the head, will in time become as valuable for use as they are now for ornament or for the purposes of the chemist.

Is an Illustrated Description a Good Advertisement.

This question is most emphatically answered by the experience of the agent of the Hinkley Knitting Machine, Mr. G. E. Harding, who, since the illustration of the machine appeared in the Scientific American—less than one week ago—has received orders for not less than 1,750 machines, which he states were obtained in consequence of that publication. Perhaps part of this success may be attributed to the undeniable excellence of the machine, but some of it is undoubtedly due to the influence of this paper.

Native Wines at the Exhibition.

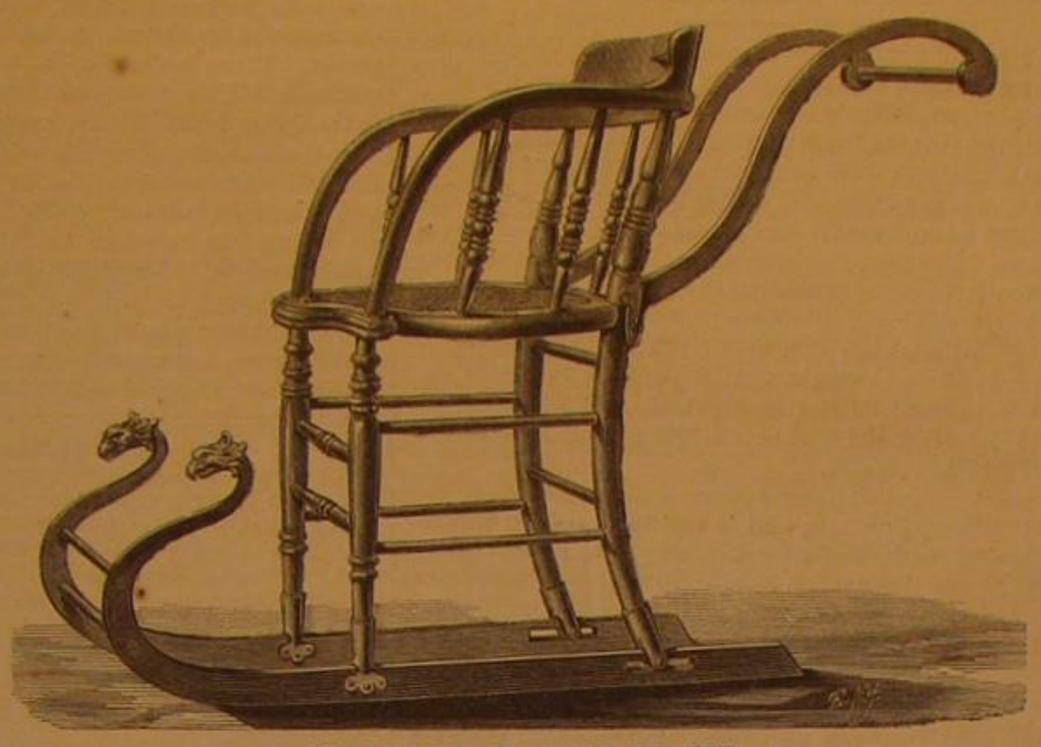
Speer & Co., of Los Angelos, Cal., and 243 Broadway, New York city, exhibited at the Fair of the American Institute a fine collection of specimens of their Catawba, Port, and Sherry wines. Of undoubted purity, manufactured from California grapes, these wines were pronounced by judges fully equal if not superior to those of authoritative genuineness which are imported under the same name.

"There is Nothing like Leather."—The *Shoe and Leather Reporter* suggests that our government might with profit follow the example of the Walrussians in using a leather currency, and thus find a valuable substitute for our present torn and defaced promises-to-pay.

An Improved Skating Chair.

The exercise of skating has within a few years become very popular in this latitude, and perhaps deservedly so; at least it is "the rage" during the frozen months, and has partially usurped the place of the old-fashioned sleighing parties as a recreation for out-of-doors. It may be it is too violent for some, and that the practice necessary to perfection entails many a hard knock, and therefore the inventor, whose device is exhibited in the accompanying engraving, has designed a contrivance which shall be an assistance to the skate learner, and a help to those whose age or weakness prohibits the practice of this graceful but laborious art.

As may be seen it consists simply of a pair of magnified skate irons braced together in the form of a cutter or sled, and provided with devices for securing an ordinary chair upon them. The legs of the chair rest in pivoted sockets attached to the skate irons, the rear ones being adjustable by means of longitudinal slots in the runners and secured by thumb or other nuts. To the back of the chair is attached a guiding bar supported by arms. This contrivance may be secured in any desirable manner, so as to be detached as required. Of course any fanciful form may be employed to give grace and beauty to the contrivance.



ADAMSON'S SKATING DEVICE.

The advantages of this device are to be seen in the fact that the runners may be either smooth and without engaging edges, as the ordinary sled runners, or may be *bona fide* skate irons, capable of adhering to the glassy surface. For the conveyance of children, feeble persons, or ladies, it may be used either as a drawn sled or a pushed chair, and for those just learning to skate it affords a certain support and guide. For the latter purpose it will be, we think, invaluable, diminishing the risks and adding to the confidence of learners.

The patent is dated March 5, 1867, granted to Alexander Adamson, 506 Ninth street, Washington, D. C., whom address for information. Rights for sale.

Champagne Country.

Robert Tomes, an American resident at Rheims—pronounced Rans—for sometime, has written a very instructive and entertaining book on the champagne growth, manufacture, and trade of that great wine-producing province. And that is not all. He cautions the public against the use of the most popular brands and tells them how to select a good wine, and how to drink it. It is full of useful hints to champagne drinkers. We copy as follows:

"The champagne which explodes the loudest and flows out the frothiest, is like a great many other things in this world of sound and show, by no means the best. It is, in fact, a proof of its inferiority. Good wine absorbs largely the carbonic acid gas generated in the course of its manufacture. In bad wine the gas, instead of being absorbed, accumulates in the vacant space above the liquid, and thus, when the bottle is opened, the cork explodes with great violence, followed by a cataract of froth. When this escapes the wine remains comparatively flat. In good wine, on the other hand, the cork may require a great effort to draw, and when drawn there may be little or no froth, but the liquid will be seen to sparkle full with those minute gems of brightness tossed up and down by the juggling spirit of the ethereal element. The explosive force and effervescence of poor champagne, great as they may be, soon vanish like those of soda water, but the sparkle of good wine will continue, even if uncorked, for twenty-four hours."

The Hoosac Tunnel Disaster.

From the *Troy Times* we gather the following particulars respecting the terrible accident at the central shaft of the Hoosac Tunnel on the 19th of October, which resulted in the loss of thirteen lives.

The central shaft is located at a point equidistant from the two portals of the tunnel, in a valley on the summit of Hoosac mountain and is in the shape of an ellipse, designed primarily to enable the work to be carried on from additional faces in the center of the tunnel, and secondarily, when the great bore is completed, to admit fresh air and light into the work. The distance from the opening of the shaft to the bed of the tunnel below is 1,040 feet, about 700 feet of which have already been sunk. Arranged around the mouth of the shaft were a series of buildings, consisting of an office, machine and blacksmith shop and sawmill, and also tanks wherein naphtha was confined and manufactured into gas for the purpose of illuminating the work below. Timbers, with platforms sixty feet apart, were placed in upright positions around the shaft from top to bottom, and within these a bucket, supported by wire rope, ascended and descended the shaft as occasion required, bringing up the *debris* from below and carrying the operatives up or down as each relief went on or came off duty.

The naphtha gas was introduced on Friday last—the day before the accident—for the first time. The contractors had made, as they supposed, every preparation to guard against any disaster from the ignition of the dangerous material; but on Saturday at 4 o'clock a lighted candle, standing about twenty feet from the tank, communicated a flame to the gaseous substance, and in a moment almost, the tanks, the buildings, and the timbers in the shaft were all on fire. The men at work in the surrounding shafts barely had time to escape with their lives, the engineer making his way out only after his shirt had been burned off his back and his person considerably scorched.

At the time of the accident there were seventeen men at work in the shaft, four of them near the mouth and the remainder in the bottom of the pit. The four escaped—the others were all suffocated. Not the slightest assistance could be rendered them. The men above had to flee for their lives, and the bucket, the only means of escape for those below, was soon burned and fell down the pit. A great and impenetrable sea of fire rose up between them and the earth above. Every one of them must have died a horrible death from suffocation, or if any long survived the calamity they must have been drowned by the vast volume of water which poured down upon them upon the suspension of the pumps and machinery used in keeping the shaft dry.

On Sunday a sailor named Marshall, at the peril of his life, was let down in the shaft, in the hope that possibly some of the men might be alive. At a point six hundred feet down, he was able to see the bottom covered with water to a depth of twenty feet, and hence not the slightest hope for any of the men in the pit.

Of the thirteen killed only three were married. One of them leaves a wife and seven children. The families of the unfortunate men resided in cabins in the vicinity of the accident, and the scenes of mourning which succeeded the catastrophe were of the most agonizing description.

The loss of property and the detention to the work are considerations only second to the loss of life. The machinery at the mouth of the shaft was very valuable, costing thousands of dollars, and was of the most elaborate and perfect description for carrying on the work. The delay at this point in conducting the great enterprise to a successful issue will necessarily be very great.

The History of the Stove.

For an article of such general use, so indispensible in every household, it is astonishing how brief has been the history of stoves. With all of its multiplicity of forms, patterns, and varieties, it is a creation of the present age—a modern convenience—which our grandfathers knew naught of. The Troy *Times* thus relates the history of stoves in general:

"Stoves are comparatively of recent general use, though they were known in this country as early as 1790. In that year a Mr. Pettibone, of Philadelphia, was granted a patent for a stove, which was claimed to be capable of warming houses by pure heated air. Pettibone's stove was soon after put up in the almshouse at Philadelphia, and Drs. James and Chapman, and several members of Congress, gave testimonials of its utility for warming and ventilating churches, courts of justice, hospitals, manufactories, etc. This was probably the first attempt to use stoves, at least in this country. From this time forward for many years, the stove was confined to public places, its use for warming private houses, or for cooking purposes not having been thought of. The long box stove, capable of taking three feet wood, was the only stove our ancestors knew anything about.

Cooking stoves have come in use within the last few years. The first advance toward a cooking stove was making the Franklin stove with an oven; and the first that deserves the name of cooking stove was an oblong affair having an oven running the whole length, the door of which was in front and directly over the door for supplying fuel, and having also a boiler-hole and a boiler on the back part of the top near the pipe. Then a stove similar in arrangement, with swelling or eliptical sides, was made, generally called the nine-plate stove. About the year 1812 cooking stoves were made at Hudson from patterns made by a Mr. Hoxie, who was the first to elevate the fire-box above the bottom. This improvement was patented, and was sustained in suits against parties who in any way elevated fire from the bottom. In Hoxie's cooking stove the fire was made above and upon the oven, and he was the first who made any stove in which the flame was made to descend from the top to the bottom *of* the oven. In 1815, William T. James, of Lansingburgh, afterward of Troy, made the stove known as the "James' Stove," which not only continued a leading cooking stove for nearly a quarter of a century, but may yet be seen on board of small eastern coasting vessels, where, being cheap and durable, it supplies the place of a caboose. James' stove is probably better known as the "Saddle bags Stove."

"The first heating of houses by flues, from anthracite coal, was accomplishyd by a Professor Johnson, of Philadelphia, about 1825. The Professor succeeded in heating a large house by means of a furnace in a cellar, surrounded by an air chamber of brick work, whence the gaseous products of the combustion were carried through the building, passing through cylindrical drums, on the first and third floor, and out at the top. This mode of warming buildings rapidly grew into favor as our people came to be well acquainted with coal.

The ample supply of wood in the country was for many years in the way of the successful introduction of stoves. This fuel was at every man's door, and houses were all supplied with ample fire-places. The cost of preparing wood for stoves was an item which quite offset any economic advantages they had otherwise. And, besides, the people were loth to give up the cheerful open fire-place for "a little black box in the corner," as the stove was disparagingly called. Even now, the West uses few stoves compared with the East; and Eastern manufactures make stoves adjusted to wood for the Western market, while those for the market of the Central and Middle States are nearly all coal-burners."

Editorial Summary.

SEWING MACHINE STATISTICS.—During the year 1866 Wheeler & Wilson sold upward of 50,000 sewing machines, and during the past five years their sales have averaged twelve thousand machines per annum more than any other company's.

	1863.	1864.	1865.	1866.	Total.
Wheeler & Wilson,	29,778	40,062	39,157	50,132	159,129
Singer,	20,790	29,237	33,917	36,220	110,164
Difference,	8,988	10,825	15,240	13,912	48,965

At the Paris Exhibition the Wheeler & Wilson stood on the roll of merit No. 1, the Singer machine (exhibited by Mr. Callebaut) No. II.

In reference to the highest premium—the Gold Medal recently awarded Wheeler & Wilson at the Paris Exposition—the *Independent* well says: "That modern wonder, the Atlantic cable, seldom flashes messages between the two hemispheres fraught with more pleasing, as well as important intelligence, than was the announcement that a magnificent tribute of merit had been awarded to one of the most enterprising firms—the Wheeler & Wilson Manufacturing Company. This is the only Gold Medal awarded for sewing machines and button-hole machines. There were eighty-two competitors. That which has long been claimed by the Wheeler & Wilson Company, and which those who are acquainted with the superior qualities of the sewing machines have never hesitated to acknowledge as a rightful claim, must now be universally conconceded—namely, that the Wheeler & Wilson machines are *par excellence* the most desirable. To the perfecters of these machines their reward is in truth well deserved."—*Express.*

EXPERIMENTING WITH THE CHASSEPOT GUN.—Dr. Sarazin, of Strasbourg, placed five dead bodies, one behind another, at certain distances apart, as targets in firing one of these guns. The result was that the hole made by the ball as it entered the corpse was exactly the size of the projectile, while the orifice made by the ball as it passed out of the body was from seven to thirteen times larger than the bullet. The arteries, veins, and muscles were literally reduced to a sort of pulp. The bones were crushed to an immense extent all over the body, and the ball after accomplishing these results pierced a two-inch board, finally lodging in the wall behind.

THE EXPENSE OF DAILY PAPERS.—The *Evening Gazette* informs its readers that the editorial, reporter, and correspondent staff on the *New York Herald* number more than two hundred persons, that the sum paid Thos. W. King on his return from his around-the-world voyage was $5,000 in gold, and that only ten of his letters were ever published, making the cost of each letter $500 in gold. During the war Messrs. Richardson and Browne, while acting as correspondents to the *Tribune*, were captured and for some time imprisoned. They received $3,500 each on their release, and for which they wrote about three columns, costing the Tribune Association about $1,200 currency per column.

UNIFORMITY OF SHAPE IN WEIGHTS.—Pending the adoption of some uniform system of weights, M. Sequier has suggested the adoption of uniformity of form, which will cause the different weights to be easily recognized by the eye, from their sizes. A cylinder, the hight of which is half the diameter, he thinks will be found the most convenient form for the smaller weights, but the larger should be made of cast iron with a hemispherical depression at one end, through which is carried a round bar for the hand to grasp. A groove on the upper surface can be filled with lead for adjustment of the weight.

Two slight shocks of earthquakes were felt in Malta on Thursday and Friday, the 20th and 21st ult.

AN ANALYSIS OF FOOD.—It is stated that a hungry man who sits down before a pound of beefsteak, tender, juicy, and an inch thick, and eats it, will find upon analysis that 65 per cent of his steak was water; that 18 per cent will go to give him an aldermanic fleshness; and that 14 per cent is assigned to warm him, and make him feel comfortable on a cold day. Of the flesh-forming ingredients, according to Dr. Playfair, every one, on an average, requires 92 pounds annually to keep up a proper bodily condition. If it is not obtained from steaks, then it must be secured from something else. Cheese is a great flesh former (30 per cent), and, taken with beer, speedily conceals all traces of unsightly bones. Two ounces of flesh formers per diem will keep a man alive if he is not forced to labor, but hard labor requires six, or the body will run short of starch and sugar, and go behindhand in health and strength. In 100 parts of wheat there are 10 pounds of flesh, but there is nearly double the amount in the same quantity of oatmeal.—*Philadelphia Ledger.*

KILLING THE CHOLERA BY ARTILLERY.—It is a well known fact that the presence of ozone is fatal to the existence of cholera. Telegraph operators are rarely attacked with this disease for this reason, and the accumulation of atmospheric electricity during thunder showers exerts a salutary influence in infected districts. Depending on this fact, Dr. Zantedeschi, of Padua, Italy, has proposed a plan for the destruction of the poison of cholera, by the explosion of gunpowder mixed with common salt and the chloride of lime and of sulphur. The Doctor suggests the placing of cannon loaded with the disinfecting mixture on towers or high eminences in the locality where cholera exists, then at every discharge the air would be cleared of its poison by the combustion of the sulphur generated by the sulphurous vapors, and the consequent formation of ozone. Caution must be practiced, by closing doors and windows, as the descending gaseous substances are very irritating if inhaled.

NATIVE SUGAR CANE IN NEVADA.—In the tules along the banks of the Humboldt river, the wild sugar cane grows luxuriantly and abundantly. Though sheltered by the tules from the wind, the surface receives some small breaks, and from them the rich juice exudes and drying in the atmosphere as it comes to the surface, forms along the stalk little balls of sugar which increase in size according to the length of time the wound remains open. The Indian squaws go through the brakes equipped with large grass baskets, and by collecting the sugar balls, obtain their family saccharine supply at their convenience. This wild sugar is superior to sorghum in that it granulates so readily, and it is confidently asserted that the cane will grow in any low lands in the United States.

THE MECHANICAL HORSE, at the Exposition, to which we have already referred, bears no resemblance to his equine namesake, but consists of a box seven feet long and wide enough for a man to saddle, and about five feet high. This body is mounted on five wheels. In a trial before the Emperor, a mile race course was moderately passed over in two minutes, twelve seconds. When at its fastest speed, the distance was made in fifty-eight seconds, and the inventor affirms that nearly this speed could be kept up for four hours. What is the real motive power, is a secret which the inventor has imparted to the Emperor only, and in return for this distinguished confidence, the inventor has been decorated with the Cross of the Legion of Honor.

THE CAEN STONE OF FRANCE has a rival in the stratified limestone which underlies the whole of the high prairie land of Kansas. A correspondent describes it as white, cream colored, pink, yellow, and red, lying horizontally, and requiring no other quarrying than the use of a crowbar to lift it in blocks from its bed. So easily worked is it that he has seen it hewn into shape with a common wood-ax, and mortised with a carpenter's chisel as easily and quickly as a pine beam; he has also seen it planed with a jack plane, sawed with a scroll saw into brackets and ornamental door and window caps, and cut with a buzz saw into blocks for street pavements or bricks of any size. The material hardens on exposure to air, and becomes as impenetrable as Tennessee marble.

MASTIC CEMENTS.—Böttger has recently published some account of these cements, and states that they are mixtures of one hundred parts of sand, limestone, and litharge, with seven parts of linseed oil. These ingredients carefully mixed and well worked together will have the consistency of moist sand, and at first but little coherence. When pressed, however, the mixture gradually acquires the hardness of ordinary sandstone, and in six months time will emit sparks when struck with steel. The binding agents in such cements are the litharge and oil, the sand giving the body, and limestone or chalk filling up the interstices.

PYROTECHNICS FOR THE SAVAGES.—The Magnesium Metal Company, of London, have received an order for the manufacture of 50-lbs. weight of magnesium to be used for signaling purposes in the Abyssinian expedition. The metal will be burnt as a powder and mixed with resin and lycopodium, the light being produced at will by blowing, by means of a pair of bellows, a portion of the compound through a flame.

EXHIBITORS of articles, at the Paris Exposition, will have one month, or until the first day of December, to pack up and remove their products. All articles not removed by that date will be transferred by authority to the public stores of Paris, at the risk and expense of the exhibitors, and if not called for by the 30th of June, 1868, will be sold and the net proceeds applied to charities.

ARTIFICIAL OIL OF BITTER ALMONDS is manufactured from the benzine of coal tar. A fine stream of benzine and another of smoking nitric acid are allowed to run together in a worm kept well cooled. The liquids react on each other on coming in contact, heat is disengaged, and the artificial oil collected at the end of the worm is first washed with water, then with a solution of carbonate of soda, and lastly, again with water.

SULPHURIC ACID IN LIVING MOLLUSCA.—At the last meeting of the Academy of Sciences, M. Dumas communicated a curious note by which M. de Luca determined, in the liquid contained in living mollusca the presence of a thirtieth part, or about three per cent of pure sulphuric acid; and stated, furthermore, that the same mollusca, plunged in water, disengages a considerable quantity of carbonic acid.

A NEW LUBRICANT.—From specimens of the Chinese tallow tree transplanted into Northern India, Dr. Jameson has made several hundred weight of grease, and has forwarded on trial a portion of it to the Punjaub railway to have its qualities tested as a lubricant. The grease thus obtained forms an excellent tallow, and burns with a clear, brilliant, and white light, emitting no unpleasant odor or smoke.

MUNICH boasts of possessing the largest bronze statue in the world. The colossal figure represents the protectress of Bavaria, with a huge lion by her side. The hight of the figure is 63 feet; weight 230,000 pounds. It stands on a granite pedestal 30 feet in hight, through which a spiral stairway leads to the head of the figure where are seats provided for eight persons.

A GENEROUS BURGLAR, who is said to have been recently transported to Australia for breaking open a safe, made a draft of a model safe which he believes thief-proof, and sent it to one of his victims as a compensation for the injury which he had inflicted upon him.

Minerals of the Pacific Coast.

One of our California exchanges thus speaks of the unexampled richness of the mineral resources of the American States on the Pacific:—

"The variety as well as the richness of the mineral resources of the American States on the Pacific appear to be without example. No other district of equal extent can boast the possession of such an abundance and multitude of valuable metals. The colony of Victoria, in Australia, for a short time surpassed California in the production of gold, but our State has resumed its supremacy. As a gold mining country we are in advance of any other State of either the past or the present. Brazil and Spain may have had places of equal richness and extent, but the laborers were not so skillful, nor the production so large; and their diggings are apparently exhausted, while ours are still turning out millions every month.

"In silver, Nevada is not the equal of Mexico, but it is superior to any State of Mexico, and the Virginia district produces annually more silver than any other district does now, or ever did produce. Neither Guanajuato, Zacatecas, Cerro Pasco, Potosi, nor Chanarcillo can show a yield of $12,000,000 a year; and in their best days that figure was never reached by any of them. All those districts had a wealth equal to that of the Comstock lode, perhaps greater, but they had not the steam power to hoist, and crush, and amalgamate the ore, and to pump out the water. Many of our silver districts are yet unopened. Kearsarge, Owen River Valley, Coso, Cortez, Toyabe, White Mountain, Montgomery, Excelsior, and dozens of other argentiferous regions have only been seen near the surface. The expense of cutting roads, fighting Indians, proving the extent of the veins, and erecting mills is too much for the prospectors, and years may pass before the necessary capital is obtained. The silver exists in the rocks, and in time it must come out.

"In quicksilver, California is richer than Spain, and our production now considerably exceeds that of any other country. The New Almaden is now yielding, according to published reports, at the rate of 400,000 pounds annually, surpassing old Almaden considerably. Discoveries of ore have been made lately at various points, promising a large addition to the production.

"It is the opinion of many miners that in five years California will be at the head of the copper producing States. Our copper mines are rich, extensive, and numerous. Large lodes, containing ore varying from ten to twenty per cent, are found in not less than a dozen counties, from Del Norte to San Diego—lodes that in England would be worth millions, but now lying idle and almost worthless, simply because of the high cost of freight, the dearness of fuel, or the lack of skilled labor. The Union, which ships about a hundred tuns per day, is one of the best copper mines in the world. If our ores could now be sent from our mines to Swansea for $10 per tun, we could ship 500 tuns every day. Railroads must be built through the copper regions, and they will have a vast influence to stimulate the production.

"Gold, silver, quicksilver, and copper, are the only metals which the coast now yields in any considerable quantity. A little platinum is obtained, and there are rich veins of iron, lead, antimony and tin, in the State, but they are not worked. Of the non-metallic minerals, coal is the most important, and of that the annual production is about 80,000 tuns, all of it from Monte Diablo. The borax lakes, in Lake county, are the richest sources of that mineral known, and the production of refined borax is becoming important. The porcelain clay, of Michigan Bar, is of a very fine and valuable quality. The felspar, of Calaveras is considered equal to any for fine ceramic uses. The plumbago, of Columbia, according to the report of experts, is as good as that of the best English mine, which is opened for only a few days in the year, and is a source of vast profit to its owners. The steatite, or soapstone, of El Dorado, is excellent in quality. Rumor says that marble, as white as that of Carrara, is found in Tuolumne and Chasta counties, and the variegated gray marble of Indian Diggings is unsurpassed in beauty of color and susceptibility of polish. Beautiful alabaster is found in Placer, El Dorado, Los Angeles, and Solano counties. There is a manganese mine on Red Rock. Vast beds of sulphur are found in various parts of the State, and the business of refining it has been established in Lake county. Our deposits of asphaltum are extensive, and large quantities of it are sent to market. Petroleum exists in the rocks from Humboldt to San Diego, and the production is slowly but steadily increasing. An opal mine, near Mokelumne Hill, is regularly worked; and diamonds, emeralds, and rubies have been obtained in the placers. There is alum in Santa Clara county, sulphate of magnesia in Lake county, and crude soda, in vast quantities, in the Colorado and Mohave deserts. Common salt is made from the sea water in considerable quantities in Alameda and Santa Barbara counties. Yellow ochre, sienna, and umber, and an iron ore that can readily be made into Venitian red, are among the resources of California. Numerous other minerals might be added, but they are either found in very small quantities, or little importance is attached to them. The list, however, as we have given it, is surely remarkable for its variety, and mineralogists will seek in vain for its like in any other country of equal area."

NEW PUBLICATIONS.

ATLANTIC MONTHLY. Boston: Ticknor & Fields.

The November number of this popular monthly is just out, fraught as ever with interesting articles by the best of authors. Terms, $4 per annum; sold by all periodical and news dealers.

MODERN PALMISTRY. New York: American News Company, 121 Nassau street.

This is a very curious book, full of illustrations of various shaped hands, which, from the lines denoted thereon, are presumed to indicate extraordinary developments of character, when found delineated in the human hand. The book we have not read, but believers in astrology, and fortune tellers under every disguise, will be interested in it.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Amsterdam Canal works consists in the digging a ship canal 213 feet wide, and 18 feet deep to open a communication between Amsterdam and the North Sea, and avoid the circuitous route through the North Holland canal which for many years has formed the only approach to the city navigable by large vessels.

A number of railroad enterprises are now being pushed forward in Connecticut with an earnestness that indicates success. The citizens of Middletown have taken such action as to ensure the building of a road from New Haven to the east bank of the Connecticut at Middletown where it will await the action of the next Legislature for permission to bridge the river when the great air line from New York to Boston, will be speedily completed. The Boston and Erie railroad have secured a union with the Erie railroad by the election of its president, as president of that company, and the guarantee of its, bonds to the amount of $3,000,000. This ought to insure the extension of the line from Waterbury to Newburgh, N. Y., thus developing the resources of Litchfield county. The Connecticut Western road, from Springfield to Collinsville, and thence to the Hudson, is in strong hands and the extension of the Collinsville branch of the Canal road to Lee and North Adams, Mass., is regarded as almost certain.

The whole number of mines in France, is now 1,184 of which 598 are coal mines; 249 iron mines, and 337 mines of other minerals. The production of the coal mines and iron works last year reached the value of 472,000,000 francs.

During September the heading at the East end of Hoosac tunnel was carried forward one hundred and eleven feet, and sixteen hundred and nine cubic yards of rock were excavated from the enlargement at the East end.

At the plumbago mines near Senora, Cal., from twenty to twenty-five tuns are daily prepared ready for market. The remarkable purity of the products commands for it a very high price.

In the Chollar Potosi, Nevada, mines, a rich strike is announced at the depth of eight-hundred and sixty-five feet from the surface. This is the deepest shaft on the Comstock lode and the success in finding rich ore at that depth is thought will be quite encouraging to other companies on the ledge.

The old Greek silver and lead mines of which the historian Xenophon once had the management, and regarding which he has left a memoir or State paper—have lately been brought again to notice from the fact that a French company, at Port Mandri, are diligently smelting down the old scoriæ, slag and refuse from them, and extracting as much as 30 tuns of metal a day. The work is said to pay well, and the lead goes to England in Newcastle ships which bring out coal for the furnaces. The value of the daily produce of the works averages 15,000 francs and it is calculated that there is a sufficient quantity of scoriæ between Port Colonna and Port Mandri, to supply the works for fifteen years to come. The yield is between 7 and 12 per cent o good metal.

The new law providing for the wearing of distinguishing uniforms by all persons employed by railway companies in this State, goes into effect on the 23d inst.

Pennsylvania takes the lead among the States, in the annual amount of iron mined; Michigan ranks next, New Jersey, New York, Missouri, Massachusetts, Connecticut, Maryland, New Hampshire, and Ohio, follow in this order. New Hampshire and New Jersey produce mainly the magnetic ores; New York, the magnetic and hematites; Connecticut, hermatites; Pennsylvania and Ohio furnish the argillaceous ores of the coal measures, and Missouri and Michigan mine the compact red and black oxides.

The correspondent of an exchange asserts that the "De Witt Clinton" was the first locomotive built in this country, and in 1831 it ran on the Albany and Schenectady railway. The engine weighed less than five tuns; its cylinders were nearly vertical, were on the outside of the boiler, and the driving wheels were made with light wrought iron spokes. Being so light it required heavy repairs every trip.

The United States commissioners have finished the inspection of a section of the Central Pacific Railroad west of Cisco, carefully examined the grades, culverts, bridges, etc., and pronounce it to be twenty-five per cent better constructed than any portion of the road before accepted. Over the section there are already four miles of roofing, and two and a half additional will be built this fall. The commissioners then commenced the primary inspection of the road two miles east of Cisco, at Coburn Station. The cars are running eight and one half miles east, and construction trains are laying the track at the rate of one and one half miles daily. In thirty days the section will be completed. The intermediate section over the summit will not be completed for transportation purposes until spring, although the company expect to lay the track before winter. By August next the cars will be running to Truckee river, near Crystal Peak, while a considerable portion of the road will be graded towards Humboldt.

The Emperor of Russia has ordered the establishment of a commission charged to inquire into the best means for mining and employing anthracite coal from the rich beds in the territory of the Don Cossacks.

Player's monster furnace at Norton, Eng. produces one tun of foundery iron to one tun of coal, the ores yielding only 50 per cent. The furnace which yields such an enormous amount is 27 feet bosh and 105 feet high. In this country a yield of one tun of iron to two and a half tuns of coal from 50 per cent ores is often considered a good result.

Recent American and Foreign Patents.

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

PUNCHING MACHINE.—J H. Haskell, Baltimore, Md.—This invention relates to a machine for the punching of holes in leather properly fed thereto and the machine is more especially designed for use in connection with the manufacture of hose from leather, and to that class of hose having its edges overlap and joined together by rivets.

CARRIAGE KNOB.—R. D. Case, N. Y. city, and John Barclay, Attleborough Falls, Mass.—This invention relates to a new carriage knob, which is so arranged that the curtain can be fastened or unbuttoned with great facility and dispatch.

FURNACE FOR REDUCING IRON ORE.—Alois Thoma, New York city.—This invention relates to a new apparatus for discharging oxide from iron ore, after the same has been roasted to reduce it in a red heat to metallic iron. The invention consists in such an arrangement of the furnace in which the ore is to be reduced that the desired result can be obtained without bringing the ore in direct contact with the solid fuel, but only with the burning gases arising from the same.

PILE FOR ROLLING BEAMS.—Wyatt W. Miller, Safe Harbor, Pa.—This invention relates to a new method of forming piles from which to roll large double flange beams, such as are used in fire-proof buildings, bridges etc.

FURNACES.—Henning Boetius, Hanover, Prussia.—This invention relates to a novel construction of furnaces, to be used in the manufacture of glass, iron steel and other material as well as for all purposes where heat is to be reduced. The invention consists in the use of flues, which are arranged on the outside of the walls of the fire places, and connect with channels or air passages, arranged above the fire chamber, said flues being provided with valves or gates, to regulate the quantity of the air passing through the same.

MOWING MACHINE.—M. A. Keller, Littletown, Pa.—This invention consists in the novel and peculiar arrangement and employment of levers for raising and lowering the cutter bar of a mowing machine.

KILN FOR ROASTING IRON ORE.—Alois Thoma, New York City.—This invention relates to a new process for roasting iron ore, said process being particularly applicable to the treatment of magnetic iron ore, which is found in large quantities throughout the United States. The object of the invention is to reduce the expense of the process, and to so arrange the kiln and the whole process, that the roasting may be done with the use of brown coal, wood, or even peat, while heretofore only the expensive anthracite coal could be used for the purpose.

FURNACE FOR SMELTING ORE.—Alois Thoma, New York City.—This invention relates to a new smelting furnace for preparing washed and reduced iron ore for use, and for separating the metal contained therein from the earthy and foreign substances.

FURNACE FOR SMELTING STEEL.—Alois Thoma, New York City.—This invention relates to a new furnace for smelting steel and for producing cast steel of the best quality from steel of ordinary or inferior kind.

HOISTING APPARATUS.—Roger Finnegan, New York City.—This invention relates to a new manner of operating a hoisting apparatus and consists in arranging a pair of oscillating clamps which are fitted around the endless rope by which the drum is revolved and which can be set in motion by oscillating a horizontal axle.

CARRIAGE KNOB.—J. Barclay, Attleborough, Mass.—This invention relates to a new carriage knob which is so arranged that the spring jaws by which the curtain is held are made detachable from the pins by which they are secured to the cam eye so that when either part is destroyed or broken it can be replaced without loosing the other part.

SELF-ACTING PORTABLE FOUNTAIN.—John Hegarty, Jersey City, N. J.—This invention relates to a fountain for propelling common or scented water which can be placed into any room and be removed with ease and will be constantly working, only requiring the occasional winding up of a spring.

STEAM RADIATOR FOR HATTERS' KETTLES.—John S. Rice, Newark, N. J.—This invention relates to a new device for heating the water in a hatter's kettle and consists in the use of a drum or cylinder inserted within the kettle and of a steam pipe inserted within the cylinder. Both the cylinder and the steam pipe are perforated, the holes in the cylinder being much finer than those in the pipe so that the steam which is conducted into the cylinder through the holes in the pipe, enters the water in very fine streams, and is distributed uniformly to all parts of the water in the kettle.

WRENCH.—B. S. Lawson, Brooklyn, E. D., N. Y.—This invention relates to a wrench which is of very simple construction and of great strength and which can be easily adjusted to work of different kinds.

SODA WATER FOUNTAIN.—William Gee, New York city.—This invention relates to a new and improved mode of lining the cast iron soda-water fountains and retorts, in order to prevent them being acted upon or coroded by their contents.

PLOW.—J. E. Jinkins, Milton, Fla.—This invention relates to a new and useful improvement in the construction of plows, whereby the same may, with the greatest facility, be made to penetrate the earth at a greater or less depth, and the plow also adapted for scraping or surface culture, when required.

METHOD OF PROTECTING HEATED SURFACES.—Edward G. Scovel, St Johns, N. B.—This invention consists in protecting surfaces exposed to heat, in furnaces, by the circulation of water, the circulation being produced by the heat of the furnace.

COAL GRATE.—W. T. Foster, Jeffersonville, Ind.—This invention consists in providing an adjustable cowl or ash fly tor the ordinary fire grate, and for other fireplaces.

HORSE HAY FORK.—Jacob H. Hendrick, Dexter, Mich.—This invention has for its object to furnish an improved horse hay fork, simple and strong in construction, easily operated, and effective in operation.

INVALID BEDSTEAD.—C. S. Baker, Winchester, N. H.—This invention has for its object to improve the construction of the invalid bedstead patented March 27, 1866, Warren S. Hill, inventor, so as to make it simpler and less expensive in construction, and more efficient in operation.

BUCKLE.—Lawrence Rhoades, Newport, R. I.—This invention relates to an improvement in buckles, and consists in hanging a second or supplementary loop, within the ordinary loop, whereby the ordinary prong is dispensed with and consequent injury to the material avoided.

HAY FORK.—L. H. Tears, Elkland, Pa.—The hay fork embraced in this invention consists of two hooks separated by a plate, pointed or dart-shaped at one end, all of which are hung to a common center pin, with the two hooks so connected to a common bell-crank lever, to which a rope is hung, that by pulling such rope, both hooks will be simultaneously drawn in, or in other words, released from the hay hung therein.

PUMP.—A. Jusberg, Galva, Ill.—The improvements in pumps embraced in this invention can be applied to either single or double-action pumps, and they consist, principally, in so arranging the several valves and the communicating passages with inlet and outlet to the piston or plunger cylinder of the pump that the water or other liquid will be drawn into the same, both in the downward and upward movement of the plunger, so that, as it is discharging before the plunger in either case, whether moving up or down, it is receiving behind or back of the plunger, whereby, even with a single plunger, or piston, and barrel or cylinder, a continuous stream or discharge of water is secured.

CORD STRETCHER AND SUPPORTER.—R. White, Decatur, Ill.—This invention consists in providing a windlass which is operated by a crank, in a suitable frame, and also in a supporter whereby the cable or rope is held in a horizontal position, while it is being stretched.

MACHINE FOR CUTTING CHEESE AND OTHER ARTICLES.—William Rhodes, Jr., and Tiras Gerhard, Reading, Pa.—This invention consists in operating a cutting knife by a rack and pinion, and also in revolving a table by means of gearing, in connection with the knife.

SELF-SUPPORTING WHEEL.—Wm. F. Sawyer, Mobile, Ala.—In connection with the spokes, which are secured to the hub by mortise and tenon, in customary manner, are employed supplemental or supporting spokes, which have their inner ends confined within a circumferential groove on the hub, and between the tenoned spokes, in such a manner as to greatly add to the strength of the wheel without weakening the hub by additional mortises.

SAFETY STIRRUP.—Wm. Weddington, Alexandria, Ind.—This invention relates to an improvement in the construction of a saddle stirrup, and consists in attaching a foot piece to an ordinary stirrup, with pivots, in such a manner that the weight of the foot on the heel of the foot-piece shall tip it up, or raise it between the bars of the stirrup, and thus release the foot in case of accident by the throwing of the rider.

HAND SPINNING MACHINE.—James M. Hart, Des Moines Iowa.—This invention relates to a new and useful improvement in the construction of a machine for spinning wool or cotton yarns or thread, the object of which is to spin by hand a number of threads at a time, instead of a single thread, as with the common domestic spinning wheel.

SELF LUBRICATOR FOR VALVES.—Simon H. Badger, Erie, Pa.—This invention relates to a new and improved self-lubricator, designed for lubricating, during the working of the engine, the surfaces of steam valves and valve seats of locomotive and other slide valves, and the pistons working in the steam cylinders adjacent to the valves.

PAWL AND RATCHET CONNECTION FOR MOWERS AND REAPERS.—John D. Wilber, Poughkeepsie, N. Y.—This invention relates to a new and improved pawl and rachet connection for reaping and mowing machines, and it consists in using a plurality of pawls, three being a desirable number, fitted in sockets attached to the axle, and enclosed within a hollow ratchet, placed loosely on the axle, and having a pinion connected to it which gears into a toothed segment on the driving wheel; all being so arranged that the pawls are made to engage with the ratchet without the aid of a spring, or springs, and a connection formed between the axle and driving wheels, when the machine is drawn forward so as to communicate motion to the sickle and other working parts, and no connection formed between the driving wheels and the axle when the machine is backed.

MACHINE FOR SLICING AND CORING APPLES.—G. C. Wright, LeRoy, O.—This invention relates to an improvement in the character of a machine for slicing and coring apples, and consists in a slicer, or cutter, having a central, tubular core-cutter, with a series of radial knives set around it, to slice an apple in segments, by means of a follower brought down upon it with a lever.

HORSESHOE.—Silas Sloat, Morgan, Ohio.—This invention relates to a new and improved horseshoe, and it consists in constructing the same with a view to its ready attachment to and detachment from the hoof, and to accomplish this end without the employment of nails. The object of the invention is to obtain a means whereby any person of ordinary ability may apply a shoe to the hoof of a horse and detach it therefrom, without the aid of a shoer or smith, and also obtain a shoe which may be applied to diseased and defected hoofs, without injuring the same.

TELEGRAPH INSULATOR.—John L. Waite, Burlington, Iowa.—In this insulator, which may be termed, a double or compound insulator, as in itself it combines two separate insulators as heretofore used, two distinct lines or means of insulation are employed, the one through the shank by which the insulator is secured to the telegraph pole or other place, and the other through the imbedment of the hook of the insulator on which the telegraph wire is hung or secured, within any suitable insulating substance, such as brimstone, gutta percha, white lead, hardened coal tar, etc.

HORSESHOE.—J. Wilson Hodges, Baltimore, Md.—The object of this invention is to provide a secure and cheap method of securing roughing calks to horseshoes, and at the same time avoid the employment of the screw in so doing.

ANIMAL TRAP.—C. S. Trevitt, Washington, D. C.—This invention relates to that class of traps in which the animal steps on a trap door in his effort to secure the bait, and by endeavoring to get the bait springs the trap and is precipitated into the chamber below. The invention consists in a new method of setting the trap door and securing the bait, and in a new device for adjusting the door to animals of different weights.

WATCHMAKERS' TOOL.—John M. Cayce, Franklin, Tenn.—This instrument is designed for rectifying and reshaping the cogs of watch wheels, in order to make the gearing run better, and for other purposes.

COMBINED LOCK AND LATCH.—Monroe B. Foote, New England Village, Mass.—This invention consists in combining the common spring door latch with, a lock situated inside of the latch case in a slot in the latch bolt, into one side of which its shot bolt locks.

PUMP.—Frederick Bauschthiker and Barnet Van Fleet, Washington, D. C.—This invention consists in a new valve which clears itself of gravel and other obstructions, and a new box which works more easily and with less liability to injury than those hitherto in use.

ANIMAL TRAP.—Joseph Trainer, Rural Dale, Ohio.—In this invention the trap is constructed with two chambers, in escaping from one to the other of which the animal sets the trap by a novel, simple, and effective apparatus.

BAKING PANS.—G. W. Mitchell, M. D., New York City. Patented Oct. 15, 1867.—This invention relates to a novel constructed baking pan, for the baking of cake, rolls, etc., and the invention consists in making the pan in two parts or pieces, one of which, or the bottom, is made of cast iron of a suitable thickness, with a series of separate and distinct circular or other desired shaped cavities or depressions therein, between which cavities in and through the thickness of the bottom are a series of holes, at suitable distances or spaces apart, and the other or upper part is made of sheet, cast, or other metal, of suitable thickness, with cavities or depressions, and of such a shape and size as to fit within the cavities of the cast iron bottom, resting therein as well as upon its upper surface.

Answers to Correspondents.

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

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

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

J. P., of Mass.—In accrediting the agency of Bourne's "Treatise on the Screw Propeller" in No. 17, current volume, an error occurred. John Wiley & Son, 535 Broadway, New York city, are the agents for the work for this country. By sending to them you may get all the numbers complete. We regard it as the best work on this subject we have yet seen.

W. C. A., of N. Y.—The colors of glass are produced by metallic oxides. Gold gives the rich red seen in Bohemian glass ware, and this is one reason of its high cost. It furnishes, in combination with tin, the finest rose and purple. Oxides of iron and of chrome produce reds, browns, and black; the latter is also obtained from manganese and cobalt. Oxides of uranium, chrome, antimony, and iron yield orange; chrome and copper green, and cobalt and zinc blue.

P. S. Y., of Mass.—We think the discussion relative to the formation and material of the tails of comets has received, for the present, sufficient attention in our columns. We must, therefore, respectfully decline your otherwise interesting article. This answer will also apply to the communication of J. S., of Md., and others.

J. H. M., of Wis., sends us samples of ferruginous earth which are ochers, worth from $5 to $10 per ton.

E. M., of Pa.—This correspondent sends us a specimen of soft copper wire, gage about 20 or perhaps 21, and asks how many feet of wire like it will be required to give strong shocks from a single Daniells' element, copper surface 96 square inches, whether collodion or shellac varnish, or cotton is best for insulation, and what material to use for molds in which to cast zinc cylinders. In reply we would say that 200 or 300 feet of the wire in an induction helix will give powerful shocks. Collodion and shellac have been used for insulating wire, but cotton is perfect enough for ordinary purposes. Good molding sand is as good a substance as we know of in which to cast the zinc cylinders for a battery.

G. E. W., of R. I., asks how a very white enamel can be secured to wood in the shape of small knobs, in imitation of white porcelain. The best way we know is by the use of screws cemented into the enamel. Melted shellac might answer for thin, broad pieces. Perhaps some of our correspondents can reply more definitely.

J. H. K., of N. Y.—"What number of emery is required for a scouring belt for fellies." This is a question easily determined by cheap experiment. Much depends on the state in which the fellies of a wheel leave the saw. If properly sawed No. 12 emery is what is needed.

J. H. L., of N. Y.—Pure steam is invisible; *vide* the "glass blowers'" steam engine with boiler and engine of glass. High or pure steam will *not* burn the hand. You are mistaken in supposing it will. Steam does not burn nor scald until it is mixed with the atmosphere. The vapor seen discharging from the exhaust pipe of a high-pressure engine is not the pure steam used in an engine cylinder.

B. W. H., of Mass., thinks that our reply to "J. P. J., of Pa.," in No. 17, current volume, is incorrect in the statement that Wm. Mason, of Taunton, Mass., improved the locomotive truck or "bogie" by spreading the axles and bringing the center of the cylinder on a level with the center of the driving wheels. He says, "both the spread truck and level cylinder were made by other builders before he ever commenced or turned out an engine." This may be so, but until B. W. H. gives us facts instead of assertions our statement is as valuable as his.

R. S., of Vt.—"How can I treat paper to have it possess the largest degree of flexibility and still retain its whiteness and texture?" In its manufacture use good stock and omit the sizing.

——., of Iowa.—We have little faith in the claims of venders of gasoline and similar oils that they are not explosive. Kerosene if properly distilled is preferable, and even kerosene is not always safe.

W. S. B., of Ill.—"What is the difference in power required to raise a column of water twenty feet between a common suction and a force pump, the pistons or valves being of the same capacity?" There is no theoretical difference, and if the pumps work with equal friction there will be no practical difference. In one case fifteen pounds to the square inch—the atmospheric pressure—lifts the water, and in the other a mechanical power equal to that pressure does the work.

J. W. W., of Mass.—"How many pounds pressure to the square inch would, in your opinion, be safe on a flue boiler 18 feet long, diameter, built by Tufts at East Boston? It has been in almost constant use for 19 years." Your data are somewhat indefinite, as the thickness of the iron, either of the shell or flues, is not given, nor the diameter of the flues. The age of the boiler suggests fears of its reliability. It should be inspected by an expert and tested by hydraulic pressure to 30 per cent above the steam pressure. Second-hand boilers are too often treacherous. Always in purchasing, the opinion of a good engineer, based on personal inspection, should be taken.

B. D. T., of N. Y., asks if oil will injure rubber, or if rubber kept continually in oil will lose any of its good qualities. We reply that oils, especially animal oils, are ruinous to rubber in any form.

W. A. C., of Goshen.—This correspondent does not give the State in which Goshen is situated, while, as post stations, there are no less than fourteen, scattered through the States of Maryland, Georgia, Indiana Massachusetts, New Hampshire, New York, Ohio, Kentucky, New Jersey, Tennessee, Texas, and Missouri. This is only one specimen of careless writing we receive every week. Sometimes we place such communications on our "dead letter" file, and sometimes cast them into our waste basket. But, to his request: This is, "what would be the result if I should carry my steam pipe down along side my boiler outside the wall, and pass it under the boiler back of the first bridge of the furnace, to be exposed to the heat of the fire, thence to the fire. Would the pipe burn when the steam was shut off from the engine, etc.?" Better have plenty of steam space to yield dry steam, and not attempt with your knowledge of engineering, to superheat your steam by any such process. We have replied to a similar inquiry before.

W. T. J., of Pa.—The ordinary method of giving iron castings a bronze appearance is by dipping them in a solution of sulphate of copper.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Inventors and Manufacturers of Labor-saving Machinery
Articles useful in the Household, the Workshop, or on the Farm, will find it to their interest to send circulars to, or correspond with, "The Texas Labor-Saving Machinery Agency," P. O. Box 244, Houston, Texas.

A Rare Chance is offered to an Energetic Business Man, (no other need apply,) to obtain an undivided one-half interest in the a popular patent. Price $3,000. Full particulars upon application to W. M. Baker Fortville, Hancock county, Ind.

W. N. Hayes, Athens, Ala., wishes to correspond with Manufacturers of Brick Machines, and tools for boring Artesian Wells.

Wanted—a large Condensing Air-pump. Makers or Owners please address D. B. Tanger, Bellefontaine, Ohio.

T. M. Cobb, Beloit Wisconsin, wants the best Press for Baling Straw.

Send to P. O. Box 706, Oil City, Pa., Prices and Description of good yet low priced mills for grinding feed for horses, cattle, and hogs.

Makers of Pill Machines suitable for manufacturing Pills in large quantities, address John A. Roy, Wellsborough, Tioga Co., Pa.

Eureka Band Saws, manufactured by Welch, Harrison & Co., corner Second and E. sts., South Boston, Mass. The best Band Saw in the market. Send for circular.

Parties having Hickory Timber for sale will please address, with particulars, J. I. Blauvelt & Co., Paskack, Bergen Co., N. J.

Manufacturers of Pump Augers will please send descriptive circulars and prices to Drawer No. 33, Ann Arbor, Mich.

Rob't Cravath, Saratoga, Winona county, Minn., wishes to know the cost of the cheapest Hay Press that will press two or three tons per diem (two men working it), to be delivered at St. Paul, Minn.

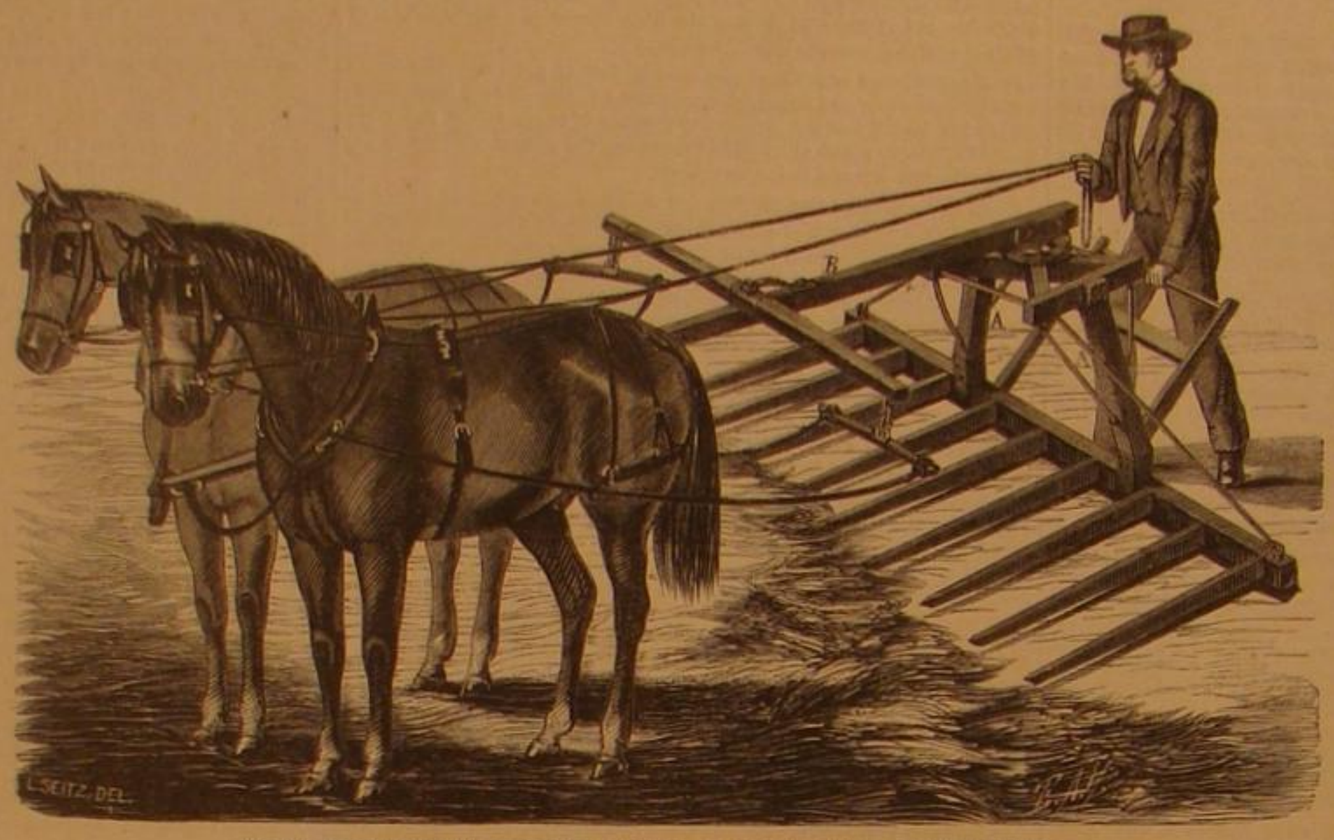
Lamp Manufacturers—New Invention.—For sale cheap. Entirely new idea. L. G. Grady, Halifax, N. C.

Can anybody tell us where we can find one of J. D. Chism's Shingle Cutters? Munn & Co.

Wanted—a machine invented, the friction to be overcome by difference in weights of bodies passing down out of, and up under water C. H. R. Troy, N. Y

Improved Horse Hay Rake.

Unlike most hay rakes this is not revolving, the teeth—of which there are but one set—being always presented to the hay or grain to be gathered. It is a device intended for carrying the hay to a stack, as well as for raking it, and obviates the necessity for cocking it. The rake teeth and head are unusually strong, the former connected to the uprights, A, which are strongly framed together by diagonal braces at the top, strengthened by iron braces passing from the top to the uprights, A, and to the ends of the rake head. The rake head is secured to the uprights by metallic straps, which, forming journals for it, permit it to have a slight semi-rotary movement, sufficient to allow the points of the rake teeth to be raised enough to clear an obstruction, which is done by the hand of the operator by means of the rigid frame projecting from the rear of the rake head. To the top of the frame formed by the uprights, A, and their braces, is secured the tongue, B, which has a plate, its sides turned up to form a socket for its reception. Under this plate is a metallic ring secured to the frame and on this the plate is moved. Pins passing through the tongue and through slots in the turned up sides of the plate on the tongue allow a slight longitudinal movement of the tongue to throw a hook attached to the rear of the tongue into and out of a slot in the rear of the metallic plate. A central pin passes from the tongue through the circular plate so that the draft comes upon the locking hook and the pivot pin.



SWINNERTON'S HORSE HAY RAKE AND GATHERER.

In operation the hay is collected upon the rake and carried to the stack or barn; the horses are then backed or the traces slacked enough to disengage the hook at the rear of the annular plate. The horses are then guided half round in either direction and the machine drawn away from the hay. The team is then turned back one quarter round and started forward, the driver, at the same time, stepping on the rake head nearest the horses, when the machine is ready to collect another load.

The machine is so simple in construction, and so ready in operation that farmers cannot fail to perceive its advantages. A patent was obtained for this device through the Scientific American Patent Agency June 25, 1867, by James F. Swinnerton, of Marion, Ohio. See advertisement on another page.

Railroad Officers to Wear Uniforms—A Step in the Right Direction.

A long-needed reform in railroad management was introduced by the legislature of New York last winter; it was by passing an act compelling the employés of all railroad companies in this State to wear a distinguishing uniform. This law went into operation on the 22d of October, and that date may be set down as an era in travel by rail in this State.

This subject of railroad uniforms is one which has long been agitated, and it has been discussed in all its bearings, both by railroad men and the press; the employés, we believe, always expressing themselves as strongly opposed to the measure.

It seems that, in addition to the fact that innovations are always opposed, no matter how necessary, the employés of railroads looked on the adoption of a uniform as a species of degradation not to be tolerated; they regarded the uniform as a sort of livery, and viewed its adoption as a badge of servitude on a par with the livery of a lackey. It is likely, that if this subject had been straightforwardly put before them, and the vast difference between the livery of a servant and the uniform of an officer been properly explained, this opposition on the part of those most interested—except the traveling public themselves—would have been deprived of its force long ago.

The reasons which explain the necessity of uniforms for officers and privates, in the army or navy, urge with equal force the propriety of its use by men intrusted with such important duties as the officers of a railroad company. Common sense suggests it, and discipline demands it. That the use of a uniform will add as much to the discipline of a railroad as it does to that of any other organization, is a fact which seems to us to be perfectly clear. Let any railroad engineer or conductor ask himself what sort of order could be maintained in a regiment or on board a man-of-war, if "all hands" dressed as they pleased; we think we can answer for him that, instead of order, confusion would be the order of the day.

We do not think, from what we have seen of locomotive engineers—and we have occupied that responsible position—that they are at all afraid of being scrutinized in the performance of their duties when in charge of a train; and it is only on such occasions, as we understand it, that any officer will be required to wear any insignia of his rank any more than a naval officer ashore, off duty, is required to wear his uniform.

Many of us can remember the great opposition that existed at the time the uniform was adopted by the police force of New York city; and it is well known that, among other good results, the increase of the vigilance and *esprit du corps* of the force are not the least. Indeed, this soon became so plain, that the police in the principal cities of the Union soon adopted the once detested uniform. The manifold advantages of the uniforming of conductors, baggage masters, and brakemen, will suggest themselves at once to every one who has had much experience in railroad traveling—advantages both as regards comfort and safety. Instead of wandering about the station, while the engine is fizzing away, impatient to start, in order to make a necessary inquiry, one can now distinguish the officers at a glance; and, instead of asking a dozen people before he hits the person he is in quest of, he can go at once to the proper authority.

We will venture to predict that so great an improvement will result from this important innovation, that it will, before long, be adopted by other States; indeed, we hope it will be made general, all over the Union.

No doubt there are some roads where its benefits would be more strongly felt, on account of improving the discipline, than others which we might name, which are managed with skill and administrative capacity. This subject has occupied our attention for some time; and the only argument which has ever been urged, to our knowledge, against the uniforming of railroad officers, namely, the opposition of the employés themselves, we think, will cease as soon as they have seen the benefits of the change.

PACKER'S PATENT BROOM HEAD.

The ordinary broom soon becomes permanently curved and worn to a stub. As the broom corn can be easily obtained at a low price, and the handle and labor of attaching the broom corn to the handle constitutes the greater part of its cost, the inventive genius of the country has designed several devices for securing new corn to the handle when the original is worn out, with but little labor and diminished cost when compared with the original first price of a broom. The one shown in the engraving is exceedingly simple and very cheap.



The head, A, is of metal and is secured to the handle by a socket. Near the lower end of the handle a bolt, B, is inserted and held, having on its lower end a threaded thumb nut which moves the yoke, C, that is guided by forks on its ends which slide on the side arms of A. The lower ends of these arms have wires passing through loops in the arms, which wires are bound through the broom and secured by means of loops passing over wires or bars going across. In filling the broom head the buts of the corn are laid across the concave side of the cap or head, in alternate layers, with their brush projecting upon either side. The binding bar is then forced down upon it crowding the buts into the concavity of the head and clamping it securely into place. The bands (outer) and the wires are then moved to place, sweeping the corn to position, and secured by hooking.

This device was patented through the Scientific American Patent Agency, Aug. 6, 1867, by T. G. Packer, of Mexico, N. Y., who will answer all inquiries relative to the sale of territory or rights to manufacture.

Rapid Scientific Progress.

Perhaps nothing can show how much more rapidly the republic of mind advances, in rendering practical results, than any one mind, however practical, and however scientific, could alone effect, so well as the rapid applications of science, which are now being effected in this country and Europe. When Napoleon crossed the Alps, no one thought of piercing them as his successors are doing. The idea was too great and novel, even for his most original and daring grasp of thought. When he was longing to break down the British Empire of the seas, and his flotillas were waiting at Bologne, with his men and horses, already to invade England, there was a man Fitch, who had driven vessels by steam on the Delaware, and another Fulton, who could and would have ferried him across the channel by steam, safely, had Napoleon had faith in steam and in him. Now, steamers cross that same channel in two hours or so, and railroads are not only penetrating, but locomotives are climbing over the Alps, as easy as a kitten sticks in her claws and climbs over a fence. The spirit of humanity, that is, the joint thoughts of many men, take in advanced ideas, and reduce them to practical and working order, more than any one autocratic mind alone. One mind carries an invention one step, and then it is exhausted and can go no further. But another begins where the former left off, until, step by step, hights are climbed, and depths are sounded, and difficulties bridged over, that only a succession of various constituted minds could effect.

There are at this time one or two ideas gaining ground daily in the public mind, and certain to work themselves out into practical shape in a very few years, and with the most practical results. One is by means of signals from Cape Hatteras Light House, to inform vessels passing within sight or sound, of the state of the weather, as to storms up and down the coast. The laws of storms are now getting each year to be better understood, so that from the state of the weather at certain points the mariner can know when he is safe at others. For instance, the most dangerous storms to the sailor are those northeast gales which sweep along the coast, beginning generally in the southwest. They probably originate in the Gulf of Mexico and strike the coast of Florida or Georgia. By telegraph the news of such an approaching storm can be signalled from Cape Hatteras to vessels going southward as they pass, and from twelve to thirty-six hours before they can prepare for the most dangerous storms of the coast. A notice of this kind will enable shipmasters to calculate beforehand the entire dangers of his voyage from Hatteras down to Charleston, Savannah, or Key West, and, if necessary, put into some intermediate port, and lie in safety till the storm has passed. That such signal systems will be arranged there can be no doubt. Nor is there any doubt that eventually it will extend all along the coast, and produce immense good.

Another invention will almost be as great an improvement upon the railway system as that upon the four-in-hand stage coach. We allude to the system of pneumatic railroads, a model of which was recently exhibited in New York at the American Institute. It has for some time now been successfully demonstrated that letters and parcels could be transmitted successfully, all over London, on little railway cars, forced through air-tight tubes by the air-pump—in fact blown through. These tubes have been laid underground thus far, but there is no reason why they should not be made larger, so as to include passenger trains. It is asserted that the first cost of this tubing will be but $50,000 per mile, and that of working the engines far less than that of running locomotives.—*Philadelphia Ledger.*

PREVENTING RAILROAD COLLISIONS.—A correspondent of the *Mechanics' Magazine* proposes a plan whereby every train on a track shall communicate with another, before or behind it, whenever the two approach within a certain distance. Electricity is the means employed, the engines of the trains carrying batteries one wire from which connects with the engine bell, the other connecting with the earth. Light insulated supplemental rails, made in continuous length of two miles each, are laid by the side of the main rail, so that the tire of the locomotive wheel runs on both. As long as two trains are not at the same time on one length of conducting rail, no electric current can pass on account of the break joint, but as soon as they come within this particular distance of each other the circuit is completed and both bells will ring.

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THE HABITUAL CARELESSNESS OF MECHANICS.

It is said that "familiarity breeds contempt." Whether this is so or not, it is very sure that "familiarity produces carelessness or indifference." Men who have spent years among machines, and know their power, their inexorable and unpitying course, their disregard for human life or limb, their ungovernable impetus when not held, like a vicious horse, "well in hand," come to look upon these mighty engines, driven by an almost irresistable force, as playthings, which may not only be governed by legitimate means, but played and toyed with. How often we see the engineer or "greaser" of a stationary or marine engine, following the connecting rod or crank with one hand and with the oil can in the other, allowing his hand and arm to pass through a space which barely permits the passage of his limb, and doing this with apparent unconcern. We have seen the engineer of an upright stationary engine, the cylinder of which was on one floor and the walking beam above an upper floor, jump on the cross head and travel up and down half a dozen times, oiling the slides; he a man weighing over two hundred pounds and passing through a hole hardly more than fourteen inches square. A mis-step would have been fatal or nearly so—at least the adventurer would have been hopelessly crushed. In cotton mills it used to be not uncommon to see the "piecer" on a mule reach over to attach a broken "end" when the outward coming carriage would almost take him from his feet, which event would have pierced his abdomen with several rapidly-revolving and sharply-pointed steel spindles, insuring as certain death as the spinning ball from a spirally-grooved rifle.

This carelessness, which becomes, in time, habit, leads, not seldom, to unpleasant, if not fatal, results. The operator of a machine, having learned all its "points" and believing he controls all its powers, frequently assumes a management which he is incompetent to oversee, and becomes careless; the machine refuses to obey his behests, and he is mulcted in an arm, or leg, or life.

We recollect, in our practice as a mechanic, a foreman who ridiculed the idea of throwing a belt from the shaft for repairing or "taking up," preferring it should be unlaced while hanging in dangerous contiguity with swiftly-revolving pulleys or couplings, and attempted the mending of a belt while hanging on a shaft in alarming proximity to these care-nothings for human life. He lost his arm and nearly lost his life. He had little sympathy but much annoyance, and not a little trouble.

At the fair of the American Institute in New York city a week or two ago a practical machinist placed his hand under a hammer to remove a "smashed" copper. The copper was smashed and so was his hand. It was an accident; but such an accident as anyone but a person, thoughtless through familiarity, would never have been victimized with. Poor McGowan paid dearly for his temerity; he lost his good right hand. Linnell, also, the engineer of the Babcock & Wilcox engine, although not careless, in the common acceptation of the term, was foolish in risking his life on the holding of a common forked wrench, which every machinist knows is not to be depended upon. He sat upon a plank running past the fly wheel of the engine, and applied his large forked wrench to the nuts of the cap of the crank shaft; the wrench slipped when he had his whole power applied to it, and over he went into the wheel. Nothing could be more admirable than his presence of mind in holding to the arms of the wheel, which he did while whirled around with immense velocity, until, probably, either through his senses deserting him or through the influence of dizziness, he let go and was thrown with the force of a stone from an ancient catapult, or the centrifugal momentum of a stone from a boy's sling, and landed, almost a shapeless mass of humanity, among the debris of the machinery he demolished in his course.

These instances show the necessity of carefulness in the management of machinery. We can never forget the advice of an old-fashioned machinist to his apprentice on this subject: "Better be foolishly careful than foolishly careless." Many mechanics seem to imagine they are doing a nice thing to put on airs before those who do not understand machinery. It is not so. They are the recipients of pity, if not of contempt.

EXPERIMENTS WITH AN ELECTRIC LIGHT AT THE BATTERY.

On the evening of the 17th inst., an electric light was tested on the top of the Barge Office near the Battery, in this city, with very satisfactory results. The apparatus for generating the electric current consisted, as usual for such purposes, of a magneto-electric machine. This machine consisted of several series of horseshoe magnets, 58 in all, fixed in a frame, within which is a cylinder thickly bound with soft wire. This cylinder is made to revolve with very great rapidity by means of a small steam engine, said to be of two horse-power.

The action of the horseshoe magnets on this rapidly-revolving cylinder is to generate, by induction, an immense amount of electricity. The current of electricity is carried by a conducting wire to the place where the illuminating apparatus, or electric lamp, is placed. At this place and at a proper distance behind a Fresnel lens twelve and a half by sixteen inches, the conducting wire is separated and the current or circuit is broken; here are attached, one to each part of the broken circuit, a crayon or pencil made of the coke of anthracite coal—in other words, pure carbon. These pencils of carbon nearly touch each other, and the powerful current of electricity, produced by the two-horse engine, passing along them in the direction of their length consumes their points and generates a light almost equal in brilliancy to that of the sun himself. As the points of these carbon crayons burn off, they are fed up by means of clock-work so that a uniform distance between their points is always preserved and consequently so long as the current is continued with uniform intensity a steady light of magnificent brilliancy is maintained.

These carbon crayons are 8 inches in length by ·33 of an inch square; a pair of these crayons will last four hours; they cost four cents each and will give during their entire combustion a light almost as bright and steady as the sun.

A good idea of the power of the electric light may be had from the fact that the captain of one of the revenue cutters stated "that he had read his newspaper by it at the distance of nearly six miles, and at the Narrows the ordinary gas light displayed from the tower of the Barge Office was entirely lost sight of."

The lens used on this occasion was what is classified as a third-class lens, the largest, a first-class size being some three times as large as this one. It is stated that on an elevation of proper hight the electric light behind even a third-class lens will project its rays a distance of forty miles at sea and that at that distance it can be plainly seen by vessels. In foggy weather it penetrates the mist with the power of the sun and can, of course, be seen at a very much greater distance than that at which the light of a first-class light house would be totally obscure; on this account alone it is quite evident that at those points of the coast where continuous fogs are prevalent this light will strip navigation of much of its danger.

We believe that the want of that absolute reliability in the electric light necessary for light house purposes has been one of the principal reasons why it has not been extensively used, but the time cannot be far distant when all the mechanism connected with it, from the motor which actuates the armature, to the clock-work which feeds up its carbon crayon points, will be made so simple and precise that its reliability will be fully as great as that of the most perfect illuminating apparatus of the old-fashioned light house.

And it seems to us that here is a new and important field for the caloric engine, for no purpose can a dry motor be of greater importance than this; of course we allude to it as the motor for generating the electric current. To say nothing of its danger and complication the skill required in the use of a steam motor on account of the boiler alone, there are many important light houses so situated where steam would be totally inadmissable.

IMPORTANCE OF ACCURACY IN TOOLS.

While every description of hand tool used for manipulating the materials employed in the mechanic arts has reached a state bordering on perfection, it is a lamentable fact that many of the larger tools and machines are faulty in construc ion and inaccurate in operation. It is not uncommon to see engine lathes on which it is impossible to turn a shaft with accuracy except by watching and callipering continually. Thus, the larger part of one man's time is wasted in making up for the imperfection of one tool. We have seen lathes which were left in so unfinished a state that after a few weeks' use the centers of the two heads varied in hight from the ways over one-sixteenth of an inch. Such a tool cannot perform good work. The ways and the grooves in the tail stock were left just as they came from the planer, and it was evident that while on its bed they had never received a finishing chip, which, if planed true, might have been sufficient. Occasionally, also, the ways of a lathe are winding, owing either to their having been sprung in securing to the planer bed or moved before being finished. Some careful builders prefer to "rough off" the ways wherever they are to be planed, and then re-secure them to the planer for the finishing chip. There is reason in this; for it is well known that the "skin" of a casting is greatly contracted, and when it is removed a small casting will show a different form or line from that of the untouched casting. Probably this alteration would be too slight on so heavy a casting as a lathe bed to affect its integrity of outline, but the precaution alluded to, if an error, is one on the right side.

Sometimes the center holes in the arbors are so imperfectly bored and tapered that the center, however perfect, cannot be removed and replaced twice alike unless marked for one particular position; or the arbor of the tail stock is loosely fitted, and, when set to be held by the stay, it is moved out of line so that the two centers of the heads do not agree. Badly fitting screws allowing of "back-lash," imperfectly cut, rattling gears, loose journals, and other results of want of care are vexatious to the operating mechanic and discreditable to the maker of the machine. There is no adequate reason why the same accuracy displayed on small tools, rifles, sewing machines, etc., should not be exhibited on the larger tools of the mechanic. Tools would cost, at first, more, but they would last longer and perform their work more satisfactorily. Skilled labor and good workmanship are costly. They always were; but they are valuable. The day of cheap tools is, we hope, passing away. One good sign is that those who make a specialty of doing the best of work and charging remunerative prices have always orders ahead of their ability to fulfill. Such conscientious manufacturers are not compelled to solicit work, but the jobs seek them.

AMERICAN INSTITUTE FAIR.

When this paper is laid before our readers, the thirty-seventh Exhibition will have been recorded upon the annals of the Institute as one of the most successful ever held under the auspices of that association. The largest hall in the city that could be procured for the purpose, was filled to its best advantage with a variety of articles numbering over sixty thousand, the collection including good representatives of all the important branches of American industry. The efforts of the managers have been thoroughly appreciated by the public, and their patronage has been all that could be desired. The average attendance during the thirty-eight days of its continuance, was about ten thousand persons daily. From 9 o'clock, A. M., up to the hour of closing, there has been a steady influx of visitors of all sizes, ages, and conditions in life. Many of the public and private schools of the city have attended in a body. On one of our visits we found the pneumatic tube, the steam elevator, and other attractions taken possession of by mutes from the State Deaf and Dumb asylum; and on several occasions we have noticed a blind man enjoying to the extent of his ability, the wonders of the fair. If any visitor fondly imagined that a visit to the Fourteenth street armory would fill the place of a journey to the Paris Exposition, such individual labored under a sad delusion, and his disappointment must have been commensurate; but few, indeed, is the number of those who, having visited the fair, have left it with any feelings but those of a pleasurable satisfaction.

THE ART EXHIBITION.

A large and splendid hall is set apart for the art works, musical instruments, fruits, flowers, etc. These form a very attractive portion of the exhibition. The photographic show is very fine, and exhibits advancing improvement very gratifying to all lovers of the beautiful. Mr. H. J. Newton, an amateur photographer of this city, exhibits a series of beautiful views almost perfect in every particular. One of these pictures is a superb view of the fountain and landing place at the Central Park lake. The exquisite softness and distinctness of these pictures render them very interesting. Not the least remarkable thing about them is the fact that they were produced from paper negatives. Mr. Newton works with paper better than many artists do with glass for negatives. Probably the largest picture in the exhibition, printed from a single negative, is that by Rockwood—an architectural view, 24 x 42 inches. It is said to be one of the largest negatives ever made in this country. The life size portraits, mechanical and architectural pictures of Rockwood, are superior. The porcelain pictures of J. M. Herron are worthy of note for their artistic execution. We believe that he presents the largest plain porcelain portraits.—Glosser's horses are fine.—The American Photo-Lithographic Company (Osborne's pat.) make a very fine display, and exhibit remarkable progress and excellence in their work. Copies of engravings and other works, printed by lithography, are produced by them with wonderful fidelity. This is an entirely new branch of art work, the like of which has never before been exhibited.—J. S. Notman & Co., of Boston, show some elegant specimens of grouping, including a number of pictures of distinguished personages. We have before had occasion to notice their work.—A. J. Drummon presents a number of specimens of nitrate of ethryle pictures—a substitute for the ordinary silver prints, by which he obtains much greater sensibility. The prints are done in one fourth the usual time. We believe that the explosive nature of the ethryle is an objection to its manufacture and ordinary use. The prints are excellent.—Huston & Kurtz present a large and splendid variety of colored work, including porcelain pictures in every style. They are unequalled.—Wenderoth Taylor & Brown, of Philadelphia, make a splendid show of everything photographic, including silver prints of all sorts, and, what is rare as yet in this country, spendidly executed carbon prints. These pictures are presented in various tints, and have a most pleasing and novel appearance. Mrs. S. R. Divine exhibits

some fine specimens of photograph painting.—The chromo pictures of H. Wood are of superior character.—The specimens of photo-sculpture, by G. P. Putnam & Son, are remarkable for life like accuracy and artistic pose. Here we have a miniature reproduction in marble of Gen. Grant and his cigar, Horace Greeley and his peculiar coat, and other notables.

The fifth group, under this department, is devoted to a display of musical instruments, which title is made to comprehend fifes, banjos, violins, and wind instruments warranted to be a match for the best developed lungs; grand pianos, square and upright pianos, church and parlor organs, and the orchestrion, which latter, by its daily performance, has added so much to the attractions of the fair.

The endurance of the pianos has been severely tested during the continuance of the exhibition, by the practising thereon by artists of all degrees of musical proficiency, from amateurs, with exceedingly limited knowledge and that of the most elementary character, through the different grades up to the musical professor, with more pretensions and with an execution demanding the expension of a vast amount of physical energy. If any instruments have sustained these combined and prolonged attacks, such pianos are worthy to receive the highest commendatory notice from the awarding committee.

The greatest novelty among the square pianos is Matthushek's "Colibri." With seven full octaves, and the usual length of keyboard, one of these instruments is but little more than half the usual size, and less than half the weight, while possessing the power and brilliancy of an ordinarily sized piano. By the use of an equalizing scale, the enormous tension of the strings is brought to bear equally upon all sides of the iron plate, and this arrangement allows of the small size and weight mentioned.

In group number seven are the cases of mathematical, philosophical, nautical, and surveying instruments, chronometers, watches, and stereoscopes. In the case of Blunt & Nichols, there is to be seen an instrument quite new in this country, called a dipleidoscope. This is an improved construction by this firm on the Dent instrument, and its object is to furnish for watchmakers an inexpensive substitute for the transit instrument in obtaining true solar time. Two prisms, with faces inclined to each other, are mounted in an iron frame which, after adjustment, is fixed immovably to a stone pillar. When the sun approaches the meridian, two images of it are formed by the prisms, which gradually merge into one, the instant of such blending not varying from exact noon, more than three seconds, during a long series of trials. This firm also exhibit an improved form of Pistor & Marten's (Berlin) prismatic sextant; the one shown us, and one belonging to the United States Government, being the only instruments of this style in the country.

T. B. Stewart exhibits marbelized slate mantels in imitation of varieties of marble; we notice one after the sienna marble, another very handsome in design after the verd antique, and one in imitation of Tennessee marble. Additional to their great beauty and moderate cost, the manufacturer claims that these mantels are much more durable, and susceptible of a higher polish, than ordinary marble mantels; and, furthermore, neither oils nor acids have the least effect upon them. The slabs of slate are dug from the deepest quarries, and the process of marbleizing, as it is called, consists in the successive applications thereto of three coatings of a mineral paint, each coat being incorporated into the slate by baking, at a temperature of 400° Fah. These mantels are made at the factory, No. 605 Sixth avenue, in this city.

The Middlefield Building Stove Company display several specimens of mantels, made from white marbles of the toughest variety, which are decorated to resemble the most costly native and foreign marbles. The samples at the fair are very handsome, and commend their own merits to every beholder.

The managers distinctly announced before the exhibition opened, that while taking efficient measures to protect the property of every exhibitor, they would not hold themselves responsible for loss, each article being taken at the risk of its owner. As a matter, then, simply of regret, and not reflecting any discredit upon the management of the Fair, we refer to the fact that several exhibitors of small articles have lost goods of greater or less valuation, such articles having been taken from their tables between the hours of closing and opening, when none but employés had access to the halls. The exhibitors of wines were, we believe, the heaviest losers, but the purloiners did not hesitate to patronize the blacking manufacturers, while the kaleidoscope and fancy box companies, and many others, have been relieved of wares of considerable value.

The managers deserve credit for their untiring devotion to the interests of the Institute and of the exhibitors. Mr. W. H. Hicks, of the engines and machinery department, and Mr. McElroy, who has charge of the steam department, have taken a direct and active interest in the success of the exhibition and contributed not a little to this end. We single out these because exhibitors were oftener brought in contact with them, but all of the board of managers have performed their duties satisfactorily to the public and creditably to themselves.

Some further notices of the Fair and the awards will appear in our next.

Inadequate Pump Tubes.

A correspondent from Kansas makes the following statement with the accompanying query; "We set a pump 23 feet above the level of the water at a distance of 130 feet. Next the pump we had 90 feet of one-inch iron pipe, to which was attached 40 feet of lead pipe of the same interior diameter, but dented in some places, otherwise perfectly clear. Now, notwithstanding the pump was in good order, we could not get enough water through it to supply the boiler. We took the pipe up and put down 90 feet of two-inch iron pipe in place of the one-inch, to which we attached enough of the one-inch pipe to reach the water. The supply of water now is ample. Why is it?"

The "why" is simply that the 130 feet of pipe was entirely too small for its length. Raising the water 23 feet, even if the pipe is perfectly tight and terminates in a perfect vacuum, would give only 75.36 cubic inches of water per minute. Now the motion of your pump, giving but half the time for the water to flow and having to start and stop the column at each stroke, reduces the amount one-half, and you would get actually only 18.84 cubic inches per minute. With the two-inch pipe you would get about four times that amount. The length of a pump tube should determine its diameter. No fault is more common than giving inadequate cross section or diameter to pump pipes.

The Language of Japan.

Dr. Roehrig, to whom we owe the following interesting communication on the language of Japan, informs us that one of the greatest and almost invincible obstacle which foreign nations meet in their intercourse with the inhabitants of Japan, who have lived so long and so rigorously secluded from the remainder of the world, is unquestionably the complicated and peculiarly difficult Japanese language; and, in fact of all the known languages of the globe, that of Japan seems to be the most rebellious to foreigners, and will under ordinary circumstances, forever baffle their most strenuous efforts for mastering it, in however slight a degree. The study of this extraordinary language has to be commenced in early years, and an extensive and thorough acquaintance with the proverbially difficult language of China is an indispensable prerequisite to a fair knowledge of Japanese. It is, however, important to distinguish between the spoken language of Japan and that which is used only in literary composition. Of the former the colloquial Japanese, as much as is needed for the common purposes of every-day life, can in a measure be acquired by routine and a prolonged stay among the people of that country. This is a far less arduous task than the acquisition of the incomparably more difficult language of the Japanese books. But even in this merely conversational tongue we meet with a good many things which will render the progress very slow, the final mastery very uncertain, and the study exceedingly tedious and discouraging. These difficulties affect the pronunciation as well as the syntactical structure; they apply moreover to the idiomatical peculiarities, and have an important relation to the intricate rules of Japanese etiquette and politeness. As regards the pronunciation, the correct utterance of the Japanese sounds is by no means an easy matter. Thus the *g* and the *n* final are pronounced with a peculiar nasalization, especially the former; *f* and *h* are not always very distinct; there is a particular mode of uttering them which cannot be easily imitated by *our* vocal organs. There is also a sound which seems to fluctuate between *r* and *d*. The Japanese have no *l*, the *l* in foreign words is constantly expressed by *r*, and when they pronounce English, they almost invariably say "*right*" for "*light*," and the word "*long*" is uttered by them in a manner which makes it sound like "*wrong*," etc. The Japanese language belonging to the class of agglutinative languages, and being in some remote degree related to the Ural-Altaic family, of which the Mantchoo, Mongolian, Turkish, etc., form a part, it shares with a portion of the languages in this class the construction which we might call a constant *inversion* of the mode and order in which *we* think. Thus, all those languages would *begin* their sentences where we *end* ours, so that our thoughts would really appear in their mind as inverted, Moreover, the word which characterizes or determines another has to precede it, so that not only, as in our language, the adjective comes to stand before the noun, but also the possessive or genitive case before the nominative, and the objective case before the verb. The principal verb always closes the whole sentence; all other verbs that occur in the sentence are put in the form of a participle or gerundive, whereby the sense remains, in some measure, undetermined and suspended to the end of the period. Then and then only it will be seen, in a great many cases, whether the whole sentence had to be understood as past, present or future; as affirmative or negative; whether a reguest was granted or refused, or an offer accepted or rejected, etc. The Japanese construction is, therefore, the very reverse of the syntactic order of the language of China. That most heterogeneous Chinese element which has almost submerged the genuine idiomatic nature of the Japanese language is, although of a paramount importance to the student, nevertheless a foreign intruder, somewhat similar to the abundant Romanic element in our purely Germanic English, or to the Hebrew-related Arabic in the purely Indo-European, Persian, and Hindustani. Another great difficulty results from the extreme ceremoniousness and politeness of the Japanese. Thus, in speaking with any person (except a son or a servant), it is always of the greatest importance to choose expressions which show our respect for the individual we address, in a measure, exactly proportioned to his rank or social standing. In speaking of absent persons, the same rule has to be strictly observed in regard to all the deference, honor, and respect to which such persons may be entitled. On the contrary, in speaking of one's self, it is always necessary to use expressions of great humility. This affects, in either case, the choice of the pronouns (of which there exist a great many different forms to serve all purposes), and the selection of an appropriate form of the verbs, different in the various moods and tenses; it affects likewise the declension of the nouns in the cases, as well as the formation of the plural; it affects even the particles and the whole quality, meaning, form, and nature of the words used in conversation. There exists, moreover, in Japanese, a large number of honorific verbs that express nothing but manifestations of humility and submission, or a display of courtesy and refined etiquette. When speaking of two persons at the same time, one of whom is much higher than the other, then we have to add to the name of the latter both a particle of respect and one of humility, thereby to indicate our respect for him, and also to show that a still greater honor is to be bestowed on the other person mentioned, on account of his superior condition and rank. Thus, to speak Japanese in a fairly correct manner, we have constantly to consider the person in whose presence we speak, the person to whom we speak, and the person of whom we speak, and this is often even extended to things or objects belonging to or sustaining any relation to such persons. As to the written or book language, of which we may treat on some other occasion, it is fraught with so many and such inextricable difficulties, that Father Tyanguren declared it (see his grammar, published in the city of Mexico, 1738, under the title "Arte de la lengua Japona") to be "simply an artifice of the devil to keep the Gospel out of that country." In fact the Bible has never yet been published in Japanese, and a complete manuscript translation of the Scriptures, by the Rev. Mr. Brown, missionary at Yokahama, was unfortunately consumed in a late conflagration in that city.—*Philadelphia N. American.*

Common-Sense in the Use of Machinery.

To devise improvements in any branch of mechanical science involves the exercise of a certain amount of original genius; and to fully develope such improvements, and to bring them into the most practical shape, requires, in addition to this, the application of acquired knowledge for the construction of the machine or apparatus in such manner that each of the different parts thereof may be properly proportioned and arranged with reference to the particular function which it is designed to fulfill. When this is done and the apparatus completed, its useful mission has commenced, and, except in inventing further improvements or modifications, neither inventive talent nor skill in construction can be employed upon it. Yet, however complete in itself, or however effectually it may perform its work, it is not endowed with the faculty of self-preservation, and, unless it be properly cared for, will be subject to numberless accidents and injuries, involving not only its own immediate or ultimate destruction, but, in many instances, the loss of life or limb to those employed in its operation. This necessary care requires not the attributes of genius or professional skill, but simply the exercise of common-sense. It is by prompt attention to little things that the maximum efficiency and durability of all mechanical appliances are secured. When the bearings of shafts are not oiled with sufficient frequency, not only does the increased friction necessitate a greater amount of power to drive the shaft, but the journals are abraded and destroyed in a proportionate degree. When the caps of a journal-box are left too loose, the journal "wabbles; and, if there is gearing attached to the shaft, its teeth are quickly worn out of their proper shape; while if the caps are screwed down too tight, the journal heats, the lubricating material is forced out or burned up, and both the shaft and bearing are soon rendered worthless. These matters may appear of trifling consequence, but the aggregate loss resulting therefrom is very great, and is not confined to machinery employed in manufacturing operations, but also, and probably in a greater degree, to machines employed in agriculture. Many a thresher, horse-power, or harvester has been anathematized as being badly constructed, and been prematurely disabled, when a few drops of oil or two or three turns of a wrench was all that was required to set things perfectly to rights. Many other items might be specified in which little attention to details, requiring only an ordinary application of common-sense, will guard against great and unnecessary waste of power and wear of machinery; but these are sufficient to illustrate the almost self-evident proposition that, while talent is required to originate, and practical knowledge to properly construct, machinery, its most efficient operation and the pecuniary returns resulting therefrom can only be secured by bringing to bear upon its management the plain and undeniable principles derived from every-day experience; or, in other words, by the employment of common-sense.—*Exchange.*

The Hard Rubber Patent and the Dentists.

The present age, more than any other has done, offers a reward to the successful inventor, not that inventions that are made now are of more intrinsic value than former ones, but in the present condition of society, a valuable invention is more apt to come rapidly into use, and the patent laws are available, as they were not years ago, to secure to the inventor a profit. Moreover, the rapidity with which an invention is applied to uses which were not, perhaps, at all in the inventor's mind, oftentimes brings immense returns, whose unexpectedness tends to encourage other men to seek for wealth in this way, which has in it something of the risk and chance of the lottery or the gaming table.

A striking instance of this kind may be found in the patent decision, a note of which we publish this morning, involving the right to use hard rubber, as it is called, in dentistry. The man who invented hard rubber had not, in all probability, the slightest idea of his invention being useful in that particular way. But when once he made his article, it needed very little for some one to think that, if it was mixed with vermillion, so as to resemble the color of the gums, it would be available for plates on which to set false teeth as nothing else could be.

The result is seen in this case, of which we have spoken. There are, as it is stated, some 6,000 dentists in the United States, all of whom want to use this article, and who by force of this decision are called upon now to pay to the owners of

this patent for its use. No wonder that a strong effort was made on their behalf to relieve themselves from this tribute. No wonder that as strong and a more successful effort was made on the part of the patentees to secure so valuable a right, all the more desirable possibly because it was not thought of at first. The suit probably involved as large an amount of money as any patent case which has been heard in this city for a long time.

Who would not be an invertor if he could only seize such a prize as this, or such a prize as that of the late Elias Howe, Jr., to whom nearly 150,000 sewing-machines paid license fees last year? But we cannot all invent a sewing machine or hard rubber. Still the resources of nature are not exhausted, and the future, we doubt not, has yet greater prizes to offer than any that the past can show.

The above very truthful remarks, with the report of the trial annexed, we copy from the New York *Times* of the 23d Oct. This decision is not only very important to the dental profession but likewise in a less degree to all persons who are obliged to wear artificial teeth.

UNITED STATES DISTRICT COURT.—SOUTHERN DISTRICT.—BEFORE JUDGE NELSON.

IMPORTANT TO DENTISTS—RUBBER PLATES FOR ARTIFICIAL TEETH—DEDICATIONS—REISSUE.

Henry R. Goodyear and others *vs.* Thomas G. Wait.—This was a case in equity to restrain the defendant, who was a dentist, from an infringement of the invention of Nelson Goodyear in the manufacture of vulcanized India-rubber. The facts of the case are substantially these: In the year 1851, May 6, a patent was issued to Nelson Goodyear for an improvement in the process of Charles Goodyear, in preparing India-rubber. The latter having taken out a patent in June of 1841 for a new process of vulcanizing India rubber, which was reissued in December, 1849. Nelson Goodyear's improvement consisted "in thoroughly mixing the rubber with sulphur, whether with or without auxiliary ingredients, in the proportion of about four ounces to a pound of sulphur to a pound of gum, and then subjecting the same to a high degree of heat, as in the vulcanizing process of Charles Goodyear, until the compound shall have acquired the hard, tough, and springy property." This first patent of Nelson Goodyear was surrendered, and reissued May 10, 1858, for a defective specification. On the surrender two patents were issued, one for the process and the other for the product, or new manufacture.

In the year 1854-5, afterward in 1857-8, the subject of the application of this compound of hard rubber to dental purposes engaged the attention of the proprietors, and in 1857-8, the application for these purposes having become perfected, agencies were established for the vulcanization of dental plates in the city of New York, and elsewhere, and public notice given of the same to the profession. These plates were made by mixing the compound with a certain proportion of vermillion. Infringements were immediately commenced, and some suits were brought to restrain such infringements, and various steps were taken to secure the rights of the patentees to this use of the article in dentistry. The defendant was a dentist, and was charged with having used this hard rubber in making and selling plates for artificial teeth.

The defendant contested the right of the plaintiff upon the following grounds: 1. He claimed that the reissued patents were void for want of authority in the Commissioner of Patents to issue them, on the ground that the process and the product which were described in the original patent both being new, constituted but one invention, and that the claim for either in a patent would cover both, and the case was, therefore, not one in which a reissue was allowed. 2. He claimed that the patents do not describe the invention in such full, clear and exact terms as to enable any one of ordinary skill in the art to make the hard rubber without experiment or further invention. 3. He claimed that as respected the use of the compound for dental purposes it had been dedicated to the public.

Held by the Court—First—That though it was held in Goodyear *vs.* The Railroads (2 Wallace, 360), that the process of Charles Goodyear in vulcanizing India-rubber embraced the new product, it does not follow that the claim for the product will protect the process; that where by a new process a new product is produced, the inventor is entitled to the allowance of both claims; that though both might have been in this case properly embraced in one, yet that is a question very much left, and reasonably so, to the good sense and discretion of the Commissioner; and that the original patent was properly surrendered to amend the claim, and that the reissue of two patents was unobjectionable.

Second—That the question as to the description in the patent was one which the Court had considered in the case of Goodyear and Poppenhusen *vs.* The New York Gutta Percha and India Rubber Vulcanized Company, in October, 1862, and it was there held that the description in the patents, both as respects the proportion of sulphur and rubber and as to the degree of heat necessary, was sufficiently full and certain within the requirements of the present law; and that the proofs in the present case confirm the correctness of the former decisions.

Third—That on the facts no dedication of the patent to the public is shown. The owners of the patent, besides having agencies over the country and published in a quarterly called the *Vulcanite* a list of their agents, with notice that they would furnish the compound to licensees only, and sold the compound in many places put up in boxes, in the label on which was a notice that it was to be sold only to licensees, and the defendant being examined as a witness admitted that he bought his compound at one of the Company's depots, in boxes having that label, and that in 1864 he was called on to take out a license, and declined on the ground that licenses were not protected, and that he had seen circulars warning against infringements, and was aware of suits against infringers, and that the defendants own testimony is abundantly sufficient to repel the conclusion of dedication as to himself.

Decree, therefore, for complainants, with a reference to the Clerk to ascertain damages.

For plaintiff, Messrs. Stoughton, Kellar and Blake; for defendant Messrs. Curtis and Law.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING OCTOBER 22, 1867.

Reported Officially for the Scientific American

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

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

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

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

69,956.—GYMNASTIC APPARATUS.—G. W. Bacon, London, England.

1st, I claim the combination of a ring, E, with a friction slide or buckle, D, when the latter is secured to one end of a strap, C, and so arranged as to pass readily through said ring and through a suspending link, B, and slide upon the outside layer of the strap, all substantially in the manner and for the purpose herein set forth.

2d, The combination of a hand piece, H, with the straps or bands, c, of my improved gymnastic apparatus by means of adjustable slides secured thereto, substantially in the manner and for the purpose herein set forth.

3d, The adaptation and combination of a swing seat with the stirrups, F, of a gymnastic apparatus, substantially as and for the purpose herein set forth.

4th, The friction slide or buckle, D, of my apparatus, consisting of a suitable metallic frame in combination with a hinged or movable center bar, d or g, constructed and operating substantially in the manner and for the purpose herein set forth.

5th, The use of a brake, d', in combination with a slide, D, substantially as and for the purpote herein specified.

6th, Constructing the rings, E, of my improved apparatus of layers of wood arranged and combined substantially in the manner and for the purpose herein set forth.

69,957.—SLIDE VALVE LUBRICATOR.—Simon H. Badger (assignor to himself and Robert Faulkner), Erie, Pa.

1st, I claim the combination of the cap, D, tubular stem, E, oil cup, H, cross piece, C, recesses, c c, and passages, d d, substantially as and for the purpose specified.

2d, The grooves, e e, in the face of the valve communicating with the passages, d d, substantially as shown and described for the purpose specified.

3d, The combination of the spring, F, cap, D, and top of the steam chest with recesses, c c, and passages, d d, substantially as described for the purpose specified.

69,958.—INVALID BEDSTEAD.—C. S. Baker, Manchester, N. H.

1st, I claim the construction and arrangement of the foot part hinged to the main portion by means of the segments, F, and operated by means of the shaft, G, and pinion, H, as herein set forth for the purpose specified.

2d, The construction and arrangement of the pawl, I, and spring, J, pivoted to the side of the main portion of the bedstead, as and for the purpose specified.

69,959.—CARRIAGE KNOB.—John Barclay, Attleborough, Mass., assignor to himself and Rufus D. Care, New York City.

I claim a carriage knob consisting of jaws, B B, secured to a ring, d, which is fitted loosely over the shank of a pin, A, provided with slots, C, upon the sides of the read, all made and operating substantially as herein shown and described.

69,960.—SCISSORS AND SHEARS.—William B. Barnard, Waterbury, Conn.

1st, I claim the combination of the cutting blades of scissers, shears or lamp trimmers, with suitable handles formed without rebates or recesses to receive the blades, but provided with projecting homogeneous rivets to secure the same, substantially in the manner and for the purpose herein set forth.

2d, I claim also overlapping the end of the tang of a shear blade with the inner edge of a rebate formed to receive it in the end of a suitable handle therefor, substantially in the manner and for the purpose herein set forth.

69,961.—FENCE.—H. Bartholomew, Dover Center, Ohio.

I claim the special construction and arrangement of the herein-described fence, in the manner substantially as described.

69,962.—BOLT TRIMMER.—Jesse Blackinton, Roscoe, Ill.

1st, I claim the combination and arrangement of the cutters, A A, with the connections, B B, and the levers, L M, as herein described for the purposes set forth.

2d, The arrangement of the recess, H, and the elevator bearing, H', in combination with the levers, D L and M, for the purposes set forth.

3d, The slot, F, and the pin, E, in combination with the levers, D L and M when arranged as and operating for the purposes set forth.

4th, The flat-headed bolt, P, in combination with the slot, R, and the levers, L and M, when arranged as and operating for the purposes set forth.

69,963.—CONSTRUCTION OF METALLURGIC AND OTHER FURNACES.—Henning Boetins, Hanover, Prussia.

I claim providing furnaces which are to be used in the manufacture of glass, iron, steel or other metals and substances and for other purposes, with a series of flues, d d, arranged around the outer walls of the fire place or in the walls between the fireplaces for the purpose of conveying air to the combustible gases evolved from the fuel, said flues being provided with a valve or valves, f, all as herein shown and described and for the purposes set forth.

69,964.—APPARATUS FOR DRYING AND DESICCATING.—H. G. Bulkley, New York City.

1st, I claim the openings, H K, when covered with wire ganze, or its equivalent, and regulated by valves and used in connection with a steam atmosphere, for the purposes substantially as specified.

2d, The return flues, N M, in combination with the ash pit, D, when constructed, arranged and used in combination with a steam atmosphere, substantially as specified.

3d, The mode of consuming waste steam and gases produced from substances while drying in kilns, substantially as described.

4th, The perforated ceiling, O, when made of fire-proof material and covered with any incombustible substance and used with a steam atmosphere, for the purpose and in the manner substantially as specified.

5th, The fire-proof kiln, constructed and operated in the manner substantially as described.

69,965.—CARRIAGE KNOB.—Rufus D. Case, New York City, and John Barclay, Attleborough Falls, Mass.

We claim the spring jaws, c c, having square shoulders upon their outer sides, and secured in the wood work to the inner end of the grooved screw pin, A, forming part of the same and adapted to be compressed in the groove, b, in the head, a, of said pin, as herein described for the purpose specified.

69,966.—WEATHER STRIP FOR DOORS.—Joseph Chadwick, Wheaton, Ill.

I claim the arrangement of a rubber packing, d, between the door and ridge, C, substantially in the manner and for the purposes described.

69,967.—CLOUDED YARN.—Joseph Chase, Worcester, Mass.

I claim clouded yarn as an improved article of manufacture made substantially as above described.

69,968.—BATH TUB.—John C. Clapp, Homer, N. Y.

I claim a portable bath made of india-rubber cloth, or equivalent flexible water-tight material, in such a form and manner that it may be collapsed and compactly folded or rolled into a portable bundle, substantially as herein specified.

The combination of the frame, B C D, with the portable bath, A, the whole constructed and operated substantially in the manner and for the purpose herein set forth.

69,969.—WASHING MACHINE.—A. H. Clement, Sunbury, Pa.

I claim the combination of the perforated bottom, D, and perforated slides, C, in radial grooves, b, boards, E, and beater, A B, substantially as described.

69,970.—MEDICAL COMPOUND FOR THE CURE OF RING BONE, SPAVIN, SPLINT, ETC., IN HORSES.—Wm. A. Cleveland, Waterville, N. Y.

I claim the medical compound above described to be compounded and prepared substantially as described and for the purposes described.

69,971.—ICE CREAM REFRIGERATOR.—E. S. Colton, Boston, Mass.

I claim the ice cream refrigerator made as described, that is to say, of the two boxes, A B, the metallic lining, a, the ice receiving space, f, and the three openings and their doors or covers, b C c, arranged together as specified and represented.

Also as an improvement in the molds or vessels for holding cream or liquids to be frozen by such refrigerator the construction of such molds foraminous on those surfaces to which the cream when frozen would be liable to adhere by atmospheric pressure under circumstances as described.

69,972.—CAR COUPLING.—F. F. Conner, Odin, Ill.

I claim, 1st, The arrow heads, A A', the hooks, k k', the cranks, d d', the lifting rods, e e', the pawls, c c', and side plates, R R', all in combination when constructed and arranged substantially as shown and specified.

2d, The construction of the slotted draw bar, A, in combination with the hook, k, when constructed and arranged substantially as shown and specified.

69,973.—TWEER.—John W. Crannell, Yorkville, Mich.

I claim the arrangement and combination of the irregular recessed cylinder, E, and shaft, S, with the wind chest, A, and cap, C, substantially in the manner and for the uses herein described.

69,974.—WEFT-STOP MOTION FOR LOOMS.—George Crompton, Worcester, Mast.

I claim, in combination with the sets of fingers or prongs between which the chute passes, the mechanism by which through their action the shipper lever is released when the thread is broken, substantially as set forth.

69,975.—MOVABLE TREADLE FOR SMALL LATHES.—W. Jennings Demorest, New York City. Antedated Oct. 12, 1867.

I claim the general arrangement and combination of the base, A, standards, B and C, balance and driving wheel, e, pedal, E, crank, F, and link, G, substantially as shown and described, the whole constituting a new article of manufacture termed the "pedemotor."

69,976.—COMBINED SHEEP RACK AND TROUGH.—George Febles, Fastoria, Ohio.

I claim, 1st, The adjustable pivoted racks, A, troughs, G, and bars, K, when arranged in combination with the frame, B, in the manner and for the purpose substantially as set forth.

2d, The grain bins, C, side, E, in combination with the troughs, G, and rack, A, when arranged in the manner as and for the purpose described.

69,977.—CLOTHES LINE CLAMP.—Christopher C. Fellows, Center Sandwich, N. H.

I claim the combination as well as the arrangement of the two helical springs, C D, with the jawed levers, A B, such springs being connected with the levers by arms extended from the springs and through the levers, in manner as specified.

And with the levers and springs so applied together I claim the connection of the two arms which go through each lever, the whole being substantially as specified.

69,978.—HOISTING APPARATUS.—Roger Finnegan, N. Y. city.

I claim, 1st, The levers, D and D', when provided with tubes, a and a', in combination with the levers, E and E', having cam projections, c, all made and operating substantially as herein shown and described, so that each set of levers will clamp the endless rope, C, during every alternate stroke as set forth.

2d, The levers, D and D', and E and E', when arranged as described in combination with the rope, F, and oscillating shaft, H, all made and operating substantially as herein shown and described.

3d, The arrangement of the cord, H, levers, D D', E E', and tubes, a a', as herein described, for the purpose specified.

4th, Providing the tubes, a a', with the set screws, d, substantially as and for the purpose herein shown and described.

69,979.—SLED.—John Fisher, St. Joseph, Wis.

We claim, 1st, The flexible knee, A, constructed as described, fitting and turning loosely upon the end of the iron axle, B, bolted to the bolster, D, its lower end stepped in the gripe, E, and held in position by means of the iron rave, F, whose center passes over the top of said knee, and whose ends are secured to the top of the runner as herein described, for the purpose specified.

2d, The slide coupling constructed as described, consisting of the loop iron I, bolted to the coupling tongue, g, and sliding upon the slide iron, H, bolted to the under side of the reach, H, the latter being rigidly secured to the front and rear bolsters, D, by the braces, L, all operating as described, whereby the hind runners are allowed a longitudinal play, while the bolsters are indexible, as herein shown and described.

3d, The inflexible bolsters, formed by the combination of the flexible knees, A, raves, F, slide fastenings, I K, coupling tongue, g, and immovable reach, H, substantially as described, for the purpose specified.

69,980.—FRUIT GATHERER.—T. Flager, Grass Lake, Mich.

I claim the receiver jaws, manner of operating them, mode of splicing my sectional staff with ferrule and dowel combined manner of attaching conductor to staff by means of rings to slide upon the same, also the cushion and elastic attachments, the whole constructed and arranged in the manner and for the purpose specified.

69,981.—CORN CULTIVATOR.—C. Flory, East Donegal, Pa.

I claim the specified arrangement of the pole, A, shovel beams, E F', straight cross bars, D D', with the screw bolts, o, notched and terminal, straight edged shovels, s, all constructed and combined in the manner and for the purpose specified and shown.

69,982.—ADJUSTABLE HOOD FOR COAL GRATES AND FIRE PLACES.—W. T. Foster, Jeffersonville, Ind.

I claim the cowl constructed as described, consisting of the triangular pieces, A B, pivoted together upon a common pivot at a, the part A fitting into the part B, and the latter into the chimney, and constralled by the springs, C, substantially as described, for the purpose specified.

69,983.—OAR.—Samuel W. Francis, New York city.

I claim an oar, constructed substantially as described, with the combination of devices used and set forth in the specification.

69,984.—OPERATING TELEGRAPH KEY.—William M. Franz, Bucyrus, Ohio.

I claim the combination of the pivoted transverse lever, J, and the slide, A, operated and self-adjusted by the spiral spring, F, or its equivalent, for the purpose, in the manner substantially as shown and described, as aforesaid.

69,985.—PROCESS OF ORNAMENTING MARBLE.—Smith Gardner, New York city.

I claim permeating pieces of marble and other stone, with coloring chemical fluids that will change the color of said stone, substantially as and for the purposes herein set forth.

69,986.—LINING SODA FOUNTAINS.—Wm. Gee, N. Y. city.

I claim the lining or coating of the interior of soda water fountains or retorts, with shells of tin or other suitable metal, subjecting the latter to hydraulic or other pressure, when fitted or adjusted in the fountain or retort, and then electro-plating them, substantially as and for the purpose set forth.

69,987.—MOTIVE POWER.—James A. Glenn, New York city.

1st, I claim the endless rails, B B, when secured to any kind of vehicles or crafts, and when connected with the rollers, E E', moving on the inner and outer edges of the rails, substantially as and for the purpose herein shown and described.

2d, The endless chain, D, consisting of the heads, a a, which are connected by rods, chains, or their equivalents, longitudinally and by suitable connecting rods, laterally, and when provided with rollers, E and E', so as to work within and around the endless rails, B B, as set forth.

3d, Ordinary gear for vehicles and craft, made and operating substantially as herein shown and described.

69,988.—BOSOM PAD.—Edward W. Glover, Medford, Mass.

I claim an inflated bosom pad, made by uniting the sack, C D E F, to the under side of the disk, A B, on the line, H H, which is more or less remote from the extreme edge of the disk, substantially as described, and for the purpose set forth.

69,989.—BAG HOLDER.—Thomas Harding, Springfield, Ohio.

I claim the expanding and contracting of the open spring hoop, by means of the levers, E E, as shown in fig. 1, in connection with the short bars, or levers, G G, constructed and operating as and for the purpose herein set forth.

69,990.—HAND SPINNING MACHINE.—James M. Hart, Des Moine, Iowa.

1st, I claim the arrangement of the clutch, G, driving pulley or drum, M, shifting lever, H, pendent piece, I, the band, K, and the carriage, E, operating substantially as and for the purpose herein described.

2d, The spring rack, e', and pinion, e, in combination with the feed rolls, d d', the carriage, E, the clutch, G, and the shifting lever, H, arranged and operating substantially as and for the purposes herein described.

69,991.—PUNCHING MACHINE.—G. H. Haskell, Baltimore, Md.

1st, I claim the combination of the shafts, G and L, carrying punching and rest wheels, together with feed wheels, I, substantially as and for the purpose described.

2d, I also claim the wedge blocks, P, in combination with the frames constituting the bearings to the shaft, L, substantially as and for the purpose specified.

69,992.—GRAPPLING IRON.—W. H. Hawley, Utica, N. Y.

1st, I claim the combination of the arms, A A, toggle joint, B, and hook, C, constructed and operating substantially as described, and for the uses and purposes mentioned.

2d, In combination with the grappling wires, the elevating and detaching apparatus, constructed and operating substantially as described.

69,993.—KNIFE SHARPENER.—T. Haynes, St. Louis, Mo.

I claim the arrangement and application of the angular steel bar, E, in connection with the bars, D and F, in the manner hereinbefore described, for the purpose set forth.

69,994.—PORTABLE FOUNTAIN.—J. Hegarty, Jersey city, N. J.

1st, I claim the combination and arrangement upon the pediment, B, of the bason, A, to the bottom of which is secured the metal ring, C, with the perforated bason, F, through which the tube, E, passes, flanged piston, D, within the ring, C, and music box, H, as described, all operated by the clock work substantially as herein set forth, for the purpose specified.

2d, The tube, e, as arranged around the shaft, f, and in the stem, d, of the revolving piston, D, in combination with the cylinder, C, secured to the bottom of the bason, A, so that no joints are in the device, that would require a packing to keep them water tight, as set forth.

69,995.—MEDICAL COMPOUND.—Mary Anne Hilt, Syracuse, N. Y.

I claim the above described composition, as made of the ingredients and compounded in the manner set forth.

69,996.—CAN OPENER.—Wm. L. Hubble, Brooklyn, N. Y.

I claim the can opener, formed with the cutter, d, made as described, and placed diagonally in combination with the spike, c, as and for the purposes set forth.

69,997.—NEEDLE THREADER.—Arthur Huston, Bristol, Me.

I claim the improved needle threader, made substantially as described, viz., with the spring, c, the series of grooves, b, varying in their sizes, and the series of conical or tapering holes, a, varying in their sizes, arranged together, and with the block or bar, A, as specified.

69,998.—CHURN.—Dwight Hyde, Bridgeport, N. Y.

1st, I claim the dashers, a, bevelled, as shown and arranged on a vertical octagonal shaft, in a spiral ring, one dasher on each side of shaft, substantially as and for the purpose specified.

2d, The combination of the driving wheel, A, gear wheel, B, bent, b b, body, D, with the shaft, c, and dashers, a, when said shaft and dashers are constructed and arranged as set forth as described, for the purpose stated.

69,999.—PLOW.—J. E. Jinkins, Milton, Fla.

1st, I claim the adjustable share, C, applied to the front bar, a, of the frame, a, of the plow, substantially as and for the purpose specified.

2d, The adjustable side cutter or scraper, D, in combination with the adjustable share, C, and frame, A, all arranged to operate in the manner substantially as and for the purpose specified.

70,000.—PUMP.—A. Jusberg, Galva, Ill.

I claim the arrangement of the pump cylinder, A, cylinders, n n2, chambers, G G2, G3, G4, valves, I K, plates, B B2, and F, forming chambers, E, all operating as described, for the purpose specified.

70,001.—HARVESTER.—M. A. Keller, Littletown, Pa.

1st, I claim the crank shaft, L, and rod, P, in combination with the standard bar, Q, bars, O M, lever, W, rod, e2, double crank shaft, A2, and cutter bar, U, substantially as described, for the purpose specified.

2d, The standard bar, S, lever, T, bar, O, and cutter, V, in combination with the crank shaft, L, rod, P, standard bar, Q, bar, M, lever, W, rod, e2, and double crank shaft, A2, substantially as described, for the purpose specified.

70,002.—HORSE HAY FORK.—J. H. Kendrick, Dayton, Mich.

1st, I claim the adjustable jointed trip brace, G, in combination with the tine, E, standard, A D, and pulley block, F, and clevis, H, all constructed as described, for the purpose specified.

2d, The combination and arrangement of the curved standard, A, tines, B E, brace bars, C D, adjustable jointed trip brace, G, clevis, H, pivoted pulley block, F, pulley, K, on the brace bar, C, all constructed and operating as described, for the purpose specified.

70,003.—TOY CUE.—Eben W. Keyes, Boston, Mass.

I claim a cue, consisting of a handle, K, barrel, L, rod, M, and trigger, O made substantially as described, and for the purpose set forth.

70,004.—HORSE RAKE.—G. W. King, Schoharie, N. Y.

I claim, 1st, The links, c c', hinged to the axle, a, and receiving the rake head, e, in combination with the shafts, b, and sliding seat rider, g, substantially as set forth.

2d, The arrangement of the lever, r, dumping spring, t, treadle, s, levers, m, h and o, and chain, w, substantially as and for the purposes set forth.

70,005.—WRENCH.—B. S. Lawson, Brooklyn, E.D., N.Y. Antedated Oct. 12, 1867.

I claim the slotted tapering wedge, A, in combination with the movable jaw, e, screw, d, and nut, f, all made operating substantially as herein shown and described.

70,006.—CARRIAGE CORNER BODY IRON.—S. Z. Lesile, Hartland, Me.

We claim, 1st, The tube or socket, d, in combination with the body corner irons of carriages, substantially in manner as described and shown.

2d, The spring, f, or its equivalent, in combination with tube, d, and pillar G, substantially as described and shown.

3d, The flange, b, formed upon the corner iron, to connect with the sills substantially in manner as and for the purposes specified.

70,007.—HARVESTER RAKE.—Edward I. Layburn, Lexington, Va.

1st, I claim the construction of the rake arm, of two sections, lapped and connected together by means of joints, so as to admit of the lower section having the rake attached to it, being turned independently of the upper section, substantially as described.

2d, The rake guide, D, applied substantially as described, and having a turning pin, f, secured to its inner end, in combination with the fork, h upon the rake arm, E E', for the purpose described.

3d, The cam rail, J', in combination with the cam, J, applied to the reel post, B, substantially as described.

4th, The pivoted and elastic yielding rake, S, applied to an arm which is combined with a reel, and operated substantially as described.

70,008.—HORSE RAKE.—John M. Long, Hamilton, Ohio.

1st, I claim the rake teeth, F, constructed and attached to the axle, D, substantially in the manner herein shown and described.

2d, The arrangement of the shafts, A, slotted axle, D, bar, B, cleavers, C lever, G, and teeth, F, as herein described, and for the purpose specified.

70,009.—CHURN.—H. H. Macklin, New Springfield, Ohio.

I claim the special construction of the adjustable frame, B, and breakers, C, in combination with the slats, D, beaters, D', and box, A, when arranged and operated in the manner substantially as described.

70,010.—TOOL FOR OPENING SHEET METAL CANS.—Chas. Messenger, Cleveland, Ohio.

I claim the rod, C, blade, E, and ring, D, in combination with the plate, A, for the purpose and in the manner set forth.

70,011.—CONSTRUCTING FAGOT FOR BEAM.—W. W. Miller, Safe Harbor, Pa.

I claim the fagots for piling beams, of smooth top and bottom plates, A A, vertical or horizontal plates forming the web, B, all secured together by the bars, c, dovetailed into such top and bottom plates, flush with their ends, and into the web, B, or upon its outer sides, substantially as herein shown and described.

70,012.—PREPARING TOBACCO.—Gabriel Neudecker, Richmond, Va.

I claim the process, herein described, of manufacturing tobacco: by subjecting the pressed tobacco to a temperature of about 120° Fah., until all tendency to vegetable fermentation is destroyed, and then repressing and repacking in fresh cases, substantially as and for the purposes set forth.

70,013.—WAGON AXLE AND GEARING.—L. F. Palmer, Endfield, N. Y.

1st, I claim the construction of a revolving axle, for a wagon or carriage, with two journals or boxes, the outer one in the hub of the wheel and the inner, or other, under the springs or bearings of the body of the wagon on the axles, and their arrangement in the manner substantially as described.

3d, So constructing the lower part of the boxing under and connected with

the springs that the plate, H, can be removed, and the revolving axles, without disturbing the straps, J J, or the springs, or the other parts connected therewith, as described.

3d, The placing over the springs the broad plate, L, and beneath the block, A, the upper part of the boxing of a revolving wagon axle, and binding the same in one fixture, independent of the lower part of the boxing, H, as described.

4th, The perforated plate, L, spring, K, block, A, and box, O, of a wagon with revolving axles, all provided with a tube or passage, P, for the purpose of oiling the boxing and journals, as described.

70,014.—CARBURETOR FOR LOCOMOTIVE HEAD LIGHTS.—F. S. Pease, Buffalo, N. Y.

1st, I claim the combination of a carburetor with the head light of a locomotive when the former is placed within the shell of the head light, substantially as described.

2d, I claim the combination of the spring, the blast apparatus, one or more, and the carburetor, arranged in the shell of a head light.

3d, I also claim an argand burner and a carburetor, arranged within the head light of a locomotive.

70,015.—COAL HOD.—Jacob Pfitzinger, Buffalo, N. Y.

I claim a coal hod having a malleable iron bottom, B, valve, C, short pipe connection, D, and skeleton frame, E, substantially as herein described.

70,016.—EXTENSION LADDER.—H. M. Quackenbush, Herkimer, N. Y.

1st, I claim the hook having an inclined top, e, in combination with the with the spring, d, and parts, A and B, of the ladder, substantially as specified.

2d, I claim the guard finger, f, in combination with the hook, D, and parts, A and B, of the ladder, substantially as specified.

3d, I claim the spring, d, or its equivalent, in combination with the hook, D, substantially as specified.

70,017.—MOP WRINGER.—R. T. Reed, Binghamton, N. Y.

I claim the combination of the frame, B B, consisting of the spright pieces and spring arms, C C, with the rollers, A A, wire or cord, D, all operating within the compass of the area, of the pail, counstructed substantially as herein described and for the purpose set forth.

70,018.—SKIRT WIRE.—Geo. W. Reynolds, Smethick, Eng.

I claim skirt wire first covered with an envelope of paper, or similar material, applied as described, and then an open braided covering or jacket, substantially as set forth.

70,019.—BUCKLE.—Lawrence Rhoades, Newport, R. I.

I claim the buckle, A A, when provided with the supplementary loops, B B, pivoted at b, in eachend thereof, opening outwardly and upon the sides of the buckle in such a manner that the strain upon the end, C, of the strap presses it against the sides of the frame, and the strain upon the end, D, releases it, as herein set forth for the purpose specified.

70,020.—MACHINE FOR CUTTING CHEESE.—Wm. Rhoads, Jr., and Tiras Gerhard, Reading, Pa.

We claim the revolving table, B, when provided with the cog wheel, b, operated by means of the pinion, c, attached to the shaft, F, in combination with the rack, a, knife, E, and pinioned, d, upon the shaft, D, as herein shown and described.

70,021.—STEAM RADIATOR FOR HATTERS' KETTLES.—John S. Rice, Newark, N. J.

I claim the arrangement of the perforated pipe, C, perforated drum, A, and kettle, B, all constructed as and for the purpose set forth.

70,022.—GARDEN LINE, ETC.—C. Richel, Cleveland, Ohio.

I claim the mechanical movements with a spring, in combination with the chalk box and line, substantially as and for the purpose set forth.

70,023.—CARPET STRETCHER.—Wm. A. Robinson, Grand Rapids, Mich.

I claim the combination of the ratchet bar, g, pawls, k k, and lever, I, with the gripes, A A, and platform, m, substantially as and for the purpose intended.

70,024.—BUNG AND BUSH.—John Ruegg (assignor to J. G. Marriott), St. Louis, Mo.

1st, I claim the bushing, A A1, when provided with screw threads; a a1, and rivet holes, a2, and with a cap or lock plate, C, as described and for the purpose set forth.

2d, I claim the bung, B, when provided with screw threads by means of which to secure it to the bushing, and the vent channel, b1, and wrench shank, b, as and for the purpose shown and described.

70,025.—PROTECTOR FOR THE EDGES OF COLLARS.—Cyrus W. Saladee, Newark, Ohio.

I claim protecting the wearing edge of collars and cuffs by securing thereto the shield piece, B, in the manner and for the purpose substantially as shown and described.

70,026.—LOOM SHUTTLE.—F. W. Sawyer, Grafton, Mass.

I claim a shuttle having friction rolls, B B, the journals of which are supported in bearings inserted in slots or recesses cut or formed in the bottom of the shuttle, substantially as described.

70,027.—WHEELS FOR VEHICLES.—W. T. Sawyer, Mobile, Ala.

I claim a wheel provided with spokes, D, and supplemental spokes, C, having their inner ends confined upon the hub by means of a groove, or its equivalent, substantially as and for the purpose set forth.

70,028.—CONSTRUCTION OF ROOFING.—John Scanlan, Chicago, Ill. Antedated Oct. 16, 1867.

1st, I claim so arranging the several layers of material used in forming the strips of felt roofing as to make the edges of said strips thinner than the central portions, substantially in the manner and for the purposes specified.

2d, I claim as a new article of manufacture the roofing strips composed of the material, and arranged in the several layers herein specified.

70,029.—ROOFING FABRIC.—John Scanlan, Chicago, Ill. Antedated Oct. 16, 1867.

I claim, as a new article of manufacture, roofing composed of two layers of saturated felt and one layer of dry felt, arranged as and for the purposes specified.

70,030.—FELT ROOFING.—John Scanlan, Chicago, Ill.

I claim, as a new article of manufacture, roofing material manufactured in strips and composed of three layers of saturated felt, arranged as and for the purpose specified.

70,031.—METHOD OF PROTECTING THE HEATED PARTS OF FURNACES.—Ed. Geo. Scovil, St. Johns, New Brunswick.

I claim protecting metallic and other surfaces from the effect of heat by the circulation of water when the circulation is caused by the heat and in the manner as substantially herein shown and described.

70,032.—HAY RAKER AND LOADER.—Bradford Shirley, Moravia, N. Y.

1st, I claim the revolving frame, C, the rake teeth, I, moving radially, as described, and the arms or teeth, a, combined and arranged as represented, and adapted to operate together, substantially as and for the purpose herein specified.

2d, I claim, in connection with the above described frame, C, the teeth, I and a, or their equivalents, the cams, K L, constructed and arranged as represented.

3d, I claim, in combination with a revolving rake wheel or frame, C, and its several connected parts, I J, and cams, K L, substantially as represented, the employment of the yielding rake teeth, D, adapted to slide on the ground, and the intermediate teeth, G, the whole combined and arranged for joint operation, substantially as and for the purpose herein set forth.

70,033.—SLOTTING MACHINE.—Elias Shopbell, Ashland, O.

I claim the punch or chisel, D, provided with angular cutting lips, E, in combination with the die, B, and hinged guide, F, when arranged in the manner and for the purpose described.

70,034.—LIFTING JACK.—E. Shopbell, Ashland, Ohio.

I claim the perforated tubular standard, A, with the pivoted lever, C, and cam E, in combination with the slide rack, B, pawls, D, and spring, B1, all arranged and operating conjointly, substantially as and for the purpose set forth.

70,035.—HORSESHOE.—Silas Sloat, Morgan, Ohio.

I claim the securing the horseshoe, A, to a metal flange, B, having a vertical portion, e, with a horizontal portion, c, projecting from its inner side or surface, in combination with pieces, C, of leather, or other suitable material, attached to the portion, e, of the flange, as shown, and the elastic metal strips or bars, E E, attached to C C, and provided with lateral projections or spurs, l, which pass through, C C, into the wall of the hoof, and are retained therein by the strap, F, all arranged, substantially as and for the purpose set forth.

70,036.—ENDLESS CHAIN.—Amroy B. Smith, Yankton, Dakotah Ter., assignor to Frank M. Smith, Chicago, Ill.

1st, I claim the polygonal wheels, A A1, each having an odd number of angles, when so placed in relation to each other that when an angle of one is vertically above its shaft, two angles of the other shall be equidistant from a vertical line passing through its shaft, in combination with the endless chain of buckets, in the manner described.

2d, The endless belt, D, composed of the plates, p p, constructed as shown, and connected by the hinges, h h, and rods, r r, and bearing the buckets, M M, when constructed and operating substantially in the manner and for the purposes specified.

3d, The combination of the belt, D, and wheels, A A1, in such a manner that in passing over the wheels, the hinges, h h, and connecting rods, r r, of the belt shall rest on, and be supported by, the bars, C C, substantially as and for the purposes shown.

4th, The connecting bars, C C, having the channeled bed in their center and their extremities bent up, substantially as and for the purposes set forth.

70,037.—VENTILATOR.—Antonio F. Smith, Ellsworth, Me.

I claim the said ventilator and spark annihilator, made substantially as described, viz: of the box, A, the induction and eduction smoke pipes, D E, the perforated partitions, B C, and the ventilating pipe or pipes, E, or with the same, and the deflector, G, arranged as specified.

70,038.—APPARATUS FOR CASTING REFRACTORY METALS.—Michael Smith, Philadelphia, Pa.

1st, I claim the provision, in a mold for casting metals, of a plunger, K, and a separate injecting vessel or cylinder, J, having a lining of clay and plumbago, or other suitable nonconducting material, to be detached in the manner described, and a temporarily closable communication with the molds, substantially as and for the purpose set forth.

2d, The combination of the mold box, D, detachable thimble, I, injecting cylinder, J, and plunger, K, all constructed, arranged, and operating in the manner and for the purposes explained.

3d, The arrangement of a series of molds, having consecutive orifices or gates, a slab or follower, B, and set screws, F, and box, D, as and for the purpose set forth.

4th, I claim the subject of the clause last recited, when inclosed within a tight chest, G, having suitable connection with an air exhaust for the purpose stated.

70,039.—BUTTON.—D. M. Somers, Brooklyn, N. Y.

I claim the combination and arrangement of the button provided with a conical aperture through its shank or neck, the largest diameter of which is at the face of the button, and the disk provided with a hollow central stem, to pass into and be expanded within the aperture in the button, all substantially as described and for the purposes set forth.

70,040.—SHANK LASTER.—W. Steele, and F. Henderson, Sistersville, West Va.

We claim the combination and arrangement of the pincer jaws, or their equivalents, with the eccentric lever, in the manner described and for the purpose set forth.

70,041.—BED-SPRING GUIDE.—Adolph C. Stich, Kalamazoo, Michigan.

I claim, 1st, The guide, Fig. 3, with spring, E, working through sleeve, C, set in slat, D, in combination with socket joint in disk, a, operating in a manner set forth and described.

2d, The ball joint in disk, a, operating in the manner set forth and described.

70,042.—MELTING FURNACE FOR THE MANUFACTURE OF STEEL.—Wm. Swindell, Allegheny City, Pa.

I claim, 1st, Constructing melting furnaces for the manufacture of steel, with iron casing or shell, lined with fire brick, substantially as and for the purposes hereinbefore described.

2d, The use, in combination with the iron casing or shell of steel furnaces, of supports for upholding the upper portion of the brick lining, while the lower portion is removed or repaired, substantially as hereinbefore described.

3d, The air-holes, i, i, around the grating at the bottom of steel furnaces to allow the air to enter between the grate bars all around, for the purpose of equalizing the combustion of the fuel within the furnace.

70,043.—VAPOR BURNER.—Dexter Symonds, Lowell, Mass.

I claim, 1st, a gas generating and gas burning lamp, constructed and arranged to operate substantially as and for the purpose specified.

2d, The insulator f, arranged and applied substantially as and for the purpose set forth.

3d, The arrangement of the tubes or pipes, G, and b, whereby the fluid is protected from the action of external heat, substantially as set forth.

70,044.—HORSE HAY FORK.—L. H. Tears, Troy, assignor to himself and Theodore Hatfield, Scranton, Pa.

I claim the combination of the hooks, A, and B, with blade, D, and crank lever, when arranged, constructed and connected together substantially as and for the purpose described.

70,045.—KILN FOR ROASTING IRON ORES.—Alois Thoma (assignor to himself, Samuel Bromberg and Artemus W. Wilder), New York city.

I claim, 1st, The arrangement of the channels, a, b, and c, within the kiln, A, B, for conducting gas and air to the ore, substantially as herein shown and described.

2d, The perforated pipe, e, when arranged in the lower part B, of the kiln, in combination with the channels, d, d, made as set forth.

3d, The process herein shown and described of roasting ore, by means of gases discharged from distant fires of any kind of fuel as described.

4th, The process herein shown and described of desulphurizing the ore, while roasting the same, by conducting water into the pipe, e, whereby the use of the steam boiler is dispensed with, and by combining the steam produced from the water with atmospheric air, as and for the purpose set forth.

70,046.—FURNACE FOR SMELTING IRON ORE.—Alois Thoma (assignor to himself, Samuel Bromberg, and Artemus W. Wilder), New York city.

I claim, 1st, Arresting the gases arising from smelting furnaces, so that they may be used for the roasting or some other process, substantially as herein shown and described.

2d, Providing a smelting furnace with two discharge channels, D, D, having suitable dam-stones, E, E, substantially as and for the purpose herein shown and described.

3d, The channels, b, b, when arranged in a smelting furnace, to retain and carry off the gases, as set forth.

4th, The shoulder, a, when formed in the charge chamber of the furnace, in combination with the channels, b, b, all made and operating substantially as and for the purpose herein shown and described.

5th, The channels, b, b, in a smelting furnace, when combined with the channels, c, blocks, or doors, d, and chimneys, e, all made and operating substantially as and for the purpose herein shown and described.

70,047.—FURNACE FOR REDUCING IRON ORES.—Alois Thoma (assignor to himself, Samuel Bromberg, and Artemus W. Wilder), New York city.

I claim, 1st, Reducing iron ore by means of gases produced from fires, the fuel of which is not in contact with the ores, substantially as and for the purpose herein shown and described.

2d, The arrangement of the structures, A, and C, connected by channels, d, and e, and with air blasts, h, substantially as herein shown and described.

3d, The arrangement in the lower part of the tube, A, of the sliding grate, or plate, f, and removable or sliding bottom, g, all made as described.

70,048.—FURNACE FOR MELTING AND PURIFYING STEEL.—Alios Thoma, (assignor to himself, S. Bromberg and A. W. Wilder), New York city.

I claim, 1st, Smelting steel in an open pan, by blowing a purified flame over the surface of the steel in the pan, substantially as herein shown and described.

2d, The pan, l, in which the steel may be smelted, is placed, when said pan is made in sections so that it can be easily inserted and removed through the narrow doors of the furnace, substantially as herein shown and described.

3d, Connecting the smelting oven, C, with the air-heating chamber, E, by means of a chamber, b, so that the air-pipe, n, is heated in the chamber, D, and not in the oven C, substantially as and for the purpose herein shown and described.

4th, So arranging a furnace for smelting steel that the steel can be tested and treated during the smelting process, substantially as herein shown and described.

5th, The chambers, C, D, and E, when connected by channels, a, and b, and when combined with the reservoir, l, blast channel, j, pan, l, and pipe, n, all made, arranged, and operating, substantially as and for the purpose herein shown and described.

6th, Making the blast channel, j, wider at its lower end, and arranging it obliquely in the furnace, substantially as and for the purpose herein shown and described.

70,049.—TOOLS FOR JEWELING WATCHES.—A. Thoma, Sen., Piqua, Ohio.

I claim the tool, B, for closing or setting jewels in watch plates, consisting of the round, hardened, cup-shaped joint, C, substantially as herein shown and described.

70,050.—BARREL HEAD.—M. L. Thompson (assignor to himself and John P. Rittenhouse), Flemington, N. Y.

I claim the blocking piece, e, formed as set forth in combination with the sections c, c, and d, d, composing the head as and for the purposes specified.

70,051.—MORTISING MACHINE.—C. R. Tompkins, Rochester, N. Y.

I claim the arrangement of the adjustable spring rod, E, lever, D, reversing scroll collar, R, collared sleeve, S, with its projections i, locking bar, y, and the spring catch, t, substantially in the manner and for the purposes herein shown and described.

70,052.—TELEGRAPH INSULATOR.—John L. White, Burlington, Iowa.

I claim the combination of the cup, A, having shank, B, and hook, C, or its equivalent, when the latter is insulated from the former, and the shank of the former, coated with gutta percha, or any other suitable insulating medium or material, substantially as herein described, and for the purpose specified.

70,053.—SAFETY STIRRUP.—William Weddington, Alexandria, Ind.

I claim the foot bar, C, pivoted at a, in the ends of the bows, A, and resting upon the projecting foot bar, B, and provided with a bow A, whose upper curved end presses against the head of the stirrup when the foot is placed therein, as herein set forth for the purpose specified.

70,054.—COMPOSITION FOR TREATING BURNING FLUID.—Hiram B. Wellman, Indianapolis, Ind.

I claim a composition of soda, ash, or Epsom salts, with gum arabic, or gum tamarack, or white pine gum, and with or without alum or gum camphor, for mixing with and dissolving in carbon oil, benzine, or other hydrocarbon burning fluids, for the purposes substantially as herein before set forth and described.

70,055.—CARPET FASTENER.—George E. West and William R. Cunningham, La Fayette, Ind.

I claim the combination of the strips, B and C, with the tongue, D, all arranged with the base, A, as described, for the purpose specified.

70,056.—PORTABLE VEHICLE.—Samuel Wheelock, Conway, Mass.

1st, I claim so constructing a vehicle for ordinary purposes of conveyance, as to be enabled to dismember, or fold, or reduce in bulk, such wheeled vehicles, for purposes of packing for transportation.

2d, I claim the mode, substantially as herein described and shown, of applying the wheels to the carriage, that is by means of the arms, l l, pivoted at one end to the seat or body of the carriage, and supported at their free ends by the extremities of the spring, n.

3d, I also claim applying the spring of a vehicle or carriage to its body in such manner as to serve the purposes both of a spring and as a means of confining the wheels to the carriage and allowing of their being readily removed therefrom.

4th, I claim combining the dasher or foot rest of vehicle to its seat or body, in such manner as to allow of its being turned inward upon or over such seat, essentially as before explained.

5th, I also claim the construction and application of the top of a vehicle, in such a manner as to permit of its being lowered and folded within, or upon the seat of such vehicle.

6th, I claim the peculiar coustruction and arrangement as well as the application of the top, o, of the carriage, such consisting of the braces, p p, swinging feet or supporters, t t, bows, u u and v v, and straps or bands, w w, substantially in manner and for the purposes as before set forth.

7th, I claim the peculiar constructtion and combination with the dasher or foot rest, b, of the pole, c, as consisting of the foot, f, and handle, g, in manner and to operate as specified.

70,057.—CORD STRETCHER.—R. White, Decatur, Ill.

1st, I claim the windlass, B, supported in the frame, A, in combination with the supporter, H, when the same are constructed, arranged, and combined substantially as described, for the purposes set forth.

2d, I claim the hooks, c, in combination with the support, H, as for the purposes described.

70,058.—LUBRICATOR.—J. B. Wickersham (assignor to E. D. B. Wickersham), Philadelphia, Pa.

1st, I claim securing the glass fountain to the metallic socket and in the manner specified.

2d, A movable stem, e, constructed as set forth, in combination with the glass fountain and metal socket, g, as set forth.

3d, The wire covered with fibrous material and applied in the manner specified to a lubricator, for the purposes set forth.

70,059.—HARVESTER.—J. D. Wilber, Poughkeepsie, N. Y.

I claim the combination of a ratchet with free or independent pawls, one or more, arranged so as to operate that is to say, engage with and disengage themselves from the ratchet by virtue of their own gravity only, substantially as set forth.

70,060.—GRAIN SEPARATOR.—J. Newton Williams, Jr., St. Paul, Minn.

1st, I claim adjusting lever, D3, in combination with the staples, d, or their equivalents, to permit an independent motion of the feed board, substantially as described.

2d, Imparting a shaking motion to the feed board, D1, from the shoe, substantially as described.

3d, The supporting hangers, f, in combination with the chute board, E, substantially as and for the purpose set forth.

4th, The lever, E1, actuated by the shoe and imparting a lateral vibration to the chute board, E, substantially as described.

5th, The conveying cleats, E2 E3, arranged as described, on the chute board, to discharge the grain in a concentrated body.

6th, The tappets or knockers, S S, pivoted to and actuated by the chute board and confined below their pivots so as to jar the screen, substantially as set forth.

7th, The combination of the connecting rod, M, with the eccentric, N, on the fan shaft, and the rock, L, whereby the front end of the shoe is suspended substantially as described.

8th, The combination with the feed board, D1, of the fingers or teeth, D5, substantially as and for the purpose set forth.

70,061.—RAILWAY FROG.—James Wixted, Port Carbon, assignor to himself and H. K. Nichols, Pottsville, Pa.

I claim the steel point, d, confined to the plate, A, of a frog, and between the rails or ribs, b and b', of the same, by the wrought iron or steel strips, m m, all substantially as and for the purpose herein set forth.

70,062.—APPLE CORER AND SLICER.—G. C. Wright, Le Roy, O.

I claim in combination with the slicing device the follower, C, vertical spring, c, surrounding such follower, and the lever, E, hung to the post upon the bottom, A, all arranged as described, for the purpose specified.

70,063.—MECHANICAL MOVEMENT.—Edwin Allen (assignor to Allen Manufacturing Co.), Norwich, Conn.

I claim the gear wheel, A, constructed with one or more chords, a, whose ends are connected by irregular sections, c b c, in combination with the gear wheel, D, composed of a corresponding number of arcs, d, with irregular connecting sections, e f e, all as herein represented and described.

70,064.—WASHING MACHINE.—Daniel Arndt, Ripon, Wis.

1st, I claim the levers, E E, pins, d d, and spring, e e, with the roller, D, and its extended axle, as and for the purpose set forth.

2d, The levers, E E, pins, d d, springs, e e, and roller, D, used in combination with the box, A, provided with a cover, F, for the purposes specified.

70,065.—MACHINE FOR CROSSING BATS FOR FELTING.—Alonzo C. Arnold, Norwalk, Conn.

I claim the arrangement of the series of traveling endless toothed bands, A, and dividing rollers, F, or their equivalents, in the manner as and for the purpose described.

Also, in combination with the arm, E, and levers, N, slotted vibrating lever, G, rotating arm, H, and pin, I, as and for the purpose set forth.

70,066.—HAT FELTING MACHINE.—Jean F. Badoye, New York City.

I claim the workers, l, mounted on arms that pass through mortices in the rock shaft, f, in combination with the kettle, b, and inclines, for operating in the manner specified upon a roller containing the materials to be felted.

70,067.—PRINTING PRESS.—Henry Barth, Cincinnati, Ohio.

1st, I claim the provision of the ink table or surface, I J J', arranged to admit of a greater or less reciprocation transversely to the path of the inking rollers by means of the compound adjustable cam, G G', or its equivalent, in manner substantially as set forth.

2d, In combination with the slotted ink table, I J J', and inking rollers, P P' P'', I claim the intermittent roller or shifter, K, applied and operated substantially as and for the purpose explained.

3d, The arrangement of the frisket, Z, screw pins, z, springs, z', and cams, t t', or their equivalents, for the purpose set forth.

4th, The eccentric journaling of the roller frames, D', upon the shaft B, for the purpose stated.

70,068.—PUMP.—Frederick Bauschtleker and Barnet Vanfleet, Washington, D. C.

1st, The pump box, B, having a smooth exterior and provided with perforations, c c c, and internal annular grooves, a a a, substantially as and for the purpose specified.

2d, The combination of the valve having the two leaves and the projections with the vertical slots or grooves, 11, in the interior walls, substantially as and for the purpose described.

70,069.—CAR REPLACER.—Alfred G. Black, Wooster, Ohio.

I claim the shifting rail, E, when provided with the bolts, g, in combination with the bed piece, C, and slab rail, H, substantially as and for the purpose set forth.

70,070.—COMBINED LAND ROLLER AND PLASTER SOWER.—George F. Brock and Eli Brondige, Davisburg, Mich.

1st, I claim connecting the inner ends of the rollers, C C, to the frame, A, by means of the L-shaped metal bars, L L, and link, S, in the manner and for the purposes set forth.

2d, The arrangement of the frame, A, with the rollers, C C, bars, L L, arms, K K, ropes or chains, m m, and pulley, o o, in the manner and for the purposes set forth.

3d, The plaster distributer, G, constructed as set forth, and used in the hopper, E, with slide, H, when said hopper is connected to the rollers, C, by means of the pulleys, a and d, with their chains, b, for operating the same as specified.

70,071.—GUARD FINGERS FOR HARVESTERS.—Alfred Brown, Horatio D. Worcester, and Abram M. Griswold (assignors to themselves and B. F. Gray), Ganier, Ill.

I claim the detachable steel plate, B, provided with the flanges, e e, either with or without the sickle edges, substantially as described and for the purposes set forth.

70,072.—MACHINE FOR MAKING BASKETS.—Franklin H. Brown (assignor to himself, Edward F. Peugeot, and Lemuel H. Fiersheim), Chicago, Ill.

1st, I claim the arrangement of forms E, radiating from the shaft B, in combination with the packing device, O, as and for the purposes specified.

2d, The arrangement of ring, D, in combination with cams, H and G, slides, x, and rods, Q, as and for the purposes set forth.

3d, The arrangement of cup, Y, in combination with shaft, B, and rods, a, as and for the purposes specified.

4th, In a machine for weaving baskets, the arrangement of arm, M, shaft, B, and set screw, m, as and for the purposes set forth.

5th, In a machine for weaving baskets, the vibrating apron P', as set forth and for the purpose specified.

6th, The adjustable nut, N, in combination with the rods, O and Q, as and for the purposes set forth.

70,073.—MACHINE FOR HULLING AND SCOURING WHEAT.—Nathaniel M. Burr and William Martyn, Pawtucket, R. I.

I claim, in combination with the cone and screening cylinder, the former running inside of the latter and made adjustable in relation to it, and both inclosed in a box or case and revolving in opposite directions therein, the suction fan on the exterior of said box or case and drawing the dust, hulls, etc., from its interior through closed passages while the cleaned grain by its greater specific gravity is separated and passed off through other avenues, substantially as herein described and represented.

70,074.—WATCHMAKERS' TOOLS.—John M. Cayce, Franklin, Tenn.

I claim the instrument above described having blades, a a, the guide, B, and the gage screw, C, substantially as and for the purpose specified.

70,075.—SELF-ADJUSTING WHIP HOLDER.—H. M. Curtis and A. Worden, Ypsilanti, Mich.

We claim the shape and construction of the whip holder and the connection of the two sectional halves by hinges or joints in such a manner as to hold the whip when inserted closely and firmly by clasping the same at the top and bottom of the holder at the same time, the holder being formed of metal, cast or pressed into proper shape, substantially as and for the purpose set forth and described.

70,076.—METALLIC PAVEMENT.—Jeremiah Dean, West Roxbury, Mass.

I claim the construction and arrangement in all its parts, of a metallic pavement, as described.

70,077.—WATER BACK AND GRATE OF COOKING AND HEATING STOVES.—George Dervey, Blooming Valley, Pa.

1st, I claim a cookstove provided with a water and steam jacket around the sides, back and bottom of the fire box, substantially as and for the purpose described.

2d, The combination of the hollow grate bars, T, with the water and steam jacket, as described.

3d, The heating pipe, P, with its bent part, l, which latter forms a shelf in the bake oven, H, and supplied with steam from the boiler, D, arranged and operating substantially as described.

4th, The pipe, G' P and P2, arranged substantially as described and the latter connected to the steam jacket of the cooking stove, for the purpose of heating the rooms by means of the cooking stove.

5th, Passing the pipe through which the steam is led into the different rooms in the shape of a coil through the chimney or stove pipe, after leading it around one room and before passing it into the next, substantially as described.

6th, The elastic pipe, N, attached to either a stop cock on the boiler, D, or the spout of the teakettle and leading into the bake oven, substantially as and for the purposes described.

7th, The combination and arrangement of the fire box, B, pipes, H, port, G, pipe, G1 G3, and hollow bake oven, H, substantially as and for the purpose described.

70,078.—BOOT AND SHOE HEEL.—Christopher Dyer, Jr., and Ellis Drake, Stoughton, Mass.

We claim a heel having the following characteristics: a body, A, constructed of wrought metal, a cast metal tread, C, and screws, D, adapted to be applied to a separate shank, F, having lug or nut, E, whereby the parts are held together independently of any other fastenings, as herein described.

70,079.—MANUFACTURE OF HORSE COLLARS.—E. P. Edstrim, Somerville, Mass.

I claim the improvement in the manufacture of horse collars by forming a core and applying thereto the roll and body leather upon a system or series of blocks, substantially as set forth.

70,080.—CORN CRIB.—N. T. Fitch, Forsyth, Ill.

I claim, 1st, The method or plan substantially as herein described of constructing corn cribs whether the same consist of one single crib or of two or more united, as shown and described.

70,081.—COMBINED KNOB LATCH AND LOCK.—M. B Foote (assignor to himself and E. N. Foote), New England Village, Mass.

I claim the latch bolt, B, having the wide slot herein described and having in one of the walls of that slot a mortise to receive the bolt of the lock, D, substantially as and for the purpose specified.

70,082.—WASHER FOR AXLE BOXES.—Walter K. Foster, Cambridgeport, Mass.

I claim the combination and arrangement of one or two metallic annuli or guards or flanged rings with a leather washer, or its equivalent, arranged within said rings, and used on an axle journal in manner as set forth.

I also claim the flanged guards as made with lips on their inner ends and outer circumferences to receive a washer, as specified.

70,083.—PADDLE WHEEL.—William Goodwin, Boston, Mass.

I claim my improved arrangement of the boats or paddles of the two series substantially as described and represented.

I also claim the combination and arrangement of the openings, a, in the several paddles or floats with the two series of paddles or floats, arranged together as specified.

70,084.—PADDLE WHEEL.—William Goodwin, Boston, Mass.

I claim as my invention the wheel or combination as composed of the three forms, A B E, made as described and of the two series of paddles, C D, having the paddles of each series arranged obliquely in the wheel and diagonally and in other respects with regard to those of the other series as explained and also having each pair, C D, of such paddles united at their middles to one of the spokes or arms of the intermediate frame, E, the whole being substantially as specified.

70,085.—PROCESS OF REMOVING BURRS AND OTHER SUBSTANCES FROM WOOL.—William A. Govern, Norwalk, Conn.

I claim treating wool for the removal of burrs and other vegetable matter therefrom, by the process substantially as herein described and set forth.

70,086.—STEAM GENERATOR INDICATOR.—D. M. Greene (assignor to Maria N. Green), Washington, D. C.

1st, I claim the combination of steam pipe, P, stationary rod, R, levers, L L' and L'', connected by the rods, R' and R'' arranged substantially as described.

2d, The steam pipe, P, stationary rod, R, levers, L and L', valve, v, and the whistle, W, arranged substantially as set forth.

70,087.—SURGICAL CUP.—George Hadfield, Cincinnati, Ohio.

I claim the arrangement of a flanged cup, A C, and grooved, broad and flexible lip, D E, as set forth.

70,088.—SURGICAL CUP.—George Hadffeld, Cincinnati, Ohio.

I claim the provision for surgical cups of the broad, flexible and impervious lip, E e, formed and adapted to operate in the manner described.

70,089.—SAFETY BRIDLE.—F. A. Hannaford, New York City.

I claim, 1st, The supplemental straps, C, arranged upon the bridle, A, and in relation with the bit, B, thereof, substantially as and for the purpose specified.

2d, The stops, f*, made adjustable upon the supplemental straps, C, substantially as set sorth whereby the force exerted upon the bit may be limited and rendered uniform, as described.

70,090.—FRAME-WORK FOR FIREPLACES.—James L. Henderson, Covington, Ky.

I claim, 1st, So arranging the frame for supporting the hearth that the latter shall rest upon a horizontal flooring, E, supported upon joist extending entirely across the hearth space either longitudinally or laterally, substantially in the manner set forth.

2d, Framing around the hearth and fireplace of buildings with single head and side trimmers and extending the joist under the hearth so as to dispense with the trimmer arch and brick arch, substantially as set forth.

3d, The mode of connecting the tail joist, C, with the breast of the chimney by metallic shoes, F, substantially as set forth.

70,091.—HORSE SHOE.—J. W. Hodges, Baltimore, Md.

I claim the combination with the calk, B b, as a means for attaching the same to the shoe, of the wedge, C, and pin, d, substantially as described.

70,092.—MANUFACTURE OF SOAP.—Nannie W. Hunter, Elizabeth city, N. C.

I claim the above described improvement in making "hand soap."

70,093.—ANIMAL TRAP.—B. Illingworth, Freeport, Ill.

I claim the arrangement of the box, A, as constructed with the door, C, plate, J, spring, o, bar, F, and rods, H and I, the several parts operating in the manner and for the purpose set forth.

70,094.—LAMP SHADE SUPPORTER.—G. C. James, Cincinnati, Ohio.

I claim a lamp shade supporter, A, constructed with wings or projections, a, of one continuous piece of wire as described and for the purpose set forth.

70,095.—BUTTER STAMP.—N. L. Janney, (assignor to himself and H. J. Kutz) Philadelphia, Pa.

I claim the expansion mold, A, when constructed and arranged as described and for the purpose set forth.

70,096.—WASHING MACHINE.—G. H. Kidney, Cleveland, Ohio

1st, I claim the combination of the cords, I, with the blocks, c, when constructed and arranged in relation to each other so as to be interwoven or interlocking forming a continuous or entire connected apron substantially as and for the purpose set forth.

2d, The arrangement of the apron, C, in combination with the cylinder, B, in the manner and for the purpose substantially as specified.

70,097.—FENCE.—J. E. Layton, New Wilmington, Pa.

I claim the posts, A and B, provided with supports, e and i, for the rails, said posts being secured to the base, C C', by means of keys 1 and 2 the whole being constructed, arranged and operating substantially as herein described and for the purpose set forth.

70,098.—WHEEL AND AXLE FOR CARRIAGES.—J. H. Lewis, Duxbury, Mass.

1st, I claim the radial flanges, M, in combination with the plate, d, the lugs, m, and the wheel hub, substantially as described.

2d, The arrangement of the spring, f, in combination with the plate, d, and the wheel hub substantially as described.

3d, I also claim forming the band, n, together with and in and piece with the journal box, substantially as described.

70,099.—CURTAIN FIXTURE.—Thos. Lyons, (assignor to himself and J. B. King). Brooklyn, N. Y.

I claim the tension spring constructed as described and arranged in relation with the stud, m, the slide, C, and the frame, A, substantially as and for the purpose specified.

70,100.—SEED PLANTER.—J. L. Manlove, Connersville, Ind.

1st, I claim the combination of the furrowing runners, A, shovels, B, oscillating braces, C, lever, C', and a hook or other equivalent fastening, E, for the same, arranged to operate substantially as set forth.

2d, In combination with the foregoing parts for covering the seed the hoppers, K, slide, F, with the adjustable openings, F', and cross piece, H, arranged to operate substantially as set forth.

70,101.—SIPHON PROPELLER.—John Marquis, San Francisco, Cal.

I claim the propelling of a vessel by water raised to any hight that can be acquired by means of a steam or hot air siphon or its equivalent the fall of the water from the hight being the propelling power either by its own weight and velocity or pressure substantially as described.

70,102.—GRATE.—Julius Meissner, New York City.

1st, I claim a grate having a shelf or other equivalent provision arranged in such relation to the lower grate bars as to enable the fresh fuel to be introduced into the grate below the incandescent portion of the mass which is supported upon said lower grate bars substantially as described.

The curved plate, G, or any equivalent thereof as a means for directing upward the incandescent fuel which is displaced in the act of introducing fresh fuel substantially as and for the purpose described.

3d, In a grate in which the fuel is supplied from below, I claim a congeries of curved or straight front grate, joined or attached to a common support at their upper ends, substantially as and for the purpose specified.

70,103.—CAR COUPLING.—Jacob Miller, Carrollton, Ohio.

1st, I claim, in the above described coupling device, the pivoted tumbler, C, acting independently from the check pieces, C', substantially as and for the purposes set forth.

2d, The combination of the pivoted tumbler, C', spring plunger, D, check pieces, C', provided with lever, E, and pin, c, and the movable frame, G, acted upon by the spring plunger, H, substantially as and for the purposes described.

70,104.—CALENDAR FOR WATCH CASES.—James D. Moore, Grinnell, Iowa.

I claim a watch case provided with the movable ring, x, and stationary ring, z, with their letters and figures arranged in the manner substantially as and for the purposes specified.

70,105.—BUCKLE ATTACHMENTS.—Robert T. Morse, Cambridge, Ohio.

I claim the slotted metal plates, A, A, constructed as described, for attaching buckles to the ends or sides of straps, and shielding the edges of the leather as set forth.

70,106.—SAWING MACHINE.—George L. Mowry, Scott, N. Y.

I claim the double ratchet clamps, a a', when arranged upon the movable table, C, and operated by the lever m, whereby wood of uneven widths may be securely held and adjusted to the saw, substantially as set forth.

70,107.—CARD RACK.—G. A. Nelson, Chicago, Ill.

1st, I claim the metal strips, D, having the clips, d, formed thereon by punching, or cutting the latter therefrom in the manner substantially as shown and described.

2d, I claim securing the strips, D, constructed as described, to the slats or case by inserting the edges of the strip into grooves, f, substantiall as described.

3d, The turning slats, A, A, marked by letters of the alphabet, and constructed as described, in combination with strips, D, D, and the stationary board, E, or boards, n, n, arranged as described, the whole arranged substantially as herein set forth, and for the purposes specified,

70,108.—POTATO DIGGER.—H. B. Norton, Rochester, N. Y.

1st, I claim the combination and arrangement of the frame, C, resting loosely on the axle, the guide arms, h, the jointed arms, n, the endless apron, I, and the levers, K and L, the whole operating in the manner and for the purpose herein set forth.

2d, The combination of the catch arrangement, s, t, with the loose frame, C, and guide arms, h, operating as and for the purpose specified.

70,109.—SWITCHES.—William P. Patton (assignor to himself, Theo's Weaver and Isaac Lloyd), Harrisburg, Pa.

I claim a lock so constructed as that the key can only be withdrawn when the bolt is completely thrown, when the same is used in combination with the operating mechanism of a railroad switch, and so arranged in relation to the bolt holes as that the bolt can only be entirely thrown when the switch is in connection with the main track, substantially as set forth.

70,110.—MACHINE FOR RENOVATING FEATHERS.—John S. Peasley, Providence, R. I.

1st, I claim constructing the cylinder for holding the feathers to be remounted in two parts, with means for uniting and securing the same together substantially as and for the purpose specified.

2d, I claim combining with a cylinder for the purpose specified, or an equivalent receptable, a number of netted openings, I, and suitable battens, E, or coverings therefor, with suitable means for securing the same substantially in the manner and for the purpose specified.

3d, I claim the tubular arms constructed substantially as described and provided with a number of steam cocks, f, f, the whole being arranged with suitable means for introducing steam thereto, and through the same into the cylinder and among the feathers therein, substantially in the manner and for the purpose specified.

4th, I claim the steam coc, k J, in combination with the said tubular arms, and a suitable conducting pipe, K, as described and for the purpose specified

5th, I claim connecting one of the tubular arms, G, to the shaft, in such a manner, by means of a coupling, or equivalent device, that the said arm may be readily detached from the shaft, as described, for the purpose specified.

70,111.—CULTIVATORS.—Ezra Peck, Chicago, Ill.

1st, I claim a framework for carrying and drawing the plows of a straddle row cultivator, supported on runners, substantially as described.

2d, The frame supported on runners in combination with two gangs of plows, substantially as specified.

3d, The main frame, supported on runners in combination adjustable and movable beams, F, and plows, Q, substantially as and for the purpose specified.

4th, The slotted clevis, m, provided with an upper and a lower bearing, substantially as specified.

5th, The slotted clevis, m, in combination with the rod, N, and plow beam, F, substantially as described.

6th, The combination and arrangement of the angle rod, N, and clevis, m, with the adjustable brace, k, for adjusting the elevation of the front end of the beams substantially as specified.

7th, The angle rods, F, in combination with the slots, a, and clamps, g, for adjusting the distance between the ends of the beams, substantially as described.

8th, The combination and arrangement of the evener, G, inclined swing bars or levers, I, rods, J, and elevated pivoted supports, f, substantially as specified.

70,112.—CHUCKS.—B. W. Pierce, New Bedford, Mass.

I claim the within described chuck, constructed and operating substantially as set forth.

70,113.—APPARATUS FOR SPOOLING THREAD.—Alfred S. Phillips, South Boston, Mass.

I claim the arrangement as well as the combination of the two rollers, B, D, the frame, A, the adjustable bars, C', C', provided with notches, or teeth, h, and pawls, l, as described, the slider, E, and its guide, k, and the cranked shaft, F, the whole being substantially as specified.

I also claim the combination of the movable journal, m, with the cranked shaft, F, and its stationary journal, l, as set forth.

70,114.—STARTING AND STOPPING CARS.—Job Phillips, Dan'l W. Southwick and David A. Arnold, Pawtucket, R. I,

1st, I claim combining the draft hook, H, with the axle of the car by means of a chain gear, C, eccentries, A, A', and a pawl and ratchet mechanism, substantially as described for the purposes specified,

2d, The combination and arrangement of the slide rod, D, under the control of the driver, with the draw-bar, B, and holding catch, k, substantially as described

70,115.—LIFTING JACK.—Oliver L. Pinney, Brunswick, O.

I claim the lever, D, wheel, E, and toothed piece, H, in combination with the link, I, substantially as set forth.

70,116.—FRAME FOR PICTURES, &c.—Chas. P. Poinier, (assignor for himself and Charles O. Horton), Boston, Mass.

1st, I claim the combination of the fixed and detachable frames, A and E, in the manner and for the purpose substantially as specified.

2d, The combination of the frame, E, glass, G, and the hinged backboard, J, when constructed and operating as and for the purpose set forth.

70,117.—APPARATUS FOR BURNING HYDROCARBONS.—H. A. V. Post and Jeptha Garrard, Cincinnati, Ohio.

We claim the arrangement of a receptacle, C, for hydrocarbon or other liquid fuel below a furnace or combustion chamber, B, in connection with a pipe, or pipes, through which air or air and steam is forced through apertures or nozzles situated below the surface of the liquid fuel, and thence through the body of the liquid fuel, substantially as and for the purpose set forth.

70,118.—WASHING MACHINE.—Charles C. and James Purington, Bath, Me.

We claim the combination as well as the arrangement of the guide bars, g, g, the two sets of rails and their wheels, with the tub, its series of rollers and the dasher and its rollers, the whole being substantially as specified.

70,119.—HYDRANTS.—Joshua Regester, Baltimore, Md.

I claim the removable divided bottom, g, g, in combination with the removable section A', applied to a wooden hydrant case, substantially in the manner and for the purposes described.

70,120.—COTTON AND CORN PLOW.—D. C. Richardson, Weldon, N. C.

1st, I claim the plate, D, cast with the standard in combination with the adjustable tooth, substantially as described.

2d, I claim the plate, D, cast in the standard, in combination with the adjustable wings, W W, substantially as described, for the purposes set forth.

3d, The shoe, S, having in rear of the mold plate a slot, a, in which wings, R R, of different sizes and form can be secured, when the same is in combination with wings, W W, the whole constructed and combined substantially as set forth.

4th, I claim the devices embraced in the foregoing claims, when the same are arranged in the manner described, and for the purpose set forth.

70,121.—LIFE PRESERVER.—R. Robinson, San Fr'cisco, Cal.

I claim the frame, A, provided with air tight compartments, and a flexible case for the legs, body and arms, and having a seat, D, and opening, F, all substantially as described.

70,122.—HOISTING APPARATUS.—J. F. Rochow, N. Y. city.

I claim the crank shaft, C, carrying pinions or cog wheels, H I, in combination with the gear, E, and internal gear, K, all constructed and operating substantially as and for the purpose set forth.

70,123.—STONE CHANNELING MACHINE.—Henry J. Ruggles, Poultney, Vt.

1st, I claim the employment of an air cylinder, S, in combination with drills or cutters, substantially as and for the purpose herein specified.

2d, I also claim the combination of an air cylinder, or cylinders, one or more drills or cutters, and a truck or carriage moved automatically over the rock or stone, to be channeled or cut, substantially as herein specified.

3d, I also claim the combination of an air cylinder or cylinders, one or more drills or cutters, steam engine, or other motive power, a truck, or carriage, on which the operating parts are mounted, and an automatic device for moving the truck along in either direction, substantially as herein set forth.

4th, I also claim a drill, or set of drills, composed of single drills, of the different kinds of points or cutting parts, substantially as and for the purpose herein specified.

5th, I also claim, in combination with the drill, the drill clamp, or stock, T, constructed substantially as described, so as to enter the channels, and serve as a guide and support for the drills therein.

6th, I also claim the arrangement of the ways, Q Q, in which the air cylinders and drills are guided, so as to be adjusted and set, either vertically or inclined, in the planes of the channels, substantially as herein set forth.

70,124.—PESSARY.—T. C. Sachse, Chicago, Ill.

1st, I claim the oblong concave face of the bowl, A, of a pessary, substantially as and for the purposes described.

2d, The curved part, B', of the stem, B, forming an automatic means of holding the instrument in position, substantially as and for the purposes set forth.

3d, The auxiliary stem, C, with its curved part, C', opening, d, and square lower opening, moving within the stem, B, substantially as and for the purposes described.

4th, A pessary substantially as described, operated by a key, D, substantially in the manner set forth.

70,125.—LAMP EXTINGUISHER.—Lucius M. Sargent (assignor to W. A. Richardson, Henry D. Ward, and George A. Gates), Worcester, Mass. Antedated Oct. 19, 1867.

1st, I claim the arrangement of the wings, e, and stems, d, upon the base plate, c, construed as described, to be placed over the wick tube, a, and secured upon the central portion, b, of the base of the burner, substantially as and for the purpose herein set forth.

2d, The stud or stop, e*, in combination with the wings, e, arms, d*, and spring, f, substantially as and for the purpose herein set forth.

3d, The combination of the downwardly extending arms, d*, operating the wings, e, with the spring, f, and spring catch, g, substantially as and for the purpose specified.

70,126.—GRAIN ELEVATOR AND FEEDER.—Benjamin F. Sherman, San Francisco, Cal.

I claim the elevator feeder described, arranged at the lower end of the elevator, and operated by the gear, D, on the lower pulley shaft of the elevating belt in combination with the gears, E F and G, so constructed and arranged that the feeding may be swung around in the arc of a circle, to bring it to the grain to be fed to the elevator.

2d, Lengthening or shortening the saw feeder, by taking out or putting in the extension pieces, H' and H', substantially as described.

70,127.—EXTENSION TABLE SLIDE.—A. P. Shute, and J. F. Jackson, Charlestown, Mass.

We claim the combination as well as the arrangement of the metallic slips, D D' D'', with the grooves, E E', and the bars, A B C, made substantially as described, and for the purpose set forth.

70,128.—HANGING TOP TO BUGGIES.—Cephas Smith, Stockbridge, Mich.

I claim the bar, B, and C, constructed and used with the slotted plate, G, as and for the purpose set forth.

70,129.—JOINT BIT AND CHECK.—Robert D. Sterling, New York City.

I claim the straps, n, suspended from the top ring, e, and connected to the loop ring, J, sliding on the linked bit, a b c, constructed and operating as and for the purpose described.

70,130.—MEANS FOR PROPELLING VESSELS.—R. R. Stevens, Mokelumne Hill, Cal.

I claim the combination and arrangement of the cams, D D and D' D', with the frames, H and G, and cranks, F and F', constructed and arranged to operate the paddles, P, as described.

70,131.—CAR COUPLING.—John Swan, Baltimore, Md.

I claim the drawhead, A, as constructed in combination with the trigger or pin, C, pivoted within or to the said drawhead and provided with the hinged bar, D, the several parts being used and operated as and for the purpose specified.

70,132.—TELEGRAPH INSULATOR.—D. W. Teller and W. L. Savage, North Greenwich, Conn., assignors to themselves and W. H. Hoag, New York City.

We claim the insulator constructed in sections substantially as described, to be inserted in an aperture or bearing in its support, by means of a slot provided in the latter communicating with said aperture or bearing, essentially as and for the purpose or purposes herein set forth.

70,133.—ANIMAL TRAP.—Joseph Trainer, Rural Dale, Ohio.

I claim the combination and arrangement of the chambers, A B, gates, a b, cords, r r, lever, L, vertical hinged rod, M, platform, D, and connected rods, H and c, all constructed, combined, and operating together substantially in the manner and for the purpose specified.

70,134.—ANIMAL TRAP.—C. S. Trevitt (assignor to himself and H. E. Wentworth), Washington, D. C.

1st, I claim the swinging bait box, H, having the cover, h', and the aperture, i, substantially as and for the purpose specified.

2d, The combination of the adjustable weight, w, rod, R, trap door, E, box, H, and notched rod, k, substantially as and for the purpose described.

70,135.—MANURE FORK.—Wm. Truby, Brush Valley, Pa.

I claim the combination of the springs, e and g, provided with catches, f and h, with the hinges, c c', of the tang, b, and plate, A, of a manure or other fork, said plate being provided with a slot, k, counter catch, l, and rib, i, all combined and arranged substantially as and for the purpose set forth.

70,136.—COOLER FOR WATER, MILK, BEER, ETC.—Charles M. Vail, Elmira, N. Y.

I claim in combination with an internal vessel for containing the fluid to be acted upon, an external casing with intermediate air spaces, with a double cover and connecting ventilated cylinder, said parts being perforated and arranged in relation to one another substantially as set forth.

70,137.—INSTRUMENT FOR CUTTING POST HOLES.—N. S. Vance and E. Watkins, Decatur, Ill.

I claim an instrument for cutting post holes formed by a combination of the tubular cutter, A, constructed as described, with the handle, B, plunger, D, rods, E, collar, F, and spiral spring, G, substantially as set forth.

70,138.—STOVEPIPE DRUM.—Jerome C. Ward, Bergen, N. Y.

I claim the combination of the two elongated dampers, B B, connected by rod, b, with the drum, A, without partitions, the whole operating in the manner and for the purpose specified.

70,139.—MACHINE FOR SHAPING BOOT HEELS.—George W. Warfield, Hudson, Mass.

I claim, 1st, The employment of the revolving cam plate or former, p, for the purpose both of supporting the heel and giving the required outline to it under the action of the rotary cutter, substantially as hereinbefore described.

2d, I claim in combination with such cutter, B, and in a machine for trimming boot heels, the fender or ledge, b2, applied to the cutting carriage, C, as set forth and explained.

3d, I claim the construction and mode of application of the clamp plate, I, in manner and operated by the treadle, J, as before explained.

4th, I claim the peculiar construction of the former, p, as composed of the oval shaped plate for giving the necessary movements to the cutter carriage C, and of the stop or abutments, p', as and for the purpose set forth.

5th, I claim the general combination and arrangement of the machine as herein shown and described, consisting of the revolving cutter, B, the former, p, and the clamp, I', these several parts being operated by their respective mechanisms in manner as before referred to and explained.

70,140.—BLOWER FOR FORGES.—C. West and B. K. Price, Pittsburgh, Pa.

1st, We claim the combination of a forge, supply pipe, and fan, when the latter is arranged in a box as shown, and is operated by means of a fly gear and pinion wheels, the whole being constructed, arranged, and operating substantially as described and for the purposes set forth.

2d, The combination of the forge, supply pipe, and fan box, when the latter is constructed with a movable top and side openings, as shown, and the whole are so arranged that, acting on the principle of the ordinary chimney flue, they will secure to the forge a continuous current of air, substantially as described.

70,141.—BREECH-LOADING FIRE-ARM.—Luke Wheelock, New Haven, Conn.

I claim the spring, E, in combination with the breech block, C, and arranged so as to be depressed by the insertion of the cartridge, and when the cartridge is inserted to immediately raise the block so as to prevent the accidental removal of the cartridge.

70,142.—MOTOR FOR OPERATING SEWING MACHINES.—Robt. Whitehill, Jr., New York City.

1st, I claim the combination, for simultaneous joint action by one and the same motion or application of force, of a spring clutch and yielding or spring brake, as a means of stopping or starting and varying the speed of a secondary shaft relatively to a prime mover traveling at a uniform velocity, substantially as specified.

2d, The spring clutch, I, constructed essentially as described, of hinged leaves, d, acted upon by springs, e, and operating in concert with a conically recessed pulley, H, as herein set forth.

3d, In combination with the treadle, J, the brake, K, provided with a spring, M, and controlled by stops or projections of, from, or through a connecting rod or sliding bar, I, substantially as shown and described.

70,143.—PITMAN HEAD AND WRIST PIN.—Wm. N. Whitely, Springfield, Ohio.

1st, I claim the solid head, B, provided with a conical box, as set forth, in combination with the tubular wrist pin, C, all constructed and operating as set forth.

2d, The recessed nut, D, in combination with the wrist pin, as and for the purpose set forth.

70,144.—FLOORING, PAVING TILE, AND BUILDING BLOCK.—Wildrich Winterhalter (assignor to himself and John McArthur, Jr.) Philadelphia, Pa.

1st, I claim a paving or flooring tile or building block, composed of pulverized bricks, and ordinary brick clay, mixed together, molded, subjected to pressure, and burnt, as set forth.

2d, Combining with the said tiles or blocks, an outer coating of pulverized quartz and brick powder, as set forth.

70,145.—CAR BRAKE.—James F. Wood, 2d, Cohocton, N. Y.

1st, I claim the arrangement of the two right angle levers, so connected together, that they form a knuckle joint bearing on the center of the brake bars, operating in the manner substantially as and for the purposes herein set forth.

2d, I claim the adjustable links, d d, and the sliding suspension rods, b b, as arranged for the purposes herein described.

70,146.—IRONING TABLE.—Asa T. Woolsey, Sandusky, Ohio.

I claim the standards, B', cross bar, C, and cord, E, in combination with the board, b, having a horizontal and vertical adjustment, substantially as and for the purpose set forth.

70,147.—MANUFACTURE OF POSTAGE STAMPS.—Charles F. Steel, Brooklyn, N. Y.

1st, I claim a postage stamp, or equivalent printed paper, having the paper partially broken, opened, and weakened, along the lines, m, substantially as and for the purpose herein set forth.

2d, I claim in the above applying the gum or equivalent adhesive material before such treatment of the paper, as and for the purposes herein specified.

3d, I claim, in combination with the above steps, the flattening of the whole, or a portion of the surface of the paper, prior to the printing operation, as and for the purpose herein explained.

4th, I claim leaving a space, B, which is embossed and partially broken, as indicated, and not flattened or printed, substantially as and for the purpose herein specified.

REISSUES.

2,781.—MODE OF APPLYING SULPHUROUS ACID GAS IN THE DEFECATION OF SACCHARINE LIQUIDS.—Nancy Poindexter Brashear, Pattersonville, La., executrix of the estate of Robert B. Brashear, deceased. Patented Dec. 6, 1859.

1st, I claim the use of the fumes of burning sulphur, or sulphurous acid gas, in the treatment of juices containing saccharine matter, substantially as described.

2d, Subjecting sugar cane juice or other saccharine liquid to the direct action of the fumes of burning sulphur, such liquid being employed in a diffused state, or in such manner treated that it will be thoroughly impregnated with the fumes of sulpnur, substantially as described.

2,782.—SEEDING MACHINE.—Hiram L. Brown and Calvin P. Brown, Shortsville, N. Y., assignees of Gilbert Jessup. Patented June 25, 1861.

1st, We claim the shaft, G, of the vertical disk distributers of seeding machines, when constructed with a rim or flange, J, for carrying the grain over the wheel from the hopper to the drill teeth.

2d, So constructing and arranging the distributing cases and wheel in this class of seed drills that either of two openings, H and D, may be used alternatively for feeding different kinds of grain, substantially as described.

3d, So constructing and combining the distributing wheel, G, and casing, A B, that the grain may be carried by the wheel from either of the two openings, C and D, and discharged through channels of different sizes, adapted to larger or smaller grain, substantially in the manner set forth.

4th, The mode, substantially as set forth, of giving the requisite play to the wheel, G, by hanging it loosely on a shaft not round, and supporting it on the casing by means of a hub or boss.

5th, So constructing the exterior or interior faces of the flange, f, that by means of irregularities upon the surface thereof, the grain may be carried with the revolution of the wheel, substantially in the manner set forth.

6th, The combination of the casing, A and B distributing wheel, G, and partition, P, substantially as and for the purpose set forth.

7th, The casing, A B, constructed in two pieces, with horizontal flanges, f, for attaching it to the hopper, when used in combination with a vertical distributing wheel, G, substantially in the manner set forth.

2,783.—REAPER AND MOWER.—Robert T. Campbell, Washington, D. C., assignee of Thos. I. Stealey. Patented Dec. 15, 1857.

1st, I claim the main frame of a harvester which carries the gearing to drive the cutters, and to which frame the tongue is attached, said frame being carried by two driving and supporting wheels and having the finger bar and platform hinged to it so as to rise and fall at the outer end above and below the plane on which the driving wheels run, in combination with a rake moving over the platform at intervals, and discharging the cut grain at the inner side of the platform and out of the path of the team in cutting the next swath.

2d, In a harvester with a finger bar and platform hinged to the draft frame thereof so as to rise and fall above at the outer end above and below the plane on which the driving wheels run, I claim applying the pivot or fulcrum of the rake and its guide to the finger bar and platform, so that the rake will work in unison with the finger bar and platform through all the vibrations of the finger bar and platform.

3d, In combination with a harvesting machine having two driving and supporting wheels which carry the main frame with a finger bar hinged to said frame, so as to rise and fall at its outer end above and below the plane on which the driving wheels run, I claim the removable platform and self-raking attachments and the other reaping fixtures, which when removed convert the reaper into a mower.

4th, So combining a two-wheeled draft frame, a hinged platform, rake teeth, and reel bars, that the rake teeth and reel bars are wholly to one side of the draft frame, substantially as described.

5th, A finger beam of a combined reaper and mower hinged to and suspended below the draft frame by means of a jointed connection which allows of its outer end rising and falling above and below the plane on which the driving wheels run, and by which its inner end can be raised or lowered to adapt the cutting apparatus for reaping or mowing, in combination with an auxiliary suspending and bracing jointed or flexible connection which is adjustable and will hold up and brace a grain platform at its inner side and in rear of the hinge of the finger beam, when the machine is used as a reaper, and will brace the cutting apparatus while the machine is used as a mower substantially as described.

6th, The combination in a two-wheel side draft combined reaping and mowing machine, of a laterally projecting hinged cutting apparatus which rises and falls at its outer end above and below the plane on which the driving wheels run, a platform for receiving the cut grain, and a toothed rake which discharges the cut crop in gavels from the platform at the inner side thereof.

7th, A harvesting machine with its cutting apparatus hinged so as to be on one side of a two wheeled draft frame and so as to rise and fall at its outer end above and below the plane on which the drive wheels run, when such machine is constructed so as to be capable of serving either as a mower or as a combined reaper, mower, and self-raker, substantially as set forth.

8th, A harvester with a two-wheel draft frame which has one of its wheels connected to the main axle by means of a spring pawl and a ratchet, or equivalent devices, which will allow and cause it automatically to become a

loose or fast wheel on said axle, in backing the machine or turning it around corners, and with the shafts of its gearing for driving the sickle arranged below the main axle, with said axle and said gearing below its main frame and with its finger beam hinged to it in such a manner as to make it a front cut machine, and so that the outer end of said finger beam may rise and fall above and below the plane on which the driving wheels run, and provided with an auxiliary rear supporting brace attached to the platform or finger beam, so that the same is braced against the resistance of the crops as the machine moves forward, substantially as set forth.

9th, A front-cut harvesting machine which can be used either as a mower or as a self-raking reaper, such machine having a laterally projecting hinged cutting apparatus and having a rake which discharges the cut crop in gavels from the inner side of the platform.

2,784.—PULLEY ATTACHMENT FOR RAISING WEIGHTS.—Geo. W. Gregory, Watertown, N. Y. Patented Aug. 14, 1866. Antedated Feb. 14, 1866.

1st, I claim the adjustable pulley support having one or more sockets or their equivalents, by and through which the pulley support may be operated and changed from place to place, for the purpose set forth.

2d, An adjustable pulley support provided with means for changing the same from place to place and with means for operating the pulley.

2,785.—CARBURETING GASES.—Henri L. Stuart, New York City, assignee of C. M. Williams. Patented Jan. 8, 1867.

1st, I claim carbureting gases by mixing or combining with them the vapors of a volatile hydrocarbon liquid before it is introduced into the service mains for distribution, substantially as described.

2d, I also claim the devices and means herein shown and described for carbureting gases in the holder before its distribution to the service mains.

2,786.—PERMUTATION LOCKS.—Geo. Thompson and Henry Mitchell, Trenton, N. J. (assignees of A. W. Johnson, and George Thompson), Patented May 21, 1867.

1st, We claim the notched disks or tumblers, M, each having a tube, O, fixed to it the outer end of which is provided with teeth to engage with similar teeth on the hubs or flanges, d, of the graduated rings, Q, substantially as and for the purpose herein shown and described.

2d, Attaching the rod or bolt, R, to the back plate of the lock, by means of a nut, T, to facilitate the permutation of the index or opening letters, and also to more effectually preserve the connection of the ring, Q, with their respective tubes, O.

2,787.—ENVELOPE MACHINE.—H. C. Berlin and Geo. H. Jones, New York, (Assignees of Thomas V. Waymoth). Patented Sept. 25, 1866.

1st, We claim gumming the seal flaps of the blanks for envelopes at or about the same time with the lower or end flaps, after the blanks are placed in the machine and before they are folded, by mechanism substantially such as described or any other suitable mechanism to produce the same effect, for the purposes set forth.

3d, The arrangement of a curved guide, T, in combination with the table supporting the blanks, substantially as and for the purpose set forth.

5th, Causing the seal flap, while being folded to bear on one or more of the other folding wings, or on parts or projections of said wings, or any device or mechanism interposed between the seal and other flaps and producing the same effect, substantially as and for the purposes set forth.

6th, The combination with mechanism adapted to gum the seal and other flaps of envelope blanks of a folding mechanism so arranged and operating as to prevent the seal flap being brought in contact with the other flaps or parts of the blank and adhering thereto.

5th, The protecting lips, f*, in combination with the folding wings constructed and operating substantially as and for the purposes set forth.

6th, The raised or projecting surface at or near the edge of the wing which folds the lower flap of the blank substantially as and for the purposes set forth.

7th, The endless apron, A, with its radiating arms in combination with a suitable gumming and folding mechanism constructed and operating substantially as and for the purposes set forth.

8th, Passing the endless apron, Q, at its receiving end over a square or polygonal shaft substantially as and for the purposes set forth.

9th, In combination with the endless apron, Q, the rail, a', or its equivalent substantially as and for the purposes set forth.

10th, The combination with a suitable mechanism for gumming the flaps of envelopes and folding the envelope blanks, of an endless apron as described or any equivalent device or mechanism for receiving the envelopes after they are folded and moving or supporting the same, without compression, until the gum on the seal flaps is dried.

11th, In combination with the endless apron, Q, or its equivalent the receiving boy, R, and follower, S, constructed and operating substantially as and for the purpose set forth.

12th, The lever arm, O, in combination with the carrying platform, N, and a suitable die inserted in or attached to said lever or to the platform, or to both, substantially as and for the purposes set forth.

13th, The arrangement of dies, s, on the creasing plunger and on the folding table or on either substantially as and for the purpose set forth.

14th, The types, u, arranged in an arm and operating in combination with the folding table and creasing plunger substantially as and for the purposes set forth.

2,788.—FANS AND PARASOLS.—Geo. Mallory, Bridgeport, Conn. (Assignee of Wm. R. White) Patented May 15, 1866.

I claim the combination of the following instrumentalities, viz.: The hoop handle, and drawn cylindrical wrapped substantially as hereinbefore set forth.

Also the combination of the following instrumentalities; viz: the hoop brace, and handle; substantially as hereinbefore set forth.

Also the combination of the following instrumentalities, viz; the hoop, handle, and joint between the handle and hoop, substantially as hereinbefore set forth.

Also the combination of the following instrumentalities, viz: the hoop handles joint, and cover or wrapper, substantially as hereinbefore set forth.

Also the combination of the following instrumentalities, viz.: the hoop, handle, joint and fastening to hold the handle in its position, substantially as hereinbefore set forth.

Also the combination of the following instrumentalities, viz.: the hoop, handle joint fastening, and cover as hereinbefore set forth.

2,789.—MAKING THICK PAPER.—S. G. Levis, Kelleysville, Pa. Patented, Feb. 14, 1854.

1st, Passing or carrying a sheet of paper pulp through or between the press rolls and expressing the water therefrom between two endless felts so arranged that the water may pass through the felts and run off freely in front of the rolls.

2d, Running or operating two or more forming cylinders in connection with the press roll by means of or in combination with the two endless felts each receiving its sheet of pulp from a separate forming cylinder so arranged that the water passes through the felts and runs off at the ends of the rolls.

3d, The combination of the two forming cylinders, C and D, the two endless felts, E and H, and the two squeeze rollers, F F', arranged and operating substantially as described.

DESIGNS.

2,804.—PARLOR COOK STOVE.—Wm. Caven and Chas. Stemler (assignors to Redway and Burton), Cincinnati, Ohio.

2,805.—EMBLEM.—M. B. Dyott, Philadelphia, Pa.

2,806.—FLOOR OIL CLOTH PATTERN.—Jos. Robley (assignor to W. M. Brashes & Co.), Brooklyn, N. Y.

2,807.—ORGAN CASE.—J. R. Lomas, (assignor to the "B. Shoninger Melodeon Company") New Haven, Conn.

2,808.—TRADE MARK.—Ferdinand Menssing, N. Y. City.

2,809.—COOK STOVE.—Garrettson Smith, and Henry Brown, Philadelphia, Pa.

2,810.—COOK STOVE.—Garrettson Smith, and Henry Brown, Philadelphia, Pa. (assignor to D. L. Bartlett and H. W. Robbins,) Baltimore, Md.

2,811.—LABEL BORDER.—A. D. Thurber, New York City.

2,812.—TRADE MARK.—Geo. Wilson, Ware, Mass., (assignor to Otis Company).

2,813.—COOK STOVE.—Thomas, James and Wm. Armstrong, Port Deposit, Md.

2,814.—MODEL OF THE ANCIENT CITY OF JERUSALEM.—J. G. Evans, Albany, N. Y.

2,815.—TRADE MARK.—Chas. Griffith, New York City.

2,816.—BOTTLE.—Henry Schlichter, and Henry A. Zag, Philadelphia, Pa.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

18,327.—MANUFACTURE OF METALLIC SQUARES.—Samuel Darling, Bangor, Me. Dated Oct. 6, 1857. Application for reissue received and filed Oct. 11, 1867.

I claim a square whose tongue and beam are united by solder, substantially as described.

A square, the beam of which is made of three pieces, substantially as described.

A square, whose beam is composed of three pieces, and the tongue of which is soldered in, substantially as described.

A square, the beam of which is faced on its sides with wood, substantially as described.

A square, constructed with the central portion of its tongue softer than the margin thereof, substantially as described.

A tongue for squares, which is hardened at its edges, and soft in the center, substantially as described.

The mode or process described of hardening the edges of the tongue, by pressure between plates of cold iron.

The mode or process described of hardening the edges of the tongue, by confining it between pieces of iron, and then heating and tempering as described.

12,590.—SCREW WRENCH.—L. D. Gilman, Troy, N.Y. Dated March 27, 1855. Additional improvement dated July 17, 1855. Application for reissue received and filed Oct. 14, 1867.

1st, I claim making the bar of the wrench thicker, as shown at F, substantially as hereinbefore set forth, and for the purposes described.

2d, I also claim the combination of the toothed plate, J, eccentric or cam, K, and adjustable plate, N, with the handle of the wrench, for the purpose of operating the jaws thereof, substantially as hereinbefore set forth.

50,011.—INSTRUMENT FOR OPENING SEALED AND OTHER CANS.—E. H. Bourne, E. Damm, Jr., and H. M. Knowles, Cleveland, Ohio, assignees of S. D. Lecompte, Leavenworth City, Kansas. Dated Sept. 19, 1865. Application for reissue received and filed Oct. 15, 1867.

1st, I claim a can opener, constructed of a cutter or knife connected to a cutter or handle, having a point so arranged in relation to said holder as to form an axial pivot for the cutter in opening cans.

2d, The point, when so arranged in relation to the holder and cutter that it acts as a point in perforating the can and an axial pivot for the cutter.

62,158.—DEVICE FOR SLAUGHTERING HOGS.—William M. Savage and Richard Savage, Chicago, Ill. Dated February 19, 1867. Application for reissue received and filed Oct. 14, 1867.

1st, We claim the combination of the clutch, A B, and chains, C, or their equivalent, with a swiveled hook, substantially as and for the purpose specified.

2d, In combination with the above we claim the antifriction roller or sheave C, arranged as and for the purposes described and set forth.

3d, We claim, in combination with the clutch, A B, chains, C, and hook, E, the arrangement of a handle, H, substantially in the manner and for the purposes specified.

4th, We claim the combination of the clutch, A B, supported upon chains or rods as specified, with the hook or bar, E, and its appendages, to wit: the roller handle and eyelet, the whole constructed and operating substantially as herein described and specified.

49,354.—HORSE HOE CULTIVATOR.—R. B. Dunn and John C. Flint (assignees by mesne assignments of Albion Webb), Bangor, Me. Dated August 8, 1865. Application for reissue received and filed October 8, 1867.

1st, We claim securing the share to a plate in such a manner as to be readily removed therefrom, or secured thereto, substantially as described.

2d, The employment of teeth or cogs, as a means of adjustment, and holding in position a movable blade, substantially as described.

3d, Providing a wing or blade, and the part of which it is connected, with a rib in one and a series of notches or grooves in the other to set and hold the blade in position.

4th, In combination with such rib and notches, a bolt and nut, or their equivalents, to loosen and tighten the same as desired.

5th, To supporting the shares by means of rods and eyes, as to admit of lowering or raising the shares, either at their front or at their rear ends, substantially as shown and described.

6th, Providing the cross bars with slots or their equivalents, as and for the purpose described.

7th Providing the cross bars with notches to receive the eyes of the loops which secure the share supporting rods in the desired positions.

8th, The curved support, D, made of a single block, when constructed and applied as and for the purposes described.

34,128.—HORSE HOE.—R. B. Dunn and John C. Flint, Bangor, assignments by mesne assignments of Moses Chandler, East Corinth, Me. Dated January 14, 1862. Application for reissue received and filed Oct. 8, 1867.

We claim the employment of two shares converging towards their rear, and made capable of adjustment to or from each other, either at their front or rear, or both.

So attaching or jointing the forward ends of these shares to their supporting rods, so that they may be turned and adjusted thereon as centers, more or less obliquely, relatively to the beam.

The means substantially as described for adjusting vertically the rear ends of the shares to vary the depth of their penetration into the earth.

The combination with the shares of pivoted wings, extending rearwards therefrom.

So connecting the wings to the shares as that they will partake of their vertical adjustments, and also admit of being thrown up out of action when not needed.

A wing constructed with a slightly concave curvature, on its under side, to round up the earth as the furrow is covered.

Supporting the shares upon bent rods capable of being adjusted, laterally in the devices which hold them in position.

Supporting the shares, both at front and rear, upon such rods, to admit of either end being adjusted relatively to the other.

Securing adjustably and steadying the share supporting rods to the beam by means of screw headed eyes or loops and nuts.

The adjustable and yielding cultivator blades, adapted to be lifted and thrown out of action when desired.

The means substantially as described for adjusting the cultivator blades, and their supports, to or from each other, without unfastening them from the bars to which they are secured.

Forming in one piece the cultivator blade support, and the coiled spring which sustains it, and admits of its various movements, substantially as described.

The provision in the beam of a slot, J, as and for the purpose described.

The adjustable stay rod, as and for the purpose described.

The combination with the stay rods, which brace the shares of the slot in the beam and means for firmly securing the rods in variable positions, substantially as described.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to MUNN & CO., Solicitors of Patents, 37 Park Row, N. Y.*

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[Condensed from the "Journal of the Commissioners of Patents."]

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2,218.—ENGRAVING MACHINE.—John C. Guerrant and Benton J. Field, Leaksfield, N. C. Aug. 1, 1867.

2,512.—COTTON BALE TIE.—Daniel Swett, Vicksburg, Miss. Sept. 5, 1867.

2,520.—SAFETY VALVE.—Geo. W. Richardson, Troy, N. Y. Sept. 5, 1867.

2,572.—MACHINERY FOR POLISHING, GRINDING, AND EDGING SLABS OF MARBLE, SLATE, ETC.—Stinson Hagaman, Welsport, Pa. Sept. 11, 1867.

2,600.—INCREASING THE EFFICIENCY OF STEAM FOR MOTIVE POWER PURPOSES.—John B. Tarr, Chicago, Ill. Sept. 14, 1867.

2,606.—TREATMENT AND PREPARATION OF MINERAL OILS AND SPIRITS FOR ILLUMINATING AND OTHER PURPOSES.—Henry Chadburn, St. Louis, Mo. Sept. 16, 1867.

2,429.—FASTENING FOR PAPER BAGS AND PARCELS.—Charles E. Atwood and George W. Davis, New York City. Aug. 24, 1867.

2,481.—WINDOW SASH FASTENER.—James C. Butterworth, Jr., Providence, R. I. Sept 2, 1867.

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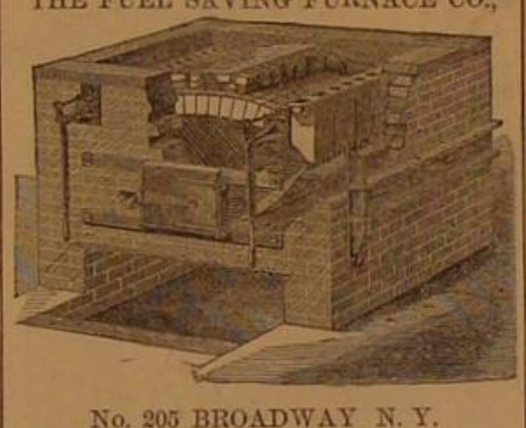
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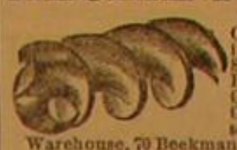
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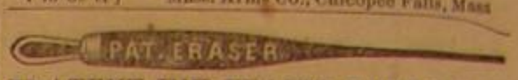
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SCIENTIFIC AMERICAN

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

Vol. XVII.--No. 20. [NEW SERIES.]

NEW YORK, NOVEMBER 16, 1867.

$3 per Annum. [IN ADVANCE.]

Improved Coupling and Cold Rolled Shafting.

For several years there has been in the market a quality of shafting known as the "cold rolled" shafting, which, being perfectly round—rolled to a gage—and bright, requires no turning, nor straightening, and is rolled in sizes from three-sixteenths of an inch to four inches, and twenty feet long, but is cut or rolled into lengths to suit customers. It is perfectly homogeneous, and is very fibrous and tenacious. We had opportunities to examine, and, in some measure, test this shafting about three years ago, and were satisfied at the time that it could not be surpassed, an opinion we have not yet seen reason for modifying. It is manufactured by Jones & Laughlins, of Pittsburgh, Pa.

This firm also manufacture adjustable hangers, pulleys, and Collins' patent, self-adjusting, double-compression couplings, all of which, with the cold rolled shafting, are represented in the engraving which accompanies this article. The hangers have swivel boxes, suspended, with the shaft, by bolts adjustable in hight by nuts. The pulleys are at once light and strong, being of a graceful pattern, as seen in the engraving.

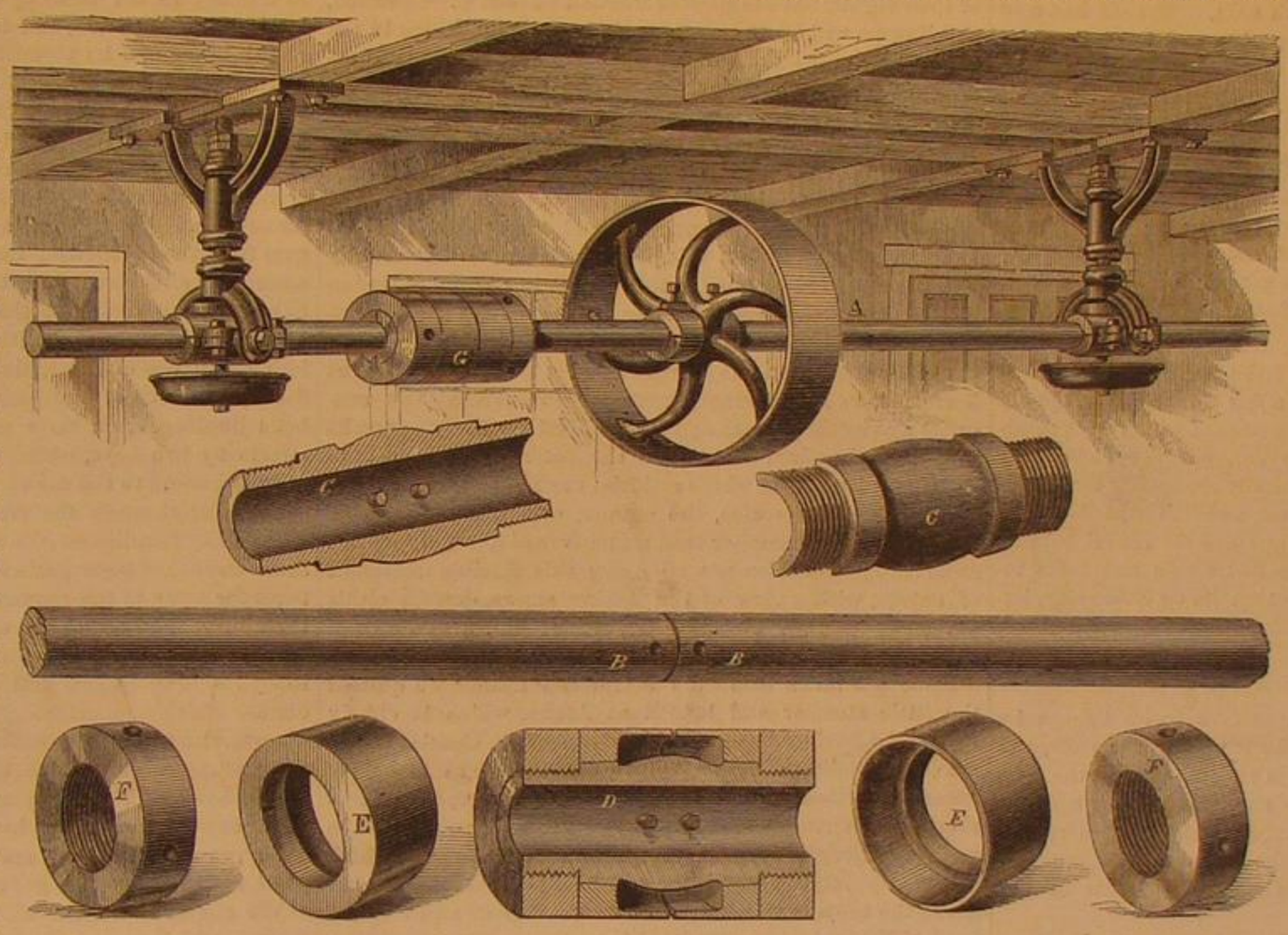
In the engraving, A, represents a line of shafting with hangers, pulley, and coupling; B B are two lengths of cold rolled shafting, fitted to receive the coupling. C C are inside and outside views of the coupling proper; D, the coupling, with its appendages complete, represented in half; E E, the thimbles, and F F, the securing nuts G is the coupling whole, as it appears when secured to the shaft.

The coupling is a cyl nder in halves, bored with a "shim" between the two sections, to fit the shaft to which it is to be attached. This allows something for compression or hug. When the two halves of the coupling are placed on the shaft, where they are retained—if desired, by pins seated in the coupling, and reaching into corresponding holes in the shaft —the thimbles or cone rings are slipped on and hold the two halves in place. Then the outer nuts, F, are screwed to place by means of a "spanner," or wrench, which operation makes the combination snug and close, and effectually secures the two ends of the shafting without keys or set screws.

The coupling, when complete, is a pulley or drum, without a single projecting point, bolt head, or nut, and may be used as a pulley for belts, if required; while a belt, however ragged or frayed, cannot be caught if it comes in contact with the coupling. Although heavy when complete, its parts are light and easily handled, and can be readily attached and detached. It makes a neat finish, and requires no turned shoulder to keep it in place; even the pins before referred to are not absolutely necessary.

The cold rolled shaft has been subjected to severe tests, both in this country and in England, and has proved its superiority over the ordinary refined iron commonly used for shafting, both in the resisting of torsion and weight, while it is easily drilled, clipped, and filed.

For further particulars address Jones & Laughlins, American Iron Works, or H. F. Mann, General Agent, both at Pittsburgh, Pa.



JONES & LAUGHLIN'S SHAFTING AND COUPLING.

PEASE'S OILS AT THE RECENT FAIR.

Visitors at the late exhibition of the American Institute could not fail to notice the splendid collection of oils entered by the manufacturer, F. S. Pease, of Buffalo, N. Y. It was one of the most attractive groups in the fair from its beauty of material and artistic arrangement of specimens. But the excellent qualities of the oils were proved by the unanimous commendation of those who ran machinery, as his lubricating oil was used on all the machines at the fair, from the large steam engine to the delicate sewing machine. It was used also for lubricating the machinery at the Paris Exposition and received the first premium, as it did also in London, in 1862.

Mr. Pease had on exhibition at the Institute fair over fifty samples of oils for engines, signals, druggists, medicinal—requiring two years to manufacture—refined and colorless petroleum, standing a fire or heat test of 142°, and many other varieties. He claims that his oils possess all the requisites for reliability, which are these:

They must stand the highest heat without change (even of melted lead) in order to stand friction and lubricate the cylinders of steam engines. (The heat under a pressure of 150 pounds of steam, is enough to decompose or distil and dry up most of the natural oils in market.) They must be fixed and not volatile oils, as produced by destructive distillation, otherwise they are decomposed by friction and burnt or dried up. They must not show or possess any acid reaction, either naturally or artificially, otherwise the bolts are cut in the steam chest, and the iron, particularly wrought iron, is made porous. They must possess a sufficient power of tenacity without oxidization, otherwise they will gum.

These same laws are applicable to signal and burning oil, for it makes no difference whether the oil is subject to immediate heat, as in a lamp or steam cylinder, or whether it is slow and long continued as in slides and other bearings, the effect and result is the same on the oil in the end.

HINDMAN'S PATENT HUSKING PALM.

The engraving so plainly exhibits the form and manner of application of this device that a detailed description is unnecessary. It is a broad leather band, enveloping the hand and having a strap or stay passing over the thickest part of the thumb to retain it in place. The larger strap is armed with a hook for splitting and stripping the husk from the ear. This band also guards the hand in the act of breaking off the stalk. Both the straps are adjustable by buckles so as to fit any size of hand. It can be put on and adjusted instantly, and as readily removed. The work of husking is, at best, laborious, and this device seems to be well adapted to diminish this labor. It is neatly got up, durable, and cheap. It was patented by John Hindman, who may be addressed for territorial and manufacturer's rights at Indianapolis, Ind.



THE MANUFACTURE OF PARAFFINE.

Liebig, in his "Familiar Letters on Chemistry," long ago expressed his belief that one day olefiant gas—the illuminating ingredient of common coal gas—would perhaps be obtained in solid form for burning on our tables in candlesticks. The Exhibition of 1851 saw the realization of this desideratum, for there was first exhibited one of the greatest triumphs of chemical science, in the the shape of solid paraffine. This was the result of the labors of Mr. James Young, the founder of the well-known Bathgate Chemical Works, and the originator of the mineral oil trade; for years before the Pennsylvanian natural petroleum was an article of commerce, Mr. Young's oils were in great demand, as was also his solid paraffine, which was, and still is, largely used for making candles. The way in which the important and extensive manufacture of mineral oil in the Torbanehill district originated and became developed is worthy of notice. Some years since, in 1847, we believe, Mr. Young's attention was drawn by Dr. Lyon Playfair to a petroleum spring in an old coal mine near Altreton, Derbyshire. On careful examination, it was found that the oil issued from a layer of sandstone over the coal. Mr. Young took a lease of the mine in the hope of working it for lubricating oils, but the supply proved so limited that he gave the matter up. He next turned his attention to the artificial production of the oil by distilling coal, and ultimately he found that the parrot, cannel, and gas coals, and especially the Boghead or Torbanehill mineral, yielded the desired results. In 1850, Mr. Young built the extensive works at Bathgate, to carry out the process as a commercial undertaking, and thus laid the foundation of an industry which in a few years has attained immense proportions. The works at Bathgate are of a very extensive and well appointed character, and are conveniently situated in close proximity to the Torbanehill mineral. The importance of this manufacture, and the leading part Mr. Young has taken in its development, as well as the interesting nature of the works, induces us to give some particulars respecting their arrangement and their products.

It is curious to trace the process by which a pure, white, shining, tasteless article like paraffine is produced from a compact, dull-looking, rusty black coal. It is also interesting to note the various products which result from the numerous processes involved in the manufacture. At the Bathgate Works, four different articles are manufactured by Mr. Young, namely, paraffine oil for burning, paraffine oil for lubricating machinery, the light volatile fluid known as naphtha, and solid paraffine or wax. The Boghead coal is conveyed from the pits by means of branch railways to the works where it is first subjected to crushing to bring the large blocks down to a size fit for the retorts. For this purpose a machine is used, which is formed of two large iron-toothed cylinders, which revolve in opposite directions, and crush up the coal. The broken mineral falls into a pit below in pieces ready for the retort house, to which they are conveyed by a lift. The retorts are vertical cast-iron tubes 12 feet in length and 14 inches in diameter, and are arranged in sets of four, placed in the form of a square, each set being built into one furnace and attended by one man. There are about fifty sets of retorts constructed upon this principle; they rise about 3 feet above the feeding platform, and have funnel-shaped tops to facilitate feeding. The tops of the funnels are closed by valves which are worked by counterbalanced levers. The body of the retorts pass down through the furnaces, the lower ends being made air tight by immersion in water. A low red heat is constantly kept up in the furnaces, sufficient to promote the distillation of the coal in the retorts, care being taken to keep the temperature exactly even. The coal fed in at the top of the retort is decomposed as it passes through that part of the tube surrounded by the furnace, and the oil is produced in the form of a vapor, which is led off through a pipe. The refuse material passes down the tube into the water at the bottom, from whence it is removed as it accumulates. As the vapors are generated, they pass off into a main pipe which conducts them to the condensers, which are placed outside the building, and are constructed upon the same principle as those employed in gas works. The vapors are thus condensed into a liquid, with the exception of a small portion which is always incondensible, and which is collected into a gas holder and used for lighting the workshops. The liquid portion is run off into a tank or reservoir capable of holding 100,000 gallons of this thick, black, greasy fluid, which constitutes the first result of the process of transformation which the Boghead coal undergoes.

From the reservoir, the crude oil is drawn off as required to cisterns for supply to the stills, to which it is fed by gravitation, and where it undergoes the first purification. The stills are cylindrical in form, and are placed in rows, with passages between them for the attendants. The stills are filled with crude oil, and the joints made air tight with clay;

fire is applied beneath, and a regular heat is maintained, which once more converts the oil into vapor. This vapor passes through iron pipes immersed in cold water, and is recondensed, passing into receiving tanks. The color of the oil is now a dark green, and its consistency much thinner than when it entered the still. The impurities are left behind in the still in the form of a compact lustrous coke, which makes an excellent fuel, and is used on the works. The oil, after the first purification is passed, into a series of cast-iron tanks, resembling a row of boilers, where strong sulphuric acid is added to it for the purpose of separating the remaining impurities from the oil. Each tank is fitted with a revolving stirrer which is worked by machinery and which violently agitates the liquor for four hours, causing the acid to act upon the whole of the oil. The color of the oil has now changed from a dark to a light green, and the organic impurities have settled to the bottom of the tank in the form of coarse tar, which is used as fuel. The third stage of purification is effected by an alkali which neutralizes any sulphuric acid that may remain in the oil, and further divests it of other impurities not acted on by the acid. After a thorough cleansing the liquor is allowed to settle; the refuse is then drawn off, and the oil is returned to the stills, where it undergoes a second distillation. From the receiving tanks it is again led to the cleansing tanks, where it is treated a second time with sulphuric acid and afterward with soda. The oil has now arrived at a state of comparative purity, and has assumed a pale yellow color. In this condition it embodies the elements of four different products, each of which has its own separate valve.—*Mechanics' Magazine.*

EDITORIAL CORRESPONDENCE.

Lake Maggiore and the Borromean Islands—Characteristics of Lombard Towns, Hotels, and People—The Simplon Pass—The Rhone Valley and its Inhabitants.

Geneva, Sept. 20, 1867.

My last letter was written from Lake Maggiore, but I must go back just far enough to say a few words about the old town of Bellinzona, the first impressions of which were somewhat peculiar. It stands in the Valley of the Ticino near the borders of Lombardy, and naturally commands the passes that lead over the Great St. Bernard and St. Gothard—a line of embattled walls surmounted by three old feudal towers, stretches across the valley on the Swiss side and locks together the stupendous mountains that lie on either side, imparting to the place, externally, a most imposing appearance, but like many other things,

"Distance lends enchantment to the view,"

for though one of the chief towns of a Swiss Canton, its characteristics are all Italian. The streets are narrow, and the houses are constructed to form an arcade over the sidewalks, which afford an agreeable shelter from the summer heat and the winter cold. The inhabitants are generally a slovenly, listless, lounging set, who appear to vegetate in a condition of dreamy unconcern about the present or the future.

The first view of the beautiful Lake Maggiore is obtained from the splendid highway that leads from Bellinzona over Mt. Cenere to Lake Lugano. It requires two hours to make this ascent, and owing to its steepness, three horses are required to drag up the carriage and two passengers; but no traveler can be impatient to complete this beautiful drive, affording as it does a succession of magnificent views of the upper end of Maggiore and its amphitheater of surrounding mountains, clothed in the richest garniture of luxuriant vines hanging in festoons; dark fir trees and noble chestnuts, the sight of which awakened the most pleasing recollections of the autumnal glories of our own country. Mt. Cenere, so fair and so beautiful, has, until recently, formed a safe cover for a band of Italian robbers, and is rendered comparatively safe only by the presence of a few guards—men who occupy rude cabins at the summit where the roadway winds through the denser forest.

The sun was just dropping behind the distant Alps, and the deep shadows of twilight had fallen upon the mountain top when we passed this gloomy spot, but we were kept in comfortable ignorance of all real or imaginary danger until we had safely reached a miserable village in the open country, which seemed fit only to shelter a band of brigands. Beyond Lugano, at the foot of the mountain, at a small place which bears the euphonic name of Fornasette, we passed the frontier into Lombardy, or Northern Italy, and here a few of Victor Emanuel's humble servants in blue waited upon us and examined our little effects, and informed us that we might depart in peace, which act of kindness we returned by polite bows and a few sous to a young, black-eyed mother who brought out her little baby—sans culottes—that we too might admire the object that charmed her heart.

Our Italian vetturino, anxious to get hold of the expected reward for the journey, drove us hurriedly down the sharp declivity, into and through the narrow streets of Luino, cracking his whip in the most vigorous manner to warn the inhabitants that we were actually coming, and thence wheeled us through the *porte cochere* of a singular looking building, which upon inspection turned out to be a hotel of nondescript architecture. In answer to an inquiry, "could we have rooms?" the little landlady answered, with a half sigh, "that we could have our choice of all the rooms in the house," and I am willing to confess that she did all she could to make us comfortable—anxious to show that her house stood high in public estimation, she brought us a little register which contained an autographic endorsement by Garibaldi, who here fought a sort of rough and tumble with the Austrians in 1849. He also seized the little steamers running on the lake, worried the inhabitants, and levied contributions upon the numerous convents that exist in this region.

Garibaldi's name is still a wonderful power in Northern Italy and his call to arms, for the unity of Italy, which simply means the desecularization of the Pope, would rouse these seemingly dull people to heroic deeds. The inhabitants of Lombardy are thoroughly and almost superstitiously attached to the Church of Rome. They were born, baptized, and reared within its folds. It is their "Notre Dame," and yet, strange as it may seem, they are eager to take up arms and fight to overthrow the pope as a temporal sovereign—but as the spiritual head of the Church, they would cling to His Holiness with all the affection of loving children.

Lake Maggiore, about which so much has been written and said, is a beautiful sheet of water about fifty miles long and three miles wide, inclosed at its upper end by high mountains, on the sides of which stand numerous ancient square-towered Lombard churches, convents, fine villas, and remains of feudal castles which belonged to noble families now either partially or wholly extinct. More than six centuries ago, during the stormy times of the Italian Republics, noble families lived upon the borders of this lake, and struggled powerfully to maintain the mere semblance of a Republic which was simply a government of civil and ecclesiastical tyrants who robbed the people of their substance and stripped them of their rights; but the spirit of freedom was not extinguished, and Europe will know no repose till the nation, which in the dark ages lighted the torch of civilization with that of liberty, shall be permitted to enjoy the light which she created. The borders of the lake are studded with picturesque little villages which just now look seriously scared as if every one had fled from them. Byron's description of "The Last Man," would not inaptly apply to these places, so desolate do they appear at this moment through fear of the pestilence which has turned back the vast tide of summer travel that usually flows down the mountains to this interesting group of Italian lakes. One of the most interesting features of Lake Maggiore is the Borromean Islands which cluster within the little bay of Baveno, upon one of which stands the Castle of Count Borromeo, and the magnificent gardens, formed two centuries ago by the patient application of soil to a ledge of rocks that rise a hundred feet above the water, forming a sort of little fairy land upon whose artificial surface flourish, in open air, the cactus, the aloe, the orange, citron, myrtle, pomegranite, and the camphor tree, all natives of the tropics; but some fastidious writer, not admiring this forcible treatment of nature, within view of the Alpine snows, describes this garden as "a huge Perigord pie, stuck round with heads of woodcock and partridges."

Some few miles below the Borromean Islands we quitted the little steamer and landed at Arona, which is chiefly famous for having been the birthplace of St. Charles Borromeo, Archbishop of Milan, whose life was spent in acts of humanity, self-sacrifice, courage, and benevolence, a combination of rare virtues which are intended to be memorialized in a colossal though somewhat uncouth statue of the saint which mounts up sixty-six feet high, and stands upon an eminence above the town overlooking the lake. Persons entering the head of the statue are permitted to rest themselves by sitting down in a recess of the nose, which serves as a very comfortable arm chair, but inasmuch as a nest of bats have got possession of the head, it is much more comfortable to keep outside.

At Arona a railway runs to Milan, a place we were anxious to visit, but owing to the existence of cholera, we decided to return to Switzerland over the Simplon. Having made a written contract for our transportation—a precaution which should never be omitted in this region—and seated in a comfortable old carriage with armorial bearings on its panels, and which we were assured was once the property of a noble family, we journeyed for two hours over the terraced road that runs along the margin of the lake, until we reached the shore opposite to Feriolo, where we were ferried over a small bend in the lake upon a rough barge propelled by ropes. It occurred to us at the time, that this rude mode of transportation was an awkward link in the magnificent chain of roads that terminated at this little firth, and upon inquiry, we were informed that several months before the roadway that led across the spur of the mountain suddenly sank beneath the water, carrying with it a portion of the village, together with several of its inhabitants, who were hopelessly engulfed in this subterranean stream, which for ages has been gradually wearing away the under crust of the mountain. At this point there are immense deposits of beautiful gray marble, and hundreds of workmen are employed in quarrying it it out for building purposes, and in cutting a new road which promises, when completed, to form a permanent stone bridge over this treacherous undercurrent of the mountain.

Our first night upon the Simplon road was spent in Domo D'Ossola, at a house which sports the title of "Hotel de Ville, or Ancienne Poste," a sort of barrack for the dilligences that run over the pass. The landlord ushered us into apartments immediately above the horse-stables, and, according to a prevailing custom at European hotels, inquired at once if we would have any thing to eat. Upon being told that we could not dine well amidst such "odoriferous concentrations," he seemed surprised, and ordered our luggage to be taken to a front room, where we found clean beds—a luxury never wanting in even the meanest looking European inns. There are no halls within the interior of some of the old Italian inns, therefore communication is had with the chambers, either from outside galleries, or through doors which open from one room into the other. I will not pretend to describe the architecture of the Hotel of the Ancient Post, but should think that it was a conglomerate of all styles since the time of the invasion of Barbarosa. Our exit in the morning was across a triangular-shaped stone balcony, down a narrow flight of steps into the stable yard, and from thence into a dark breakfast room, where everything looked very uninviting except a few boiled eggs, which seemed to have escaped contamination.

The distinguishing characteristics of Domo d'Ossola, are houses with colonnade, awnings over the streets, shops with a choice assortment of sausages, macaroni, and garlic; stupid looking lazzaroni, in red night caps and bare, mahogany-colored legs; sleek looking, well fed priests; females of a dreamy, unwashed cast of countenance—these all go to make up a picture which may aptly apply to any of these Italian towns; but the country is grand and lovely in the extreme, and in the hands of an industrious and enterprising people, it would become the fairest of the earth. With the exception of the Ravine Gondo, which is wild and savage in the extreme, together with that portion of the roadway that runs along the gorge of the Schalbet and through a tunnel underneath the the Kaltwasser which flows from an extensive glacier above, there is nothing in particular that distinguishes the Simplon above the other great passes of the Alps. Indeed, it is inferior, on the whole, to the St. Gothard, the scenery of which is sublime from beginning to end, a remark that cannot justly be ascribed to the Simplon. It is, however, a stupendous piece of engineering, and must forever stand a monument to the memory of the great Napoleon, who projected its construction, and to Ceard, the engineer, who planned and executed its gigantic details.

Another hard day's travel brought us from Domo, over the Simplon, to Brieg, a small Swiss village in the valley of the Rhone. In this valley the inhabitants are usually poor, simple, and wretched. They subsist upon the products of a cold, sterile soil, which supplies little else than scanty pasturage for cows and goats. They are also exposed to constant dangers from the overflow of the river, and from avalanches that sometimes slide down from the higher portions of the mountains, plowing their way through fields and villages, uprooting trees and rocks, presenting, often, a scene of savage desolation. In one of the little mountain villages we counted a flock of upwards of one hundred and fifty goats, with little bells jingling upon their necks, being driven through the streets by two boys, whose appearance indicated that they were strangers to the use of water as an external application. In passing through the streets, the goats were gradually taken in by families on the route, and the next morning the same unwashed boys gathered the flock together and drove them far away to the mountain pastures, where they tended them until the hour of the evening milking.

In the Rhone valley the inhabitants are, also, afflicted with the goitre, or swollen neck, in its most repulsive forms. A disease which has baffled all medical skill and research to discover its cause or to effect its cure. Here, also, we found the Cretans, or idiots, who, though bearing the human form, are always repulsive objects of commiseration. I cannot imagine any other reasons why people should try to live in this valley, except that they are ignorant of a better country beyond, or are too poor to get away.

We stopped an hour at the poor little village of Tourtmagne, which was nearly overwhelmed by an earthquake in 1855. The postmaster very civilly explained to us that at the time of the earthquake, he was standing in the street, fronting the old hotel, which was at one time the residence of a Baron, who must have had a *barren* time indeed if his luxuries were supplied from the surrounding country. The postmaster, in order to give emphasis to his fearful situation, planted himself in the middle of the road and described the "Baronial Hotel" as about to pitch on to him, and that he thrust out his hands most vigorously to resent so uncomfortable an intruder. But the most singular feature of all was, that the adjacent mountains were thrown upward, and, during the upheaval, they were ripped open in several places, the evidences of which plainly appear in the form of deeply-cut fissures, extending from the base to their summit. A little further on there is an immense crater, called Il Graben, the jagged interior walls of which resemble an extinct volcano; but it is not extinct for mischief, for, during high rains, and at springtime, large masses of dirt and stone have been forced down with such violence that a channel fifteen feet deep has been cut all the way down to the edge of the river.

In a few hours more we reached the active and picturesque old town of Sion, where we were glad to dismiss our Italian vehicle, and to get into a comfortable railway car, which safely landed us at Villeneuve at the head of Lake Geneva, one of the most lovely spots in Switzerland. S. H. W.

Correspondence.

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

Conveying Steam through Long Pipes without Condensation.

Messrs. Editors:—We notice in your answer to H. L. W., of Pa., you say: "If the steam pipe is of ample size and well protected there will be but little loss from condensation in carrying steam 1,000 feet." We think this answer is calculated somewhat to lead persons astray, as they might think the larger the pipe the less the condensation. We will give some of our experience in carrying steam and our reasons for using small pipe. We have a steam pump working in a mine slope 1,540 feet from the boilers. The steam cylinder is 14 inches diameter, 3 feet stroke, and we are carrying steam the whole distance in a 2-inch wrought-iron pipe. We had some little trouble before the pipes were covered, but now experience no difficulty in working the pump up to its full speed. We also have two steam pumps in mine slopes 800 feet from the boilers; the steam cylinders being 25 in. diameter and 4 ft.

stroke. The steam pipe for each pump is of cast iron, 3¼ inches internal diameter. These pumps are working with perfect satisfaction, without any protection whatever to the pipes. This, we think, demonstrates the utility of small pipes. Our idea is this: the pipes should be just large enough to convey a sufficient quantity of steam to do the work, then the steam is passing rapidly through the pipes and is used soon after leaving the boiler, whereas if the pipe be large there will be more surface exposed to the elements that condense the steam; the steam will move through the pipes slowly and will not be used for some time after leaving the boiler. To illustrate: suppose we take the pump with a 14-inch steam cylinder, at a piston speed of 100 feet per minute; if we should use a 14-inch pipe to carry the steam it would be over fifteen minutes from the time the steam left the boiler until it arrived at the cylinder and there would be over 6,000 square feet of surface exposed to condense the steam. Now compare the above with a 2-inch pipe. In using a 2-inch pipe the steam would remain in the pipe about twenty seconds, and there would be but a little over 900 square feet of surface exposed to condensation. In some instances we have seen large receivers placed at the end of the pipe, ostensibly to draw off the condensation and give the engine dry steam, but in our estimation all such appliances are only so many condensers, and the more of them used, the less steam you will have and the more saturated. We should like to hear from your correspondents upon this subject, as it is one of much interest.

A. & B.

[It is obvious that pipes for conveying steam under the conditions stated by our correspondent—indeed we may add under all conditions—should be of as small diameter as will permit the necessary quantity of steam to pass through them. Of course, as condensation is produced by the difference in temperature, between the steam inside the pipe and the atmosphere outside of it, and is governed by the conductibility of the material, the area and condition of the surface exposed to the air, the loss from this cause will be proportionate to the radiating area. Hence a steam pipe should never be made any larger than is necessary to convey the required quantity. The opinion of many rule-of-thumb engineers, that efficiency of steam engines is increased by the use of excessively large steam pipes is incorrect. As an illustration it may be mentioned that the steam pipes and passages of the screw engines planned at Washington for the navy are so ridiculously large, that scarcely any change at all is perceptible in indicator diagrams taken with the throttle valve half closed, and again with it wide open. Such blundering as this not only wastes steam, but, of equal importance, it increases the weight and cost of the structure.

We think the letter of our correspondent will do much good in calling the attention of the users of steam to these obvious and important facts.

Although an exaggerated estimate of the economy resulting from the felting of steam pipes and boilers is very generally entertained, whatever saving that can be effected by the prevention of radiation, is so easily obtainable, that there is scarcely ever any excuse for omitting it.

Our reply referred to by our correspondents, was intended for a particular case. This explanation, we think, makes it perfectly clear.—EDS.]

Pumping Hot Water.

MESSRS. EDITORS: As some of your correspondents are discussing the theory and practice of pumping hot water, and as I have had considerable experience in that line, I will give you some of the conclusions that I have come to. I believe that water can be pumped as hot as it can be got to the pump if the following directions are complied with: First, discard all ideas of forming a vacuum in the pump, which I consider impossible to do when the water is heated to, or near the boiling point. Second, place the heater and pump in such a position that the water will flow by its own gravity from the former to the latter. Third, put no obstruction between the heater and the pump in the form of a stop cock unless it is of the same capacity as the pipe, and see that it is fully open when the pump is working. Gage the water as it runs into the heater, and not between the heater and pump. Fourth, set the heater and pump as near together as can be done conveniently, as the water does not start readily through a long pipe. I have found that when the pipes were of considerable length and obstructed by gage cocks, the work of the pump was very uncertain, and would at times be subject to thumping and chattering of valves as mentioned by your correspondent. I have found that by connecting a pipe to the supply pipe of the pump, near the induction valve, and letting it project up about four feet with the top open it would entirely prevent all irregularities in its working. The water should be filtered through straw or something of the kind, after it has been heated, to take out any sediment that it may contain. When the above directions are strictly carried out I have no more trouble pumping hot than cold water with any of the force pumps in common use.

J. B. GREELY.

Muscatine, Iowa.

Tunneling or Bridging the Atlantic.

MESSRS. EDITORS:—The SCIENTIFIC AMERICAN for October 26th, in an article entitled "Speculation Run Mad," speaks of two wonderful propositions; one for sub-tunneling the Atlantic, and the other for causewaying it.

I have in my possession a novel, published by Long & Brother, of your city, some ten or twelve years ago, entitled "The Ship Carpenter's Family," written by Wm. E. S. Whitman, and dedicated to H. Ward Beecher. In this is a proposition by Mr. Ichabod Snorter to run a wire bridge across the Atlantic. Mount Washington, and one of the mountains of Newfoundland, were to be the American piers; while the Peak of Teneriffe, and Mont Blanc were to be the European. The structure was to be kept from sagging by means of huge ships anchored mid ocean. Mr. Snorter had constructed a model, but happening to sneeze, it fell to pieces; whereupon he gave up the plan. He arrived at that conclusion by means of the following proportion: Sneeze: earthquake:: fate of model: fate of bridge.

His next proposition was to tunnel the Atlantic. Hear him speak for himself: "That dot on your right is New York, while the one on your extreme left is Bristol. The lines running parallel from point to point are supposed to be a tunnel, a trifle over three thousand miles in length, of an elliptical form, twenty-five feet from apex to base, and fifty feet subcontrary. I intend that the whole structure shall be built of angular blocks of granite, neatly dovetailed into each other, the instertices being filled with cement. Well, all I've got to do, d'ye see, as soon as the workmen get fairly under way at each terminus, say ten miles under ground, is to put down coffer dams in mid ocean, and pump out the water, as you see by the figure which represents my apparatus, d'ye see.

"Then I intend to sink shafts into the tunnel, you know, to raise the dirt, and make a string of islands all along the route, d'ye see, convenient for storing coal for steamships passing to and fro. Each one of these islands will be named after a stockholder. Every kind of produce will be raised on these islands, to be sent down these central tubes, or breathing holes, which I have sketched in red ink, to go on the sub-oceanic railway to Europe or America, as the market commands."

Mr. Snorter expected to illuminate the tunnel with electric lights. Immense mineral wealth was to be brought to view.

I have given the outlines of Snorter's scheme, hoping they may assist "The Sub-oceanic Tunnelers."

Yours, for the tunnel,

Richmond, Ind. S. S. G.

Spouting Wells and Flowing Springs.

MESSRS. EDITORS:—The phenonena of running springs and spouting wells has been mainly attributed to hydrostatic pressure. This is rational enough for all such flows as have a head reservoir, but it will not account for the outflow of springs on the plateaus of high mountains, nor even in plains where there are no adjacent highlands. We must find a more philosophical solution. We find it in the centrifugal force of the earth's axial revolution, What else accounts for the strong outflowing springs on top of the Allegheny mountains where there is no higher land for hundreds of miles? The centrifugal force in the revolution of the earth causes a tidal wave to roll around it in the southern ocean ahead of the solid parts of the planet. A ship will sail upon this tidal wave at the rate of 24 knots an hour, as has been demonstrated by mariners who followed the directions as laid down under this theory of sailing from the Pacific to the Atlantic by doubling Cape Horn. On this tidal wave fact may yet be found a more rational theory of the tides than that of moon attraction. The tidal wave by gurgitation and re-gurgitation will account for the flowing and the ebbing of the tides by the water striking the Capes Horn and Good Hope, and it will moreover account for the absence of tides on the open ocean and on the lakes.

But our subject now is spouting wells. How the water gets to these submundane basins may be accounted for in two ways. Rains percolate the earth to seek these basins, and centrifugal force will not prevent this. And as the earth is cavernous the oceans will also sap into these interior basins. Some of these basins may be fresh by the water giving up its salt in passing through substances having more affinity for salt than water. It may also become fresh by passing hot regions where it is evaporated and then passing in the form of vapor into cooling regions and there condensed into pure spring water. When we consider that land occupies only one fourth of the earth's surface it is not difficult to believe that water may find its way to any point under the dry land either plain or mountain. Many springs reveal the phenomenon of rising and falling in accordance with the changes of weather. I know a spring (a sulphur spring), that rises always when a rain is pending, and falls when the weather clears off again. Why is this? Just before a rain the atmospheric pressure is diminished. Centrifugal force has at such time less supercumbent resistance, and the well rises. When the atmosphere in clear weather resumes its normal elasticity and weighs more heavily upon the surface of the earth and the well, the water resumes its normal level. Many years ago in passing over the tops of the Allegheny Mountains in a stage coach a fellow passenger asked me the question, "Do you know what makes the water run out of the top of this mountain?" This puzzling question made me think over the matter with much interest, and as hydrostatic pressure would not account for it in this case, as it does not in the cases of some of your intelligent correspondents, we are compelled to seek for a solution that will answer these extreme cases, and I am persuaded, after weighing the matter well in the balance of great natural laws, that centrifugal force is at the bottom of this singular phenomenon Centrifugal force will not prevent the rains from percolating into these deep basins through the sinuous pores of the earth. If you take a sponge and saturate it with water to a degree that it will not run out without considerable pressure, and tie this sponge to a string and swing it around your hand it will not throw off the water by centrifugal force. Now take and fully saturate it and swing it around and the water will fly off. Take a sponge perfectly dry and whirl it around in like manner in a drizzling rain and it will absorb a quantity of water. I state this merely to show that centrifugal force will force out water in some cases and not in others.

Centrifugal force is the cause assigned for the bulging of the earth round its equator about 14 miles beyond the common surface of our planet. We know also that this centrifugal force throws out around the earth's equator a mass of vapor that forms a cloud belt around the world several hundred miles broad.

If this solution of the question has any insurmountable scientific obstacles, I would like to have them stated by you or any of your philosophic correspondents. After a while I will demonstrate through your paper how this same law of nature will more rationally account for the tides.

Lancaster, Pa. JNO. WISE.

THE AMERICAN INSTITUTE FAIR.

The following notices were omitted from our last issue:—

The Parallel Vise of Messrs. Stephens & Co., 91 Liberty street, N. Y., is shown in several different sizes. It is one of the most useful and ingenious implements of the kind that has come under our notice. The claim of the makers that it is stronger, more durable, and can be adjusted in less time, holding firmer than screw vises, appears to be well sustained. It is a superior article.

Pumps.—Among the several devices for raising water exhibited at the Fair we were struck with the excellence of those exhibited by Rumsey & Co., Seneca Falls Pump and Fire Engine Company, of Seneca Falls, N. Y. Among these we observed particularly their steam cistern pump, of great capacity, brass force pumps, steam boiler force pumps, etc. The work turned out from this establishment enjoys a high repute for excellence and reliability. They make from two to three hundred pumps of different styles and varieties, and justly command an extensive share of the public patronage.

THE AWARDS.

The Fair closed, as stated in our last, on the 26th ult., and on that day the awards were made. We regret that our limited space prevents us from giving a complete list of all the premiums. We can only subjoin the first prizes for the leading mechanical things. The full list can be seen at the office of the Institute, Cooper Union Building, N. Y.

DEPARTMENT V.

Washington Iron Works, Newburgh, N. Y., Wright's Horizontal Engine.
Knowel & Warren, Mass., Knowel's Automatic Boiler Feeder.
H. K. Smith, Norwich, Conn., Small Engine Lathe.
J. Patterson, Williamsburgh, N. Y., Blacksmith's Forge and Tweer.
Charles Murdoch, Automatic Stave Machine.
Baxter & Whitney, Smoothing Machine.
Baxter & Whitney, Cylinder Surface Planer.
L. J. Knowles & Bros., Warren, Mass., Webbing and Tape Loom.
L. J. Knowles & Bros., Warren, Mass., Woolen Loom (three shuttles).
D. McFarland, Worcester, Mass., Curling Machine.
Brown & Ashworth, Lowell, Mass., Wire Heddle Machine.

DEPARTMENT VI.

Joseph Pace Woodbury, Boston, Mass., Working Model of Locomotive Street Cars.
Bridges & Lane, New York, four Jack Screws.
T. W. H. Moseley, Boston, Mass., Model of Bridge.
Joseph Dixon, New York, Cast-iron Plates for Underground Railway.
Alfred E. Beach, New York, for the exhibition of a working section of a Pneumatic Railway.
James Eustace, New York, case of Fancy Leather Goods.
J. Palmer & Co., Concord, N. H., Improved Carriage Springs.
John Raddin, Lynn, Mass., Elastic Carriage Wheel.
George P. Overin & Co., New York, case of Whips and Lashes.
C. Ducreux, New York, arrangement for Detaching Runaway Horses.
John Goulding, New York, Life preserving Mattress.
Spalding & Coffin, Boston, Mass., Uniton Power Capstan.
Jas. L. Jackson & Bro., New York, Screw Steering Apparatus.
Samuel Brown, New York, Boat detaching Apparatus.
F. G. Fowler, Springfield, Ill., Working model of Steering Propeller.
L. Bradley, Jersey City, N. J., Telegraphic Relay.
The Bishop Gutta Percha Company, New York, Submarine Cables.
Thomas S. Ball, Stamford, Conn., Magnetic Railway Switch alarm Signal.
Jerome Kidder, New York, Electro-Medical Apparatus.
The American Fire Detector Company, New York, Fire Detector.
Alfred E. Beach, New York, Pneumatic Postal Dispatch.
Milo Peck & Co., New Haven, Conn., Newspaper Directing Machine.
Heath, Smith & Co., New York, Graining Machine.
J. F. Trow, New York Type Setting and Distributing Machine.
Wood & Tuttle, Boston, Mass., Printing Press.
George P. Gordon, New York, improved Card and Bill-head Press.
Otis Brothers, New York, Hoisting Apparatus.
John P. Gruber, New York, Bank Scale.
Herman Kohlbursch, Jersey City, N. J., Diamond and Druggists' Scales.

[Advertisement.]

Explosions and Incrustations.

Probably nothing tends more toward these disasters than the deterioration of the iron from overheating and "picking," incident to the deposit of scale, or incrustations. Corrosion, also, is due to this cause, as well as "picking," which cuts the outer crust or strongest fiber of the iron, weakening it and inviting corrosion—both destructive to the metal.

Iron cannot be overheated while the water is in contact with it; but insert even an egg shell between the iron and the water, and burning of the metal commences. It is estimated that the thinnest fraction of a scale compels the use of 20 per cent more heat or fuel. In all probability, one-half the explosions are due to this overheating and corrosion, *caused by incrustations.*

We would suggest as a means of preventing these accidents, saving fuel, repairs, and the life of the boiler, to "*keep it clean.*" This may be done by some chemical which will destroy the lime and other salts contained in the water, and prevent corrosion. We refer to the Anti-Incrustation Powder of Mr. H. N. Winans, of this city. This article has proved itself reliable and uninjurious for twelve years past—a fact alone which is sufficient recommendation of its value and efficiency in preventing or removing incrustations.

RAILROADING EXTRAORDINARY.—A correspondent assures us that engineering art has accomplished many wonderful achievements, but congratulates himself on originating an undertaking surpassing in its grandeur any thing yet attempted. This project of unparalleled magnitude is the construction of a first class double track railroad from this city *via* the inviting regions of Alaska, and ferry boat across Behring's Straits to Asia. Running across this continent, scattering in its course the New York dailies, and the seeds of christianity and civilization, the road will reach Europe, terminating finally in the city of London. In passing through the regions of extreme frigidity, any trifling inconvenience arising from heavy snows is to be obviated by the construction over the track of a substantial archway of masonry, and at convenient distances apart, forming part of the structure, "hotelets" might be erected for the accommodation of travelers desirous of remaining for short periods for scientific or other purposes.

Temple of Xochicalco in the Champ de Mars.

We reproduce in this issue another of those national monuments exhibited at the Paris exhibition, which serve better than the most vivid description to convey a proper idea of the characteristics of a people and nation long since passed away. From *L'Exposition Illustrée* we condense the following description :—

The edifice that is here reproduced in its severe and primitive aspect, and with its walls covered with hieroglyphic basreliefs, is not a creation of the artist's fancy, but a faithful restoration of a temple found about twenty-five leagues southeast of the city of Mexico. It had been vaguely described by Father Alzate, and by MM. Humboldt, Nebel, and Col. Dupaix, before the able and ingenious explorer, M. Léon Méhédin thus placed it before us in the model in the *Champ de Mars*.

It proves that civilization and art existed in Mexico before European feet had trodden its soil. The annals of the Conquest of Mexico have already told us something of the atrocious sacrifices that were celebrated in these temples, and of the human beings immolated to appease the thirst for blood of the deities of the New World. It is unnecessary to recall the overwhelming indignation of the Spaniards against these altars reeking with blood, where the companions of Hernando Cortez were miserably slaughtered by hundreds. These awful temples, that all narrators speak of with horror, and in one of which a Spanish officer counted sixty thousand skulls, disposed as decorations, are brought in tangible form before us in the structure in the *Champ de Mars*. Nothing is wanted, neither the skulls ranged along the architrave, the fantastic hieroglyphics, nor the brilliant curtain decked with plumes that closes the entrance. Lift this curtain and the sacrificial stone will appear, on which five priests brutally slaughtered the victims whose bloody hearts were rendered up as burnt-offerings to their god, the Sun. Facing this block, and portrayed as faithfully as possible from the descriptions of Father Sahagun, Prescott, and others, rises the colossal statue found at Téotihuacan, and that M. Méhédin thought to be the statue of the Sun, rather than another in the Museum at the city of Mexico, called the Téoyaomiqui. Even the stone tubs are shown in which they collected the human hearts reserved for the communion of the High Priests. The body was rejected as something vile, and beneath the dignity of the Temple.

Near the Temple is seen a monolith of the highest importance, reproduced in plaster from a casting taken on the spot, and representing the Zodaic of Tenotchtitlan, showing a surface four times as large as that of the Zodaic of Dendérah, and ornamented with alto-relievos of great perfection.

The statue of a Mexican woman, most skillfully executed, gives the visitor a perfect picture of an age long past; she is sleeping at the brink of a fountain. Beside this woman of the olden time are seen the men of modern Mexico in all the brilliancy of their national costume, the sarapa on the shoulder and the flowing pantaloons open at the foot.

It is proper to note four modifications that have been made in the representation of this Temple: 1st. The grand stairway, which was very steep in the ancient structure, is here at a more gentle incline, in order to facilitate the access of visitors. 2d. The terrace on which the temple rested at Xochicalco was of earth, with fronts of masonry; here it is built of timber and hollow, and is used by M. Méhédin as a repository for the collection of articles made by him during his scientific mission in the Crimea, Egypt, Italy, and Mexico. 3d. The large windows painted from manuscripts of that period, are anachronisms—but essential to obtain the correct effects of light here, which were unnecessary under a more brilliant sun. 4. The interior partitions are covered with Egyptian mouldings brought from Thebes in 1860.

In conclusion, the Temple of Xochicalco is an object to attract the attention and interest of the literati, as well as the curious. It is something very different from all we have ever known, and it will linger in the memory as a strange and peculiar spectacle, a vision of a world that has long disappeared.



THE ANCIENT MEXICAN TEMPLE AT THE PARIS EXPOSITION.

Japanese Mechanics---How They Work.

A correspondent of the New York *Times* gives the following interesting account of the Japanese artisans in San Francisco :—

"The steamship *Colorado* brought over a company of Japanese performers, calling themselves the Ha-ya-ta-kee troupe. During the past week they have been fitting up the Metropolitan Theatre in the similitude of a Japanese temple, for the exhibition of their feats of strength. It is said that the entire company, even the workmen who are engaged in putting up the stage, belong to one family. It is a curious sight to see these Japanese carpenters at work. They use their hands and toes at the same time, the latter being as handy as their fingers. At first there seems to be a great advantage in their having four hands instead of two, and, although they seem to work with great rapidity, yet they do not accomplish one-half as much as a good American mechanic would in the same time. A Japanese carpenter makes no use of workbenches or vices. If he wants to sharpen a saw, he squats on his hams, places the back of the tool to be operated on on the ground, grips one end of the saw with his left hand, seizes the other with the toes of his right foot, and goes to work. Their tools are not like American tools, though they have a slight similarity, showing that all tools have one common parentage, whether their inventor was Tubal Cain or some other artificer. All Japanese saws are shaped like butcher's cleavers. The handle is like the handle of a cleaver, but flattish, as if whittled out of a piece of inch board; the metal shank of the saw is driven into that handle, and the whole is secured by being wrapped with fine split cane. The metal of the saw is about the substance of our saws, but the teeth are narrower, giving more of them to an inch, and much longer. They are all pointed toward the handle, and cut the wood like so many hocks. When a Japanese wants to rip a plank, he places it across any thing which will elevate the end a few inches, then stands on the wood and cuts it by seizing the cleaver-looking saw in both hands, and pulling it toward him. Thus, by a number of short, quick, up strokes, he gets through a plank not so speedily, but quite as effectively, as an American carpenter would with the long, slow, down stroke of the rip-saw. The planes are small, with single irons—no handles. The planes are shorter, lighter, and the wood shallower than ours, being generally not more than an inch deep. To plane a piece of wood, they lay it on the ground, squat on their hams, hold it fast with their toes, and work the plane with both hands toward them. To drill a hole they have a short awl inserted in a round piece of stick eight or nine inches long. They take the wood between their toes, squat as before, and make the hole by rubbing the handle of the awl between their hands, in less time than one of our carpenters could drill one with a gimlet. Their hammers are solid cylindrical pieces, not made shapely with waists and graceful outlines like ours. They have the same flat-sided handles as the saws. The Japs. have iron squares, not unlike American squares, marked with degrees. Their measures are brass, very light and fluted. On one side the inch, or what stands for the inch with us, is 1 3-16 inches, and divided into ten parts. On the other side is a different scale, measuring 1 13-16 inches, and divided into twelve parts. Some of their tools appear to be mere children's toys: for instance, they have a smoothing plane two and one-half inches long, one inch broad and half an inch thick. Their chisels are light and small. The cutting parts of some are the size and shape of a section of half a dollar—the square side being the cutting edge, and a round metal shaft connecting the convex side with a wooden handle.

"The most ingenious article in their tool-chest is a chalk-line. It is a wooden cup containing a spongy substance steeped in Indian ink. This is pierced front and back, and the marking line passes through it. The end of the line is attached to a small awl; the other end of the line, after passing through the cup, is wound round a reel, not unlike a fishing-rod reel, which takes the place of the handle of the cup. To mark a line down a plank, the Japanese carpenter sticks the awl in at one end of the proposed line, carries the cup to the other, the line paying itself out as he does so; he holds the line down to the board when he reaches the desired spot, strikes the mark, and then takes up his cup and reels up the line as he walks back to the spot where he inserted the awl. The process of paying out the line and of reeling it up again both draw it through the ink supply in the cup and keep it ready for action."

The Velocity of Light, according to a calculation recently published by Prof. Chase, of Boston, is nearly the same as would be acquired in one year by a falling body under the influence of an accelerating force equivalent to the force of gravitation at the earth's surface, *viz.*, 32 1-6×86,400×365¼÷5280=192,254 miles per second.

Grindstone Grit, being mainly silica, offers an excellent resistance to heat.

Improvement in Hoisting Machinery.

The construction of this elevator or hoisting machine may be understood by a glance at the drawing. The pulley in the center drives a worm screw, which, by means of a gear working into it and by miter gears, moves the two main screws on the sides, that engage into the screw racks, which are firmly secured to the posts. Thus the whole platform and gearing moves up and down together, this being the only elevator in which the motive and sustaining power are inseparably connected with the platform.

An endless belt, running from top to bottom of the hatchway, gives motion to the center pulley, being passed under and over the smaller pulleys at the side. If this belt should break or come off, the platform remains stationary of itself, without the aid of other mechanism, such as pawls or catches used in other elevators, and is incapable of being moved up or down till power is again applied to the pulley.

By means of an improved belt-shipping apparatus furnished with the elevator, only the belt to be used at the time is moved on to the working pulley, thus saving much wear and tear of belts. The brake for overcoming the momentum of the platform is applied by the same movement which ships the belt, so that the very instant the belt leaves the working pulley the elevator stops.

If the elevator should rise higher than the ends of the screw racks on each side, it goes no further, the screws merely revolving till the motion is reversed, when they again engage and descend as usual.

The platform, with the gearing, is counterbalanced by an iron weight, suspended over suitable sheaves by a wire rope, so that all power used is taken up for hoisting what is on the platform, and not the platform itself.

One great advantage of this elevator is its security against the accidents so terribly common to those which are raised by means of wire or hemp ropes or by chains. Another is its great strength, one of the smallest size built raising over 2,000 pounds from the lower floor to the upper story, while the largest raise easily over four tuns.

This machine cannot fall, it rises no higher than is desired, and can be stopped within an inch of the intended spot. Its cost is no greater than that of first-class rope elevators. It can be run at any speed by altering the size of the center pulley. It was awarded the gold medal at the Lowell (Mass.)Fair, for general excellence and utility.

It is manufactured by Campbell, Whittier & Co., who may be addressed at Roxbury, Mass.



MILLER'S PATENT SCREW HOISTING MACHINE.

HOW GUN-COTTON IS MADE.

There are at present only two places in England, perhaps in the world, where the manufacture of gun-cotton is carried on upon anything like a large or systematic scale, viz., at the government powder works at Waltham Abbey, and at the private works of Messrs. Prentice, at Stowmarket. The manufacture falls naturally into three main subdivisions: 1st, The preparation of the cotton; 2d, The conversion of cotton into gun-cotton; 3d, The preparation of the gun-cotton for use. Formerly, until Baron von Lenk elaborated an improved system of manufacture, gun-cotton was made exclusively from cotton wool. This substance, however, was generally regarded as presenting difficulties in its preparation. It was argued that the complete and uniform saturation of masses of cotton wool was a thing not easily accomplished, and under the old process of manufacture the objection undoubtedly held good. On immersion the wool assumed a new character. It caked into a wet mass far less readily penetrated either by water or acids, and less convenient to handle than the skeins of cotton which Von Lenk introduced, and in the introduction of which he has generally been held to have effected a radical improvement. The present system of working gun-cotton has, however, removed many of these difficulties, and it seems now to be coming to be understood that it matters little in what form the cotton be employed.

The cotton is first boiled in an alkaline solution, and from this point remains, with one exception, damp, and therefore absolutely innocuous during the whole of the subsequent processes. The safety attending the manufacture of gun-cotton is an important feature in its production. There is no danger or possibility of accident until the material reaches the final stage at which it has to be dried; and although the same precautions are officially insisted upon in a gun-cotton factory as are necessarily observed in gunpowder works, they are in truth superfluous, and their observance is only calculated to conceal one of the strong recommendations of the substance, viz., its absolute immunity from danger in manufacture.

The cotton, after being boiled in the alkali, is placed in a revolving cylinder with perforated wire sides, which makes from 600 to 800 revolutions per minute, and by means of the centrifugal force thus generated the alkaline water is wrung out. The cotton is then washed in clean water, which is afterward wrung out in the same way. The final operation in the preparation of the cotton consists in thoroughly drying it, partly by atmospheric exposure, partly by depositing it in a chamber artificiallly heated to about 120 degrees. On the thorough drying of the cotton at this stage a great deal depends. If the drying be imperfectly effected, the water which the cotton retains will afterward generate heat by union with the acids, and establish a destructive action.

Having by these simple processes obtained a mass of practically pure dry cellulose, the next operation is to convert that substance into "trinitro cellulose," or gun-cotton. The acids with which the cotton is to be impregnated are mixed in the proportion of three parts by weight of sulphuric to one part by weight of nitric acid, only the very best and strongest acids being used. After mixing, they are allowed to cool before applying them to the cotton. The cooling process occupies ordinarily two or three days. The cotton, in charges of 1 lb., is immersed in a bath of the mixed acids, which is kept surrounded with cold water to prevent the heat generated by the chemical action from accumulating. The cotton is then removed on to a strainer, and roughly expressed until it retains only about ten times its weight of acids, in which condition it is transferred to an earthenware jar. The jars are placed in water to keep down the temperature, a point of considerable importance, in order to avoid the destructive results which would be due to any elevation of temperature. During the whole of the processes into which the employment of acid enters, iron tools are used, as, by a curious apparent contradiction, iron, although so susceptible to the action of weak or dilute acids, is not acted upon by pure strong acids. The fumes of the acids are drawn away from the workmen through a shaft, up which an intense draft is artificially created. The jars remain in the water forty-eight hours, to insure the thorough conversion of every particle of the cotton, which is then removed from the jars, and the free acid expelled by means of the centrifugal machine. The cotton is now no longer simple cotton, but gun-cotton; and at this point it may be well to explain what change has taken place, and what gun-cotton really is.

Cotton wool, wood fiber or cellulose, consists of the two oxidizable or combustible elements, carbon and hydrogen, in combination with a proportion of oxygen. Nitric acid is the chief constituent of saltpeter, and a very powerful oxidizer. Thus it is to the tendency which that substance possesses to oxidize carbon or charcoal with great rapidity and energy that gunpowder mainly owes its explosive properties. If the strongest nitric acid be added to cotton wool, and its properties slightly assisted by heat, it will violently and rapidly oxidize the hydrogen and also partially the carbon in the cotton. But if its oxidizing powers be moderated as far as possible by abstracting the heat as fast as it becomes generated by the chemical action, only a certain proportion, amounting to three tenths of the whole of the hydrogen, becomes oxidized by the nitric acid, the remainder being converted into water. During this slight oxidation of the cotton wool, the space created in the construction or composition of that substance by the removal of so much hydrogen is at once occupied by the nitric acid, which has given up a small proportion of its oxygen to the abstracted hydrogen, but which thus conveys into the composition of the cotton a large additional proportion of oxygen, ready upon the first favorable opportunity—that is, upon receiving a slight assistance from heat—to oxidize the remaining hydrogen and the carbon in the cotton and convert them into gases with explosive rapidity. In this action the nitric acid is aided by the oxygen originally existing in the cotton wool. Gun-cotton is therefore cotton wool from which a small proportion of hydrogen has been removed, a powerful oxidizing agent becoming introduced into its composition in place of that of hydrogen; and thus with but very slight alteration of its appearance and physical properties, the simply inflammable substance becomes converted into a powerful explosive. The object of mixing the nitric with strong sulphuric acid is simply to give greater strength to the former. The affinity of sulphuric acid for water is so powerful that it takes to itself a proportion of that with which the strongest known nitric acid is still diluted, combining also with the water liberated from the cotton by the nitric acid, and thus by preventing the dilution of the latter it assists indirectly in its action upon the cotton.

The gun-cotton now undergoes a most elaborate process of washing. It is absolutely essential to its safety that every particle of free acid should be removed, otherwise spontaneous decomposition will ultimately be set up with destructive and possibly dangerous results. The first washing is effected by plunging the gun-cotton suddenly, so as to prevent heating, into a stream or fall of water. The gun-cotton is then deposited in a tank of running water for forty-eight hours. The water is then wrung out in a centrifugal machine; another bath and another draining; a third bath and third draining, and so on, until, in addition to the drench-bath, the cotton has been washed and drained six times. At Waltham Abbey these processes of washing are reduced in number, although not in degree, by placing the gun-cotton after the drench-bath in a river, where it remains for a fortnight, the river impurities being afterwards washed out. The gun-cotton is finally washed in a warm alkaline solution, to remove the last traces of acid.

It might almost seem as though this washing were immoderate and excessive, but, on the contrary, the washing of the gun-cotton under the system now observed is not even yet complete. And here the processes of making the gun-cotton become merged and in a measure lost in the third and final subdivision of the manufacture, viz., the preparation of the material for use. That preparation consists in converting the gun-cotton into pulp, similar to that from which paper is made. To whatever use the gun-cotton may be intended to be put, it is now invariably pulped, and it will easily be understood by those who know how paper is made that the process of breaking up the cotton into pulp constitutes in itself a very thorough and effectual process of washing, since it is one in which the water is necessarily brought into contact with every fiber and particle of the cotton. The pulp once obtained, it can be applied as desired. It can be compressed

into dense compact masses for mining charges; into disks for charges for cannon, each charge containing a number of disks, corresponding to the pellets which compose a charge of the new "pellet gunpowder"; or, it can be formed into paper, which, cut up into strips and rolled into little cylinders, forms charges for sporting guns. The pulp, too, can be used pure, or it can be diluted down to any degree of weakness by the admixture of a certain proportion of incombustible pulp—plain cotton, not gun-cotton pulp. In practice, advantage is taken of this to reduce the strength of the gun-cotton for sporting purposes, the charges for which contain a proportion of raw cotton. The same mode of dilution is also advantageously employed for certain special blasting operations, particularly in slate and stone quarries.

At this stage if the gun cotton be intended for mining or cannon charges it is pressed damp into masses of the required form and size and density. It is then dried, and now for the first time it puts off the armor of damp which has hitherto rendered it innocuous and proof against possible explosion. The drying is effected in small charges of 20 lbs., isolated in fire-proof-cages; and so little danger is there attending this the only "dangerous" operation in the manufacture that the whole of the charges undergoing drying at any one time might be exploded simultaneously without giving rise to any accident. If intended for sporting charges the pulp is formed into sheets of paper and then dried. On each sheet is printed the nature of gun and weight of shot for which the charge is intended, and this printing is repeated along one edge of the paper as many times as the sheet will make charges. The paper is then cut up into strips defined by the printing. Each strip is carefully weighed, and the excess cut off. It is then rolled up, with a definite and carefully adjusted pressure, and the edge cemented down. Each roll constitutes one charge, with the printed particulars on the outside. After passing the roll through a gage, they are water-proofed by inclosing them separately in a fine film of india-rubber. The operation by which this is effected is neat and ingenious. The charge of gun-cotton is introduced into a cylinder, over the mouth of which is placed a disk of india-rubber. By means of a pair of small bellows worked by a pedal the india-rubber is blown into a bubble, into which the charge of gun-cotton is introduced; the bubble is allowed to collapse, and the mouth of it is tied securely over the end of the charge. The waterproofing of the charges contributes greatly to their uniformity of action.

The extreme simplicity of all the processes connected with the manufacture of gun-cotton, and the absence of all necessity for costly machines and appliances, together with the perfect safety which attends the operations, are points which will not escape notice. Under the present system, also, there is no waste, since all the cuttings from the strips and spoiled work can be thrown back into the mill and reconverted into pulp. The key to the successful production of gun-cotton is the thoroughness with which the several processes must be performed. The thorough purification and drying of the cotton, its thorough conversion into gun-cotton, and its thorough washing, are the salient features in the preparation of the material; and where this element of thoroughness is wanting an inferior or dangerous substance must be the result. From this source one of the chief practical difficulties in the way of the general use of gun-cotton may be expected to proceed. Manufacturers greedy of gain and anxious to meet an immediate demand, will always be exposed to the temptation of "scamping" some of the operations, and producing an imperfect and inferior material. But it may be hoped that the evil will provide to some extent its own safeguard. When it comes to be understood that a failure of a sportsman's cartridges is due not to inherent defects in the gun-cotton itself, but to bad workmanship, manufacturers will be checked by a consideration which will probably prove potent enough to keep them within the lines of fair dealing. —*Pall Mall Gazette.*

Institute of Reward for Orphans of Patriots.

The Institute held its sixth anniversary at the rooms of the President, Dr. Webster, College of the city of New York, Wednesday, Oct. 23d. The reports of the Secretary and Treasurer were very encouraging. The Institute holds valuable scholarship contributions. In various institutions scholarships for qualified patriot orphans have been founded or donated by individuals, corporations, and legislatures:

In Union College, Schenectady, N. Y., twelve perpetual scholarships.

In Middlebury College, Vt., an unlimited number of scholarships.

In Williams College, Williamstown, Mass., an unlimited number.

In Dickinson College, Carlisle, Pa., scholarships held by certain Sunday schools.

In Wittenberg College, Springfield, Ohio, an indefinite number.

In Knox College, Galesburg, Ill., scholarships for twelve sons and twelve daughters of fallen patriots.

In Kansas State University, Lawrence, scholarships for an unlimited number of patriot sons and daughters of the Union

In Phillips Academy, Exeter, N. H., free tuition for all patriot orphans.

In Eastman's Business College, Poughkeepsie, twenty scholarships.

In Kimberly's Commercial College, Philadelphia, ten scholarships.

In sundry other Business Colleges in various States.

In the National Academy of Design (city of New York) perpetual scholorships, founded by the liberality of R. A. Brick, Samuel B. Higenbotam, Wm. H. Bridgeman, James B. Alling, and Charles P. Daly.

[For one young lady, an accepted candidate for one of these *Art Scholarships*, board is proffered by Mrs. Joel T. Benedict.]

In Ontario Female Seminary, Canandaigua, N. Y., by B. Richards, five scholarships for five years.

In Dr. Adolph Douai's school, N. Y., tuition and board for a Union soldier's orphan child, girl or boy, acceptably qualified, and *protegé* of the Institute.

In the Northwestern University, Evanston, Ill., a scholarship for twenty years' tuition, the gift of Messrs. Bryant & Stratton to the Institute.

Applicants for these and other scholarships, address David P. Holton, Corresponding Secretary, 124 West 54th street New York City.

Momentum and Inertia.

J. H., of Pa., gives us this most unnatural and almost impossible problem, which, by the way, is almost as old as known science, and probably will never be solved to the satisfaction of inquirers:—

"Suppose two *perfectly non-elastic bodies* should meet each other in space, both in motion, and one body considerably larger than the other, now it is plain that the smaller body would be carried away in the direction of the greater, after their contact. But as the smaller body was going forward before it came in contact with the larger, and also as it (after the contact) went backwards, it is evident that it must have paused or stopped at the turning point, and if the smaller body stopped the larger one must also have stopped; then they both stopped. Now I want to know, if they stopped, what set them in motion again, for we all know there is some motion after contact of unequal forces; but if there is a motion, how does the law of inertia hold good?"

Editorial Summary.

AUTOMATIC COOKERY.—A Norwegian cooking apparatus exhibited at the Exposition, consists of a wooden box lined with some non-conducting material, and containing a tin vessel which fits into the stuffed aperture of the box. The stuffed lining is so poor a heat conductor that water in the interior tin box only cools down from 212° F to 172° F in seventeen hours In cooking a piece of beef, the meat is placed with water in the tin vessel, over an ordinary fire, until the water has boiled for five minutes, when the vessel with its contents is quickly placed is the isolated apparatus, and left alone for three hours, when the beef is found to be thoroughly boiled. This method of cooking is pronounced the truly philosophic one, the maximum nutritive quality being retained. Economy of fuel, and great saving in labor are other recommendations. The patentee lately had all the materials for a *pot au feu* prepared, and shut up in the apparatus at Paris, and brought it with him to London, where it was opened, and furnished a smoking hot meal four hours after leaving the fire.

THE DECOMPOSITION OF CARBONIC ACID BY PLANTS, as influenced by different colored rays, has been investigated by M. L. Cailletet, who observed that green light afforded unexpected results, whether this color was obtained from glass vegetable leaves, or solutions. Under its influence carbonic acid is never decomposed; a fresh quantity of gas seems, on the contrary, to be evolved. When a glass containing pure air and a leaf was placed in full sunlight under a green glass shade, after a few hours a quantity of carbonic acid was obtained, scarcely inferior to that which the leaf would have evolved in the dark.

A MANUFACTURERS' CONVENTION, consisting of delegates from all parts of the United States, will meet in Cleveland, O., on the 18th of December next. The most prominent object of the convention will be to urge Congress to repeal the internal taxes on manufactures and productions, except luxuries, and simplify and remodel the tax list, so that taxation may be confined to a few articles, and taken from all of prime necessity. We have had a copy of the resolutions, and a circular appealing to manufacturers, signed by a number of large Western manufacturers, sent to us, from which we judge the movement to be a formidable one.

NO FULL MOON.—Last February was a month in which there was no full moon, a remarkable fact, but not so rare as some of the Italian journalists would make it, for these authorities asserted that this occurrence could only take place once in 25,000 centuries. A Milanese astronomer, M. Schiaparelli, who noticed this rash assertion, has just shown that the same thing occurred in 1847, when the moon came full on the morning of January 31st, and next again on the morning of March 2d following. In 1828 there was a similar occurrence in this country.

CAN WOOD IMPRINT OR ENGRAVE IRON?—Some rails of one our city railroads were taken up a few days ago and on their lower surface was a perfect representation, or reproduction of the grain of the sleepers on which they rested, with all the knots and the curvatures of the wood, as neatly done as if by the painter's art. On applying the fingers to aid the sight, these lines were found to be really engraved or indented into the iron, so much so as to be readily detected by the sense of feeling. Whether produced by chemical action or by mechanical force is a question.

AMERICAN TIN.—For a few weeks past experiments have been conducted by Dr. T. R. Goulding, of St. Louis, to decide upon the proper flux for, and the best manner of roasting and smelting tin ore from the Missouri mines. As a final result, on the 18th inst. was produced the first pig of pure tin ever made in this country. The yield of pure metal was eight per cent of the quantity of ore.

AN ELECTRIC ORGAN.—The *Scientific Review* describes a method of employing electricity in organ playing, so that the key board and pipes may be separated any distance apart, and in performing on the most powerful instrument the tones will respond with readiness to the most rapid touch. Whenever a key is pressed down, an electric current is completed, the keeper of a small electro-magnet is attracted, a valve is opened, and air passing into the organ pipe causes it to sound at once, and as long as the key is depressed. The battery is arranged on the upper surface of the bellows, and each cup contains a solution of sulphate of mercury, into which the action of the bellows forces a plate of zinc, which at other times is protected by two plates of graphite, so that there is no waste of battery force unless the organ is actually playing.

THE ENGINEERING POWERS OF THE BEAVER are really astonishing, as those most conversant with the habits of the animal testify. On the southern shore of Lake Superior, in Marquette county, a naturalist found remains of long canals and dams constructed by them for the purpose of transporting their cuttings—consisting of trunks of trees two or three feet long—from the place where the trees had fallen to their lodges. Some of these canals were from three hundred to five hundred feet long, by three feet wide and deep. In order to maintain a continuous depth of water they made dams at certain distances, and followed the Chinese plan, in lieu of locks, of drawing their load from one level to another.

THE PYRENEES DISAPPEARING.—A Madrid paper laments over the fact which scientific researches have established, that the range of the Pyrenees mountains during the space of twenty years has lost about one hundred feet in altitude, and proceeds to make a calculation whereby it appears that after the lapse of one thousand years the chain separating France and Spain will be no more, in which case the Ebro will empty into the Bay of Biscay instead of the Mediterranean.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The New Haven, Hartford and Springfield railroad, are about putting on the road two coaches of the English style.

The best oil well in Pennsylvania has to be pumped, and only yields two hundred and fifty barrels a day.

There are but three manufactories of wire rope in the United States.

Pittsburg, Pa., has two hundred and one firms, principally manufacturers of iron, steel and glass, who did a business last year of over one hundred thousand dollars each.

A foundery and machine shop at Austin, Nevada, is supplied with Lehigh coal shipped around Cape Horn to San Francisco, thence by river to Sacramento, thence *via*, Central Pacific railroad to Cisco, whence it is carted to its destination. The Austin *Reveille* under the heading "Good News" lately congratulated conductors of mills and those using machinery, on the receipt at this foundery of a six month's supply of coal enabling the proprietors to execute all orders without delay. The freight on twenty tuns of coal thus transported amounted to nearly $3,000.

The porgy oil manufacture in Maine last year, amounted to $2,000,000 in value, and the guano to $400,000. This year's production will be only about one half as large, and the price is much less than last year.

An elm tree at Hampden, Ohio, furnished seven thousand feet of inch boards, clear stuff. The tree was six feet ten inches in diameter, and weighed sixty thousand pounds. The concentric circles, which indicate one year each, numbered seven hundred and ninety two.

In the neighborhood of Colesburg, Cape of Good Hope, the people are prospecting in all directions in search of diamonds, several very valuable stones have already been found. Garnets are found here in considerable numbers. Amber abounds in this district, also formations containing phosphorus and quicksilver, while it is reported on good authority that some gentleman searching for diamonds have come upon a lode of silver and lead ore.

In St. Charles, Mo., there is a manufactory of that valuable pigment used in oil and water colors, ultra marine. The ordinary method of obtaining this coloring matter has been by manipulating the *lapis lazuli*, but Missouri furnishes the material for making this precious blue, so that it can be afforded at much lower cost than the European article.

The section of the Troy and Greenfield railroad, from Greenfield to Shelburne Falls was formally opened on the 29th ult. Next summer the road will be continued to the east end of the Hoosac tunnel, where it will be likely to rest for some time.

The low water in the Ohio has caused a coal famine in Cincinnati, and the inhabitants finding they can no longer depend upon water communication for commercial purposes, appointed a committee who reported this state of affairs to the Chamber of Commerce, and urged a railroad South to supply the deficiency.

The French railways have profited by the Exhibition. Five lines show an increase of receipts for the summer, ranging from two hundred and fifty thousand dollars to four hundred thousand dollars, as compared with the corresponding period of 1866.

By contract, 2,400 railway ties must be provided for every mile of the Union Pacific Railway. When it is considered that each tie, which must be of oak, costs $1.50 within sight of the Missouri river, and must at date, be transported by mules and locomotives over five hundred miles before being laid in position, we can form an estimate of the immense cost of this one item in the construction of this road.

There are in both hemispheres at least 75,000 miles of railway in actual use, constructed at a cost varying from $20,000 a mile in the Western prairies, to $4,250,000 per mile for the London Metropolitan road, and averaging throughout the world perhaps $30,000 per mile. The capital then, expended in construction alone is represented in round numbers by $6,000,000,000.

The willow ware factory on the Colt estate, Hartford, is the only one of large size in the country, and employs when in full blast one hundred and fifty persons. The company import most of the light, fancy baskets which they sell, and confine their work to coarser goods; for labor is so much cheaper in Germany than here, that even though a duty of thirty-five per cent is laid upon them, it is still cheaper to import. The company have thirty-eight acres planted with the species of willow required in the manufacture, and supply a great abundance of slips to various parts of the country, sending last year one hundred thousand to Delaware.

The number of gold and silver watches manufactured in the French town of Besançon, is about 300,000 a year, or about four fifths of the whole consumption of France. This industry has increased surprisingly since 1845 when only 54,000 were annually produced, and just as the home manufacture has augmented, the importation has decreased. In the town of Besançon and also in Cluses, there have been established under governmental support schools of horology, whose object as stated in an imperial decree, is to form educated and able workmen for the different branches of the trade and to secure the necessary instructions for those who intend to become manufacturers, finishers, or repairers. The course of instructions extends over three years, and the teaching which is theoretical as well as practical, is gratuitous. A collection of finished watches, movements, and detached pieces made at their schools is exhibited at the Paris Exposition.

The linen trade of Dundee, Scotland, was nearly doubled by the American war, and now employs seventy two firms, steam engines of 580 horse power, 200,000 spindles, 8,000 power looms, 6,000 hand looms, and there is worked up in the district 130,000 tuns of jute, flax and hemp, making fabrics valued at $40,000,000 a year. The jute comes from the East Indies, the hemp from Russia, the flax mostly from the continent, and it all comes here to this barren nothern coast to find coal, iron and Scotchmen, and then with its value increased from ten to a hundred fold, be distributed over the world again. Jute comes ten thousand miles to be spun and woven, and then goes back to where it grew, to be worn, just as copper comes from Chili to Birmingham, and goes back, doubling Cape Horn again in brass buttons.

Latest accounts from the inter-oceanic railroad of Costa Rica, presents an encouraging prospect. The route is from Port Limon on the Atlantic to Port Caldera on the Pacific. The former port was discovered by Columbus on his fourth voyage, and the town of Estrella was subsequently built there, but being destroyed by pirates the knowledge of that old highway became extinct until the begining of this century. From this port the proposed railway will cross the isthmus in a westerly direction, past the City of San José, the capital of Costa Rica. The only difficult piece of engineering is the descent of 1,244 feet over a length of fourteen miles, or a grade of 128 feet per mile. The cost of construction is estimated at $12,000,000. A governmental concession for this road has been granted to a company of New York capitalists for seventy years.

Recent American and Foreign Patents.

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

LOOM.—G. W. Firestone, Fredericksburg, Ohio.—In this invention the oscillation of the lathe works the shuttles by means of the mechanism hereinafter explained.

WINDOW-SHUTTER FASTENER.—Will. H. Wayne, Philadelphia, Pa.—This invention consists of a new, simple, and convenient device for fastening window shutters together so as to allow them to be adjusted, instantaneously, to a greater or less degree of opening, and without tying or untying a cord.

RAILROAD CHAIR.—B. J. Romaine, Hackensack, N. J.—This invention relates to a new railroad chair, which consists of wrought iron plates bent to inclose the sides of the rails, and resting upon two sleepers, being long enough to reach between them; these plates extend downward below the rail, and are held together and connected by means of bolts or screws passing through these downward projections.

SAFE LOCK.—Rees Lewis, New York City.—This invention relates to a burglar proof lock which is to be used on safes, vaults, and on such doors on which the key is only to be applied from one side, and consists in a novel construction of the key and lock, whereby feeling of the lock is prevented and the insertion of any but the right key made impossible, as long as the lock is not broken.

LIFTING JACK.—Christian Holmes, Washington, Ohio.—This wagon jack is so constructed as to be self-sustaining when placed under the wagon axle.

CHURN DASHER.—John Leaken, Clinton, Ill.—This dasher is of such form that in churning butter the milk is worked from the bottom of the churn to the top, and the gathering together of the butter greatly facilitated.

CARD FOR HOOKS AND EYES.—Maltby Fowler, Northford, Conn.—This invention consists in so puncturing cards for hooks and eyes that a tongue piece will be left in such punctures, whereby the hooks and eyes can be firmly secured to the card.

WAGON JACK.—Wm. Trusty, Philadelphia, Pa.—This wagon jack consists of a foot or base piece, provided with a standard carrying the lifting bar or lever, but in addition thereto has combined with it a pawl and ratchet surface for holding the lifting bar in whatever position it may be brought.

OX SHOE.—Hazelton Lake, Shelburne, Vt.—This invention has for its object to so improve the form and construction of ox shoes that they may be more securely held to their place upon the feet of the oxen.

CRUET CASTER.—Westel E. Hawkins, New York City.—This improvement has reference to the manner in which the apertures through which the cruets of a table caster pass are formed and completed, and the invention consists in forming the bead on the center plate of the caster by a peculiar and greatly improved method, and of one and the same piece of metal.

LIME KILN.—John L. Livingston, Mount Carroll, Ill.—This invention consists in the peculiar formation and arrangement of parts of the kiln, whereby the process of burning and removing the lime from the kiln is greatly improved and the labor lessened.

BUGGY SPRING.—William Humphrey, Brooklyn, N. Y.—This invention consists in so constructing and attaching the springs of light wagons and buggies that the perch (so generally used) is dispensed with, whereby the middle of the rear axle is relieved of nearly all the weight usually put upon it, and the buggy is made much lighter in consequence.

SETTING TIRES ON WHEELS.—Anders Fagerström, Wyoming, Pa.—This invention relates to a new and improved mode of setting tires on wheels, whereby the tire, by a very simple manipulation, may be tightened or loosened on the wheel as the condition of the latter may require—tightened during the summer season when the wheel is dry and the wood consequently contracted, and loosened during the fall or winter, when the wood is moist and consequently swollen. The object of the invention is to have the tire bind at all time properly on the wheel, so as to hold the spokes firmly in the hub and the rim firmly on the spokes, and thereby avoid all working of the parts, which would otherwise be occasioned by shrinkage, and also avoid an undue pressure of the tire by the swelling of the wood, which frequently causes the spokes to bend and gives the wheel too much "dish," either condition being very detrimental to the wheel.

CULTIVATOR.—E. W. Pike, Galesburg, Ill.—This invention has for its object to improve the construction of W. H. Smith's Cultivator, patented January 15, 1861, and numbered 31,132, so as to make it more convenient, reliable, and effective in operation.

BUNK FOR LOGGING SLEIGHS.—James P. Davis, Stiles, Wis.—This invention has for its object to furnish an improved bunk for attachment to logging sleighs, by the use of which the logs of the lower tier will be prevented from spreading while loading the upper tier, or tiers, and which will enable the logs to be bound and unloaded in much less time than is necessary when the logs are bound in the ordinary manner.

RUDDERS.—D. W. Howard, Detroit, Mich.—This invention has for its object to furnish an improved rudder, so constructed and arranged that a slight movement of the rudder will produce as much steering power as a much greater movement of the rudder post in a rudder constructed in the ordinary manner.

DOOR FASTENER.—P. L. Weimer, Lebanon, Pa.—This invention relates to an improvement in door fastenings, and consists of a weighted figure (as of a man carrying a basket), having a side projection to one foot, which is placed under the door and wedged in the required position by the falling back of the weighted figure. The door may be further prevented from falling forward by the body of the figure and the other leg, and from falling backwards by the free arm of the figure, which carries a cross piece, and is held in a strap stretched partly across the door, in which strap it is free to move.

PORTABLE DUMPING AND LOADING MACHINE.—Wm. Goff, Big Flatts, N. Y.—This invention relates to an improved portable dumping and loading machine, and consists in a self-adjusting dump frame, furnished with folding aprons, the whole capable of being readily transported in a wagon, and be got ready for use in a few seconds.

FASTENING METAL PLATES UPON DOOR-HINGES.—Wm. W. Whiting, Brooklyn, N. Y.—This invention relates to a new method of fastening the silver-plated, or other ornamental plates, which are used to cover and conceal the screw-heads of door-hinges. The invention consists in so securing the said plate upon the hinge that it can be easily detached for cleaning and other purposes, and can be easily refastened; and that it will be secured without the use of pins or screws, whose heads appear on the face and injure the appearance of the same.

CLOTHES FRAME, OR RACK.—R. D. Chandler, Fairhaven, N. J.—This clothes rack, or frame, consists of a square center post, having pivoted to its sides a clothes frame, so as to swing therein in combination with sliding spring bolts, so applied to such bolts as to hold them in position.

MODE OF TREATING OR PREPARING WOOD, ETC.—Harrison Smith, Phillipsburg, Pa.—This invention relates to the mode of imparting to wood, etc., a smooth surface, before the application of the color, or colors, with which such wood or other material is to be covered or ornamented.

PICKER AND STAFF COMBINED.—William E. Card and Parden Andrews, Phœnix, R. I.—This invention consists principally in so making the picker and its staff as to be one and the same device, and also in using an India rubber cushion within the staff, for the picker to act against.

SEWING MACHINE.—George W. Baker, Hinsdale, N. H.—This invention consists in arranging a bar under the platform of the sewing machine, which bar is pivoted at its rear end eccentrically to a horizontal gear wheel, driven by the main gear wheel of the machine, so that a kind of oscillating motion is imparted to this bar; its front portion, which is below the front part of the machine, is by a spiral or other spring drawn off the needle, against an adjustable stop, and thus, when the aforesaid horizontal gear wheel is turned, the bar will be moved forward and backward, and will have its fulcrum on the aforesaid stop, whereby, as the stop is close to its front end, and as the diameter of the gear wheel is not large, the side motion of the said bar will be very little; still it will be large enough to make the front end of the bar strike against the needle, when the same is down with thread for a new loop, thereby feeding the cloth before a new loop is formed.

LAMP BURNER.—George K. Osborn, Brooklyn, N. Y.—This invention relates to a new and useful improvement in lamp burners of that class which are designed for burning coal oil and other hydro-carbons which require a large amount of oxygen in order to support proper combustion for illuminating purposes. The invention consists in the application of a jacket to the upper part of the wick tube constructed and arranged in such a manner that a current of air is supplied to the base of the flame all around the top of the wick.

REMOVING CARBON FROM GAS RETORTS.—B. E. Chollar, Leavenworth, Kansas.—This invention relates to a new and improved method of removing the carbon which is deposited in retorts used for generating gas for illuminating purposes, and it consists in providing for a supply of air within the retort whereby a more perfect combustion is produced.

COAL SCREEN.—George Whittle, New York City.—This invention consists in constructing a cylinder screen and revolving the same in a tight box and in constructing the box in a peculiar manner so that the parts thereof are rendered otherwise useful.

PNEUMATIC SPRING.—W. A. Dripps, Fort Wayne, Ind.—This invention consists in confining compressed air in a chamber and thereby taking advantage of its elastic character for forming springs for various purposes.

PORTABLE BODKIN AND TWEEZERS.—William Quail, New York City.—This invention relates to a new and useful device whereby certain instruments which are in constant use by printers are combined and rendered portable.

BREECH-LOADING FIRE-ARM AND CARTRIDGE.—S. S. Rembert, Memphis, Tenn.—This invention consists in various improvements in the breech-loading gun, especially in the manner of moving and holding the barrel, the construction of the cartridge case and in extracting the same from the barrel.

CHURN.—William Newberry, Clarksville, Mo.—This invention consits in arranging an upright shaft with wings or dashers attached thereto which are revolved within the churn, and also in the arrangement of stationary crosses and wings in the angles of the churn.

HEATER.—Thomas Shipton, Newark, N. J.—The object of this invention is to construct a heater which will make use of the heat generated therein.

TRY SQUARE.—N. Hamblin, Flatbush, N. Y.—This invention has for its object to so improve the construction of a try square that the workmen may be able to see whether his work is exactly true by simply looking at the top of the square.

PAINT BRUSH.—Joseph M. Estabrook, Milford, Mass.—This invention relates to a new manner of connecting the bristles of paint and paste brushes with the handle of the same, and the object is to so arrange the devices by which the bristles are held that the bristles may be firmly clamped by a conical ring against the outside of a wedge projecting from the handle, without the use of cement or other similar material, and so that the bristles can be secured to the handle by any person not experienced in brush-making.

DOOR STOP.—Geo. F. Atkinson, Seymour, Conn.—This door stop or bolt is so constructed that it can be set for operation or put out of operation as may be desired.

DEVICE FOR MEASURING HORSES' FEET.—Moses S. Woodward, Marshalton, Pa.—This invention relates to a device by which the exact measurement of horses' feet can be taken, and which can be used for fitting horse shoes to the feet, so that the same may be very accurately adjusted without burning or cutting the feet.

CAR BRAKE.—A. Z. Long, Scranton, Pa.—This invention relates to a new and improved brake, designed to prevent a retrograde or back movement of a car or a train of cars, when the same is on an incline or rising grade. The invention is more especially intended for cars on roads having great inclines, or steep grades, up which the cars are drawn by a rope and stationary engine, and is designed to hold the cars perfectly stationary on the grade in case the rope should break, a contingency of not unfrequent occurrence, and which is frequently attended with serious accidents both to life and property.

STAINED GLASS.—John C. Millward, New York city.—This invention consists in laying a piece of crystallized sheet zinc under or behind a piece of stained or painted glass, whereby the glass will not only be considerably strengthened, but whereby those portions of the glass which are left transparent will look as if they were inlaid with pearl.

BOOT-JACK.—A. P. Seymour, Jr., Hecla Works, N. Y.—This invention consists in a novel construction of a boot-jack, whereby the implement, when not desired for use, may be folded or closed up so as to occupy but a very small space, and when required for use be capable of being readily extended or unclosed.

SLED BRAKE.—Samuel K. Sutton, Paterson, N. J.—This invention relates to a new and improved brake for sleds, and it consists in operating a dog by means of a toggle, connected to a shaft provided with a spring and a lever, all so arranged that, by manipulating the lever, the dog will be forced down into the ground and the motion of the sled checked or entirely stopped, as desired.

MACHINE FOR CUTTING PAPER, PASTEBOARD, OR OTHER SIMILAR MATERIAL.—Stephen D. Tucker, New York city.—This invention relates to a new and improved machine for cutting paper, pasteboard, or other similar material. The invention, however, is more especially designed for cutting paper for printers' and bookbinders' use, and consists in a novel construction and arrangement of parts, whereby the paper or other material may be cut very expeditiously, and the working parts of the machine placed under the complete control of the operator.

WATER WHEEL.—George W. Herring, Bangor, Me.—This invention relates to a new and improved center-beat water wheel, and it consists in a peculiar construction and arrangement of the same, whereby the usual platform for the wheel to run upon is avoided, and the wheel rendered capable of running in either direction, right or left, at the option of the millwright.

MACHINE FOR STRIPPING WILLOW.—James Swan, Paterson, N. J.—This invention relates to a new and improved machine for stripping willow of its bark, preparatory to the manufacture of the same into baskets. The invention consists of a rotary stripping device provided with blades or strippers arranged in connection with a spring or springs in such a manner that the strippers will be made to bear or press upon the willow by centrifugal force generated by the rotation of the hollow mandrel to which the stripping device is attached. The invention also consists in a means for cleaning the stripping device, or preventing the same from clogging, and the invention finally consists in a clamp of peculiar construction for grasping the willow, and drawing it through the stripping device.

ANTI-KICKING ATTACHMENT FOR HORSES.—O. H. P. Fancher, New York city.—This invention relates to a new and improved anti-kicking attachment, to be applied to horses in harness, the object of the invention being to obtain a device for the purpose specified, which will be self-operating, and require no special care or attention on the part of the driver to apply it, or cause it to act.

PORTABLE FENCE.—G. W. Campbell, Pendleton, Ind.—This invention relates to a new and improved fence of that class which are designed to be readily put up and taken down, and it consists in a novel manner of constructing the fence, whereby a very strong, durable, and economical fence of the kind specified is obtained.

Answers to Correspondents.

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

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

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

J. B. H., of Pa., inquires in regard to the process of polishing horn, and specimens of quartz. The two inquiries are very diverse. In regard to the first we have no information to offer, except that it is similar to that of polishing wood, and as to the latter, the same means employed in finishing the harder qualities of stone will succeed with quartz. This is shown in any work on the business of the lapidary or the treatment of gems.

C. C. M., of Tenn., asks what is the "facial angle" as understood by phrenologists. We advise him to address Fowler & Wells, Phrenologists, New York city. They know more about such matters than we ever hope to imagine.

H. C. B., of N. Y., says: "It is well known that an object capable of casting a shadow gives a converging one if it intercepts the rays of a luminary larger than itself, and a diverging one if the conditions are contrary. If this is true why do clouds appear to give a diverging shadow during a smoky day." Our correspondent does not consider that the diverging shadow includes the penumbra.

E. T. M., of Ill., seems to object to the scent of petroleum. He asks how to alter the smell or partially change it to something else. We can only counsel him to use a stronger and pleasanter odor.

S. F. B., of Conn., asks how to make an amalgam for the old style electrical machine. The recipe is: mercury, 4; zinc, 8; tin, 2. Melt the zinc first, add the tin and pour into a box containing the mercury. Mix by shaking while hot.

J. H. S., of Pa.—"Which would you advise for economy and service in an iron mill, a vertical engine of 12 inches cylinder and 18 inches stroke, 100 strokes per minute, attached directly to the shaft; or a horizontal engine with a cylinder of 14 by 36 at 40 strokes per minute?" We should prefer the 12 by 18 inches, direct acting engine if obliged to choose; but to do its full work 200 strokes per minute would be better than 100. We cannot, however, give a conclusive answer without working drawings of the two engines.

H. F., of Mo., asks how to temper mill picks. We think the question has been answered through our columns. Perhaps some practical man can afford the information.

J. H., of Ind., asks if felt covering is injurious to a boiler. We never knew of injury to a boiler from this source. He sends us also a statement, clipped from a local paper, to the effect that an engineer in trying his gages discovered a bluish flame issuing from the cocks! We have little regard for such "cock and bull" stories.

S. M. S., of Pa., asks how to melt and cast such metals as brass, copper, and nickel to the best advantage. We presume nothing more is required than good plumbago crucibles, a clear anthracite fire, and good molding sand.

C. W. C. & Co., of Montana, state that they are cracker bakers, and the only lumber obtainable of which to construct their boxes is a pine that possesses a strong odor which is imparted to the crackers. Seasoning the lumber and lining the boxes with paper is ineffectual. We think it doubtful if the wood can be deodorized without considerable cost. Lining the boxes with tin foil would be cheaper and probably effectual.

S. M. P., of R. I.—You can whiten or restore ivory which has turned yellow by boiling it in lime water and polishing it with whiting and chamois leather. In many cases where, as in piano keys, the ivory cannot be removed, the polishing process will be found partially successful.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

INVENTORS and MANUFACTURERS may have their articles Illustrated and Described, *free of charge*, in the English Catalogue of Chas. Pomeroy Button, (American Merchant, and Dealer in American Machinery, Nos 142 and 143 Cheapside, London, England,) by sending cuts immediately to F. L. Button, "Waverly House," 697 Broadway, New York city. N. B.—30,000 copies of the January edition will be circulated.

A metal-working shop, with two patents, for sale or exchange for Real Estate in city or country. Townsend & Sears, 218 Fulton st., room 7.

All who consult their own or their friends' interest, will send their address, at once, on stamped envelope, to Dana Bickford, 52 Broomfield st., Boston, Mass.

A Lamb, 12-gage, Family Knitting Machine, used only a week, for sale. Will send, C. O. D., by Express. Price $50; cost $65; in perfect order. Address W. W. Thompson, Adams, Lee county, Georgia.

Smokers—See advertisement of the cigar perforator. Every smoker should have one. Oliver Guinand, Vicksburg, Miss.

Where is cotton silk thread manufactured? what firm manufactures Pettunett woolenwares, shawls, etc.? and where can machines for making cotton lace cords be had? Address E. Förster, Condersport, Potter county, Pa.

Can coiled steel wire be silver-washed, tin-washed, or colored any color that will remain permanent? E. F. Mallory, Springfield, Pa.

To Sleigh Manufacturers—For Snow and Ice.—Bourne's Propellers for children's sleighs. State Rights for sale. Address F. Philip Bourne, New Dorp, Staten Island.

Parties manufacturing very fine perforated iron screen, or parties having machinery to manufacture it, will address F. R. Wilson, Philadelphia, Pa.

Wanted—A split-stave dresser. Send descriptive circular and prices to S. W. Little, Evansville, Ind.

Manufacturers of Power Spice Mills please address Box 1000, Baltimore, Md.

I want a shaping machine, new or second-hand. Parties having the same address particulars to Wm. Holmes, Galion, Ohio.

A. W. Griffith, of Jefferson City, Mo., wishes to know where he can obtain a machine to cut and bale excelsior.

Improved Combination of Steamer and Roaster.

Many of our readers remember the old "tin kitchen" or "Dutch oven," and later the reflecting "Yankee baker," the later of which cooked food by the aid of a small cylinder holding a little charcoal. The Dutch oven, however, cooked the food by the reflected heat from an open fire. One of the purposes of the implement shown in the engravings is this latter; the other is to steam or heat food already cooked, or to bake, stew, or roast without losing any of the aroma of the edibles.

It is seen at A, both figures, and is made of tin or other sheet metal. The bottom compartment, B, is a reservoir for water, and the rest of the box holds shelves or racks for sustaining dishes of meat, vegetables, etc. The front is closed by a sliding door, C. In Fig. 1 it is set on a cooking stove, the front covers being removed and their openings covered by the bottom of the steamer. Fig. 2 shows it set upon legs the ends of which are held by staples or straps, D. In this form it is convenient for standing before an open fire, as a grate or Franklin stove, for roasting purposes. In this position the door, C, is removed from the front and introduced into the chest on inclined snuge, so that it will form with the top a double incline, reflecting the heat from both surfaces. As a steamer the door, C, closes the front and the reservoir is filled with water. The backward incline of the top prevents any condensed steam from falling on the food, but conducts it back to the reservoir.

Fig. 1

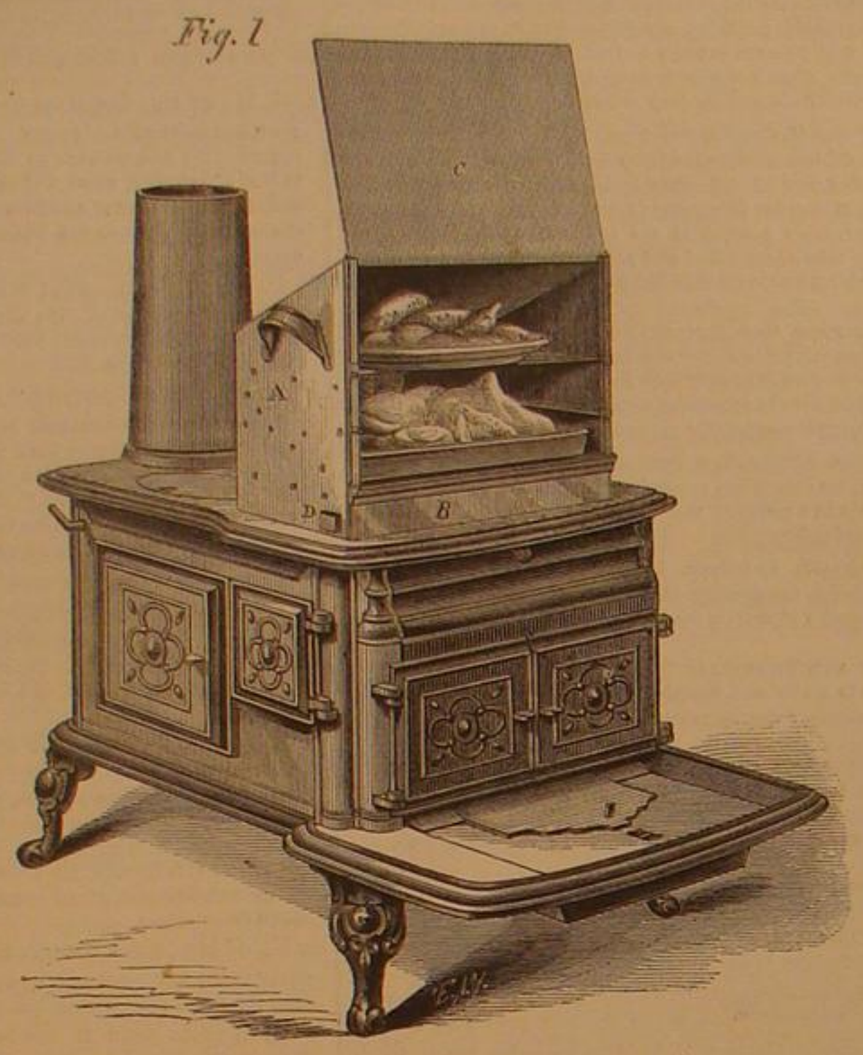
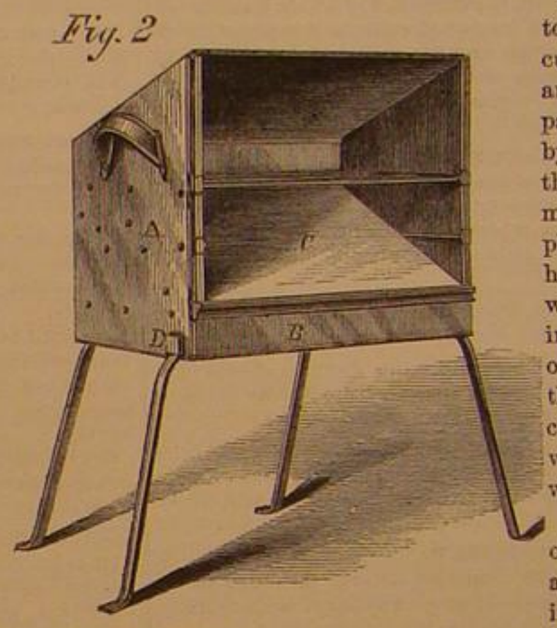


Fig. 2



FORMAN'S COMBINED STEAMER AND HEAT REFLECTOR.

The inventor says that it bakes light bread without any hard crust, cooks green corn and other vegetables, fruits, etc., without robbing them of their flavors and without the possibility of burning or scorching them. Cakes, puddings, custards, and pastry of all kinds are cooked safely and evenly and sauces, even in glass dishes, may be prepared in this apparatus without injury to the dish. As a roaster it is superior to the old-fashioned Dutch oven.

It was patented through the Scientific American Patent Agency by Israel Forman, Fairmont, W. Va., who will dispose of the entire right on favorable terms. Address as above.

Coal Cutting by Machinery.

Mr. Sturgeon, of Burnley, East Lancashire, England, has constructed a machine for mining or cutting coal, a description of which we condense from the London *Colliery Guardian*: In general appearance Mr. Sturgeon's machine, which is self-acting, resembles a mortar, carried in trunnions, by means of which it can be adapted to any dip of the seam. The engine which gives motion to the machine is worked by compressed air, and consists of a small cylinder about seven inches in diameter, in which a piston works with a backward and forward motion, as in a steam hammer. The piston gives motion to an angularly-vibrating "cutter," working upon a center or fulcrum, and carried upon the machine. In its general form the "cutter" resembles a heavy pick. Its length of stroke is 36 inch. Hitherto it has been a defect in these machines that when cutting coal of unequal hardness, or in which pyrites or other solid matter are prevalent, the cutter has been prevented from penetrating to its depth and the work left very irregular and incomplete.

In Mr. Sturgeon's machine this is obviated by a very simple contrivance which causes the cutter to repeat its blows in the same place until the obstruction has been either cut through or dragged forth from the strata, and when at length the full length of the stroke is attained, the machine is advanced to make a fresh cut. The "cutter" having gone the length of its stroke, it would be almost impossible to withdraw it from the coal by a direct backward motion, and hence Mr. Sturgeon has applied a self-acting arrangement to his machine which gives the point to the "cutter," at the end of its forward strokes, a slight retrograde motion, thus enabling it to disentangle itself, and also to return without friction against the strata. The machine will enter a seam of eighteen inches in thickness. Including the "cutter," it only occupies a place three feet square, and its total weight is only seven to eight cwt.

As already stated, the machine is worked by compressed air. The air is condensed outside the pit, by a suitable air pump, into a receiver, from which it is conveyed to the machine in the workings by an india-rubber pipe, and the machine may thus be moved about from one part of the workings to another without being cut off from the motive power. The compressed air, when liberated by the action of the piston, proves most beneficial. The cutter, coming with great force upon the stones imbedded in the strata, is apt to "strike fire," which, in fiery seams, would of course be attended with much danger. By a well-known law of gases, however, compressed air when suddenly allowed to expand, produces great depression of temperature, and Mr. Sturgeon has availed himself of this law to prevent the firing of splinters while his machine is at work. A pipe leading from the exhaust port meets another pipe leading from a small water vessel carried on the machine. The mouths of these two pipes meet at right angles, and the suction caused by the velocity at which the exhaust air makes its escape over the orifice of the water pipe causes to be drawn up a small quantity of water, which on mixing with the cold air current is dashed into spray. This is directed towards the "cutter," and the groove it is forming, and has the combined effect of keeping the "cutter" cool, of reducing the temperature in the groove, preventing the accumulation of gas and the ignition of splinters, and also serving to keep down the dust. The production of cold air by this method may also materially affect the supply of coal from our coal fields.

It is commonly known that the deeper we descend into the bowels of the earth the higher the temperature becomes. Extensive seams of coal lie at a depth so profound as to be utterly beyond reach with present appliances, owing to the heat which is known to prevail at these depths, and the cost of raising the coal. But by the use of coal-cutting machines an abundance of fresh air, of very low temperature, might not only be thrown into the workings, but would be ejected at those points where it would be most required, and hence vast tracts of coal field might be made available, and that, too, at a moderate cost. There is another peculiarity about Mr. Sturgeon's machine which we ought not to pass over. Hitherto only one operation has been performed by coal-cutting machines—under cutting in long lengths—but Mr. Sturgeon's machine will do the necessary work in tunneling and in pillar and stall cutting.

TABER'S IMPROVED SINK TRAP.

The object of the device shown in the accompanying engraving is to provide a safeguard against the rising of impure and deleterious gases from sinks, cesspools, and water

Fig. 1



Fig. 2



closets, and to prevent the evaporation of liquids under certain circumstances. It is evidently excellently well adapted to this purpose, as it is simple and acts wholly without springs or other auxiliary contrivances, being entire in itself.

It is composed of a ferrule or ring with a broad projecting flange, A, to rest on the sink bottom or the top of the pipe, and secured in the usual manner. To the barrel of this ferrule are pivoted two half funnels by rivets at B. These project down into the pipe and when empty close by their own weight as in Fig. 1; but when liquids are passing through from the top they are forced apart as in Fig. 2. When closed, the longitudinal joint is air and water tight, wholly preventing the rise and escape of unpleasant and noxious effluvia. The flange of the ferrule may be constructed to stand at an angle with its barrel without disturbing the action of the two half funnels. These may be made in three parts if desired, the only objection being the formation of another air-tight joint. It may be used to admit volatile liquids to any vessel but prevent their escape by evaporation.

It was patented April 2, 1867, through the Scientific American Patent Agency, by John E. Taber, of Fall River, Mass., who will reply to all inquiries relative to the sale of rights, etc.

Collodionized Paper for Transfers.

Those who desire may transfer to ivory, enamel, porcelain, or a sheet of gold or silver paper, the collodion on which the positive image is obtained in the pressure-frame, and detached from the paper which has served to hold it.

The whole method consists in pouring on a porcelain paper, the enamel which is composed of a salt of alabaster, a very thick collodion sensitized with chloride of silver. Chloride of strontium and nitrate of silver, dissolved beforehand and in equal proportions, the former in alcohol, the latter in distilled water, in the proportions of 2 p. c., and poured, with subsequent agitation, into a very thick plain collodion, give perfect results. Any chloride soluble in alcohol may be employed. The tone of the print varies, according to the chlorides, between red and violet.

It is necessary, in order to collodionize the paper, to cut the sheet into quarters, and to transform a fourth part of a sheet into a basin by turning up the edges to the level of half a centimeter. The paper is then placed on glass, which is held in the left hand, while with the right, in the first instance, ether is spread over the paper, and after the excess is poured off the collodion is poured, without waiting, precisely in the way as a *cliché* is made.

At the end of a quarter of an hour the sheet is dry, and can be used for printing positives. The collodion will not keep, and loses its properties in twenty-four hours, but the paper thus prepared continues fit for use after six days. The yellow tinge which disfigures it subsequently disappears.

The proof leaves the frame with a poppy red color, very bright, and passes to a violet, then to black in the following toning bath:—

Water	1,000 gr.
Hydrosulphite of soda	125 "
Chloride of soda	60 "
Chloride of gold	1 "

It is toned and fixed at the same time; this result is obtained in ten minutes.

The proof is afterward washed in a basinfull of water, and the collodion, detaching itself, floats on the surface. If care has been taken to varnish the four corners of the proof, the transfer is easier. In this case the image never leaves the sheet of paper which bears it. The operator now lays it face downward, upon a sheet of glass, a little larger than the paper, and presses it in close contact; removes the paper and washes carefully the image, now soiled by the alabaster salt, with a little wet cotton. This operation is not attended with any danger to the proof, the collodion being stronger than would be supposed.

Finally, it is washed with plenty of water under the tap and allowed to drain for a few seconds. For transferring the collodion, which is now on a sheet of glass (and where, if a transparency be desired, it can be allowed to remain), the following mixture is passed over the surface with a soft brush:—

Water	1,000 gr.
Gelatin	10 "
Arrowroot or gum	5 "

A sheet of gold or silver paper is then applied over the collodion, avoiding creases. If it is intended to make a porcelain *carte*, place over the image a square of enameled paper. The air bubbles must be got rid of and the whole removed. It is well to mount the proof while it is damp, and to roll it after it is dry.

All these operations are simple and easy, and, commercially speaking, quite as many can be produced as by the ordinary processes. The proofs are unalterable, for the paper which sustains them has not passed through any bath, and the collodion which forms the proofs has been subjected to sufficient washings. By employing a more fluid collodion the image adheres to the porcelain paper. The transfer is no longer necessary. The same result is obtained by coating Rive paper in a dish with the following mixture, which should be warm:—

Water	1,000 gr.
Gelatin	5 "
Arrrowroot	10 "
Sugar candy	20 "

The brilliance is not equal to that obtained with the porcelain paper, though the proofs are exquisitely fine and delicate, and the ordinary papers do not give the details of the *cliché* so perfectly.—*M. Geymet, in Bulletin Belge.*

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THE INVENTOR---SOME OF THE OBSTACLES TO HIS SUCCESS.

Did it ever occur to the reader of the SCIENTIFIC AMERICAN who looks over the long list of patents published weekly, how few of these he ever hears about afterward? It would seem, sometimes, that the result of a patent was to send the invention to oblivion, from the fact, so frequent, that its publication is the last heard of it. That this is not so, however, is proved by the hundreds of successful patentees whose inventions bring wealth to their owners. We must look elsewhere for the reasons of failure, and no direction is more natural and proper than that which points toward the inventor.

Ignorance of the laws of mechanics is a fruitful source of failure. Men will spend years of time and much money in trying to contravene the simple, but immutable and unvarying laws of nature, when a slight acquaintance with natural philosophy would prevent this waste of valuable time and treasure. In machinery the expectation of getting more than is given, increasing power by multiplying intermediates between the source of power and its development, is the cause of the hallucination of hundreds. Refusing to recognize the presence of friction and attempting to remove it by adding to its sources of production is so common among those who essay improvements in machinery that the wonder is so many succeed rather than that so many fail. We might, from our experience, cite many individual instances of earnest, honest, struggling men vainly attempting to override the bounds of physical possibilities, when a little calm reflection, combined with knowledge of nature's laws, would show them, at once, their error.

Want of mechanical practice is another cause of failure. No doubt many mechanical improvements have been made by men not practical mechanics, but their success was not because of the want of this practical experience, but in spite of it. They will be found to be, in nearly all cases, natural mechanics, whatever their profession or occupation, and, in the pursuit of their object, to have acquired not only a theoretical knowledge of mechanics, but skill in manipulation. In many cases, however, the inventor possesses only a crude idea of his device and the model maker is the real inventor, working out the half formed idea into shape. This class of our mechanics has never been properly estimated. They do much toward the improvements which assist the progress of the race. Usually they are regarded merely as skilled workman, while, in fact, they are actual inventors. It requires something more than a practical knowledge of the use of tools to become a successful model maker; he must also have a fund of intellectual knowledge, great patience, perseverance, and a faculty of overcoming obstacles. He is the main reliance of many inventors.

Another cause of failure may be found in misdirection of endeavor; either the object sought is valueless, or the means employed to compass it inadequate. The number of so-called improvements which are merely alterations, and of so-called inventions which are revamps of long ago, exploded ideas is surprising. Instead of informing himself of what has been done in the department to which the would be inventor directs his attention, he blunders on over a road which has been laid out for him by those who have gone before and either achieved the goal or stopped disheartened by the way; or he persists in attempts at success by the employment of means and appliances wholly unfitted for his purpose. What can be the benefit of using machinery for an object much easier attained by hand? Yet hundreds persist in pushing these useless inventions before the people. Still, the value of an invention is not to be judged by its apparent insignificance. The balanced handle table knife was a simple and seemingly trifling improvement, yet it became very valuable to the inventor. In soliciting the extension of a patent in as simple an article as a clothes pin the other day, the only difficulty we had to encounter before the patent office was the large sum, almost sixty thousand dollars, which had been realized in working the patent during its existence.

Having, perhaps, perfected a working model of his invention, the next thing for the inventor is to make it "pay." Here is where more fail, perhaps, than in any other stage of their progress. To be pecuniarily valuable the invention must become popular, and to become so it must be introduced to the public. The inventor, not seldom, is peculiarly unfitted to this task. He has been directing his attention, perhaps for years, on the details of his improvement—has concentrated his whole mind on its perfection—and understands nothing about "business" or has no inclination for its excitements and annoyances. Or, he lacks the faculty of properly presenting the claims or explaining the construction, operation, and merits of his invention, and bores and annoys where he would interest and please. Many fail here. Such cases come before us continually. They seem to suppose that because every detail of their contrivance is as plain as day to themselves, who have watched, and worked, and thought on it for years, it must be so to others. Perhaps they become disgusted at the want of enthusiasm evinced by him to whom they would exhibit the excellences of their improvement, as though everybody should ride their hobby, and give up the task in despair. No doubt many inventions now lie unused from these causes which if properly managed might yield a rich return to their owners.

BAD WORKMANSHIP IN STEAM BOILERS.

The unusual number of steam boiler explosions which occurred during the past three or four months, prompts us again to call the attention of those who employ steam power to those fruitful causes of boiler explosions, namely faulty construction and deterioration.

We feel confident that if these two points receive that attention which their importance as agents in destroying human life, demands that they should receive, boiler explosions will be reduced in frequency to such an extent that careless management or ignorant planning will be found sufficient to account for the rest of the boiler accidents without calling in the assistance of either "gas" or "electricity."

Of equal importance with the requisite thickness of iron, particularly if the form is circular, to resist the pressure put upon it, with an ample margin for safety, is the construction of the seams or laps where the plates are joined. And a large proportion of the fearful boiler catastrophes which are of almost daily occurrence may by accounted for by carelessness or, in too many cases parsimoniousness on this very point. To say nothing of the improper size of the rivets which are not infrequently employed, as well as the improper pitch of the holes, we will in the first place briefly allude to the use of that abominable tool known as the "drift pin"—a tool which by the way should be kicked out of every boiler shop in the land.

This tool, it is well known, is used by boiler makers to force the two rivet holes, which have been carelessly laid out in overlapping sheets, to come in line with each other so that the rivet can be inserted. It is a piece of round steel, tapering from the point which is about ⅝ of an inch in diameter to the butt which is considerably larger than the hole in the sheet; suppose the edge of one hole overlaps so that its circumference passes through the diameter of the other, this part of the tool is inserted in the lunar space left between them and a pair of sledges, handled by a pair of stalwart arms, applied at the other end soon rips, tears or strains the iron so that a rivet can be put through the hole. If even after this treatment the proper sized rivet cannot be got in, a smaller one can, and this is the very thing which is constantly done even in "first class" establishments. Let five or six of the rivet holes in a single riveted seam of say thirty rivets, be treated in this way, and we have a structural deficiency which no doubt if it were known would account for many a first class blow up.

Here then we have two causes which no one we think will deny are of constant occurrence and which we likewise think could be wholly prevented by proper legislative enactments specifying among other things, the sizes and pitch of rivets for various thicknesses of iron and prohibiting the use of "drift pins" in boiler shops.

In England, we are informed, these matters of detail receive much greater attention than they do in America; and one firm near Manchester, has we believe, given so much care and attention to the joints of their boilers as to have achieved a very high reputation for constructing safe boilers. This concern carries this important matter to such a degree of nicety as to lay out the boiler sheets with very accurately made steel templets and then to drill the holes instead of distressing the iron by the usual method of punching.

We are also informed that the boilers built by this establishment are remarkably free from accidents, and we must say that we are glad to hear it; beside it corroborates our view that very many accidents may be prevented by proper attention to construction and proportion.

Before leaving the subject of boiler joints, let it not be forgotten that the ignorant use of the caulking tool very frequently destroys that small margin of safety which is left after the "drift pin" and small rivets have done their best to weaken the joint. This for the most part is done by holding the calking tool nearly perpendicular to the sheet and banging away on it with a heavy hammer: by this process we have, on more than one occasion seen sheets of iron cut into nearly a quarter of their thickness. We did not always witness this defect be it remembered, during the life of the boiler, but on one occasion after a huge gap had been rent in it and eighteen or twenty people were scalded to death. As usual philosophers were as thick as blackberries, every one with a theory, which included every agent from "gas" to "super heated steam."

These remarks which were merely intended in the outset as a short caution to boiler builders and users have reached such a length that we must close them by a word of caution respecting braces and stay bolts. Braces and stay bolts are for the most part used to sustain flat surfaces and hence the strain which will be put upon them by the pressure of the steam may be pretty accurately calculated.

Now when it may be set safely down as a rule that no brace should have more than one fifth of its breaking strain put on, there is no difficulty in determining their sizes; and it remains to see that the jaws, pins, and crow feet, are made of good material and so proportioned that they will stand as much as the brace rod or bar.

It is intended in a short time to take up this subject again when some suggestions will be offered on other matters connected with the construction and durability of boilers, particularly the subjects of design and corrosion, we trust however that enough has been said to show that causes strictly within the control of the boiler maker will go far to account for very many explosions and much loss of life.

THE USEFUL MECHANIC.

All mechanics are useful; but the useful mechanics, *par excellence*, may be be divided into two classes, those who are skillful or "close" workmen, and those who are ready for any emergency. The first are always in demand in shops where fine work is the rule; the second are useful everywhere. The sewing machine, gun, and tool business have had the effect to educate machinists, probably more than all other causes combined—at least to educate them to skillfulness in the use of tools. In the gun business, the construction of plugs and templets, for gaging the bore of rifle and pistol barrels, requires the careful manipulation, the experience, and the judgment of a first class workman. The result may appear to be purely mechanical, but it is not so. No machine yet invented could produce these gages. The plug, as its name imports, is simply a cylinder finished to a certain size, which is the same throughout its length. This fits a hole drilled through a block of steel—the plug, also, being of steel, and both hardened. Now it may be a work of no peculiar difficulty to turn and finish a plug to fit nearly, if not quite air-tight a corresponding hole in a block; but when both must be subjected to a hardening process, which will invariably warp them more or less, and still leave them as hard as steel can be made, the problem of perfection becomes somewhat difficult. The hole in the templet must be scoured, ground, abraded, and polished until its surface is like glass, and at the same time perfectly true from end to end. Then the plug must be also ground, polished, etc., to fit perfectly air-tight, yet without binding or requiring pressure to pass it through the hole. So delicate are these gages, and so perfect their fit, that not a particle of air can pass between their engaging surfaces. Such work as this requires the talents of the close workman, of whom there are few. Many other manipulations in the mechanic arts require similar skill. Such concerns as Whitworth's, in England, Brown & Sharpe's, Providence, R. I., Pratt, Whitney & Co., Hartford, Conn., and Colt's of the same place, have secured a world-wide reputation for their attention to these niceties in details of the machinist's art. They use the best tools and employ the best mechanical talent, and they have their reward.

The "men at a pinch" are an entirely different class of mechanics. They have always a plan at their fingers' ends. They can contrive and manage almost without means, or with means which none but they would think of using. In the late war such men, drawn from the ranks of our armies, were invaluable. They improvised bridges over otherwise impassable streams, repaired dilapidated and almost destroyed locomotives, relaid tracks, constructed roads through otherwise impassable morasses, utilized the means at hand, otherwise valueless, and contributed largely to the success of the armies of the nation. Such men are invaluable on railroad lines, on steamships—indeed on all vessels—in "job shops," and in a hundred places. Their faculty of adaptation of means to an end should bring to them an adequate reward—a reward they do not always receive. In a country like ours, where cultivated mechanical skill is pitted against the obstacles or obstinacies of nature, such men are always required. They are born engineers, and from them are drawn our best specimens of engineering talent.

We knew of one, who, sent to repair a boiler in an out-of-the-way place, found no tools with which to work. He wished to remove the manhole of a boiler, but had no wrench and could get none made. He managed, by twisting a rope, to coax the nut from its seat, and after inspecting the boiler and packing the manhole flange, to return the plate to its place and secure it steam-tight by the same means.

Such men are invaluable mechanics. They are not dismayed at difficulties before which some others might succumb, but, "making the best of a bad job," they go heroically and confidently to work, and generally "snatch victory from the jaws of defeat." So long as our country needs such men—which it must until we have tamed the forces of nature and wildness that beset us—we believe in the man for an emergency. In other words, the best apprenticeship for a young man who desires to become a thorough mechanic, is first a job shop, where he has to work on building or repairing everything.

from a wheelbarrow to a steam engine, and then to go into a first class shop and learn the niceties of the business.

ORDNANCE AT THE EXPOSITION.

A tour through the Ordnance Department of the Great Exposition furnishes the opportunity, though scarcely the material, for a comparison of the relative progress of the several Christian nations in the science of destruction, as applied to modern warfare. The display is a very unequal one. England takes the lead in the completeness of her exhibition, and America follows after all her rules in this respect. The French, who make so imposing a display in other departments, were at first strangely behind here. In July, however, they brought out their largest and best guns, and fine specimens of workmanship they are, whatever they may be in other respects. Most of them are manufactured at Ruelle, on the Louvre, near Angoulême. This site for the Government manufactory was originally selected in 1776, on account of its not only affording good water power, but because of its proximity to mines furnishing ores best adapted for the manufacture of iron having that peculiar quality of tenacity which is so essential in the metal used for ordnance. The extensive forests in the vicinity also furnish an ample supply of charcoal. Thus most of the material used at Ruelle is obtained near, though some gray pig iron, of a peculiarly tenacious quality, has recently been imported from Alelich in Algeria. The system adopted at Ruelle for securing the most perfect material for casting cannon, is worthy of notice. After testing the pigs by breaking them, they are cast into a cannon, which is tested to the bursting point, the contractor paying the expenses of the trial if his ore is not accepted. The ore is then broken into small pieces, and the extraneous matter carefully removed. It is next exposed to the air, until the sulphur and magnesia contained in it are dissipated, after which the ores from the different mines are carefully mixed, so that every casting shall contain a due proportion of each.

The heavy guns exhibited by the French are cast upon the core system, and are all breech-loaders and reënforced. Their rifle guns are uniformly made with six grooves. All of their siege and battery guns are made of gun metal. This is less enduring, and not so good for securing a perfect range as a harder material, but it has the merit of economy, as it can be cast over and over again. The bore of the French gun is larger, in proportion to weight of metal, than the steel guns exhibited by Krupp, Whitworth & Armstrong. One French gun in the Exposition is 18 feet long, 16 inches bore, and weighs 85,000 lbs. It throws a shot of about 700 lbs., with a charge of 100 lbs. This the first and only gun of its size yet made in France, has only been fired twice with ordinary charges. In size it is excelled by a gun exhibited by Krupp, which weighs 112,000 lbs, and with its steel carriage and turntable 200,000 lbs. It is a rifled breech-loader, intended for harbor defence, and will prove a most formidable weapon if it answers expectation. Thus far it has never been fired, having been put on a car, built especially for its transportation, and brought direct from the foundry to the Exposition building. The diameter of the bore is 14 inches; weight of steel shot, 1,212 lbs.; shell, 1,080 lbs., with a bursting charge of only 17 lbs. The charge of the gun is 110—130 lbs. Length of gun, 17½ feet. The insignificance of the bursting charge is explained by the fact that the deep grooves required for the lead case leave no room for a heavier charge. The cast-steel in the shell weighs 843 lbs.; the lead jacket, 220 lbs.; the bursting charge, 17 lbs.: total, 1,080 lbs.

The inner tube of the gun weighs twenty tuns. It was forged under the fifty-tun hammer, at Krupp's foundry, from a massive ingot of forty and a quarter tuns. The waste was over twenty tuns, or fifty per cent. There are three sets of cast-steel rings at the breech, and two at the muzzle. These weigh altogethor thirty tuns, and are manufactured without welding from rectangular pieces of metal split down the center, opened with wedges, forged under the hammer, and finished in the rolling mill. This gun is an admirable piece of work, and is a remarkable evidence of what is possible in the manufacture of heavy guns. Sixteen months of constant work, day and night, were expended upon it. It is claimed that the machinery for working it enables two men to handle it with ease, elevating, depressing, and turning the gun so that it can be brought easily and rapidly to bear upon an object

Besides this mammoth gun, Krupp exhibits a 9-inch breech-loader, weighing twelve tuns, forged as described, without welding, and all from one piece of steel, with the exception of the trunnions. This gun has been fired one hundred and twenty times, with forty-five pounds of powder, the service charge being from forty to forty-five pounds. It carries a solid shot weighing three hundred and thirty pounds, and a shell of two hundred and seventy-five pounds. A smaller gun of Krupp's manufacture is a rifled, breech-loading field piece of crucible steel. It is a 4-pounder, seventy-four inches in length, weighs six hundred and five pounds, with a 3-inch bore, and carries a charge of one pound, throwing an eight-and-a-half-pound shell. Another German firm, Berger & Co, of Westphalia, exhibit some guns of large caliber. The largest is an 8-inch gun, with a breech-loading arrangement similar to Krupp's, though more simple in action. Berger & Co. have made many guns for the Prussian and Russian Governments. Their chief reputation, however, is for steel gun barrels; nearly all of the barrels of the needle gun being drilled out of the solid bar, at their manufactory. Petin & Gaudet, a French firm, exhibit a hooped soft-steel gun, of sixteen tons weight, 9½ inch bore, and carrying a three-hundred-pound solid shot. This firm is best known as the manufacturers of cannon rings or hoops. Up to this year they have supplied rings for eight hundred cannons to Italy, for five hundred to Spain, one hundred and thirty to Russia, one hundred and eighty to Denmark, twenty-five to Turkey, forty to Sweden, and one hundred and twenty to England, besides those furnished to the French Government.

The Swedish Government exhibits two cast-iron Finsburg guns, nearly like our fifteen-inch gun in shape and general character. One is an eleven-inch smooth-bore, without reënforce, and the other a four-grooved nine-inch rifled gun, with a steel reënforce at the breech. Both of these guns are muzzle-loaders. They have been severely tested; first with two rounds of thirty pounds and one-hundred-and-sixty-pound shot, then with forty-pound charges and shot, increasing in weight at each round, from two shots weighing three hundred and twenty pounds to eighteen, weighing altogether 2,880 pounds, and filling the gun to the muzzle. Sweden is striving hard to regain her old reputation as a manufacturer of guns, and recall the days when most of the states of Europe came to her workshops for their heavy ordnance. Russia, Austria, and Belgium exhibit a few guns, but nothing worthy of note.

Coming now to the English department, we find the rival systems of Whitworth and Armstrong fully presented. The largest gun shown by Sir William Armstrong & Co. is a nine-inch wrought-iron muzzle loading gun, rifled, and weighing twelve and a half tuns. Whitworth's heaviest is a 150-pounder, besides which he shows a 70-pounder and 32-pounder, with specimens of shot and shell. Major Palliser exhibits a 9-inch gun, weighing thirteen tuns, manufactured at the Elswich ordnance works. It is a coiled, wrought-iron tube, two inches thick, over which is cast an ordinary cast-iron cannon. A Fraser gun is also exhibited. It is a 12-inch, weighing 52,640 pounds, and is made in four pieces, instead of Armstrong's eight, which is the only difference between them, the Fraser gun being nothing but the Armstrong, with improvements introduced by Mr. Fraser. The length of bore in this gun is twelve feet, one inch; the outside measurement fourteen feet, three and a half inches. It is rifled, with nine grooves, spiral, increasing from one in one thousand two hundred to one in six hundred, or fifty calibers. Its elongated projectile weighs six hundred pounds, and is thrown by a charge of seventy pounds, with an initial velocity of 1,240 feet per second. The *Captain*, a new English turret ship, is to have two of these guns in each of her turrets.

A 9 inch, twelve tuns, and a 7-inch, six and a half tuns, the usual British naval guns, are also exhibited; besides a 7-inch breech-loading, polygrooved gun, on Armstrong's vent system. The British Government exhibit, in addition to the display of private manufacturers, ten pieces in all. On the whole the British department is the most complete of all in the way of ordnance.

America makes a poor show, though the peculiarity of the few guns exhibited has attracted much attention to them. One is the Gatling battery gun, of which two specimens are presented, both six-barrel guns, one 5-8 inch bore, the other 1-inch bore. Then we have the Ferris gun, with its claim of a nine mile range, and its enormous charge in proportion to its size. The one shown is a chamber gun of one and three-fourths inch bore, carrying a ten ounce sperical and a twenty-seven ounce conical ball. The chamber is cone-shaped, with an average diameter of two and seven-eighths inches, and an average length of seven and a half inches. The depth of bore is thirty-one and a half inches. This gun has been fired one hundred and forty-seven rounds, and has attained a range of nine miles, with an initial velocity of 2,200 feet.

Though we have so slim an exhibition of American ordnance, the deficiency is in a measure compensated for by the trial our favorite 15-inch gun is receiving in England. We need have no fear as yet in regard to its capacity to cope with anything this Exposition affords in the way of heavy guns. The huge guns exhibited by the French Government, and by Krupp, are formidable in appearance, but their enormous dimensions are serious objections to them. Our 15-inch gun weighs 43,000 pounds, but one half the weight of the French 16-inch gun, and scarcely more than one-third of Krupp's untried monster. Beside, this gun has endured the test of actual service, while there are grave doubts of the reliability of these heavy French and Prussian guns. No gun is stronger than its weakest point, and the weak point of these guns is their breech-loading arrangement, which the English are discarding, and which we have never tried. Krupp's gun is the least objectionable in this respect, but I hardly think even Mr. Krupp himself would be willing to put it through the test to which the Swedish guns are subjected, as above described. All the heavy French guns are breech-loaders, as are all the guns exhibited by Krupp, with the exception of the small mountain cannon. Thus far Krupp has manufactured 3,500 steel guns, and has orders for 2,200 more. Of these 5,700 guns 19 in 20 are rifled breech-loaders, in caliber from 4 lbs. to 300 lbs., with a few of 600 lbs. and 1,000 lbs. In value they amount to a total of nearly $12,000,000. The admirable character of Krupp's light steel guns is well known, and their longevity is remarkable. How he is succeeding with heavier ordnance remains to be proved. He has certainly demonstrated his ability to handle metal in masses large enough to forge guns of the most extraordinary dimensions, but the breech-loading apparatus he has invented is yet to be proved in these large guns. In the large gun I have described the charge is introduced at the side of the breech and not at the rear. In the heavy French gun, on the contrary, the shot is introduced from the rear, and the breech closed by a screw, with a cap of soft steel, which expands and tightens the joint. In both guns, however, the opening made at the breech must seriously weaken the gun. It is not long since the breech was blown out of one of the French guns on board the *Montebello.—Cor. Army and Navy Journal.*

PLATING OR COATING METALS WITH METALS.

Not very long ago, and quite in the remembrance of most who are likely to read this journal, the principal manufactures that might have been described under the above title were the manufacture of tin plates, of tinned culinary utensils, and the operation of Sheffield plating. The process of "galvanizing" (coating iron with zinc by immersion in the molten metal) has materially interfered with that of tinning, and the introduction of the principles of electro-deposition, to produce articles of beauty at a cheap rate, and to serve many useful purposes, has altered the condition of the Sheffield plating trade to such an extent that it only exists to produce certain articles of large consumption and well-defined form.

Great changes can also be traced in the theory and practice of electro-deposition itself. Smee, in his admirable work, laid down the "laws" of electro-metallurgy, as he was pleased to term them, in which the evolution of hydrogen during the time of deposition was made to determine the character of the deposit obtained; he also put forward certain views relating to the deposition of alloys in which the use of intense battery power was pointed out as a possible means of accomplishing that purpose. Now, it is found that, by the use of alkaline solutions, many deposits can be obtained in a reguline form during the evolution of hydrogen, and that, also, from certain alkaline solutions, brass and other alloys can be electro deposited in a reguline form, without the use of more battery power than is necessary to compensate for the want of electric conduction in the solution employed.

In the five years that are comprised between the years 1861—1865, inclusive, the increase of knowledge (practical and theoretical) does not appear to have been very great in relation to the subject at the head of this paper. The chief attempts at improvement have been made in the practical details of the tin-plate manufacture. The use of ordinary resin as a flux, above the molten metal, is provided for by special arrangements by Messrs. Banks and Morgan, in their patent specification: Messrs. Morewood and Whytock employ ordinary resin, in conjunction with tallow, by using a plurality of coating baths worked in connection, by the aid of machinery. With a view to economy of material and of work ing, rollers, guides, and other machinery, are employed in certain inventions. Some inventors set forth improvements in the fluxes used (independent of the above-mentioned resin), comprising potassium, ammonium, zinc, tin, and cadmium chlorides. H. J. Madge manufactures a cheap alloy for coating iron plates, by using lead and antimony, with perhaps, a small quantity of tin, instead of tin alone. Messrs. Nurse use an annealing pot with a double case. Lastly, George Tomkins coats lead and terne plates by pouring the melted metal over the plate, and uses an alloy of nickel, zinc, and lead.

Electro-gilding has made but little practical progress during this time. The ordinary solution of gold trichloride in potassium cyanide is used by Martin Miller to gild wire, and by Kuhlmann to ornament metal. The depositing solution employed by Moore contains potassium ferro-cyanide, "pearl potash," potassium iodide, sodium carbonate, copper cyanide, silver cyanide, and "fine gold;" it is said to give a rapid, durable, and richly colored deposit. J. B. Thompson prepares iron or steel articles for electro-deposition by tinning, and then pickling and washing them; he also ornaments silver surfaces by electro-gilding them with a polarized paint brush containing the electro-depositing solution.

In electro-silvering, the following are the principal points that appear:—Martin Miller employs a solution of silver chloride dissolved in potassium cyanide to coat wire. Moore uses electro-magnetic force, but does not state his silvering solution. Weil's solution for previously coppered articles is made by means of silver nitrate, hydric tartrate, ammonia, and potassium cyanide; this solution gives an adherent and either brilliant or dead coating.

All the solutions for electro-coppering are evidently intended to coat iron or other easily oxidable metals. Miller uses a mixture of copper carbonate, potassium cyanide, and potassium or sodium carbonate, to coat wire; the alkaline portion of the solution is first boiled, and then the copper carbonate is added, the mixture being kept boiling until ammonia is freely given off. Walcott charges a strong potassium-cyanide solution with copper by electrolysis. Weil's electro-coppering solution is formed by adding a solution of cupric sulphate to a solution containing sodic potassium tartrate and sodium hydrate. Thompson deposits copper (on an article already electro-coated with iron) by means of a solution of hydrated cupric oxide in sodium hyposulphite.

Among the other inventions that may be mentioned are the following:—Marshall prevents the fracture of metals, owing to their crystallization, by coating their bearings with soft metal, by running the molten metal on to the inclosed bearing. Le Chatelier deposits aluminum by electrolysis of fused sodic aluminum chloride. Bennett tins lead pipes, that are made by hydraulic pressure, by the overflow of the melted metal. Beslay electro-coats iron with tin preliminary to the final electro-coating. Holley coats iron with aluminum, in the fire, by means of a frit that contains felspar, silex, china clay, and a potash clay, when an external vitreous coating is required. When only a coating of aluminum is wanted, boracic trioxide is added to a potash clay: the slag throws itself off as the iron shrinks.

Owing to the trouble of arriving at the history of patented inventions prior to the year 1852, many important improvements have been repatented. This difficulty, however, has been much lessened by the printing of the specifications, superintended by Mr. Woodcroft, in his successful endeavor to carry out the amended patent laws. Lately, and more especially since the year 1857, his attempts have received great accession of strength by the publication of "Abridgements

of the Specifications," in series chronologically arranged, and drawn up by competent men acquainted with the subject to which each series refers.

Nothwithstanding this, the number of inventions still repatented may be drawn from the following analysis of those relating to our subject between the years 1861—1865, inclusive:—

Resin was used on the surface of melted metal as early as A. D. 1786. Silvering glass with silver, which is afterwards electro coated with copper, is referred to in the year 1852. Apparently, the first patent in which machinery was used for tinning iron or steel plates was secured in 1852. A solution of copper carbonate in potassium cyanide was used to electro-deposit copper in 1853. Although Smee sets forth the deposition of copper from its electro-solution in potassium cyanide, it forms the subject of Walcott's patent. Smee, in 1851, and Alexander Watt, in 1860, electro-deposit silver from a solution of its chloride in potassium cyanide. Smee points out the electro-deposition of gold from a solution of its chloride in potassium cyanide. The combination of hydric tartrate, ammonia, and potassium cyanide, was used in 1857 to electro-deposit silver.—*Ironmonger* (*London*).

STEAM FIRE ENGINES AND THE PETROLEUM FUEL.

In our issue of Oct. 26th we copied from the Boston *Traveler* an account of the performances of a steam fire engine in that city using petroleum for fuel. The report was quite favorable to the performance of the engine and to the value of petroleum as a means for generating steam. By reference to that notice on page 265, current volume, our readers will understand the force of the criticism which we have received from a "Looker-on," who is evidently a practical man. He says: The engine had but one stream on and the hose could be compressed by the foot. He stood by the engine half an hour, and during that period it was stopped several times to get up steam. The gage never showed over 60 pounds pressure. If the experiment was as successful as the *Traveler* represents, our correspondent inquires why was it taken off the next morning.

We have yet to learn of any experiment made with this fuel where its advantages over coal were undeniably demonstrated.

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING OCTOBER 29, 1867.

Reported Officially for the Scientific American

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

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

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

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

70,148.—MOLD FOR ARTIFICIAL TEETH.—A. M. Asay, Philadelphia, Pa. Antedated Oct. 15, 1867.

1st, I claim constructing the mold with oblong depressions, c, for receiving and retaining the bowed end of the staples, b, or end of plates which project from the lingual surface of the teeth for confining them to vulcanite or other plates.

2d, The depressions, d and e, constructed and arranged substantially as described, for giving increased strength to the rim, f, substantially as set forth.

70,149.—SPRING BOLT FOR DOORS.—George F. Atkinson, Seymour, Conn.

I claim the bolt, A, moving in casing, B, in combination with spring, C, and screw bolt, F, and nut, G, when all are combined and arranged together substantially as and for the purpose described.

70,150.—CONSTRUCTION OF MILK CANS.—Silas O. Avery, Brewster's Station, N. Y.

I claim the making of a can or vessel to contain milk or other fluid substances from one piece or strip of tin or other metal so constructed in the manner and with the devices described as to have between the inner and outer surfaces an air chamber perfectly sealed and impervious to the external effects of atmospheric heat or cold, and which may be applied to all cylindrical vessels composed of tin or other metals and designed to contain fluid substances.

70,151.—TREENAIL.—John Baird, New York City.

I claim the new fastening herein described namely a treenail combined with a metallic socket and wedges applied thereto, substantially as specified.

70,152.—SEWING MACHINE.—George W. Baker (assignor to himself and Warren E. Eason), Hinsdale, N. H.

1st, I claim the combination of the gear wheel, a, and crown gear, E, needle feeding bar, L, carrying the looper, N, and pin, p', as herein described for the purpose specified.

2d, Regulating the lateral or feeding action of the needle feeding bar, L, carrying the looper, by means of a cam or lever, M, made substantially as herein shown and described.

3d, Combining the looper bar, L, and looper, N, with the slotted or adjustable plate, m, spring, o, and lever, M (or its equivalent), all made and operating substantially as and for the purpose herein shown and described.

4th, The take-up device, J, constructed as described when arranged as set forth on the needle bar, D, and when operated by the motions of the same and by the stationary pin, j, in combination with the hinged bar, H, needle, G, and looper bar, L, all made and operating substantially as and for the purpose herein shown and described.

70,153.—FIELD FENCE.—T. H. Bellard, Colbrook, Ohio.

I claim the special arrangement of the boards, A, stakes, B, yoke, C, and rails, E, in the manner as and for the purpose set forth.

70,154.—SINKING WELL TUBING.—R. N. Bennett, Branchport, N. Y.

1st, I claim the point, C, with its shank, B, provided with the cylindrical portion, a, the chamfer, b b, and the T portion, c, and attached by the slot and pin, d, when combined with the tubing, A, in the manner and for the purpose herein set forth.

2d, The combination with the shank, B, of the star-shaped diaphragm, g, arranged and operating in the manner and for the purpose specified.

70,155.—WINDOW SCREEN.—J. G. Bicknell, Cambridgeport, Mass.

I claim the combination of the outer frame, A, with the inner netting covered frame, B, fitted into it and hinged at its sides, all as and for the purpose described.

70,156.—PLATED WARE.—J. C. Blackman, West Meriden, Conn.

I claim in the manufacture of plated ware or articles, providing such articles at their points of rest or contact with a thickness of the same metal as that with which they are plated, substantially as and for the purpose described.

70,157.—BOOT AND SHOE SHIELD.—G. P. Bradley, Lawrence, Mass., assignor to himself and E. E. Allen, Boston, Mass.

I claim the boot shield or plate, a, provided with the metal strap, b, and flexible strap, c c, all relatively arranged to secure the shield in position to protect the side of a boot in coasting, substantially as set forth.

70,158.—LEATHER QUILTING MACHINE.—Albert G. Brewer, Washington, D. C.

I claim the combined arrangement of the spindle, e, adjusting slide, N, and plate, d, the adjusting bolt, y, and adjusting stud, h, arranged substantially as and for the purpose described.

70,159.—GANG PLOW.—G. T. Brewer, Prairie du Rocher, Ill.

I claim the combination and arrangement of the plows, B B1 and B2, with the beams, A A1 and A2, as described and set forth.

70,160.—MACHINE FOR BRAIDING OPEN-WORK BASKETS.—Franklin H. Brown (assignor to himself, Edward F. Pengest and Lemuel B. Flersheim), Chicago, Ill.

1st, I claim pieces, R and S, in combination with lever, M, as and for the purposes set forth.

2d, Slides, P, having an opening or hole 7, and a groove, 11, as and for the purposes set forth.

3d, Combination of the shaft, E, disk, D, and disk, N, as and for the purposes specified.

4th, Plunger, F, in combination with pieces, R and S, and lever, G, as and for the purposes set forth.

5th, Crank pin, L, piece, K, and rods, k k', in combination with rods, 3 and 4, shaft, E, and sleeve, 9, as and for the purposes specified.

6th, In a braiding machine the movable platform, U, as and for the purposes set forth.

7th, Cam, B, in combination with lever, G, and standard, J, as and for the purposes set forth.

8th, Spring, Q, in combination with lever, M, as set forth and for the purposes specified.

9th, The general construction and arrangement of mechanism, substantially as shown and for the purposes specified.

70,161.—BRUSH.—John Buercky (assignor to himself and Michael Wehr), Overpecks Station, Ohio.

I claim the plate, F, with its arms or guards, f f, and plate, F, with ledges, e e, in combination with plate, b, arms, a a, and adjustable handle, c, constructed, arranged and used in the manner and for the purpose described.

70,162.—PORTABLE FENCE.—G. W. Campbell, Pendleton, Ind.

I claim the connecting together of the upper parts of the panels, A, by means of the hooks, j, and the slots, b, in the upper ends of the braces, C, with the rods, K, passing through said slots for the hooks, j, to catch over in combination with the slots, l, in the upper edges of the centers of the base strips, g g, of the braces to receive the lower ends of the end bars, b, of the panels, substantially as shown and described.

70,163.—CHENILLE.—William Canter (assignor to J. Henry Vogt and J. Jacob Gass), New York City. Antedated Oct. 16, 1867.

I claim the partially uncut chenille made in the manner specified as a new article of manufacture.

70,164.—PICKER FOR LOOMS.—William E. Card and Pardon Andrews, Phoenix, R. I.

1st, We claim the combination of the staff, A, having recesses, E G, of unequal diameters in its end, B, the loose pad, D, elastic cushion, F, and plate, J, as constructed as herein described and for the purpose specified.

2d, So securing the pad in the staff as to have a side or lateral play, substantially as and for the purpose set forth.

70,165.—CLOTHES DRYER.—R. D. Chandler, Fairhaven, N. J.

I claim the combination of the center post, A, having shoulder plates, E, in combination with the clothes frames, C, having slide spring bolts, D, substantially as and for the purpose described.

70,166.—METHOD FOR REMOVING CARBON FROM GAS RETORTS.—B. E. Chollar, Leavenworth, Kansas.

I claim the use of a jet of steam in the stand pipes of gas retorts to cause a draft of air through the retort for the purpose of burning or consuming the deposit of carbon, substantially as described.

70,167.—BEEHIVE.—John Coats, Camden, Ohio.

I claim the herein-described extension beehive when constructed and arranged in the manner and for the purpose substantially as set forth.

70,168.—STOVE DRUM.—J. L. Collins and H. C. Bergie, Chicago, Ill.

1st, We claim the reversible partition, F, when provided with lateral flues and bent at the lower end so as close one half of the lower opening into the drum, substantially as specified.

2d, The combination and arrangement of the outer case, A, and removable partition, F, with the collars, E, substantially as and for the purpose specified.

70,169.—DEVICE FOR TRUSS SPRINGS.—Geo. A. Colton, Adrian, Mich., and Albert D. Angell, Coldwater, Mich.

We claim the plate, B b b', and adjusting screws, C C', in combination with the hinged sections, A A' a a', of the truss spring, substantially as described and for the purpose specified.

70,170.—WASHING MACHINE.—Thomas Courser, Burlington, Iowa.

1st, I claim the combination of an elastic yielding box, B, carrying a concave, b, with a plunger, C, which receives motion from a crank shaft, D, substantially as described.

2d, The combination of a washboard, E, pressure board, G G', and plunger, C, with the concave bed, b, arranged to operate substantially as described.

3d, So constructing and arranging the plunger, C, and combining it with a concave bed, b, that the clothes are raised out of the water and compressed at every forward stroke of said plunger, substantially as described.

70,171.—SHUTTLE.—George L. Crandal, Pitcher, N. Y.

1st, I claim the curved tension spring, a, in combination with the curved fixed wire, c, when arranged and operating in a shuttle, substantially as and for the purpose herein specified.

2d, The inclined groove, m, in the shell of the shtutle opposite the eye, c, for guiding the threading wire, p, as set forth.

70,172.—CONNECTING LINK.—Robert Creuzbaur N. Y. City.

1st, I claim an O connecting link having a closing piece pivoted to it substantially as described.

2d, Adapting the pivoted closing piece of the O-link to serve as a means for strengthening the main portion of the link, substantially as described.

3d, The combination of the pivoted closing piece, B, spring, E, and link portion, A, constructed substantially as described.

70,173.—SHUTTER BOWING BOLT.—J. M. and M. L. Cummings, Philadelphia, Pa. Antedated Oct. 15, 1867.

1st, We claim a shuttle bolt having jointed to the end of its slide, C, an T-piece, c', so as to operate in combination with the case, A, substantially and for the purpose described.

2d, We also claim in combination with the slide, C, having a jointed end and operating in the case, A, substantially as described, the adjustable thumb and finger piece, c'', and the slotted hole, b5, in the plate, B, substantially as and for the purpose set forth and described.

70,174.—BUNK FOR LOGGING SLEIGH.—James P. Davis, Stiles, Wis

I claim an improved logging bunk, A, the ends of which are slotted vertically and which has log chains, B, attached to it within the said slots and at or near their inner ends, substantially as herein shown and described and for the purpose set forth.

70,175.—LEATHER SPLITTING MACHINE.—Alfred Dawes, Hudson, Mass.

I claim the leather splitting machine constructed, arranged, and operating substantially as described.

Also, the compound roll consisting of the central roll or shaft, the sleeve of yielding elastic material covering said roll or shaft, and the outer rings of hard material arranged to operate as set forth.

Also, the construction of a cylinder cam in two separate pieces, adjustable with respect to each other substantially as and for the purpose specified.

70,176.—MANUFACTURE OF ENAMELED AND JAPANNED LEATHER.—Ichabod W. Dawson, Newark, N. J.

I claim leather the Japan or composition of which is applied after the same has been subjected to a powerful stretching action, as a new article of manufacture.

70,177.—PNEUMATIC SPRING.—W. A. Dripps, Fort Wayne, Ind.

I claim the construction of the pneumatic spring consisting of the case, A, and having an eccentric cylinder, B, and cover, J, said cylinder containing the piston, D, having the rings, c d e, and perforated upon its under side at f, and provided with the rod passing through the cover, J, as herein set forth, for the purpose specified.

70,178.—WASHING MACHINE.—H. W. Driver, Havana, Ill.

I claim the drum, B, rollers, I I, and rubbing board, N, when arranged in connection and combination with each other, substantially as and for the purpose described.

70,179.—CRADLE.—D. A. Dunham, Pilatka, Fla.

I claim a child's cradle, A, formed of a barrel with the hoops, b b, projecting over the ends, and the ribs shaped rockers, c c, lying close underneath, arranged substantially as described.

70,180.—HOISTING MACHINE.—Jacob Edson, Boston, Mass.

I claim the arrangement and combination of the lever pawl, G, the brake, H, the windlass barrel, A, the brake pulley, I, the ratchet, D, the shaft, B, and the train of gears, c d C, or the equivalent thereof, such gears being applied to the shaft, ratchet, and windlass barrel, substantially as specified.

I also claim the combination of the screw arm, l', and its nut, l, or nuts, k l, with the brake, H, and the lever pawl, G, substantially as described.

70,181.—CLOTHES WRINGER.—T. B. Emerson, Seville, Ohio

I claim the shaft, A, collars, C, provided with notches, D, when said collars and shaft are constructed in one entire piece, in combination with the rod, E, canvas, F, and rubber, G, in the manner as and for the purpose set forth.

70,182.—PAINT BRUSH.—Joseph M. Estabrook, Milford Mass.

1st, I claim the arrangement of the rings, D and E, having flanges or studs or shoulders, a and c, respectively, and being combined with the handle, A, having the ferrule, B and conical pin, C, all made and operating substantially as herein shown and described.

2d, Making the ferrule, B, and pin, C, of one piece of sheet metal, substantially as herein shown and described.

70,183.—SETTING TIRES ON WHEELS.—Anders Fagerstrom, Wyoming, Pa.

I claim the notched bars, F F, in combination with the hooked or bent ends, a a, of the tire, B, and the bar, G, fitted between the bars, F F, all being arranged and applied to the wheel substantially in the manner as and for the purpose set forth.

70,184.—GAS GENERATOR.—Mathew Faloon, Bloomington, Ill.

I claim the combination of the fountain, C, connected to the generator, B, by means of the tube, d, with the sack, A, provided for different forms of nozzles, substantially as herein shown and described and for the purposes set forth.

70,185.—ANTI-KICKING ATTACHMENT FOR HORSES.—O. H. P. Fancher, New York City.

I claim the strap, C, applied to the thills, A, and bit rings, a', as shown, in combination with the straps, b b, bit rings, a, and rings, c', all arranged to operate substantially as and for the purpose set forth.

70,186.—HAND LOOM.—G. W. Firestone, Fredericksburg, O.

I claim the combination of the lathe, B, with the sweeps, F F, shaft, G, treadles, H, cords, K K, and pickstaves, M M, substantially as and for the purpose specified.

70,187.—RAILROAD SWITCH.—Thomas Fogg, Detroit, Mich.

I claim the switch composed of the three rails, C D E, at each side, in connection with the rigid tongues, I J, yielding main rails, A' A', and guard rails, K, arranged to operate in the manner substantially as and for the purpose set forth.

I further claim the combination of the springs, L, with the rails A' A', when the latter are used in connection with the tongues, I J, and the switch, substantially as and for the purpose specified.

70,188.—MACHINE FOR OPENING CANS.—Wm. H. Forker, Meadville, Pa.

I claim the handle, A, with the base, B, and the handle or lever, D, constructed as described, when the same are in combination with the knife, J C, and the point, F, as described and for the purpose set forth.

70,189.—HAY STACKER.—J. Forsher and J. C. McCland, Unionville Center, Ohio.

We claim the shaft, a, supported by standard, b, upon the carriage, c, and having at its top, the revolving cross pieces, d, with sheaves, e, over which latter pass ropes, h, attached to windlasses, k, and forks, I, the whole being constructed and arranged as and for the purpose described.

70,190.—CARDS FOR HOOKS AND EYES.—Maltby Fowler, Northford, Conn.

I claim the card, A, provided with two or more series of punctures, s, the convex side of each series facing each other, and provided with the tongue pieces, b, fitting over the hooks and eyes, as herein set forth for the purpose specified.

70,191.—SEAT FOR CHAMBER VESSELS.—Isaac Freed, Harrisburg, Pa., assignor to Wm Getty, Camden, N. J.

I claim the arrangement of the springs, C, the boards, A B, and the rims, D E, as and for the purpose specified.

70,192.—MACHINE FOR CUTTING WOOD GEAR.—Thomas F. Freeman (assignor to himself and Wm. H. Abbot), Brooklyn, N. Y.

I claim, 1st, A pair of revolving cutters set upon the same axis of rotation, but capable of being moved toward or away from each other, in combination with guides or slides, substantially as specified, for directing the cutters in forming gear teeth, as set forth.

2d, I claim the arrangement of the slides, q r, arms, a p, frame, m, slide, c, and bed, b, in combination with the rotary cutters, b b, mounted and actuated as set forth.

70,193.—CAPPING SCREWS.—John Gardner, New Haven, Ct.

1st, I claim the combination of the cap, and screw stem fast to the cap, with the screw head and socket or orifice formed therein for the reception of the said stem, under the arrangement and for operation as set forth.

2d, In screws in which the cap and its central screw stem are combined with the head of the screw as described, I claim making the under surface of the said cap concave, substantially as and for the purposes set forth.

70,194.—HAIR BRUSH.—J. N. George, Boston, and Jacob R. Sanborn, Waltham, Mass.

We claim the combination with a hair brush of a sponge, C, or equivalent absorbent material, substantially as and for the purpose specified.

70,195.—CORN SHELLER.—George Goeway (assignor to himself and Howard Baron), Philadelphia, Pa.

1st, I claim the ribs, i, for the purpose of enabling the ears of corn, while being shelled, to revolve freely and not clog.

2d, The longitudinal flanges, k, for the purpose of compelling the ears of corn to revolve and prevent their getting crosswise in the machine while being shelled.

3d, The concave, c, formed in sections with diagonal toothed bars, each section acting independently of the other sections and corresponding in width with the spaces between any two of the longitudinal flanges, k, at their outer edges, substantially as set forth.

4th, The combination of the cylinder, b, concave, c, and springs, d, in the manner and for the purpose substantially as set forth.

70,196.—PORTABLE DUMPING AND LOADING MACHINE.—William Goff, Big Flats, N. Y.

I claim, 1st, The spring guides, d, operated by lever, K, and system of levers, L, substantially as described, in combination with an incline or inclined track, D, and rest, f, and their respective equivalent, substantially as herein shown and described.

2d, The folding apron, C, hinged at c, in combination with a device for dumping and loading, substantially as above set forth and described.

3d, The folding apron, H, hinged at h, also in combination with a device for dumping and loading, substantially as above set forth and described.

70,197.—WHIFFLETREE, TRACE CATCH, OR COCKEYE.—Wm. W. Gordon, Delhi, N. Y.

1st, I claim the stud, key, or pin, a, Figs. 1, 2, 3, and 4, in combination with a whiffletree tip or trace catch, substantially as set forth.

2d, I claim the slot, c, in combination with the cockeye, c, Figs. 1 and 5, when constructed in the manner and for the purposes set forth.

3d, I claim the combination of the stud, 2, and slot, c, Fig. 1, when constructed in the manner and for the purposes set forth in the above specification

70,198.—VENTILATING MILLSTONES.—John Gray, Dubuque, Iowa.

1st, I claim the fan blower, E, arranged in relation with the box, D, constructed as described, spouts, C C, and millstones, as herein set forth, for the purpose specified.

2d, The box, D, constructed as described, provided with the discharge spouts, G G, at each end, and having the cleaning sweep, g, operated by means of the cord, h, as herein set forth and for the purpose specified.

3d, The oblong box, D, inclined spouts, C, and fan blower, E, arranged in relation with each other and with the millstone, as herein set forth for the purpose specified.

70,199.—RATCHET DRILL.—John Gray, Litchfield, Ill.

I claim the combination of the feeding screw, C, with its head, C1, the sliding head, C1, the yielding cushion, C3, the drill spindle, A, with its dowel, a, and the cylindrical head D, with its flange, d', substantially as described.

70,200.—FURNACES FOR STEAM BOILERS.—Jacob Green, Norristown, Pa.

1st, I claim the ash pit, A, with its arched top composed partly of brick and partly of a cast iron key, when the latter is constructed to form a bearer for the grate bars, all substantially as herein set forth.

2d, The cast iron key, F, its side pieces, a a, and notched ribs, I, in combination with the movable bars, m, for the purpose described.

70,201.—BAG TIE.—Joseph Grimes, Alexandria, Va., assignor to himself and F. A. Reed.

I claim the combination of the lever, c, provided with the teeth, c', with the links, a a', and clevis, b, arranged substantially as described.

70,202.—SAFE.—Joseph L. Hall, Cincinnati, Ohio.

1st, I claim the jointing together two or more metallic plates by means of dovetails, grooves, and tenons at their edges or otherwise, as herein described, when the said plates are used in the construction of burglar proof safes, vaults, and other secure receptacles.

2d, The dovetailed, grooved, and tenoned angle irons, G, when the same are used for securing together the corners of safes, vaults, or other secure receptacles, as herein described and for the purpose specified.

3d, The dovetailed plates, B D, or their equivalents, in combination with the dovetailed, grooved and tenoned angle irons G, and the tapered arbors, c, when the same are constructed and arranged for burglar proof safes, vaults, and other secure receptacles, substantially as and for the purpose herein described and set forth.

70,203.—LIGHTNING ARRESTER FOR TELEGRAPHS.—Wm. H. Hall, Chicago, Ill.

1st, I claim supporting the connecting plate, G, over the ground plate, A, without any non-conducting substance between them, by means of the plate B, substantially as specified.

2d, Connecting the plate, B, to the ground plate, A, adjustably by means of the posts, E, and slides, D, substantially as and for the purposes specified.

3d, The non-conducting plate, B, when surrounding and supporting the connecting plates or disks, G, substantially as specified and shown.

4th, The non-conducting supports, a, substantially as and for the purposes specified.

5th, The combination of the ground plate, A, and posts, E, with the non-conducting plate, B, non-conducting supports, a, and collars or slides, D, substantially as specified.

6th, The combination of the ground plate, A, posts, C, and standards, E, with the plate, B, connecting plate, G, post or posts, F, and slides or collars, D, substantially as and for the purposes specified.

70,204.—TRY SQUARES.—Elson Hamblin, Flatbush, N. Y.

I claim the combination of the plates, C and D, with the blade or plate, B, and handle, A, of an ordinary try square, substantially as herein shown and described, and for the purpose set forth.

70,205.—MACHINE FOR CUTTING SOAP.—Cyrus H. Hardy, Charlestown, Mass.

I claim a machine for cutting soap, provided with ways, a, for receiving the soap from and delivering it upon the "truck," substantially as described.

I also claim one or more screws, b, operated as described, for lifting the block of soap from the truck to the ways of the machine, substantially as set forth.

I also claim pivoting the rectangular frame, O, to one side of the center of vibration of the segmental disks, M, in order that the position of the wires, V, when cutting the block of soap, may be nearly horizontal, substantially as and for the purpose described.

I also claim the rod, s, with its screw nut, u, in combination with the guide bar, t, and shoe, r, for adjusting and tightening the wire in place, substantially as described.

70,206.—WATER RESERVOIR FOR COOKING STOVES.—Conrad Harris and Paul W. Zoinet, Cincinnati, Ohio.

1st, We claim a stove reservior, consisting of two or more covered pots or vessels, A A', A' B', formed and combined substantially as and for the purpose set forth.

2d, A stove reservoir composed of two pots or vessels, A A', having covers B B', on their opposing sides, in combination with closing strips, C C', top plate, D, and bolts, F F', with their described or equivalent accessories, substantially as set forth.

3d, The mode of hinging the lids of the reservoir by gudgeons, N, occupying indent lines, M, in the vessel, and secured by the top plate, D, in manner substantially as represented.

70,207.—GAS COOKING STOVE APPARATUS.—David G. Haskins, Cambridge, Mass.

1st, I claim a gas cooking apparatus, formed with the double casing, a, c, fitted as described, with wire netting in combination with the combustion chamber, b, and exit flue, f, the inner casing being provided with a hole for the reception of a kettle, or other culinary vessel, and with openings and covers, h, for the escape of steam, etc., substantially as specified.

2d, I claim the combination of the metal plate, or cover, e, provided with the diaphragm, e', with the perforated inner casing, c, and the combustion chamber, b, as set forth.

70,208.—PLANING MACHINE.—Warren D. Hatch, South Antrim, N. H., assignor to himself and Lewis Babbitt, Worcester, Mass.

In a machine for reducing a board to a series of cylinders, I claim the rotary cutter carriers, B, C, cutters, D, in combination with the feed rollers, I, I', and K, K', fluted guide bar, L, and fluted guide rollers, O, O, P, P', M, all arranged and adjusted to operate in the manner and for the purpose described.

70,209.—CONSTRUCTION OF CRUET-CASTERS.—Westel E. Hawkins (assignor to Joshua B. Graves), New York city.

I claim the center plate, A, and the bead around the cruet-holes of one and the same piece of metal, substantially as shown and described.

70,210.—COMPOSITION FOR HARDENING STEEL.—Charles T. J. Hayden, Versailles, Mo.

I claim the application of the aforesaid chemical compound or mixture to steel, for the purpose of hardening it, or any other substantially the same, which will produce the same effect; when steel is hardened it can be used in cutting glass, steel, or other hard substances.

70,211.—WATER WHEELS.—George W. Herring, Bangor, Me.

I claim the alternate long and short buckets, b, c, formed respectively with curved and radial portions, c, g, d, f, and placed or arranged relatively with the upper and lower rims, a, a, of the wheel and the shaft, e, and the lower rim, a, fitted in a circular opening in the bottom of the scroll, substantially as herein shown and described.

70,212.—METHOD OF PILING, HEATING AND FLUXING FAGOTS. Anthony J. Hindermeyer, Rohrstown, Pa.

I claim the method herein described of constructing, fluxing, and heating a pile of iron and steel bars, to be subsequently converted into a railroad rail by rolling as set forth.

70,213.—STEAM GAGES.—John P. Holt, Cleveland, O.

1st, I claim the arrangement of the lever, I, link, K, and adjusting arm, D, with the bow, C, chain, G, and spindle, E, substantially as set forth.

2d, The combination of the abutments, P', with the case, A, and spring, R, substantially as herein set forth.

70,214.—LIFTING JACK.—Christian Holmes, Washington, O.

I claim a lifting jack composed of a lifting lever hung to a standard having base board substantially as and for the purpose described.

70,215.—RUDDERS.—D. W. Howard, Detroit, Mich.

I claim the combination of the hinged wings, D, and vertical bar, C, with the upper and lower parts of the blade, B, and with the post, A, substantially in the manner herein shown and described, and for the purpose set forth.

70,216.—RAILROAD CAR VENTILATORS.—James L. Howard, Hartford, Ct.

1st, I claim the combination of the frame of a ventilating aperture, with a double mouthed hood turning upon an axis arranged transversely to the aperture substantially as before set forth.

I also claim the combination of the said frame and double-mouthed hood, with arms, C, F, by means of which the said hood at the outer side of the frame may be operated from the inner side of the frame, substantially as before set forth.

I also claim the combination of the said frame, double-mouthed hood, and arm, with a connection by means of which two or more of said hoods may be turned simultaneously, substantially as set forth.

I also claim the combination of the frame of a ventilating aperture, having a hood connected with it, with a register valve, and with a transverse spindle, K, for the purpose of operating said register valve, substantially as before set forth.

I also claim the combination of each of the first three combinations aforesaid, with a register valve for regulating the passage of air through the ventilating aperture, substantially as before set forth.

I also claim the combination of each of the first three combinations aforesaid, with a register valve and a transverse spindle for operating said valve, substantially as before set forth.

70,217.—WAGON BRAKE.—Wesley Hull, Fort Wayne, Ind.

I claim the brake, A, bent lever, a, connecting rod, C, in combination with slotted connecting rods and lever, for the purpose of locking wheels of wagons while ascending or descending hills, the whole being arranged and combined in the manner and for the purposes herein set forth and described.

70,218.—FASTENINGS FOR BUTTONS.—Henry Humphrey, Adrian, Mich.

I claim the within described button fastener, consisting of the plates, A and B, provided with slots j, s, to encircle the shank of the button, and connected together by the elastic, g, the whole constructed and operating substantially as described.

70,219.—BUGGY SPRING.—Wm. Humphreys, Brooklyn, N. Y.

I claim the springs, A, formed of either wood or metal, substantially as shown and described, and attached to the rear axle and to the D, circle, substantially as set forth, and for the purpose specified.

70,220.—UMBRELLAS.—Julius Jacob, New York city.

I claim the umbrella ribs formed of the sliding tube, as shown in combination with the folding handle and stretchers, as set forth.

70,221.—SASH FASTENER.—George Jelby and John W. Gowell, Boston, Mass.

We claim the improved window sash supporter and fastener herein described, the same consisting of the rack, C, in combination with the spring bolt, D, moving longitudinally in bearings, c, d, and operated by the key, G, substantially in the manner and for the purposes herein shown and set forth.

70,222.—WINDOW SASH STOP.—J. Gay Jewell, Washington, D. C.

I claim, 1st, the screw head or pad, A, made hollow and filled with gutta percha, rubber, leather, composition, cork, or other substance that may be used for preventing the abrasion of the window frame.

2d, The button, or handle, made in one piece with the main screw, and attached to a screw-head or pad by a swivel, or shoulder joint, with a small screw penetrating the screw-head or pad, as and for the purpose set forth.

70,223.—JOINT BOLT.—S. E. Jewett, Haverhill, Mass.

I claim, 1st, a joint bolt furnished with a dovetail slot and a dovetailed segment of wood to fit the same.

2d, The application of a segment of wood and glue, in combination with the ordinary belt-head, or its equivalent, N, or with a hinge-head, as specified and described.

70,224.—PITMAN COUPLING.—William J. Keeney, Florence, Ind.

1st, I claim the wrist, F, G, composed of two cylindrical studs, with correspondingly oblique terminations, when formed to be approximated or withdrawn in the line of their axis, substantially as set forth.

2d, The arrangement of jaws, D, E, having the obliquely terminated cylindrical steels, F, G, and compressing and expanding devices, I, J, K, or their mechanical equivalents, substantially as and for the purpose set forth.

70,225.—PITMAN COUPLING.—Wm. J. Keeney, Florence, Ind.

1st, I claim a pitman coupling composed of the recurved heel, B, and adjustable jaws, D, E, which can be adapted to grasp said heel with a uniform pressure on every side, with their described or equivalent accessories substantially as set forth.

2d, In the described combination, the recurved heel, B, jaws, D, E, screw nut, F, and block or spring, G, for the purpose set forth.

70,226.—WINDOW SHADE MATERIAL.—Gibbons L. Kelty, New York city.

I claim a window shade material formed with a printed ground representing the meshes of lace curtains, and in combination therewith I claim the ornamental printed figure representing the embroidered work of lace curtains.

70,227.—OX SHOES.—Hazleton Lake, Shelburne, N. H.

I claim extending the forward part of the shoe, A, inward, and forming nail holes through the inner edge of the said extended part, substantially as herein shown and described, and for the purpose set forth.

70,228.—LABEL HOLDER FOR MAIL.—George A. Lamb, Jeffersonville, N. Y.

I claim the manner of construction and the mode of adjusting and securing the label therein, at set forth in the foregoing description.

70,229.—CHURN DASHER.—John Leaken (assignor to himself and F. H. Bogar), Clinton, Ill.

I claim a dasher for churns provided with wings and arms, substantially as and for the purpose described.

70,230.—COTTON BALE TIE.—R. H. Lecky, Alleghany City, Penn. Antedated Oct. 9, 1867.

I claim a clasp for bands or hoops used for baling cotton, said clasp consisting of the piece, x, provided with openings, C, D, and e, and a projection, B, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

70,231.—HORSE SHOES.—George W. Lewis, Providence, R. I.

I claim the improvement in toe calkins described, which consists in making one of the faces, b, of each of the holding spurs, a, curved from the top outward toward the base, as and for the purpose specified.

70,232.—SAFE LOCKS.—Rees Lewis, New York city.

1st, I claim the key, B, constructed as described with one or more sliding guards, c, which are operated by springs, d, and which project into the tubular spindle of the key, or from the bit of the same, as herein set forth for the purpose specified.

2d, The revolving shell, D, in combination with the vibrating plate, E, springs, f and g, all made and operating substantially as and for the purpose herein shown and described.

3d, The device herein shown and described for preventing the shell, D, from turning, consisting of the stud or roller, b, on the roller, F, fitting between two jaws, j, j, projecting from the shell, D, substantially as set forth.

4th, The key, B, in combination with the revolving shell, D, vibrating plate, E, and slotted guard plate, H, all made and operating substantially as herein shown and described.

70,233.—HEAT RADIATING STOVE, OR FURNACE, FOR FIRE-PLACES.—John Liddle, (assignor to Jane E. Liddle), Brooklyn, N. Y.

1st, I claim the combination in a fire place heater of the cylinders, A B and C, with their tops, D E and F, respectively, and a suitable opening or openings through the walls of the hot air chamber, G, at or near its top for passing the hot products of combustion from the chamber, I, to the chamber, V, substantially as herein above set forth.

2d, The combination with the hot air chamber, G, and hot exit pipe, M, of the wings, O, connected at the bottom or their equivalents by which all the hot air which enters the said hot air exit pipe, M, is taken from the top of the hot air chamber, G, substantially as and for the purpose specified.

3d, The combination with a heater constructed substantially as described of the lining, A', which prevents the hot air from the room in which the heater stands passing into the hot air flue, N, or into the room above substantially as herein above set forth.

4th, The combination with the hot air chamber, G, of a fire place heater constructed substantially as described of an opening, f, for feeding the said hot air chamber with air from the cellar or other source free from dust; substantially as and for the purpose described.

5th, The combination with the openings, d d and d', in the top plate of the base of a furnace constructed substantially as set forth, of the annular box damper, T, constructed and operating substantially as herein above specified.

6th, The combination with the lining, A', frame, B', front, C', of the hooks, J, substantially as set forth.

7th, Taking the air from a point at or near the top of the hot air chamber, G, within the fire place heater out through the casing, A', and passing it into the hot air flue, N, by means of a suitable exit pipe substantially as described.

70,234.—LIME KILN.—J. L. Livingston, Mt. Carroll, Ill.

1st, I claim the draft holes, a, upon each side of the furnace, C, crossing each other and entering said furnaces upon each side of the partition, D, whereby the effect of the winds is counteracted and the draft in the furnaces regulated as herein set forth for the purpose specified.

2d, The arrangement of the furnaces, C C, upon each side of the interior opening, A, whereby the products of combustion are enabled to pass from such furnaces toward each other at the same time the flue is kept from the furnace as herein set forth for the purpose specified.

70,235.—CAR BRAKE.—A. Z. Long, Scranton, Pa.

I claim the toothed wheels, D, and pawls, E E', in combination with the levers, F, connected with the pawls, and the lever, G, substantially as an I for the purpose set forth.

70,23 .—SASH FASTENER.—G. H. Lupton, Cleveland, Ohio.

I claim the bolt, A, hook, D, and loop, E, as arranged in its application to the shutters, B and F, for the purpose and in the manner substantially as specified.

Bolt, A, and rib, H, as arranged in combination with the sill, F', and groove, G', as and for the purpose set forth.

70,237.—PLOW AND PLANTER COMBINED.—J. D. Marshall, Renick, Mo.

I claim the carriage, A, plows, B, vertical posts, a, swing frame, D, and stirrups, d, when combined and arranged in the manner described.

70,238.—METALLIC GARTER.—W. H. McCoy, and A. Wheeler, Charlestown, Mass.

We claim the stocking band or supporter, b, when made in two parts hinged together at c, substantially as described.

We also claim the clamp wire, g, having a band or eccentric, f, working in combination with the grooves, h, to fasten the band substantially as shown and described.

70,239.—CLUTCH FOR HAY FORK.—G. D. Melott, Watertown, N. Y.

I claim the construction of a clutch composed of two members, connected together by a bolt, or pivot upon which bolt or pivot, said members are free to turn in combination with the link, c, as herein described, constructed and operated substantially as and for the purposes herein set forth.

2d, The combination of the shank, d, with the link, c, and the combination of the shank, f, with a member of a clutch, as and for the purposes specified.

3d, The combination of a pole or stole and socket, o, with the shanks, d, and f.

70,240.—ORNAMENTING GLASS.—J. C. Millward, N. Y. City.

I claim the application of the crystallized sheet metal plate, B, to the under side of the glass against the paint or staining as herein described for the purpose specified.

70,241.—FASTENING FOR UMBRELLA RUNNERS.—Wm. Money, (assignor to E. W. Cloud) Paterson, N. J.

I claim the double lever eccentric cam, C, in combination with the umbrella slide, a, constructed and operating substantially as and for the purpose herein described.

70,242.—ROTARY METORS OR MOTORS.—Chas. Moore, and Arthur P. Emery, New York City.

1st, We claim the connecting links, m, hinged together by the independent pin, o, concentric with the outer cylinder in combination with the sliding piston, l, for operation together substantially as shown and described.

2d, The independent pin, o, arranged for connecting the sliding piston, l, by means of the links, m, substantially as shown and described.

70,243.—PLOW.—Josephus Moore, Bushnell, Ill.

1st, I claim the combination of the beams, d and c, the rod, l, and the spring lever, k, as and for the purpose described.

2d, The combination of the lever, n, and handle, t, with the axles of the wheels, a a, and the main frame, A, in manner and for purpose specified.

3d, The combination of the elbow lever, v, with the spring, w, and connecting rod, u, substantially as set forth.

4th, The combination of the elbow lever, v, the spring, u, with the rack plate, s, and lever, n, substantially as described.

70,244.—PUMP.—J. A. Morrell, Chicago, Ill.

I claim the air chamber, A, provided with the arms, d and e, and with a side opening or cavity, J, cast with it and also supporting two stationary plungers, B, in combination with the cylinders, C, constructed with necks having annular cavities and with their internal diameters enlarged below the necks as described valves, D, and balls, I, the several parts constructed and arranged substantially as and for the purposes specified.

70,245.—IRON BRIDGE.—D. H. Morrison, Dayton, Ohio.

1st, I claim the universal washer, B f, constructed and applied in the manner and for the purpose specified.

2d, The combination and arrangement of the arch beams, C, arch joint plates, g, and universal washer, B f, when constructed, connected and operating conjointly in the manner and for the purpose described.

70,246.—BOOT JACK.—J. G. Moulton, Boston, Mass.

I claim the combination and arrangement of the several parts of the machine namely: the standards, a a, the crop bar, a', the brace, b, the jac, c, the screws or pivots, d d, and the bolt, e, whereby a boot-jack is constructed, substantially in the manner and for the purpose above set forth.

70,247.—LAMP.—Wm. Mullally, (assignor to Howard Tilden) Boston, Mass.

I claim arranging the bottom of the cap, H, a little above the convex base, G, leaving an opening between it and the base, G, for the air to pass out and up and cool the chimney and to prevent the cap from heating the base.

Also I claim the deflectors, J J, extending down from the ends of the slot in a blaze cap with closed sides substantially as described.

I claim making lugs or supports on the base plate to fit recesses in the side of the cap so that the cap can be readily removed from the base plate to adjust the wick and clean out the base of the top.

I claim the pins or lugs on the base or bottom plate for the lower edge of the chimney to stand on substantially as described.

And in combination with the cap and base arranged substantially as described, I claim the perforated bottom plate, A, for connecting the top to the lamp or oil vessel.

70,248.—AUTOMATIC VALVE AND FILTERING WATER LEADER John Muss, Quincy, Ill.

I claim an automatic water leader and filter consisting of a waste-pipe strainer valves and float applied to a water leader and so constructed and arranged that the water shall pass through the strainer into the cistern when it requires filling but when the cistern is filled shall cleanse the strainer and pass out through the waste pipe substantially as herein shown and described.

70,249.—CHURN.—Wm. Newberry, Clarksville, Mo.

1st, I claim the crosses, E and F, with the stationary wings, G, attached thereto and arranged substantially as shown and described.

2d, The stationary wings, G, in the angles of a square or angular churn whether the churn has more or less angles, substantially as described.

3d, In combination with the crosses, E F, and wings, G, I claim the revolving dashers, C, substantially as and for the purposes set forth.

70,250.—MODE OF TREATING CAOUTCHOUC, GUTTA PERCHA, AND SIMILAR GUMS.—J. B. Newbrough and E. Fagan, New York City.

I claim gutta percha or other gums combined with or treated in connection with iodine in the manner described or in any other manner by which the within described result is obtained.

70,251.—ROSETTES FOR BRIDLES.—W. F. Niles, Leominster, Mass.

I claim as a new article of manufacture a rosette, the body of which is made of concave convex disks of horn or hoof and combined together substantially as and for the purposes herein specified.

70,252.—LAMP BURNER.—G. K. Osborn, Brooklyn, N. Y.

I claim the construction and arrangement of the tube, B, surrounded by the perforated disk, C, the upper part, b, corrugated and of less diameter than the lower part, c, all supported at their points of connection by the short tube, A, as and for the purpose specified.

70,253.—TENSION REGULATOR FOR LOOMS.—Frank Painter, East Hampton, Mass.

1st, I claim in looms for weaving elastic fabric the construction and arrangement of the feed roll, B, receiving the rubber threads from the threading and guide plates, c c', the adjustable tension roll, C, bearing against the feed roll, B, and clamping the threads by means of the spiral springs, d d, the friction roll, D, take up shaft, E, under the adjustable tension roll, F, that bears the rubber threads against said shaft by means of the spiral springs, d' d', all operating as described whereby the rubber threads are stretched and held positively to any degree of tension while the web is being woven to produce fabrics of any desired elasticity, as herein shown and described.

70,254.—SMOKE STACK.—T P. Peck, Savannah, Ga.

1st, I claim the combination with the stack top or cover, E, and sleve or spark catcher, F, of the wings or plates, f, arranged for action substantially as described.

2d, A smoke stack embracing an interior pipe, A, outer shell, D, with its top or cover, E, having interior ribs or wings, f, sleve, F, and cone box, B, constructed as described and provided with a ribbed or winged cone and outlets or port bevels, or the equivalents of these devices for operation together as herein set forth.

70,255.—STEERING APPARATUS.—Joseph Perkins, Saco, Me.

I claim in combination with the wheel, A, shaft, a, and gear, d, the table, F, having the rack, h, grooves, m n, and slides, 1 2 3 4, attached to the arms, o p, all substantially as and for the purposes set forth.

70,256.—MEANS FOR SETTING, REEFING, AND FURLING SAILS.—Charles Peterson, San Francisco, Cal.

1st, I claim the within-described mode of setting furling and reefing sails from the deck of a vessel by means of the swivel booms, D, swivels, G H, and ropes or chains, 1 2 3 4 5 6 7 and 8, substantially as described.

2d, Setting furling and reefing stay sails and jibs by rolling them on the stay, substantially as described.

3d, Setting furling and reefing the upper square sails from the deck by means of two sets of ropes or chains only operating together with the swivel booms, D, substantially as described.

4th, A swivel boom around which the upper square sails are rolled or furled, substantially as described.

5th, An india-rubber cap, P, on the end of rotating span, for the purpose and manner set forth.

6th, The swivel, D, provided with friction balls, substantially as described for the purpose specified.

7th, An india-rubber roller over the periphery of a sheave, substantially as and for the purposes described.

8th, A stay for ships' sails constructed of metal links, substantially as described.

9th, The combination of the swivel, H, link, I, and swivel, G, substantially as described for the purpose specified.

10th, The india-rubber covered rollers, g and g', in combination with the india-rubber covered boom, E, substantially as and for the purposes described.

11th, The guide rope, 5, in combination with the courses, substantially as and for the purposes described.

70,257.—APPARATUS FOR FEEDING SCREW BLANKS.—E. S Pierce, Hartford, Conn.

1st, I claim a zig-zag or serpentine channel way formed of corrugated sides, substantially as herein described and for the purpose set forth

2d, The devices, a b c d e f g, for maintaining screw blanks, or other similar articles, in any desired position while passing through a channel or groove, substantially as herein specified.

70,258.—CULTIVATOR.—E. W Pike, Galesburg, Ill.

1st, I claim the combination of the plate, S, jaws, R, and coiled spring, U, with the pivoted catch block, P, and standard, F, substantially as herein shown and described and for the purpose set forth.

2d, The hinged plate, W, and springs, X, in combination with the cross beam, B, and standards, F, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the brace bar, H, with the beam, A, and cross beam, G, substantially as shown and described and for the purpose set forth.

70,259.—RAIL GUIDE FOR GUIDING WAGONS.—Chas. Plagge, Darmstadt, Grand Duchy of Hesse.

I claim the application of rail guides to wagons, carts, and other vehicles, with plain wheels, as used on common roads or paved streets, made and applied substantially and for the purpose as herein descried and set forth.

70,260.—CREEL FOR WINDING YARN.—Moses O. Potter, South Scituate, R. I.

I claim a creel plate (for creels used in transfering yarn from the spools to the sections, etc.,) with a hinge and catch, or latch, comb nea, with the spool spindle or skeiver permanently affixed in said hinge, and swinging and latching upon the same, alternately, as the case may be, and as herein described and set forth.

70,261.—POCKET CASE FOR PRINTERS' BODKIN AND TWEEZERS.—Wm. Quail, New York city.

I claim the combination and arrangement of the case, B, with the bodkin a, and the tweezers, c, substantially as described and for the purposes set forth.

70,262.—SHUTTER CATCH.—F. Raymond, Woodhaven, N. Y.

1st, I claim the pivoted laterally-moving bar, A*, in combination with the catch, C, and fixed stud, r, on the shutter, substantially as and for the purpose specified.

2d, The arrangement of the pivoted bar, A*, of the catch, with reference to the rod, m, of the shutter, substantially as and for the purpose herein specified.

70,263.—MACHINE FOR MAKING WOODEN WARE.—Adam R. Reese, Phillipsburg, N. J.

I claim the combination of the vertical mandrel revolving in a fixed position and carrying the block, with a series of parallel straight cutters moving in an inclined path nearly vertical at an angle to the block, for the purpose of simultaneously cutting a series of concentric frusta of cones from a solid block.

I also claim the combination of the mandrel with the cutters and the guides, arranged and operating substantially as described.

70,264.—BREECH-LOADING FIRE ARMS.—S. S. Rembert, Memphis, Tenn.

1st, I claim the breech piece, A, constructed with recesses, a a, which pass through the abutment, h, substantially as described for the purposes specified.

2d, I claim the double key, B, operated substantially as described, to hold the barrels to the abutment, as described.

3d, The pointed screws, m, passing through the stock into the cartridge chamber, whereby the cartridge shell is held in place when the barrels are thrown forward, as herein shown and described.

4th, The combination and arrangement of the breech piece, A, double key, B, bar, C, rod, D, and lever, E, substantially as described for the purpose specified.

5th, The T-end of the lever, E, having catch, e, in combination with the notched bar of the double key, B, and spring, g, substantially as described for the purpose specified.

70,265.—LET-OFF FOR LOOMS.—Jacob Remick, Newburyport, Mass., assignor to Amos L. Wood and Josiah G. Abbott, Boston, Mass.

I claim the combination of the whip roll, b, in the bent arms and levers, E, with the springs, G, adjustable rod, k, friction wheels, F, and warp beam, B, all constructed and arranged substantially as and for the purpose set forth.

70,266.—FRAME STAFF FOR GRINDING MILLS.—Walter Ring, Gosport, Ind.

1st, I claim the gage staff, B, centered upon the mill stone by means of the circular center fitting over and around the spindle, b, provided upon its under side with the bush plate, m, having the pivoted eccentric followers, n, and surrounded by anjustable collar, m1, with lugs, n, all constructed and arranged as herein set forth.

2d, The combination of the tram and gage staff, B, with the spirit levels, K, substantially as herein shown and described and for the purpose specified.

70,267.—PLOW.—Gerhard Ringen, Smith City, Mo.

I claim the share, D, and the land side, E, when formed of one piece, and combined with the post, F, having two branches, f f1, substantially in the manner herein shown and described.

70,268.—MACHINE FOR BEAMING HIDES OR SKINS.—Thos. Roberts and Patrick Lennox, Lynn Mass.

1st, We claim the combination with the sliding carriage and mechanism for imparting a reciprocating motion to the same, of the hinged or pivoted beaming tool and spring, or equivalent mechanism, for actuating the same during the movements of the said carriage, in the manner herein shown and described.

2d, We claim the employment of the spring bar, J, for the purpose of raising the tool, I, from off the skin during one movement of the tool, and pressing it down in contact with the skin during the opposite movement of it, essentially in manner as set forth and explained.

3d, We also claim, in combination with the above described arrangement of parts, the movable car, K, in manner and to operate as before described.

4th, We also claim the peculiar construction of the car, K, as composed of the truck frame, b, circular platform, d, and revolving tablet, L, supported by the friction roller, g g, etc., substantially as before described.

5th, We also claim, in combination with the car, K, the device for locking it in position, consisting of the catch bar, i, and notched rail, k, as and for the purposes set forth.

70,269.—RAILWAY CAR.—Daniel T. Robinson, Boston, Mass.

I claim so constructing the running portion of a railway car as to dispense with the ordinary truck, and apply the axle boxes directly to the levers or bars upon which the carriage rests, substantially in manner and for the purpose as described.

I also claim the peculiar combination and arrangement with the carriage body or platform, of the levers, D D D, etc., and springs, d d, applied and operating together in manner and for the purposes as before set forth.

70,270.—METHOD OF HOLDING BRISTLES IN BRUSH STOCKS.—C. D. Rogers, Utica, N. Y., and M. P. Wilkins, Jersey City, N. J.

1st, We claim a bunch of bristles, in combinat on with a flanged ferrule, and these in combination with a hole or aperture and countersink in a brush stock substantially as described.

2d, We claim, in combination, a ferrule, a bunch of bristles, and an attaching contrivance, substantially such as described, the combination being substantially such as set forth, and also, we claim these elements in combination with a hole in a brush stock.

3d, We claim, in combination, a flanged ferrule, an attaching contrivance, and a bunch of bristles, the combination being substantially such as described, and we claim these, also, in combination with a hole and countersink in a brush stock, the combination being substantially such as set forth.

And we wish it distinctly understood that by the word bristles, in all these claims, we mean fiber, vegetable, or animal, suitable for the formation of brushes.

70,271.—RAILROAD CHAIR.—B. J. Romaine, Hackensack, N. J. Antedated May 1, 1867.

I claim the wrought iron plates, C, upon each side of the rail, their upper portions bent to receive the flange of the rail and embrace the web lying flush therewith, their lower ends bent at right angles, and adjusted nearer to or further from each other by means of the screw, a, and nut, b, the projecting portion of the curved upper part under the flange of the rail resting upon the ties, as herein described for the purpose specified.

70,272.—MODE OF LIGHTING STREET GAS BURNERS.—E. P. Russell, Manlius, N. Y.

I claim a small supplemental burner, A, to be kept burning constantly, when operating in connection with a main burner, substantially as and for the purposes set forth.

70,273.—BRAIDING-MACHINE CARRIERS.—Socrates Scholfield, Providence, R. I. Antedated Oct. 16, 1867.

I claim so arranging the outer or extreme eye, or point, of a braiding machine carrier or racer, that it may be made to yield with the tension of the thread, as such carrier or racer passes around the gears, or in the grooves of a braiding machine, substantially as described.

I also claim balancing the carrier or racer upon the edges of the groove in which it runs, substantially as specified.

70,274.—ATTACHING HORSESHOES.—Henry Schreiner, Philadelphia, Pa.

1st, I claim attaching the belts to the sole, B, by means of the tapering mortises, b1, and the corresponding enlargements, d'', on the lower ends of the said belts, substantially as described and set forth.

2d, I claim the combination of the belts, C and D, with the enlarged heads, d'', and clasp, d1 c1, operating substantially as described and for the purpose set forth.

70,275.—BOOTJACK.—A. P. Seymour, Jr., Hecla Works, N. Y.

1st, I claim the sliding jaws, C C1, pivoted together at their inner ends by the pin, B, sliding in the groove, a, of the foot piece, A, said jaws guided in their inward and outward movements by means of the lugs, b b, as herein set forth for the purpose specified.

2d, The feet, D D, applied to the foot piece, A, in such a manner as to be adjusted by the movement of the jaws, C C1, substantially as shown and described.

3d, The construction and arrangement of the foot piece, A, sliding jaws, C C1, and feet, D D, substantially as described for the purpose specified.

70,276.—HEATER.—Thos. Shipton, Newark, N. J.

1st, I claim the arrangement of the pipes, C, circular pipe, b, upright pipes, d, boiler, a, and air pipes, f h, as herein described for the purpose specified.

2d, I also claim the steam pipe circling the boiler with upright pipes, all arranged in the manner and for the purpose substantially as described.

70,277.—COMPOSITION FOR STUFFING WOOD.—Harrison Smith, Phillipsburg, N. J.

I claim the mixture composed of the several ingredients, and mixed together in about the proportions, substantially as described, and for use, substantially as and for the purpose specified.

79,278.—SLEIGH BELLS.—Henry K. Smith, Boston, Mass.

I claim the improved construction of the tongue hook, and the arrangement of it, the rivet, the belt, and the strap, as described.

70,279.—CAR COUPLING.—J. L. Smith, Penn Township, Pa.

I claim the construction and arrangement of the devices, E J M R and P, as herein described and for the purposes set forth.

70,280.—THRASHING MACHINE.—C. L. Snyder, Hardin, Ill.

1st, I claim arrangement and employment of the endless screw, d', in combination with the shaft, E, and zig-zag, a, separator, F, as and for the purpose shown and described.

2d, I claim the construction and arrangement of the feed board, G, when applied to the frame, A, as herein set forth.

70,281.—MACHINE FOR SPINNING METALS.—Chas. F. Spaulding, St. Johnsbury, Vt.

I claim the arrangement and combination of a lever, E, with the spinning wheel or wheels and die wheel, substantially as set forth.

I also claim the die wheel, as constructed, with the peripheral opening, k, and the groove, q, arranged in it, substantially as and for the purpose herein before set forth.

I also claim the combination and arrangement of the supporting roller, G and its adjustable devices, as described, with the die wheel and its shaft movable lengthwise, as set forth.

I also claim, in combination with the spinning wheel supporting lever, and the die wheel supporting lever, and the die wheel shaft, arranged as described, the devices by which the vertical adjustment and longitudinal movements of the said shaft may be effected, as set forth.

I also claim the arrangement and combination of the separate handle, F, and its fixtures, substantially as described, with the lever, E, and the spinning and die wheels, arranged as explained.

70,282.—HINGE AND FASTENER.—Nathaniel B. Spooner, Plymouth, Mass.

In a blind hinge I claim the combination of the upper disk, a, having the pintle, b, set in the socket, d, the pin, v, set in the holes, v', on the lower hinge, the catch pin, e, in the pintle of the upper hinge, and the spiral spring, h, all arranged and operating as and for the purposes herein described.

70,283.—STEAM-ENGINE SLIDE VALVE.—Albert Staley, Clinton, Iowa.

I claim the balancing disk, E, of circular or other form, on the outside of the valve chest, provided with packing, e i g, in combination with the valve, B, and stem, d, to which the said disk is attached, substantially in the manner and for the purpose set forth.

70,284.—MODE OF ATTACHING AXES TO THEIR HANDLES.—Jas. Stewart, Money Creek, Minn.

I claim improved fastening for ax handles, and other tool handles, consisting of a plate, c, attached by a clip, D, and secured by a bolt, a, to the handle, in combination with the bolt, e, and wedge, d, constructed and arranged to operate as herein described.

70,285.—PUMP.—Ransom E. Strait, Battle Creek, Mich.

1st, I claim the detachable spout, C, and rest or fulcrum, E, constructed as specified, and operating as set forth.

2d, I claim the spring, h, and valve, e, and valve seat, f, constructed as described, and operating as set forth and for the purposes specified.

3d, I claim the arrangement of the cup or spout, C, barrel, A, reducing socket, f, joint, A1, barrel, B, and conical point, G, and valves, b1 and e, plunger, F, standard, E, and handle, D, the whole constructed and operating as described and for the purposes set forth.

60,286.—BLOWER WHEEL.—B. F. Sturtevant, West Roxbury, Mass.

I claim the arrangement of the blades and the frusto conical disks relatively to each other and to the flanged rings, substantially as and for the purposes described.

70,287.—SLED BRAKE.—Samuel K. Sutton, Paterson, N. J.

I claim the combination of the dog, C, with the toggle, a a1, and the shaft, B, provided with the spring, e, and the lever, E all arranged and applied to the sled to operate in the manner substantially as and for the purpose set forth.

70,288.—MACHINE FOR STRIPPING WILLOW.—James Swan, Paterson, N. J.

1st, I claim the stripping device consisting of the rotating head or hub, a, having the transverse groove, b, strippers, D D, each composed of two parallel plates, c c, having openings, e, whose outer edges are V-shaped, the plate of one stripper sliding between the plates of the other, said plates secured together at their outer ends by the pins, d, and to the hub, a, by the cap, E, the hub and strippers surrounded by the elastic band, F, substantially as described for the purpose set forth.

2d, The reciprocating slide, O, provided with the jaws, R R, and levers, Q Q, the uprights, T T T' T', endless chain, N, shafts, L H I, connected by bevel gear, i, driving belt, J, fixed and loose pulleys on the mandrel, B, and shafts, H I, all arranged and operating as and for the purpose specified.

3d, The sliding tube, G, fitted within the mandrel, B, for guiding the willow to the strippers, as herein shown and described.

70,289.—CARRIAGE-SHAFT CONNECTION.—Charles Tholl, Boston, Mass.

I claim my improved shaft connection, constructed substantially as described, viz: of the open box, B, with its cover and catch, and the strip of rubber, or its equivalent, arranged and applied together to the journal of the forked arm, F, and to the axle, substantially in the manner as hereinbefore specified.

70,290.—FLASK FOR CASTING CAR WHEELS.—W. R. Thompson, Catasaugua, Pa.

I claim the metal ring, G, constructed with both an upper and lower shoulder for upper edge of the flask, C, and lower edge of flask, A, to bear against, in combination with said flasks and with the clamps, J J, constructed and applied as shown, all substantially as described.

70,291.—WAGON JACK.—Wm. H. Trusty, Philadelphia, Pa.

I claim the pawl and ratchet surface, in combination with the lifting bar, when such pawl is provided with a lifting lever, substantially as and for the purpose described.

2d, In combination with the above, I claim the series of notches to the standard of the jack, as herein described for the purpose specified.

70,292.—MACHINE FOR CUTTING PAPER, PASTEBOARD, ETC.—Stephen D. Tucker, New York city.

1st, I claim operating the knife, G, through the medium of the screw, N, worm wheel, L, lever, J, provided with a slot, d, to receive the wrist pin, e, of wheel, L, and the pitman, I, all arranged to bring the knife slowly down while at work, and throw it up with a comparatively quick movement, substantially as shown and described.

2d, Operating the clutch, Q, to connect the driving pulley, P, with shaft, O, and disconnect it therefrom by means of the rod, R, actuated automatically from the worm wheel, L, substantially as set forth.

3d, The treadles, s s', arranged in connection with the slide rod, R, to admit of the pulley, P, being connected with the shaft, O, at the will of the operator, substantially as described.

4th, The spring or brake, V, operated automatically from the rod, R, substantially as set forth.

70,293.—MACHINE FOR CUTTING TEETH OF WHEELS.—John Underwood, Muscatine, Iowa, assignor to Ephraim Ball, Canton, Ohio.

I claim, in combination with the mechanism for producing the intermittent rotating feed motion given to the gear that is being cut, the mechanism for producing the vertical motion toward the cutting tool, substantially as herein described.

70,294.—BABBITING AND DRILLING JIG.—John Underwood, Muscatine, Iowa, assignor to Ephraim Ball, Canton, Ohio.

1st, I claim a babbiting jig or former, constructed and arranged substantially as herein described, which, in conjunction with the bearings on a cast iron frame, shall control the position of and give shape to the babbit linings of said bearings, as and for the purpose herein set forth.

2d, I also claim the drilling jig herein described, as and for the purpose set forth.

3d, And, finally, I claim the combination of the babbiting jig, and the drilling jig, for arranging and fitting the journal bearings, and boring the screw bolt holes or the caps of the journal boxes, as herein described and represented.

70,295.—BALE TIE.—Joseph D. Van Benthuysen, New Orleans, La.

I claim constructing a cotton bale tie with a triangular opening as shown, when the diagonal side thereof is beveled substantially as described and for the purpose set forth.

70,296.—HULL FOR VESSELS.—John Van Pelt, Perry, Ill.

I claim the transverse trussing braces or floor timbers, a a, in combination with the straight floor beam, A, substantially as described and set forth.

70,297.—LET-OFF MOTION FOR LOOMS.—Richard Walker, Milford, Mass.

I claim the combination with a yarn or dresser beam of a brake, E, attached to a curved lever, G, the bar, K, provided with a slide, f, and spring, h, and the arms or levers, L M, substantially as and for the purpose set forth.

2d, I claim the combination of the vibrating bar, K, provided with a spring, h, a graduated scale and indicator, m, with the arms or levers, L M, whereby the pressure of the pad, p, on the yarn of the yarn beam may be regulated and adjusted.

70,298.—MINER'S PICK.—S. H. Wallace, Parnassus, Pa.

I claim making the head or points, or both head and points, of picks for mining purposes, removable, substantially as and for the purposes hereinbefore set forth.

70,299.—HINGE.—B. D. Washburn, Roxbury, Mass.

I claim as a new article of manufacture a blind hinge formed of the three parts or members, a b c, when these (having the relative arrangement or disposition as shown) are cut in one piece from sheet metal, substantially as set forth.

70,300.—SHUTTER FASTENER.—Will. H. Wayne, Philadelphia, Pa.

I claim the shutter-fastening above described, consisting of the cords, A A, having the snaps, a a, and the tassels, C C, and provided with the elastic ring or thimble, B, substantially as and for the purpose specified.

70,301.—WATER WHEEL.—Samuel Webb, Joliet, Ill.

I claim the combination of the air tube, b, the floats or buckets, d d d, the lid, c, and buckets, h h, of the peculiar shape described, all constructed and arranged as and for the purposes set forth.

70,302.—DOOR STOP.—P. L. Weimer, Lebanon, Pa.

I claim the arrangement of a bent lever, having a flattened projection, c, at the end of one arm, to pass under the door, the other arm being weighted so as to tilt the projection, c, and wedge it in place.

70,303.—HAND TRUCK.—James T. Whipple, Chicago, Ill.

1st, I claim corrugated strap, T, when attached to the sharp curved part of the rear end of the truck, substantially as and for the purpose set forth.

2d, Clasp, L, when used for the purpose of adjusting said holding and stop bar, P, substantially as and for the purpose described.

70,304.—FASTENING METAL PLATES UPON DOOR HINGES.—W. W. Whiting, Brooklyn, N. Y.

I claim providing the plate, C, with one or more lugs, b b, and with an eye c, and securing it to the plate, B, of the hinge, by means of a pin or screw, e, substantially as and for the purpose herein shown and described.

70,305.—COAL SCREEN.—George Whittle, New York city.

I claim the cylinder coal screen, B, and the screen box, A, when the same are constructed, arranged, and operating, substantially as shown and described, for the purposes set forth.

70,306.—LAY-AWAY VAT FOR TANNING.—Isaac C. Williams, Philadelphia, Pa.

1st, I claim the employment of the interstitial supplementary sides and ends, F, substantially as described, for the purpose of allowing a more free and perfect escape of the spent liquor, and the admittance of the fresh, as described.

2d, I claim the application of the supplementary inclined bottom, C, substantially as described, for the purpose of causing the spent liquor to run off from between the hides in a perfect and rapid manner.

3d, I also claim the employment of the skeleton frames, D D, or their equivalents, substantially as described, for the purpose of preventing too great a pressure between the layers of hides.

70,307.—DEVICE FOR MEASURING HORSES' FEET.—Moses S. Woodward, Mahattan, Pa.

1st, I claim, as an improved article of manufacture, a device for measuring horses' feet for fitting the shoes thereto, made substantially as herein shown and described.

2d, The expansion and contraction bars, B B, when arranged on the center plate, A, substantially as and for the purpose herein shown and described.

3d, The manner of arranging the quarter measures, so that they can be moved in either longitudinal and transverse direction, as specified.

4th, The set screws, in combination with the bars, B and E, substantially as set forth, so as to hold the same in any desired position.

70,308.—OPERATING PICKER-STAFF FOR LOOMS.—Edward Wright, Worcester, Mass.

I claim the combination, with lever, E, and its arm, I, of the arm, F, rod, G, and spring, H, substantially as and for the purposes set forth.

70,309.—LOOM.—Horace Wyman, Worcester, Mass.

I claim the mechanism for effecting the changes of the shuttle boxes, substantially as set forth.

70,310.—MOP WRINGER.—Joseph Adams, Janesville, Wis.

I claim a wringer, formed by the two arms, E E1, cogged segments, E2 E2, lever, F, and roller, G, positively actuated by a winch, G, and attached to the outside of the tub, and in such manner that the rollers shall be above the same, substantially as set forth.

70,311.—HARVESTER GUARD FINGER.—William Allen, and Luther Ross, Worcester, Mass.

1st, We claim the combination with a guard, A, of the nipple, e, having a notch or lip, f, to hold the plate down, arranged substantially as and for the purposes set forth.

2d, The corrugated plate, E, made as described, in combination with the guard or finger, A, and nipple, e, arranged substantially as and for the purposes set forth.

70,312.—HYDROSTATIC SCALE.—Ira R. Amsden, Buffalo, N.Y.

1st, I claim the use of mechanism with a dial, and one or more revolving hands, when applied to hydrostatic scales, substantially as and for the purposes set forth.

2d, The combination of the cylinder, B, buoy, D, with the cord or chain, E, and weight, F, substantially as and for the purpose described.

3d, The tube, G, in combination with the weight, F, and buoy, D, for the purpose, and substantially as described.

4th, The chamber, H, for the purposes, and substantially as set forth.

5th, The application and use of the apparatus herein described, as a bilge water indicator, or a liquid gage, substantially as described.

70,313.—BEEHIVE.—Aaron C. Badgley, Earleville, Ill.

1st, I claim the base, B, having inclined boards, b b, forming a bottom for section, A, said base being provided with openings, d d1 d1, leading into chambers, f g g, which chambers are constructed as set forth, having their respective outlets, the whole constructed and arranged in the manner and for the purposes specified.

2d, The vestibule, k, composed of the blocks, r, having passages, s s, and leading into the tube, N, which extends outside of the hive, and is provided with the metal shields, v v, when constructed as described, and used in combination with the bottom boards, b, and chambers, f and g g, having their communicating passages in the manner and for the purposes set forth.

3d, The upper section, A, having a front formed into a hinged door, h', which may be opened into the vestibule, k' l, and false passages, s s, which are formed in the front of this section, all constructed and used in the manner and for the purposes set forth.

4th, The combination of the sections, A B, with their tube entrances, N N', having metal shields, v v', and vestibule, k', with entrance, c', the whole constructed, arranged, and operating as herein described.

70,314.—WHEELED HARROW.—A. C. Baker, and N. O. Hoyt, Lafayette, N. Y.

1st, We claim the arms, a a a, the teeth, t t t, and adjustable braces, b b b, in combination with each other, substantially as and for the purposes described.

2d, We also claim the same parts, in combination with the frame, E, lever bar, F, and chains, f f f, made and operated substantially as and for the purposes described.

3d, We also claim the parts within and attached to the frame, E, as above described, in combination with the axle, A, wheel, B B, tongue, C and seat, D, substantially as and for the purposes described.

70,315.—METALLIC CHECK PIECE FOR BRIDLES.—John C. Baxter, Washington, D. C.

I claim a metallic check piece for bridles, with or without the blinder, E, substantially as described.

70,316.—VASE FOR HOLDING FLOWERS.—L. H. Bigelow, Worcester, Mass.

1st, I claim a vase, provided with a series of cups or vessels arranged one above the other, substantially in the manner and for the purposes herein described.

2d, The combination with the pedestal of the vase of the detachable cups or vessels, under the arrangement herein shown and set forth.

70,317.—PROCESS OF EXTRACTING SALINE MATTERS FROM MARINE PLANTS.—C. F. Brackett, Brunswick, and George L. Goodale, Saco, Me.

We claim the application of dialysis to the extraction of the saline constituents of marine plants, in the manner and for the purposes specified.

70,318.—MACHINE FOR FINISHING BASKETS.—Franklin H. Brown (assignor to himself, Edward F. Peugeot, and Lemuel H. Flersheim) Chicago, Ill.

1st, I claim wheel, E, in combination with hooks, a, and shaft, C, as shown, and for the purposes set forth.

2d, In a machine for finishing the edges of baskets, the universal joint, N, in combination with twister, E, and shaft, C, as and for the purposes set forth.

3d, Wheel, H, in combination with adjustable wheel, H', and set screw, m, as and for the purposes set forth.

4th, In a machine for finishing the edges of baskets, the roofed apron, J, as and for the purposes set forth.

5th, The general construction and arrangement of mechanism, substantially as shown, and for the purposes specified.

70,319.—CHAIR FOR SCHOOLS, ETC.—Samuel C. Brown (assignor to himself and James Smith), Richmond, Ind.

I claim the combination of the seat supports, B and B1, with the spring, D, elastic washer, E, and bolt, C, and nut, C', constructed and arranged to operate substantially as and for the purpose set forth.

70,320.—STRAP HOLDING DEVICE.—G. W. R. Combs, Alliance, O.

I claim the metallic box, A, contracted longitudinally and vertically at its end, having its sides, x x, turned so as to form a groove to allow the plate, C, to be secured and connected to the leather at bottom, by the bar, B, in the manner as herein described, and for the purposes set forth.

70,321.—APPARATUS FOR REDUCING QUICKSILVER ORES.—Joseph C. Coult, San Francisco, Cal.

1st, I claim the fire chamber, B B, ore chambers, C C, and vapor chamber, D, arranged together, and with a steam tank above them, as and for the purpose set forth.

2d, The arrangement of the pans within the chamber, D, with alternate spaces between their sides and the walls of the chamber, as and for the purpose set forth.

3d, The silvered wire screens, c c c, in the condensing flue, H," used as and for the purpose set forth.

4th, The arrangement of the flues, H H' H", water tanks, I, and partitions, J J, substantially as and for the purpose set forth.

5th, The arrangement of the steampipe, F, and its orifice, k, for creating a draft as and for the purpose set forth.

70,322.—PUDDLING AND HEATING FURNACES.—Samuel Cuddick, Pembroke, Me.

I claim, 1st, The shape and form of the inner door, and its brick lining of peculiar shape, and the flanges upon the door with its slides, pins, and pinholes, as above described.

I claim, as an improvement in the applying the water, by the improved manner of wrought iron tubing, detached and renewable at pleasure, instead of being cast in the doors, frames, and other castings of the furnace.

I claim the form of the application or introduction of water over the air blast box by means of detached wrought iron tubing, instead of the cast iron tubing in the air blast box, with the flange of the air blast box attached to support the bottom of the furnace, instead of having the air box resting upon it.

Further, The water tanks, or chambers, in the fire grates as described, and in the introduction of water through the bearers or supporters of the furnace bed or bottom, and in the under side of the bottom or bed of the furnace, as indicated by the drawing.

I claim as my improvement in the chimney u, the skeleton columns as above indicated, by figs. 1 2 and 12.

70,323.—FOLDING CHAIR.—Isaac N. Dann (assignor to New Haven Folding Chair Company), New Haven, Conn.

I claim the combination of the indexible or rigid seat, A, with the cross legs, F and B, and back, D, when the joints of the several parts are arranged relatively to each other, in the manner as herein set forth.

70,324.—TRUSS AND SUPPORTER.—Solon Dike, N. Y. city.

I claim the flexible body brace, C, provided with the adjustable pads, d d, arranged in combination with band, B, and strap A, substantially in the manner set forth, and for the uses and purposes herein described.

70,325.—PROCESS OF MANUFACTURING SILVERED GLASSWARE.—Edward Dithridge, Pittsburg, Pa.

I claim providing a recess for the reception of tenons so as to form any article of silvered glass ware, composed of any number of pieces, without bringing the cement used in contact with the silver on the glass, substantially as set forth and described.

70,326.—CAR COUPLING.—Justin Ebee, Hummelstown, Pa.

I claim the combination and arrangement of the hunter, G, shaft, E, arm, a, cage, D, coupling link, B, and hook, C, substantially as and for the purpose herein specified.

I also claim the lever, L, arranged in combination with the coupling link, B, and hook, C, substantially as and for the purpose herein set forth.

70,327.—HORSE RAKE.—Samuel Eberly and Samuel Hanck, Mechanisburg, Pa.

We claim, in combination with the sliding rod that takes against the projections on the carrying wheel to lift up the rake, the trigger pivoted and connected thereto, and the adjustable tripper, or "let-off," so that the hight to which the rake may rise may be regulated to the hight of the windrows of hay, grass, or other material desired to be gathered, substantially as described.

70,328.—CULTIVATOR.—C. A. Ewick, Rushville, Ind.

1st, I claim the arrangement of the frames, A A', connected together as specified, and provided with the cranks, e e g g, in the manner and for the purposes set forth.

2d, The shovel beams, D D' D D', connected to the cranks, e and g, and secured in position by the springs, G G', and chains, r r, to the frame, A, as specified.

70,329.—CUPOLA BLAST AND SMELTING FURNACE.—Henry Fayette, Port Chester, N. Y.

1st, I claim a downward central blast through a pipe so located in the furnace that the air will become heated by the fire of the furnace before being discharged into the same, substantially as shown and described.

2d, A divided downward blast, one portion passing down a flue or pipe through the center of the furnace, and the residue down side flues so latched that the air in all said flues will become heated into passing down the same, substantially as described.

3d, An upward central blast, from below the furnace, substantially as shown and described.

4th, The combination of an upward and downward central blast, substantially as shown and described.

5th, In combination with the air chamber, B, I claim the curved wings, s to conduct the blast into the furnace, with a whirling, centripital motion, substantially as described.

6th, In combination with a central blast, whether from above or below, or both, I claim the flanges or disks, e, and f, with the intervening curved wings, t, to give the blast from the center, a whirling, centrifugal motion, as described.

7th, In combination with the air chamber, B, and curved wings, s, I claim a central blast from above or below, or both, with the curved wings, t, all constructed and arranged substantially as and for the purposes described.

8th, In combination with an annular air chamber as described, I claim passage ways for a portion of the air to be forced therefrom into the circumference of the furnace, and a curved or bent pipe or flue for conducting another portion of the air from said chamber down below, and thence up through the bottom of the furnace, centrally, as described.

70,330.—BED BOTTOM.—J. P. Flanders, and S. K. Wells, Burlington, Vt.

We claim the slat, A, with grooves formed upon its upper side, substantially as herein represented, for the purpose of securing the bottoms of the springs as is herein fully set forth.

70,331.—NECK-TIE.—Franklin D. Ford, New Bedford, Mass.

I claim the metallic spring fastening, provided with fingers or end, a2, and clamping parts, as herein set forth, and for the purposes specified.

70,332.—REIN HOLDER.—G. W. Fosdick, Dowagiac, Mich.

I claim the plate, A, spring, D, and uprights, B B, and C, constructed, connected, and operating, as and for the purpose set forth.

70,333.—DOOR HOLDER.—John Hale, Scranton, Pa.

I claim the block, A, as constructed and provided with the spring, C, and used for the purpose specified.

70,334.—BALL SOCKET JOINT.—William P. Haskins, Mendota, Ill.

1st, I claim the mode of securing the parts of a ball and socket joint, by means of a pin passing through the socket and ball, and a thong passing through the ball and socket, and also through the pin, substantially in the manner set forth.

2d, I claim the sockets, A A, constructed with rounded cavities, perforated by four holes, substantially as set forth.

3d, In combination with sockets constructed as described, the double headed link, substantially as set forth.

70,335.—CORN HARVESTER.—William Hill and James A. Harpham, Havana, Ill.

We claim, 1st, The cylinders, D, constructed and operating substantially as described with flanges, E, and knockers, e.

2d, The elevator, H, in combination with the cylinders, D, substantially as described.

3d, The elevator, H, in combination with the discharge elevator, I, substantially as described.

4th, The reversible elevator, I, constructed and operating substantially as described so as to discharge the corn on either side.

5th, The "triple tree," S S1 S2 S3, in combination with double pulley, U, and cards, t and u, substantially as described.

70,336.—ANIMAL TRAP.—Seth Hoke (assignor to himself and Val Thompson), Union City, Ind.

1st, I claim, in combination with the box, A, and doors, C and D, the lever, B, hinged floor, F, and connecting rods, F2 and D2, substantially as set forth.

2d, The arrangement of the box, A, bait box, E, oscillating frame, G, and trigger, G', doors, C and D, lever, B, and connecting rods, D2 and F2, substantially as described.

3d, The combination of the hinged floor, F, door, H, and the angular rod, H', attached to the latter with the doors, C and D, and weighted lever, B, for setting the trap automatically, substantially as set forth.

4th, The arrangement of the cage, I, having a sliding door, K', in connection with the box, A, having the parts for setting the trap automatically upon the passage of the animal from the box, substantially as set forth.

70,337.—PROCESS OF TANNING.—Alonzo W. Irish, Rochester, Minn.

I claim the within described process of tanning when composed of the ingredients, as set forth and for the purposes specified.

70,338.—BEEHIVE.—Robert Jones, Cedarsville, Ill.

I claim a beehive with two horizontal sections, A A', having rubber or cloth, x, between them and with the interior and exterior covered with the plastering specified, box, D, honey board, F, ventilating hole, y, and pipe, E, all constructed, arranged and used for the purposes set forth.

70,339.—FOLDING DESK.—T. W. Kreitz, Quincy, Ill.

I claim a portable folding desk consisting of a frame, A, panels, b c, and top, d, jointed or hinged to each other which when elevated for use are supported at the desired elevation by the props or pawls, e, and the notches, f, constructed substantially as and for the purposes described.

70,340.—FLUSH BOLT.—Charles E. Laltin, Birmingham, Conn., assignor to himself and John R. Laltin

I claim the combination of the plate, D, in the plate, A, and the bolt, B, constructed and arranged so as to operate substantially as herein set forth.

70,341.—LOCOMOTIVE.—John L. Lay, Buffalo, N. Y.

I claim a locomotive engine constructed with high and low pressure cylinders the pistons of the high pressure cylinders being upon the same rod with those of the low pressure and the axis of each in line with the other, substantially as and for the purposes set forth.

70,342.—COMPOUND FOR STOPPING LEAKS IN STEAM BOILERS.—H. Lefevre and J. McGuire, Lancaster, Pa.

We claim the composition set forth combined substantially in manner and for the purpose specified.

70,343.—WASHING MACHINE.—E. W. Lowe, Almond, N. Y.

I claim the combination of the spring, I, stump rods, H H, lever nuts, h h, as described with the washing cylinder, as constructed, and the frame, C C, as suspended on the springs, D D, so as to operate substantially in the manner herein described for the purposes specified.

70,344.—FAN AND PARASOL COMBINED.—George Mallory, Bridgeport, Conn.

The combination of the curved or drooping hoop frame, handle and joints, substantially as hereinbefore set forth.

Also the combination of the hoop frame, handle, joint and locking mechanism, substantially as hereinbefore set forth.

Also the combination of the hoop frame, handle, joint, locking mechanism and slide substantially as hereinbefore set forth.

70,345.—COMBINED CULTIVATOR AND SEEDER.—A. S. Markham, Bushnell, Ill.

I claim in connection with the frame of a wheeled cultivator the pendants, E E, beams, I, with the plow shanks, J J, chains or cords, L, and levers, P, with the bar, S, rods, a a, and whiffletrees, b b, arranged and used as and for the purpose specified.

70,346.—BURNING FLUID.—George McLean, Brooklyn, N. Y., assignor to himself, Joel P. Stillwell and George Deland, New York City.

We claim the illuminating compound composed of the ingredients substantially as herein described and for the purposes set forth.

70,347.—PORTABLE RADIATING FURNACE.—Matthias Mead, Lowell, Mass.

I claim the arrangement of the continuous vacuum or flues, e and f, for the purpose of heating foreign air and distributing it into any room or rooms, substantially as described and as herein specified.

70,348.—DETACHABLE WHIFFLETREE.—John W. Melcher (assignor to himself and John J. Sprague), Oshkosh, Wis.

I claim the intermediate connection, C, the spring bolt, e, detachable hook, d, hinged attachment, f1, and swivel bolt, k, when arranged relatively to each other and to the whiffletree, a, and cross bar, c, substantially as described for the purposes set forth.

70,349.—TREE PROTECTOR.—Daniel Mendenhall, Fairfield, Iowa.

1st, I claim the flexible collar or band, B, applied to a trough, C, and adapted to serve the purposes described.

2d, The use of a clasp, a, for uniting the extremities of the trough, C, about a tree, substantially as described.

3d, The combination of the interposed protecting strip, 1, and clasp, a, with a trough, C, substantially as described.

70,350.—EGG HOLDER.—Joseph Nathan, Washington, D. C.

I claim the egg-holding device consisting of the handle, A, with flat portions, e, expanding strips, a a', ring, b, cross pieces, c, and foot piece, d, substantially as described.

70,351.—PLOW CLEVIS.—Jacob Newhart, Terre Haute, Ind.

1st, I claim the oscillating plow clevis, Figs. 1 and 2, in the manner set forth.

2d, The regulating bolt, C, in connection with the looped T segment, Figs. 1 2 3 and 4, substantially as set forth and herein explained.

70,352.—MANUFACTURING KNIVES AND FORKS.—Josiah H. Nichols, New Britain, Conn., assignor to A. H. North and G. W. Lunt.

I claim the blade, a, and one part of a handle, c, when formed of one piece of metal, substantially as described.

I claim uniting one part of a handle, 'c', formed in the common way to said blade and handle, a and c, substantially as described.

70,353.—THIMBLE.—H. D. Peck, Newton, Mass., assignor to Wm. N. Ely, Stratford, Conn.

I claim a sliding knife blade or cutter, attached to and combined with a thimble or finger clasp, when constructed and arranged substantially as described.

70,354.—BOAT-DETACHING TACKLE.—Charles Peterson and Charles Gunner, San Francisco, Cal.

1st, We claim the rods, C, attached to the bottom of a boat, their upper ends being free and provided with loops, c, substantially as and for the purposes described.

2d, The sleeves, D D', on the rods, C, substantially as and for the purposes described.

3d, The rods, B B', pivoted as described in combination with the rods, C, and sleeves, D D', and ropes, b and d.

4th, The roller or drum, e, pivoted in a slot in a thwart or crossboard and provided with a lever, f, substantially as and for the purposes described.

5th, The detaching device consisting of the rods, B B' and C, sleeves, D D, ropes, b and d, and roller or drum, e, provided with a lever, f, and pivoted in a slotted thwart or board, substantially as described.

70,355.—SPRING BED BOTTOM.—Marvin Pierce, Winona, Minn.

I claim the slots, C, C, running lengthwise of the bed and resting upon the extremities of two springs, B, B, formed as here described, and connected through angular openings, c, c, in two bars, A, A, which extend crosswise of the bed, when constructed, arranged and used in the manner and for the purpose set forth.

70,356.—CAR AXLE BOX.—C. Puider and D. C. Robinson, Lowell, Mass.

We claim, 1st, a car axle box, a, having bearing surfaces, d d, d d, each being ready provided with babbitt or equivalent soft metal, c, and arranged to be in turn placed in position for use, substantially as described, and for the purpose set forth.

3d. The cooling chamber, b, in combination with the box, a, for the purposes substantially as herein described.

70,357.—WAGON SHACKLE—Thomas D. Powers, Rochester, Wis.

I claim a draw iron, with a slot E, a cylinder with a slot, E, notch, L, rubber spring, G, metallic spring H, A, shaft iron with F, head shoulders K, K, when arranged to operate as shown and described, and for the purpose set forth.

70,358.—CARRIAGE SHACKLE.—J. E. Prodden, Birmingham, Conn.

I claim the herein described shackle as an improved article of manufacture, consisting of the shackle, B, and coupling, C, constructed and arranged with the conic l bolt, D, made square at its lower end, and provided with nuts, G and H, so as to be adjustable, substantially in the manner herein described.

70,359.—COMPOUND FOR BLASTING POWDER.—Albert T. Rand, New York city.

I claim a compound or powder made substantially as above described, for the uses and purposes above set forth.

70,360.—KNIFE SHARPENER.—John C. Reynolds, Taunton, Mass.

I claim a knife sharpener with two steels, arranged to turn in a stand and present new sharpening surfaces when required, in combination with said stand, and a foot and clamping screw to fasten it to a shelf or table, substantially as described.

70,361.—COMPOSITION TO BE USED IN PUDDLING IRON.—Isaiah F. Richards, Columbia, Pa.

I claim the composition of the black oxide of manganese with litharge, and also with nitrate of potassa, when combined in the manner and for the purpose substantially as herein specified.

70,362.—MATCH SAFES.—Adolph Roesler, Warsaw, Ill.

I claim rod, e, and sliding tube, F, in combination with the double safe, A, provided with springs, G, G, or their equivalents, the whole arranged and operating substantially as described.

70,363.—MACHINE FOR HEADING BOLTS.—John Root (assignor to himself and McLazan & Stevens), New Haven, Conn.

I claim the arrangement of the forging dies, e, e, and f, f, the upsetting die, m, and the holding die, J, in combination with the mechanism for operating the same, and the spring, S, all connected so as to operate substantially in the manner herein set forth.

70,364.—STEAM GENERATOR.—Hamilton Ruddick, Boston, Mass.

I claim in traction and climbing engines, when the engine is rigidly connected with the carriage, a boiler hung on trunnions, and delivering steam through said trunnions to pipe D, connecting the same with the engine, substantially as and for the purpose described.

70,365.—MODE OF FACILITATING THE FLOW OF ILLUMINATING GAS THROUGH PIPES.—James F. Russell, Washington, D. C.

I claim the method herein described of heating and keeping at an even temperature gas, water, or other pipes, by allowing steam, hot air, etc., to pass in at one end of a case pipe and follow along its whole or partial extent, pass off in the manner substantially as described for the purpose set forth.

70,366.—COMPOUND TOOL FOR SHEARING, PUNCHING AND UPSETTING.—John J. Sandgren, Lyons City, Iowa.

I claim the combination and arrangement of the levers, G and E, with the toggles, W, W, T, and U, when constructed, arranged, and operating substantially as and for the purposes as above set forth.

70,367.—SIRUP PITCHER.—Daniel Scanlin, Rochester, N. Y.

I claim the spouts, a and b, when constructed so that their outer edges form a curvilineal line, and cover, c, when constructed so that it will open and close both spouts at one operation, in combination with tube, d, constructed substantially as described, and for the purposes set forth.

70,368.—CORN POPPER.—Chas. H. S. Schultz, Cincinnati, O.

I claim the encircling frame, E, whose hooked shanks, f, f', are secured to a perforated and grooved handle, G, g, g', g'', by means of the ring or ferrule H, in the manner and for the purpose set forth.

70,369.—VALVE GEAR OF STEAM HAMMERS.—William and Coleman Sellers (assignors to William Sellers & Co.), Philadelphia, Pa.

1st, I claim the lever, L, or its equivalent, when all its points of attachment may be fulcra in turn, according to the work required of the hammer, substantially as described, and for the purpose specified.

2d, The lever, L, or its equivalent, when arranged in combination with the piston and slide valve, so that the relative position of the piston and valve may be changed for the purpose specified.

3d, The diagonal slot, or its equivalent in the hammer bar within the steam space of the cylinder, or its connection for the purpose specified.

70,370.—ANIMAL TRAPS.—Robert Simpson (assignor to himself and David Wilkinson), Port Jefferson, O.

I claim the combination of the notched bar, F, with the spring triggers, E, wings, C, shaft, B, and spring or weight, D, all arranged and operating in the manner and for the purpose set forth.

70,371.—RATCHET FOR DRIVING WHEELS.—W. W. Smith, Stronsville, O.

I claim the blocks, E', E', shaft, C, crosspiece, D, spring, F', F', and hub, A, constructed, combined, and used as and for the purpose set forth.

70,372.—SAFETY POCKETS.—Henry D. Snyder (assignor to himself, O. Reynolds and A. L. Hunt), Carbondale, Pa.

I claim a safety pocket constructed with a series of springs between the pocket and its lining, substantially as described.

30,373.—MILL BURR DRESSER.—William P. Stalcup (assignor to himself and John P. Lancaster), Brookville, Ind.

1st, I claim the slot, s, in the frame, A, substantially as and for the purpose specified.

2d, The instrument above described for adjusting the loop, O, accurately to the center of the runner, when constructed and operating substantially in the manner and for the purpose required.

3d, The loop, O, when provided with a set screw and used in connection with the frame, A, to regulate the draft of the dress, substantially as described.

4th, The tempering arrangement consisting of the screw rod, F''', and screw, F'', when used in connection with the frame, F, to regulate the force of the cutting tool, K, substantially as described.

5th, The sleeve, o, bearing the two cams, e, e, when used upon the working shaft of a stone dressing machine, to enable it to dress in both directions, substantially as set forth.

6th, The stone dressing machine above described, consisting of the frame, A, horizontal sliding frame, D, vertical sliding frame, F', bearing the tool, K, shaft, E', bearing the sleeve, o, two cams, e, e, rack, b, and gear wheels, w, w, m, adjusted by means of lever, L, all the said parts being constructed, arranged and combined substantially in the manner and for the purposes specified.

70,374.—HORSESHOE NAIL MACHINE.—Antoine St. Louis (assignor to himself and P. S. Whitcomb), Keeseville, N. Y.

1st, I claim constructing, arranging, and operating the hammers, E, F, and H, H, in the manner and by the means herein described, whereby said hammers are given a precise stroke, and one which draws the nail substantially as represented.

2d, The combination of the cross piece, N, the pivoted arm, s, box, e, knife, s, bar, Q and wheel, R, with its projection, used substantially as and for the purpose set forth.

70,375.—CAR REPLACER.—Louis Straus, Louisville, Ky.

1st, I claim the combination of a lifting device with a stool support attached, so applied to the end of the car or locomotive as to admit of the replacement of the same upon the track, substantially as described.

2d, The slotted stool bar, C, and traveling rack, D, in combination with a pinion gear wheel, e, and hand wheel, F, substantially in the manner and for the purposes described.

3d, The manner described and shown of attaching the rack, D, to the stool bar, C, for the purpose specified.

4th, In combination with a device for lifting one end of a car, I claim a device by which such end, while elevated, can be moved laterally, substantially as described.

70,376.—ALARM CLOCK.—Wm. A. Terry, Bristol, Conn.

1st, I claim the spring catch, D, Fig. 2, made as in the drawings, or swinging on a pin or center, with separate springs, or any other manner, to operate substantially as described.

2d, The alarm index, A, Fig. 2, by means of which the alarm can be set to go off at any hour of either 12 or 24, or be prevented from going at all when desired, or any substitute in a similar manner.

3d, The pins, E and F, Fig. 1, in the alarm dial.

4th, I do not claim the use of the slot, K, Fig. 1, the pins in the wheel, J, Fig. 1, or the lock work, I and H, Fig. 4, taken separately, or for other purposes, as I am aware they have been previously used, but I claim the arrangement and combination of them substantially in the manner and for the purpose described.

70,377.—FLOUR SIFTER.—John Tobin, Newark, N. J. Antedated Oct. 9, 1867.

I claim the reversible arm, t, with the rollers, r r, and the flexible beaters or rubbers, q q, constructed and arranged substantially as shown.

70,378.—UMBRELLA.—Wm. F. Turner, Philadelphia, Pa.

I claim an umbrella having a hollow cane or handle, the rib stretchers, cap, runner, and cover all being detachable, as and for the purpose herein shown and described.

70,379.—PUMP.—Hiram Tyler, Gaines, N. Y., assignor to himself, Chas. T. Richards, Albion, and John Marsh, East Carrollton, N. Y.

I claim the boxes, D and E, pipes, B C, valve plates, L, and piston head as constructed with its piston rod, F, the several parts being used with the cylinder, A, when combined, arranged, and operating in the manner substantially as and for the purposes herein specified.

70,380.—CONNECTING LINK FOR CHAINS.—Samuel Vanstone (assignor to himself and John Stewart), Providence, R. I.

I claim the improvement in connecting links described, which consists in making each division of the link with a central tongue, a, which tongues when overlapped by placing the two parts of the links together and uniting the same by a rivet, will form a cross bar, b, substantially as described, for the purposes specified.

70,381.—CULTIVATOR.—Elisha Walker and A. M. Weed, La Porte, Ind.

1st, We claim the mode of counterbalancing the weight of the tongue by that of the driver by means of the seat, K, resting upon the bars, K', adjustably secured to the tongue and supported upon the axle substantially as set forth.

2d, The combination of the tongue, D, doubletree, F, with sockets, F', and beams, G, respectively constructed and arranged substantially as set forth.

70,382.—MACHINE FOR MAKING BLIND SLATS.—Francis W. White, Norwich, Conn.

1st, I claim cutting blind slats from a plank and finishing the same automatically at one operation, by the mechanism substantially as herein set forth.

2d, The railway saw, D, in combination with the connecting rod, f, to throw it into operation by the contact of the plank while passing through the parallel ways, as shown and described.

3d, Cutting the tenons of the slat in the block by mechanism substantially as described.

4th, Cutting the shoulders of the slats in the block by mechanism substantially as described.

5th, the cutters, k and k', formed to fit the space between two slats and employed to finish their sides and edges, substantially as shown and described.

6th, The rests or followers, v, for holding the slats while being cut from the block as described.

70,383.—UNITING SHEET METAL.—S. R. Wilmot, Bridgeport, Conn.

I claim the uniting of the two edges of metal by the formation of the corresponding edges and uniting the same in the manner herein set forth.

REISSUES.

2,790.—MECHANISM FOR STRETCHING LEATHER.—Ichabod W. Dawson, Newark, N. J.

1st, I claim the combination of means for supporting the center of the hide with means for stretching the same breathwise over the said support, substantially as described.

2d, The combination of means for supporting the center of the hide, with means for stretching the same, breathwise and lengthwise, over the said support, substantially as described.

2,791.—STRETCHING AND PREPARING LEATHER AND HIDES.—Ichabod W. Dawson, Newark, N. J.

I claim the process substantially as herein described, of stretching leather or hides.

2,792.—PRINTING PRESS.—George P. Gordon, Rahway, N. J. Patented April 23, 1861.

1st, I claim such rocking platen, when a sliding motion shall be imparted to it bodily, and such platen shall turn upward and away from the form to receive the sheet to be printed, and downward or toward the form for the reception of any impression, whether such platen shall occupy the precise angle shown in receiving the slot or not.

2d, I also claim, after the face of the platen has been rocked down to a position parallel with the face of the form or type, for the purpose of presentation of the sheet to such form, carrying the platen in the parallel position to and from the form.

3d, I claim a sliding rocking platen, having a direct movement to and from the bed, in combination with a bed which shall be stationary at the time of giving an impression.

4th, I claim the elongations or projections at the back of the platen, having upon them the legs or their equivalents in combination with the sliding boxes or their equivalents, which hold and carry the shaft upon which the platen rocks, for the purpose of causing the rocking platen to move in a direct line to and from the impression.

5th, I claim attaching the connections directly to the ends of a shaft of a sliding rocking platen, in combination with the cranks, substantially as shown, for the purpose fully described.

6th, I claim combining with a sliding rocking platen, a cam and roller, or their equivalent, to rock the platen up to receive the sheet to be printed.

7th, In combination with a sliding rocking platen cam and roller, I claim the use or employment of the segment gear and rack, for the purposes fully described.

8th, I claim combining the sheet taking nippers, with a rocking platen, for the purposes described.

9th, I claim combining with a rocking platen the sheet taking nippers, and feed table, for the purposes specified.

10th, I claim combining with a rocking platen the sheet taking nippers, feed table, and sheet holding grippers, for the purpose specified.

11th, I claim lifting the printed sheet, substantially as shown, for the purpose specified.

12th, I claim hinging the face of a rocking platen, beyond the angle at which the sheet is received upon it, to such an angle inclining toward the operator that the printed sheet may be relieved or freely discharged from it by its own gravity.

2,793.—MANUFACTURE OF BELLS.—Andrew Patterson, Birmingham, Pa. Patented March 5, 1867.

1st, I claim making seamless concave bells, of single sheets of wrought or rolled steel, by forming or shaping the metal between dies, while sufficiently heated, and so as to give an increasing thickness of metal at or toward the mouth of the bell, substantially as above described.

2d, Wrought steel seamless concave bells, constructed as hereinbefore described, as a new article of manufacture.

DESIGNS.

2,817.—NAME PLATE.—Samuel S. Bent, Portchester, N. Y.

NOTE.—Fifty-two patents in the above list of claims were issued through the Home Office of the Scientific American Patent Agency.—EDS.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,497.—MACHINERY FOR CUTTING, ENGRAVING, ETC.—Isaac Hall, New York City. Sept. 3, 1867.

2,529.—MANUFACTURE OF GARMENTS.—Leander W. Boynton, Hartford, Ct. Sept. 6, 1867.

2,538.—ILLUMINATING ROOF AND ROOF PAVEMENT.—Thaddeus Hyatt, Atchison, Kansas, Sept. 7, 1867.

2,547.—CARTRIDGE HOLDER.—Charles Howlett, Charles H. Pond, Jacob R. Schuyler, Marcellus Hartley, and Malcolm Graham, New York City. Sept. 9, 1867.

2,730.—APPARATUS FOR TURNING AND SCREW CUTTING.—Wm. T. Cole, New York City. Sept. 25, 1867.

2,722.—APPARATUS FOR SUPPLYING STEAM BOILERS WITH WATER.—Henry Demarest, New York City. Sept. 26, 1867.

EXTENSION NOTICE.

Aaron Palmer, of Brockport, N. Y., and Stephen G. Williams, of Janesville, Wis., having petitioned for the extension of a patent granted to them the 24th day of January, 1854, for an improvement in grain harvesters, for seven years from the expiration of said patent, which takes place on the 24th day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day January next.

NEW PUBLICATIONS.

THE CHAMPAGNE COUNTRY. Hurd & Houghton, publishers, 459 Broome street, N. Y.

This is one of the most interesting books we have read. An article copied from it in our last issue indicates the nature of the work and the vivacious champagne sparkle of the author.

SOUND. A Course of Eight Lectures by the celebrated John Tyndall, LL.D. D. Appleton & Co., publishers, 443 Broadway, N. Y.

The science of accoustics as treated by the author is interesting and instructive. The work is copiously illustrated, and will be found useful and entertaining to all who are interested in accoustics. In his preface the Doctor says: "There is a growing desire for scientific culture throughout the civilized world. The feeling is natural, and, under the circumstances, inevitable. For a power which influences so mightily the intellectual and material action of the age, could not fail to arrest attention and challenge examination. In our schools and universities a movement in favor of science has begun which, no doubt, will end in the recognition of its claims, both as a source of knowledge and as a means of discipline."

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One 11 ft. Engine Lathe, 24 inches swing, second hand	500
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One 6 ft. Engine Lathe, second hand, price	125
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Your obd't servant,
GEO. W. TOWNSEND,
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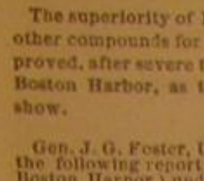
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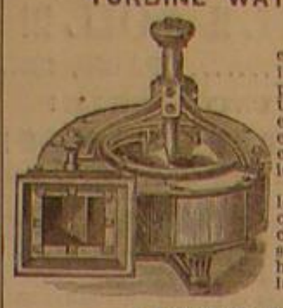
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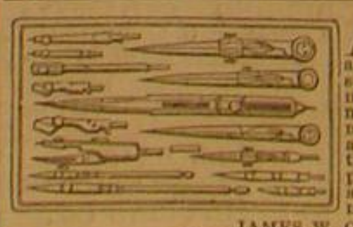
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Vol. XVII.—No. 21. [NEW SERIES.]

NEW YORK, NOVEMBER 23, 1867.

$3 per Annum. [IN ADVANCE.]

Liquid Measuring Apparatus.

The canning of oils for exportation, especially coal oil and spirits of turpentine, has grown within a few years into a business of great magnitude. The difficulty of procuring a vessel not liable to leakage or breakage has been overcome by the invention of the can shown in Fig. 5, which is known as "Pratt's Improved Patent Can." This can is of rectangular form, with corrugated sides and ends, which method of construction, with the peculiar process of manufacture, gives great strength with the least material, and provides for the most compact and convenient storage. This can is the subject of three patents in its form, and of others in the process of construction.

It was found, in preparing oils for shipment, that much care was required to get the exact amount in each, and also to adapt the measure to the different standards of liquid measure in use in this and other countries. These requirements and difficulties led to the contrivance of the apparatus seen in the accompanying engravings.

Fig. 1 is an external view of the measure, with its appendages, and Fig. 2 is a vertical section. Figs. 3 and 4 show the faucet and cock. A is the measure, made of sheet metal, and of any form desired. The measure is air-tight. On the top there is a metallic collar, B, on which is a ring or annular nut, C, designed to form a stuffing box for the cylinder, D, which may be solid or hollow, but should not be open. It is raised or lowered into the vessel, A, by means of a screw, E, which turns in a thread cut in the upper part of the cylinder, D, and passes through a yoke, F. By lowering or raising the cylinder, it is evident the capacity of the measure may be adjusted. By thus varying the capacity of the measure the measurements of different countries may be compensated for, and also the difference in bulk occasioned by changes of temperature.

Means for the escape of the air during the process of filling are afforded by the chamber, G, and valve, H. The chamber connects with the interior of the vessel, A, by an opening under the valve, H. This valve is rather smaller in diameter than the interior of the chamber, sufficiently so to allow of the escape of the air around its sides, and through the opening at the top of the chamber, as the vessel fills with liquid, and forces it out.

The oil or other liquid with which the measure is filled enters it at the bottom through the pipe, I, from the tank or reservoir. This pipe is of bent form—an obtuse angle—as seen plainly in Fig. 4, and having a two-way cock, J, at the angle; in Fig. 4 the passages in the cock are seen as open to each branch of the pipe. A chamber, K, projects from the angle of the pipe, I, and its wide end is closed by a plate, L, having two holes, as seen clearly in Figs. 3 and 4. M is a plate attached at its lower part by a pivot to the plate, L, moved by the handle, N, and guided by a pin working in a curved slot. To the plate, M, are firmly secured two curved nozzles, seen in Figs. 1 3 and 4. The bent pipe is not seen in Fig. 1.

The operation is as follows: Suppose the measure, A, to be empty, and the operation of canning to be commenced. The two-way cock, J, is turned in the position seen in Fig. 4, so as to permit the flow of oil from the tank or reservoir into the measure, A, and, as it fills, the air escapes up through the chamber, G, the valve, H, being down. When the measure is filled it is indicated by the valve stem, the valve being raised so as to close the aperture in the top of the chamber, G. The measure being filled, the plate, M,—Figs. 3 and 4—is turned so as to bring one of the nozzles into the aperture of the can to be filled. The position of the nozzles, when thus in use, is shown in Fig. 3, the dark aperture in the plate, L, being in connection with the depressed nozzle. The two-way cock being turned, communication between the tank and measure is closed, and that between the measure and can to be filled is open. When the measure, A, is empty, the plate, M, is turned so as to raise the depressed nozzle, and depress the other into another can, and the process of measuring is repeated while the filled can is being soldered. (The can is seen in Fig. 5. It is of tin, the sides corrugated, which gives great strength with lightness.)

With this apparatus there is no waste by drip or leakage, all differences in measure standards and variations of temperature are adjusted, and the filling from the bottom insures accuracy impossible to be obtained when measures are filled from the top. It was patented through the Scientific American Patent Agency, Sept. 17, 1867. All further information relative thereto may be obtained of the owner of the patents, Charles Pratt, manufacturer and dealer in oils, 108 Fulton street, New York.

Fig. 1

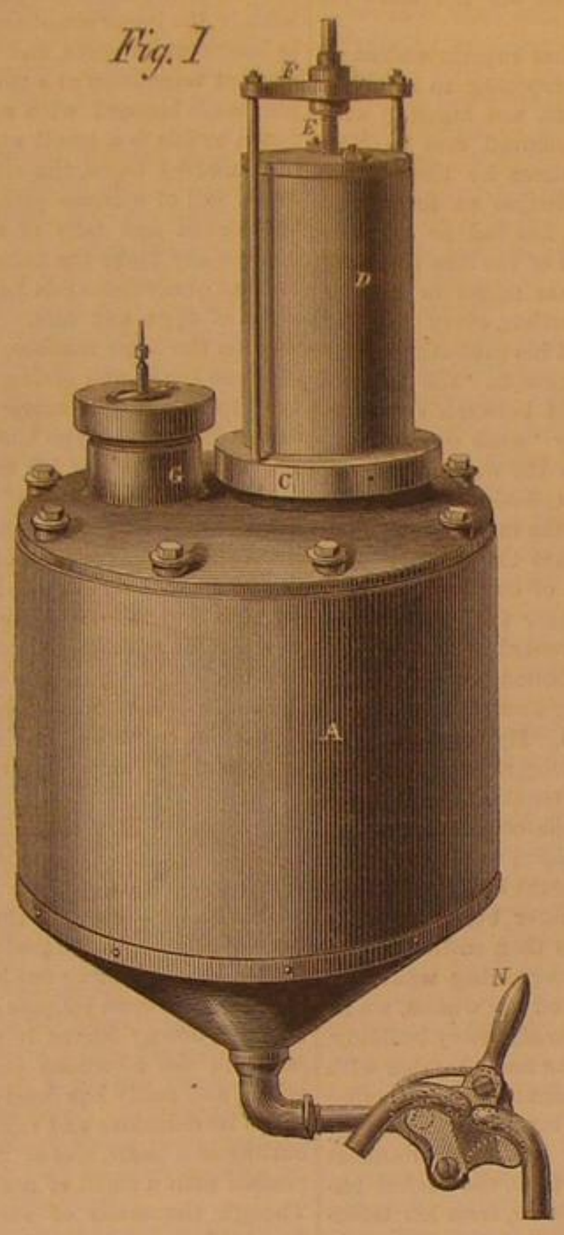
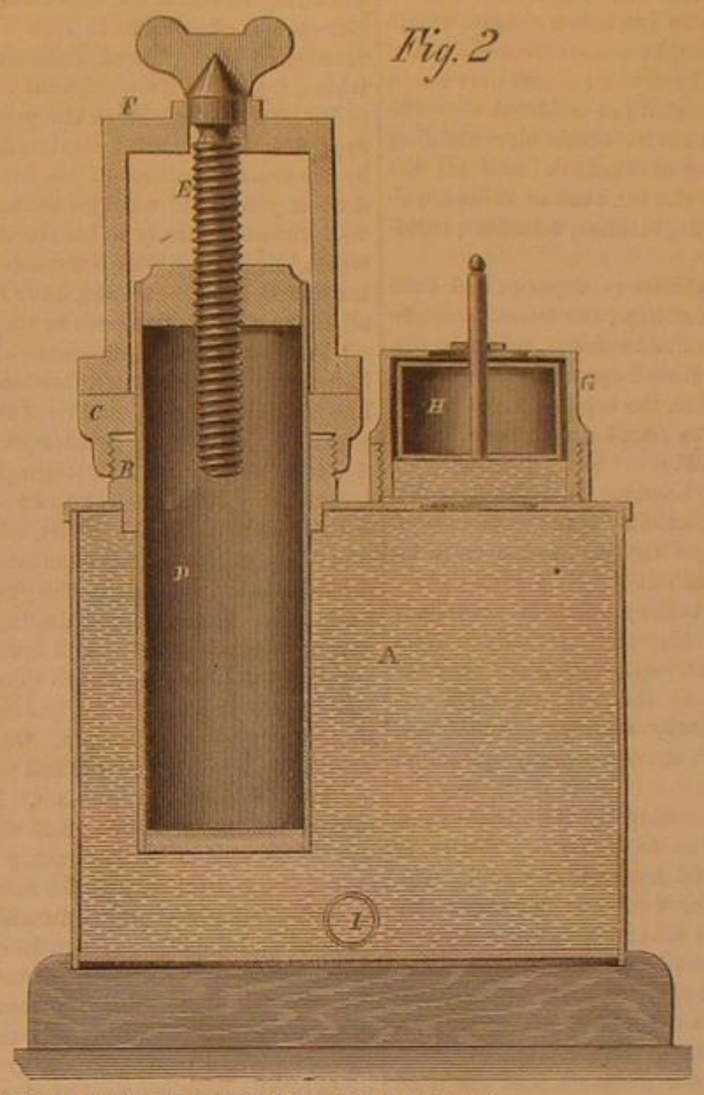


Fig. 2



APPARATUS FOR MEASURING LIQUIDS WITH PRECISION.

Fig. 3

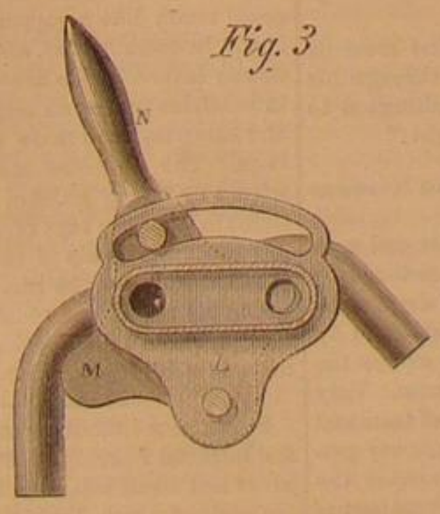


Fig. 4

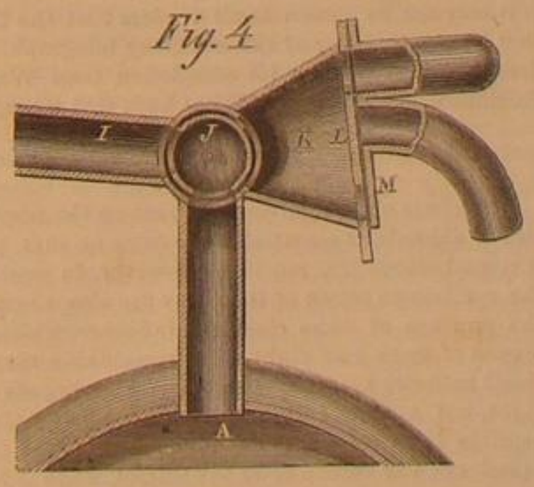


Fig. 5



ANILINE—ITS HISTORY, PROPERTIES, AND PREPARATION.

Aniline was discovered in 1826 by Unverdorben. The original method for its preparation was by digesting indigo with hydrate of potash, and subjecting the resulting product to distillation. Aniline was also obtained from the basic oils of coal tar; but the process which is now employed for its preparation is a remarkable instance of the manner in which abstract scientific research becomes, in the course of time, of the most important practical service. It was Faraday who first discovered benzole; he found it in oil gas. After this it was obtained by distilling benzoic acid with baryta, which result determined its formula, and was the cause of its being called benzole. After this, Mansfield found it to exist in large quantities in common coal-tar naphtha, which is the source from which it is now obtained in very large quantities. Benzole, when studied in the laboratory, was found to yield, under the influence of nitric acid, nitro-benzole. Zinin afterwards discovered the remarkable reaction which sulphide of ammonium exerts upon nitro-benzole, converting it into aniline. And, lastly, Bechamp found that nitro-benzole was converted into aniline when submitted to the action of ferrous acetate. It is Bechamp's process which is now employed for the preparation of aniline by the tun. Had it not been for the investigations briefly cited above, the beautiful aniline colors now so extensively employed, would still remain unknown. When Mr. Perkins discovered aniline purple, nitro-benzole and aniline were only to be met with in the laboratory; in fact, half a pound of aniline was then esteemed quite a treasure, and it was not until a great deal of time and money had been expended that he succeeded in obtaining this substance in large quantities, and at a price sufficiently low for commercial purposes.

The coloring matters obtained from aniline are numerous; they are the following: Aniline purple, violine, reseine, futschine, alpha aniline purple, bleu de Paris, nitrosophenyline dinitraniline, and nitro-phenyline diamine.

Pure aniline is a colorless liquid, very astringent, having an aromatic odor and an acid burning taste, slightly soluble in water, very soluble in alcohol and ether. Its specific gravity is 1·028, It does not freeze at —20. It boils at 262·4° Fah., and distils unchanged. When warmed it dissolves sulphur and phosphorus. It is a powerful basis, combining with acids, and forming salts, which in general are soluble. It decomposes salts of protoxide and peroxide of iron, and the salts of zinc and alumina, precipitating from them the metallic oxides. It precipitates also the chlorides of mercury, platinum, gold, and palladium, but does not precipitate the nitrates of mercury and silver. Aniline easily oxidizes, turning yellow in water, and in time becoming resinified.

When aniline dissolved in hydrochloric acid is acted on by chlorine, the solution takes a violet color, and on continuing the current of chlorine, the liquid becomes turbid and deposits a brown-colored resinoid mass. In distilling the whole, vapors of trichloraniline and trichlorophenic acid pass over.

A solution of the alkaline hypochlorites colors aniline violet blue, which turns rapidly red, especially in contact with acids. A mxture of hydrochloric acid and chlorate of potash acts on aniline, the final result of the action being chloranile $C^{12}\ Cl^4\ O^4$, but in the course of the reaction several colored intermediary bodies are formed.

If a solution of chlorate of potash in hydrochloric acid be added to a solution of a salt of aniline mixed with an equal volume of alcohol, and care is taken to avoid an excess of the hydrochloric solution, a flocculent precipitate is deposited after a time of a beautiful indigo blue color; this precipitate filtered and washed with alcohol contracts strongly, and passes to a deep green. The filtered liquid has a brownish red color; on boiling it, adding fresh quantities of hydrochloric acid and chlorate of potash, a yellow liquor is obtained, which deposits crystallized scales of chloranile.

An aqueous solution of chromic acid gives, with solutions of aniline, a green, blue, or black precipitate, according to

the concentration of the liquors. When a small quantity of an aniline salt is mixed in a porcelain dish with a few drops of strong sulphuric acid, and a drop of a solution of bichromate of potash is allowed to fall on the mixture, a beautiful blue color appears after some minutes, which, however, soon disappears.

Diluted nitric acid combines with aniline without adhering to it immediately; but after some time nitrate of aniline crystallizes in the form of concentric needles, the mother liquor turns red colored, and the sides of the evaporating dish become covered with a beautiful blue effervescence. When a few drops of strong nitric acid are poured upon aniline, it is immediately colored a deep blue; on applying heat the blue tint quickly passes to yellow, a lively reaction is manifested, which results in the formation of picric acid, or trinitrophenisic acid.

Potassium dissolves in aniline, disengaging hydrogen, while all becomes a velvet-colored pap.

The method which appears to be the most rational, and which deserves to be tried, would consist in treating the tar as condensed in gas works with hydrochloric or sulphuric acid diluted with three or four times its volume of water. Mechanical means for affecting the intimate mixture of the tar with the acid might be easily contrived, but in the absence of any special contrivance, the end may be obtained by half filling a barrel with the tar, adding one-fifth or one-sixth of its volume of acid, and rolling and shaking the barrel until the acid has taken up the bodies with which it is able to combine; the whole might thus be run into a cistern, where by degrees, the watery liquid would separate from the tar.

The same acid liquid might be used over and over again until the bases have nearly saturated the acid. A very impure aqueous solution would thus be obtained, containing the hydrochlorates or sulphates of ammonia, and all the other organic bases contained in the tar, such as aniline, quinoline, pyrrol, picoline, pyrrhidine, lutidine, toluidine, cumidine, etc.

By evaporating this solution almost to dryness, and then distilling with an excess of milk of lime, the bases would be set at liberty. Ammonia as the most volatile, would be disengaged first, and might be condensed apart, and by raising the temperature higher and higher, the organic bases would be disengaged. Aniline would be found among the liquids distilling between 302° and 482° F.

The manipulation of the tar, however, is a disagreeable operation, and presents many difficulties; it is therefore preferable, in many cases to distil the tar first, and operate on the most pure and limped distilled oil.

Aniline, because of its high boiling point, is never met with, in the light and volatile liquids when first distilled from tar. The most of it is found in those which distil between 302 and 356°. These, according to Hoffman, contain about ten per cent of organic bases, mostly aniline and quinoline. The oils which distil above 482°, contain mostly quinoline and very little aniline.

The following process for extracting the two bases form the oil and separating them is due to Hoffman. The oil is agitated strongly with commercial hydrochloric acid. The mixture is then allowed to rest for twelve or fourteen hours and the oil is separated from the acid; the latter is treated again by fresh quantities of oil until nearly saturated. The still acid solution is filtered to retain the oil interposed mechanically. It is then placed in a copper still and supersaturated with an excess of milk of lime. At the moment of saturation an abundance of vapors are given off, and the head must be quickly fixed on the still. Heat is now applied so as to obtain a quick and regular ebullition.

The condensed product is a milky liquid with oily drops floating on it. The distillation is carried on as long as the vapor has the peculiar odor of the first part distilled, or the condensed product gives the characteristic reaction of aniline with chloride of lime.

The milky liquid is now saturated with hydrochloric acid; it is then concentrated in a water bath: and lastly, decomposed in a tall narrow vessel by means of a slight excess of hydrate of potash or soda. The bases set free, unite and form an oily liquid which floats on the alkaline solution. This is removed with a pipette and rectified. The rectified product is aniline, sufficiently pure for industrial purposes, especially if we set aside the part distilling about 392° or 428° Fah., which is principally composed of quinoline.

To obtain aniline perfectly pure, the neutral oils forming part of the oily layer must be completely removed. This is done by dissolving the whole in ether, and adding dilute hydrochloric acid which combines with and separates the bases and leaves the oil in solution in either. The acid solution is then decanted, decomposed with potash, and submitted to careful fractional distillation. If the products are gathered separately in three parts, the first will contain ammonia, water and some aniline; the second will be pure aniline; while the third portion will contain mostly quinoline. An alcoholic solution of oxalic acid is now added to the impure aniline, which precipitates oxalate of aniline, as a mass of white crystals, which are washed with alcohol, and then pressed. The salt is then dissolved in a small quantity of water, to which a little alcohol is added. From this solution the oxalate crystallizes in stellated groups of oblique rhomboidal prisms, These crystals are decomposed by a caustic alkali, to set free the aniline, and when this is distilled, water at first passes, then water charged with aniline, and lastly, at 359° Fah., chemically pure aniline.—*Dussauce.*

THE CHINESE COAST.—Preparations are being made for the erection of a complete system of lights and beacons along the Chinese coast. Up to this time fifteen points have been chosen.

EARLY HISTORY OF AN INVENTOR.

Rev. Jedidiah Morse, of Charlestown, Mass., was the father of S. F. B. Morse, the inventor of the telegraph, and of Sidney E. Morse, of the New York *Observer*. From a memoir of his father, lately published by Sidney E., we derive the following interesting particulars of the family and of the distinguished inventor.

The first Sunday school ever organized in this country is stated to have been founded at Charlestown, Mass., in the church of which Rev. Jedidiah Morse was pastor. The first superintendent of that school was the inventor of the telegraph, S. F. B. Morse. His brother writes as follows:

"In 1811, my elder brother, Samuel F. B. Morse, having manifested an unconquerable desire to become an artist, my father sent him to London, placed him in the British Royal Academy, then under our countryman, Benjamin West, and maintained him there for more than four years, and until the close of 1815, when he returned to Charleston after having received at the hand of the Duke of Norfolk, the gold medal of the Adelphi Society for his model of a statue of 'The Dying Hercules,' his first attempt at sculpture; and from Mr. West high commendations for his paintings, exhibited at the Royal Academy under circumstances which did not allow his competition for the prizes.

"In 1816, my brother became the first superintendent of your Sabbath school, and was then proposing to establish himself in his profession in Boston; but, not meeting with the encouragement he expected, he removed first to New Haven, and afterwards to New York, where he became the founder of the National Academy of Design, an institution which, from its commencement in 1826, has had no superior of its kind in America in the promotion of the fine arts, and over which your first superintendent was called to preside, by the annual election of his brother artists, every year for sixteen years, and until he relinquished his profession to devote himself entirely to his electric telegraph, 'the lines of which,' since they were successfully laid between Washington and Baltimore in 1844, have literally 'gone out through all the earth, and its words to the end of the world.'

"Prior to the relinquishment of his profession as a painter, however, your first superintendent was the instrument in the hand of Providence, of introducing into this country that great (I may say the greatest) wonder of our age, the new Art of Photography. Photography, under the name of the Daguerreotype, it is well known was invented by the celebrated Daguerre, a French artist, who exhibited his first collection of specimens to the members of the French Academy of Sciences, in Paris, early in the year 1839. My brother was in Paris at the same time, exhibiting his telegraph to the same persons. Brother artists and brother inventors, thus brought together, each was invited to examine the other's invention; and my brother became earnest in his desire to introduce the Daguerreotype into America. On his return to New York, in April 1839, he inspired me and my younger brother with a portion of his own enthusiasm. He was then entirely destitute of pecuniary means; and after ascertaining what was wanted to enable him to gratify his and our wishes, we removed the central part of the roof of our six story building, covered it with a skylight, furnished the new chamber with cameras and the other apparatus of photogarphy, and, having thus completed the first "tabernacle for the sun" erected on the Western hemisphere, placed your first superintendent there to fix, for inspection through all time, the perfect image of men and things, as the great Painter, from his tabernacle in the heavens, flashed them upon the silvered plates. It was in that chamber that he, who first practiced the art of training in your Sabbath school, in 1816, trained the young men who went forth rejoicing, from New York into every part of our land, to work the wonders, and display the beauties of the new art, eliciting admiration from all beholders, and from the devout the exclamation, which four years afterward, passed in an instant through the wire from Washington to Baltimore, to be recorded there, while it was echoed everywhere, "What hath God wrought!"

It may not be known to all readers that the first message sent by the inventor of the recording telegraph, through his first telegraph line, on its completion from Washington to Baltimore, in 1844, was, "What hath God wrought!"

Galvanic Electricity upon the Muscular and Nervous System.

The effects of the galvanic current on the nerves and muscles of animals, is essentially the same as that produced by frictional electricity, modified, however, in some degree, by the continuous action of it. They are also characterized by the presence of some chemical influence, which excites the organs of taste and sight in a remarkable manner. Very small batteries are adequate to excite the organs of taste and sight, but a large apparatus is needed to produce any perceptible influence on the sense of touch, so as to cause the muscles of the human body to contract, when it forms part of the circuit. Galvani, in his fundamental experiment, touched the nerves of a dead frog's spine and the muscles of one of his thighs with two different metals, and then forming a circuit by a wire between them, the leg became violently contracted. When the nerves of vision are made to form part of the voltaic connection, peculiar luminous flashes will appear before the eyes. The excitement of the organ of hearing under similar circumstances is not less interesting, a roaring sound being heard as long as the wires are kept in place. On closely observing the effect of galvanic electricity upon the muscular and nervous system, three distinct stages in the process are readily seen. First, when the circuit is completed, an electric shock is experienced; next, the continued action of the current causes a series of contractions rapidly succeeding each other; and lastly, when the connection is broken, a less violent shock than before is felt. The shock of the voltaic battery differs from that of common electricity, as the latter is felt far less deeply, affecting only the outer part of our organs, and being exhausted in a moment. The voltaic shock, on the contrary, penetrates further into the system, passing along the entire course of the nerves. The influence of the galvanic current on the nervous system, has been successfully applied to the restoration of persons in whom animation was suspended. By means of it Aldini set in motion the feet of a corpse, caused the eyes to open and shut, and distorted the mouth, cheeks, and the whole countenance. Ure, by completing the circuit through the body of a man recently hung, caused the muscles of the face to acquire a frightful activity, so that rage, despair, and anguish, with horrid smilles, were successively depicted on the countenance. —*Telegraphic Journal.*

Two Curious Plants in California.

In the Southern coast is a species of the familiar mullen, and of a small species of teazle burr, both of which are peculiar to the Pacific coast. The burr is about as troublesome a member of the *dipsacus* family of plants as the cattle or sheep breeder is acquainted with. From July to October it is met with in the lower countries, covering the alkali or moist soils in hundreds of acres, and presenting a vigorous growth of verdant vegetation at a time of the year when nearly all other plants are bronzed with age or burnt to powder. The California article is a small species of teazle, with from sixty to one hundred burrs, the size and shape of a blackberry, but stuck full of spinous points, which, when mature, catch in the manes and tails of sheep, horses and cattle in great masses, and make the animals present as ludicrous an appearance as quadrupeds can be guilty of, and they are the abhorrence of dogs and cats. Whole bands of *caballada* may be seen on the large ranchos, with their caudal appendages full of these burrs, and giving the herdsman an immense quantity of trouble in the extraction, and on many farms it is the daily occupation of the horseman to trim them from his favorits with his knife or his fingers. In many places they seriously injure the quality of the wool. This troublesome plant grows to the height of some three feet, and with its large, heart-shaped leaves presents a deceitfully inviting appearance to one who is a stranger to its annoyances; for when the burrs are ripe they fall off at the least touch, and are as molesting to the rider as to his animal. It is one of the worst of weeds in a garden, the fruit taking root wherever there is the least modicum of moisture. The only thing good about this disreputable vegetable is the fragrance of the leaves when bruised, which emit an agreeable perfume of mint and lemon.

The member of the California mullen family mentioned is very abundant, not only throughout the Southern coast, but covers hundreds of thousands of acres of land in the plains of the great valley of the Sierra Nevada to the west, where with the *wichapora*, in the fall, it crowds out nearly every herb of the fields. Growing to the height of three or four inches, and spreading out into immense, blanket-like masses, over leagues upon leagues of land, on hill and plain, with its silvered, downy leaves, it makes every appearance at a distance, in the afternoon sun, of extended pools of standing water, and really has deceived many thirsty travelers, strangers to its delusions and vagaries. The leaves are the perfect outline of a heart, and of the size of that of a rose, and when pressed emit a smell of melon faintly mixed with marjoram. Though thousands of sheep may be walking among its masses, I never noticed one of them to feed on it; but as nothing was made in vain, the ground doves love the seed of the plant as much as cows do clover, and on opening their crops in the fall months they are found to be full of the small black seeds of the mullen. It is entirely different from the Atlantic mullen, which carries leaves as large as that of the mustard, with a central stalk three and four feet in height, whereas the mullen member of the California *Verbascum* has a diminutive leaf, and bears no column like the other, but a small trunk like a pepper bush. It is called by the natives *Pollei*, in some places, and in other *Yerba de Cenisa*, from its downy leaves, which are of the color of fresh wood ashes, and in medicine makes an elegant demulcent infusion for fevers and catarrhs, or in mass with hot water as a soothing cataplasm. The immense masses of this curious plant, when stirred by breezy gales of a summer afternoon, will sheen and twinkle with the rays of the sun as if Sol was amusing himself after the heats of the day on a sea of molten silver or silken floss, before he hies to bed behind the mountain peaks to dip his vexed, hot, monstrous red face west of the California Cape Horn in the waves of the ocean—where we will leave him till the cooler dawn.—*Cor. Steamer Bulletin.*

SOLAR AND LUNAR HALOS.—M. A. Decharme, Professor at the Imperial Lyceum of Angers, observes with much care the great and small solar and lunar haloes and coronæ, and has ascertained, that—1st, At Angers these phenomena are more frequent than is generally believed, thirty-three being observed by him during last year. 2d, In all cases they were followed by rain or snow on the same day, the day following, or, at latest, on the third day. 3d, That in general the rain is the nearer and more abundant in proportion to the brilliancy of the phenomenon. His observations simply confirm the generally received belief of all the weatherwise.

THE NEW GRASS which has made its appearance in the Southern States since the war, is called *Lespidosa striata*, and is said to be a native of China and Japan. It appears to be a dwarf clover, very thick set, much relished by cattle, and is a complete exterminator of Bermuda, joint, sedge, and other grasses. It was not seen before the war, and how it was introduced is a mystery among planters and botanists.

THE PERMEATION OF ORGANIC AND OTHER FLUIDS.

It is well know that at various stages of the functions of different organs there is a direct passage of liquor from one portion to another of the organs. Thus, for example, from the stomach and bowels at certain periods there is a permeation of liquor, consisting of the soft and dense fluid products of digestion, through the side of the intestinal canal, into the blood and lymph vessels, which ramify in the thickness of its walls. So too, also, there is during certain periods a transit of fluid from the blood vessels, ramifying through certain glands (for example, the salivary) into the ducts of the mouth. Phenomena of this character have been long mistakenly likened to those which were transacted between different fluids partitioned outside of the animal organisms. The whole two series together have been comprised as endosmosis and exosmosis.

If a glass vessel have a thin, upright partition of plaster of Paris through its center, and on the right hand side brine be placed, and on the left pure water be poured, until the divided fluids are at one level, a flow is immediately established through the partition, and the brine will soon rise, while the clear water will lower in exact proportion. This is endosmose. The mixture of the two fluids, if the partition were removed, would be easily understood as one of the simplest of mere physical phenomena, and the only action of the partition is to graduate the rate of the flow, and thus allow the phenomena to be observed.

This is strictly true with substances having such large pores as plaster; but when an inanimate membrane is used the tissue of it seems to exert a more definite action. The change in volume of the side by side fluids depends on the difference of their properties. In mixable liquids this is determined by their capacity for water, and acts the same between solutions of different density of the same substance, as between different substances. Solutions in water, of gum, gelatin, etc., increase in volume when opposed to water.

Each kind of matter has a tendency to diffuse itself through the pores or interstices of every other kind. And this tendency explains the solution of bodies. The various degrees in which this exists in different bodies accounts in part for many of the at first mysterious phenomena of physiology.

When a body is plunged into water it is either wetted or the reverse, according to its capacity for that fluid. If wetted, then its pores are saturated with moisture. This phenomenon is very simple, yet it is perfectly analogous to fundamental phenomena in the realm of physiology. This wetting is the first result of adhesion, or the first intimation of chemical affinity. That it is a result of chemical or physical affinity is shown by the fact that different substances act with different power. Thus while water will readily flow into the pores of chalk, mercury will not enter there at all, but is rather repelled. But while metals are really impervious to water, mercury will interpenetrate them.

Solids indicate various degrees of penetrability for water. A tube filled with glass, powdered very fine, will elevate water 170 millimeters, when the lower extremity is immersed in that fluid, while a tube containing glass, coarsely powdered, elevates it only 107 millimeters. This depends on the minuteness of the pores, by which a greater surface, and consequently a fuller action, is exhibited. It is evident that when the pores are large, the atoms of water occupying the central portion, do not come in contact with so large an extent of surface, and hence are not influenced.

This surface action of the pores is well shown by the filtration of liquids. Salt water passing through a column of sand becomes fresh, but if the current be continued, it at length flows through unchanged; for after the surfaces of the sand grains have attracted all the salt they can hold, they permit the remainder to pass unimpeded.

The exact reverse of this is obtained with some solutions, as carbonate of soda; the sand having a stronger affinity for the water than for that substance, the fluid flows out more concentrated than it enters.

The principle of the elevation of a fluid by a column of sand or powdered glass is the same as that of a capillary tube. The minute spaces or pores between the grains form a continuous, if tortuous tube, throughout their whole extent, up which the fluid is drawn. The hight to which it will ascend is limited by the size of the pores, as in a continuous hollow tube. The fluid will not aggregate and flow from the surface, for the reason that they are thus drawn up and held by the attraction of the interior of the pore or tube.

The central portion is never so much elevated. The pressure of the atmosphere accelerates, but does not otherwise affect the ultimate hight to which the column of fluid will ascend. The effect is the same in vacuo; nor does the hygrometric state of the atmosphere vary the result.

Elevation of temperature increases the hight to which a fluid will ascend, and also the rapidity. Heat increases the energy of affinity. Warm liquids are more readily absorbed than cold.

When a colored solution is dropped on a piece of chalk the water penetrates into the pores of the chalk, leaving the coloring matter on the surface; and this is not because the particles of the coloring matter are too large to enter the chalk. If fluid mercvry be dropped upon the chalk it will not be absorbed—it will not wet it; in other words, there is no affinity between the atoms of chalk and mercury. The phenomena here are the same as in capillary attraction; unless the fluid is capable of wetting the tube it will not be affected. Porous bodies, like tubes, imbibe fluids for which their atoms have attractions, and repel those for which they have not.

If an end of an open glass tube of small size be placed in water, that fluid will rise to a considerable hight; but if the tube be placed in the mercury it will fail to enter, and will be depressed below its external level. Not only are fluids and gases absorbed by porous bodies, but they are peculiarly affected in the act. When the pores are extremely minute, they exert a decided condensing influence, especially on gases. Spongy platinum, placed in a jar of hydrogen and oxygen, becomes bedewed with water produced by liquefying of these gases, *i, e.*, their union. Spongy platinum condenses 252 times its own volume of oxygen, and then has become a powerful oxidizing substance. Prepared charcoal exerts so strong an attraction that it completely removes the nitric oxides from solutions of lead, tartar emetic, ammoniated oxide of copper, chloride of tin and zinc. Charcoal will absorb the coloring of almost all organic substances.

All bodies, even the densest minerals and metals, are permeable to fluids and gases. Water may be used as a partition between gases, and is found to be one of the most permeable of substances. The water of lake and river contains common air, but this air contains one fifth oxygen; that of the atmosphere contains about one third. It is from this richness of oxygen that aquatic organisms derive their support.

Solution is an imperfect form or stage of chemical affinity, in which change of form occurs without change of properties. If water be added to an alcoholic solution of camphor, the latter is at once precipitated, for the alcohol has a greater affinity for the water than the camphor, and when a solution of salt in water is treated with alcohol, the salt at once crystallizes at the bottom of the vessel, thus showing that both were held in solution by chemical affinity.

The line of distinction between capillary attraction and chemical affinity is indefinite. Hence Clairaut's formula, "if the attraction of the particles of a solid for those of a fluid is more than half the attraction of these last for each other, the solid will be wetted; but if it be less than half, the solid will not be wetted."

Capillary attraction is not only related to chemical affinity, but also to attraction of cohesion. When two pieces of lead, on being pressed surface to surface, adhere; when two plates of glass become attached, or when a plate of glass adheres to the surface of water, one and the same principle is involved. But in the passage of animal fluids through membranous tissue, it must not be inferred that the latter exert no power. On the contrary, they act on animal substances in a flowing state, with the most varied results.

The processes of absorption, secretion, and excretion, while they are illustrated by the physical processes we have described, to which they are strictly analogous, and while they moreover involve physical laws, exhibit a character which precludes our considering them physical, and which distinctly distinguishes them from, and elevates them above chemical proceedings.

Such is the history of the phenomena of endosmosis. They are a series which are not physiological, but which are dependent on physical laws and the physical properties and relations of substances. They bear no nearer relation to the phenomena of physiological transudation than the descending flight of a swallow or an albatross does to gravitation. Undoubtedly, both alike involve the existence of physical substances and properties, since, if the body of the bird had no weight, it could not descend; and so also the liquids and secretions of the body could not permeate vessels unless the fluids had physical properties. But these properties are not what constitute the heart of the phenomena, nor can they be alleged to explain them. The physical side of the phenomena are made strictly subservient to other and higher processes than they are capable of. The essential conditions of absorption in animate organisms are a cell wall, whose composition is in great part water, and a fluid of animal substance. The products of digestion are animal substances in a flowing state, the composition of which, as food, was in large proportion water. This will pass through cell walls, or their interstices, not in virtue of the existence of defined passages or pores, but by displacing inwardly the particles of fluid already constituting a considerable part of the soft solid matter of the cell. Organic absorption commences and takes place in unison with prevailing organic actions. These are, the flow or progressive motion of the contents of the vessels that tend to draw into their own undisturbed current, soluble particles through extremely attenuate films of substance, interposed between fluid and current. Such films are cell walls. This is demonstrated by the fact that the power of different organs for absorption, depends on the number of vessels with which they are supplied, and the rapidity of the flow of their contents. This absorption, as in the case of the incoming of the products of digestion or soluble portion of food, is strictly organic, and is not to be induced under merely physical conditions; that is, where organic motions have come to an end, or where the tissues are exanimate. The readiness with which the fluid or watery portion of the contents of the blood vessels will leave them and infiltrate the tissues when the organism is really exanimate, attests the existence of condition during animation which held those fluids in their regular channel. The physiological refuses to be merged or swamped in the physical and chemical, while making both the latter subservient and ancillary to its own issues. The more we study the phenomena of each department, the more complete and inflexible becomes our assurance that the two latter phenomena are not convertible with the physiological. In view of a proper estimation of the facts, the ordinary and uniformly accredited designation of the ingress of oxygen into the capillaries of the lungs, and the egress of their carbonic acid into the air-vesicles, as a phenomenon of the diffusion of gases, seems far from the truth.—*Dental Cosmos.*

PRACTICE and persistence are the elements of the mechanic's success.

For the Scientific American.

METRIC SYSTEM.

In the year 806, in the first days of the month of May, near Aix-la-Chapelle, in the middle of a plain shaded by young poplars recently imported from Italy, numerous workmen were engaged in embellishing a magnificent tent of circular form, and being not less than one hundred and fifty cubits in diameter. Rich silken flags, representing the different countries conquered by Charlemagne, were hanging from each of the posts supporting the magnificent Turkish carpets which formed this elegant structure.

This tent was already filled with knights and deputies from all nations. Charles, on this occasion, intended to divide his empire among his three sons, Charles, Pepin, and Louis.

When the Emperor had arrived, seated on his throne, surrounded by his family and the principal officers of his kingdom, he rose, his aspect was imposing, his countenance thoughtful, open, but severe, recalling his German origin. He then spoke, and his words were repeated by interpreters standing in the middle of the representatives of each nation. After his speech, which was but an account, or rather a history of the first years of his reign, he caused his sons to be recognized as his successors, and having finished what he had to say respecting the settlement of public affairs, he turned toward his secretary, Eginard, saying: "It is your turn, my friend; speak to the learned men who are here present, and ask them for me if they have resolved the question I proposed to them last year."

This question was a very important and a very difficult one to solve. It was to find an imperishable unit of length. Charlemagne had already remarked that the ancient slade and cubit had no exactness.

The idea of giving to the nations of the earth a common measure, capable of being transmitted with exactness to the most remote posterity, was truly worthy of his genius.

Then, after Eginard had asked an answer from the learned men, a long silence prevailed in the assembly, notwithstanding the royal reward which the secretary had ready for the distinguished man who should find this wonderful unit. It was not timidity that kept those men silent, it was simply incapacity.

Understanding at last that this question was, if not insoluble, at least beyond the knowledge of his time, Charlemagne, after a moment of anger, stretched out his foot on the table before him, and ordered Eginard to measure it, which he did, including the shoe of polished steel worn at that time. This length named the king's foot was correctly marked inside of public monuments.

Charlemagne wished also that after his death his body and his shoes should be kept with care in a leaden coffin. "I do not think, said he, that after my death there will be a man so devoid of sense as to destroy or alter my mortal remains." In fact, no living being ever touched this celebrated foot, for even in 1793, when the French revolutionists in their fury sacked all the royal tombs, the king's foot was yet an object of veneration for the infuriated mob, and the leaden coffin was opened with great care. Alas! Time, not with his scythe, but with the help of his exterminating agents, the oxides, had destroyed not only the shoes, but even the bones of the monarch, and all was reduced to dust.

After the division of the kingdom of Charlemagne, the different States remained separated, and little by little the models of the king's foot have been lengthened by some and shortened by others, so that the true foot is lost.

If we take the English foot, or that of the United States, as a point of comparison, we find that the French foot is longer, and that of Spain shorter, and, indeed, we have as many king's feet as we have kingdom's in Europe.

In 1791, that is, 985 years later, the learned men of modern times thought of measuring the circumference of the earth in several countries. This difficult undertaking, the object of which was not only to ascertain the dimensions, but also the exact form of our globe was perfectly executed, and they took for unit of length the *meter* which is the ten-millionth part of the distance from the pole to the equator.

This meter, which can no more be lost than the earth which we inhabit, is equivalent in English feet to 0.3048 meter, and reciprocally a meter is equal to 3.28 feet, or 3 feet, 3⅛ inches.

This meter determines the dimensions of the other units, which have new denominations and of which here is the table:

Are, unit of surface for land, is a square whose side is ten meters.

Liter, unit of capacity for liquids, is a cube whose side is the tenth part of the meter.

Stere, unit of solidity for wood, is simply a cube meter.

Gramme, unit of weight, imagine a small cube of water whose side would be the hundredth part of a meter.

Franc, unit of money, is a piece composed of nine parts of pure silver and one of copper, the weight of which is five grammes.

Thus all the units of weights and measures are derived from the meter which is the standard of this system.

To be able to form an exact idea of the absolute value of these new measures, we will compare them with measures that are familiar, thus: Meter, 3 feet, 3⅛ inches; Kilogramme, about 2 lbs., 3 oz.; Liter, about 1¼ pint.

Let us finish this article by an experiment which may be useful. We will add that if to a pin, A, we suspend a small ball, B, and that by shortening or lengthening the thread we succeed in making it oscillate sixty times in one minute, then the length of the thread from the pin to the center of the ball will be exactly 0.997 meter—very nearly one meter in the latitude of New York.

No. 4 E. Eleventh st., New York. M. VERGNES.

Correspondence.

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

A Wonderful Turbine.

Messrs. Editors:—On page 258, No. 17, current volume of Scientific American, you publish a communication from F. Wilber, on "Turbines and Water Power," who asks your opinion, or that of some of your readers, as to the possibility of a six inch turbine doing more work than two twenty feet overshots, as stated by parties using a "Leffel Turbine," in an advertisement to which he refers; in reply, allow me to say that the power of a turbine does not depend necessarily upon the diameter, but upon the quantity of water which it discharges, and which is commonly denominated "square inches of discharge," and which means the quantity of water which will flow through an opening of the given area, under the given head, without "contraction."

It is stated that one set of cards, one jack of one hundred and eighty-four spindles, two looms, etc., are driven by a Leffel turbine, under forty feet head, with three-fourths of a square inch of water. Now a vein of water of three-fourths of a square inch cross section, discharging under forty feet head, will give theoretically 1 2-10 horse power. The best turbines usually develop about eighty per cent. of the theoretical powers of a given quantity of water. Eighty per cent. of 1 2-10 horse power gives 96-100 horse power to do the amount of work stated, but which actually requires not less than four horse power. It is also stated that this wheel does double the amount of work that could be done with two twenty feet overshots, which were as good as were ever built; consequently they must have given seventy-five per cent. Therefore this turbine must have developed one hundred and fifty per cent. of the power expended. Again, eighty-four gallons of water per minute are stated by the parties to be furnished by their stream. A gallon of water weighs $8\frac{338}{1000}$ pounds, from which we have $\frac{84\times8\frac{338}{1000}\times40 \text{ ft. head}}{33{,}000} = \frac{848 \text{ H. P. theoretical effect}}{1000}$, 80 per cent of $\frac{848}{1000}$ H. P. is $\frac{678}{1000}$ H. P. to do the work stated. These, Messrs. Editors, are the facts of the case from which your correspondent and the public will see that this wheel, according to figures which "cannot lie," is developing from one-and-a-half times to more than three times the amount of power there is in the water itself. A most remarkable achievement and worthy the attention of all desiring great economy of water!

Chas. E. Fowler.

Carmel, N. Y.

Prevention of the Musketo Pest.

Messrs. Editors:—In a recent number of the Scientific American I noticed an article entitled "The Musketo Pest," with an invitation for suggestions of means of defense against these insects. "Persian Insect Powder" and Carbolic Acid are mentioned as remedies, but in either of these cases many would consider the remedy worse than the disease. The only remedy is the exclusion of the musketo from the dwelling. This is attempted by a fine netting stretched over the windows and doors. These are of various fabrics, cotton being the material chiefly employed. But the fibers of cotton, even if sized or starched, will spread themselves across the interstices of the netting and prevent the cooling currents of air from entering; and they are easily torn, when they become valueless for the purpose intended. I have tried the various kinds of musketo netting, and find that the only proper material is wire cloth. It not only excludes all insects, but, the material being smooth, permits the air to pass freely between the meshes. They can be made plain, or so woven as to present agreeable patterns and pictures to the eye. Such screens should be kept in stock by upholsterers.

Clinton, Mass. G. F. W.

Occult Properties of Numbers.

Messrs. Editors:—Permit me to add to the examples of "extraordinary coincidences" mentioned in the current volume of your valuable journal first on page 227, and afterward continued by Mr. Konvalinka on page 259.

As a professed believer in the occult properties of numbers first expounded by Pythagoras, the number 27,648 has been the object of some study by me. In the first place it is exactly equal to the series $1^1\times2^2\times3^3\times4^4$ and as I believe "that such a remarkable coincidence can not be merely accidental, it must have some deeper foundation in the mysteries of astronomy," such, for example, as the number in which the vast cycle of the precession of the equinoxes is completed. It is true that astronomers do not make the years exactly those I have given, although very nearly identical; so nearly, in fact, that we may well suppose the difference to be due either to imperfection in apparatus or to some "personal equation" or other in observation, for you will notice that the first two digits (27) is a cube ($=3^3$) and the last digit (8) is also a cube (2^3) that the middle digit is twice the cube root of 27 and that the other digit (4) is twice the cube root of 8 and that finally the sum of all the digits is exactly equal to the two first (27) whose cube root is 3 and whose sum is 9 the square of 3

If now the order of the digits is reversed it becomes 84,672 which contains the original number exactly $4\frac{9}{16}$ times. Both terms of the fraction expressing the ratio are perfect squares, which are contained a whole number of times in the reversed quantity and their square roots ($\frac{7}{4}$) differ exactly by that constantly recurring number 3, the terms (49—16) differ by 33 Again the 84,672 is divisible without a remainder by the squares of all the digits except 5 and 9, that is, by $1^2\ 2^2\ 3^2\ 4^2\ 6^2\ 7^2\ 8^2$ and also by the cubes of 1 2 3 and 4. The sum of all the digits 8+4+6+7+2=27 the cube of 3 the first two digits (84) minus the last two (72) is exactly twice the middle digit (6) the exact difference of the first (8) and last (2).

The sum and the difference of 84,672 and 27,648 are 112,320 and 57,024 which can be shown to possess remarkable properties but I forbear to speak of them as well as of several properties of the other numbers having made this communication as long as I dared. Wm. G. Leonard.

Cincinnati, Ohio.

Diagram of the Day Line.

Messrs. Editors:—In the Scientific American (Vol. XVII., No. 16, page 246) you say that a Mr. Lyman Thayer, of Burlington, Vt., has invented an admirable device for illustrating the day line, etc., and also for telling the relative time of any two points on the earth's surface. Now I have not seen Mr. Thayer's diagram, but the one herein inclosed (completed a month ago) I suppose to be very similar. It, however, is by no means exact, but is only intended to give an idea of the invention. I have taken for the day line the 180th meridian from Greenwich. It can readily be seen that a similar diagram can be made of the southern hemisphere, and also that the device can be applied to all maps, to tell



the difference of time between any two points represented on the map. I should have written sooner on this matter, but was waiting until I could finish a large and accurate diagram to send you.

If the 180th meridian be taken as 12 o'clock, 15° E., or the 165th meridian W., represents 1 o'clock, and 15° W., or the 165th meridian E., represents 11 o'clock, etc. According to this I propose to number each meridian, allowing of course 4 minutes to the degree. Any meridian may be taken as 12 o'clock, but this alters all the others. W. R. Shelmire.

Philadelphia, Pa.

LENHART'S SPRING FISH-HOOK.

The engraving accompanying this description represents a device for contravening the proverbial want of success of fishermen. It is a double hook, one, A, being the bait hook, and the other, B, the securing hook. Fig. 1 shows the hook

Fig. 1

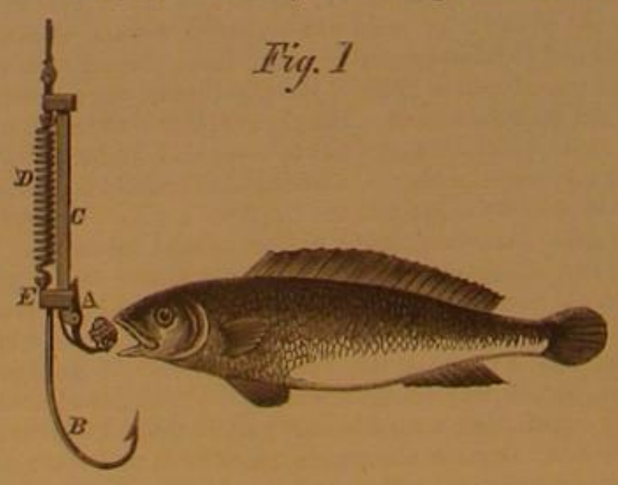
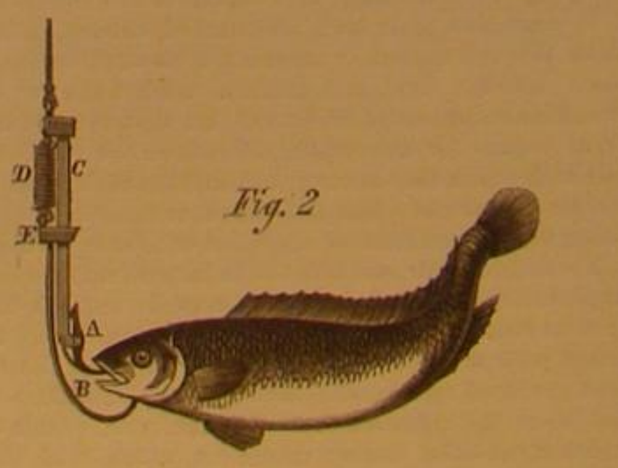


Fig. 2



ready for use and a fish about to take the bait, and Fig. 2 the hook sprung and the intended result. It is a combination of two hooks, connected in a light frame, the smaller or bait hook being pivoted to the bar, C, at its lower end, and the larger or securing hook attached to the spiral spring, D. By pulling down the large hook the slide, E, is engaged with the hook, A, which has a catch on its back and a light spring to throw the catch in place. A slight pull on the small hook, or such a disturbance as may be made by a "nibble," must disengage it from its catch and allow the spring, D, to act, when the fish is held by the larger hook, as seen in Fig. 2. To disengage the fish and to bait the hook anew, the larger hook is pulled down by one hand, while the other holds the top of the bar. It appears to be cruel to the fish—a consideration which probably has little force with anglers—but, unless carefully used, may also be dangerous to the fisherman. A patent for this device is now pending through the Scientific American Patent Agency. All communications should be addressed to the inventor, A. I. Lenhart, New Brunswick, N. J.

Imperfection of Malleable Iron.

It has for some time past been known, that the fibrous nature of iron, long considered an element of its strength, is in reality, due to the presence of foreign matters, which are taken up during manufacture, and prevent the adhesion of the adjacent particles of the iron, however carefully or powerfully the metal may be compressed, or however it may be twisted, doubled up, or contorted. The effect is similar to that which occurs with a glass tube hermetically sealed at both ends; however it may be drawn out, however often it may be doubled or twisted together, at even a very high temperature, the air, a foreign substance within it, will prevent the union of its particles, and cause it to have a fibrous appearance, without adding to its strength, but the contrary.

The imperfection of malleable iron from this cause has now been found far greater than was suspected. It has been shown, by experiments made on French and English armor-plates, that, however homogeneous they may seem when cut and polished, whether formed by the rollers or the hammer, they consist of laminæ not at all welded together, and presenting an appearance similar to that of a number of sheets of paper. This condition has been revealed unmistakably by the effects produced by projectiles; and it is found to be present even when the plate has been both hammered and rolled at a welding temperature.

This discovery assumes a still more serious character, if possible, when there is question of such forgings as railway axles, screw shafts, the shafts of marine engines, and other portions of machinery, the soundness of which is of vital importance. It explains the difficulty of constructing large forgings of requisite strength; and leads, unfortunately, to the conclusion, that without fusion, as in the case of steel, there can be no adequate security with regard to the homogeneity, and therefore the strength of the material.

The intense heat employed in the manufacture softens the scoriaceous matters, but they are never expelled. This is true, to a greater or less extent, even with charcoal iron. The only advantage possessed by the charcoal iron, in this respect, seems to be that the laminæ do not separate during fracture under the blow of a projectile, which is a most trying test of the amount of their adhesion.

It is worthy of notice that the laminæ are more distinctly perceptible, the better the iron, and the more capable of resisting fusion at high temperatures. Fusion seems to be an indispensable condition for the prevention of a laminated structure; hence the excellence of metal such as steel, which is subjected to fusion during manufacture. When fusion has taken place, the rolls and the hammer impart new and valuable qualities. The so-called fibrous character of iron causes its practical to be far less than its theoretical power of resistance; and when it begins to give way in the shafts of marine engines, etc., the fracture commences along lines of junction of the laminæ; and the results of numerous experiments seem to show that, while the welding is very imperfect in those portions to which the shock of the hammer cannot reach, it is in all more or less faulty.—*The Scientific Review.*

A Singular Fact.—The Effect of Variable Calibers in Foam Pipes.

It is known to engineers that some practitioners believe that running a pipe from the steam space to the water space, outside the boiler, and attaching their gages thereto, will give them notice of foaming, or priming, and assist in the prevention of these annoyances. We have a letter from a Maine correspondent who says, that on the Portland and Kennebec railroad is a freight engine which has a "foam pipe," tapped into the top of the boiler, running down, and tapped into the leg-water space of the fire box, just above the foot board; which leaves the pipe about three feet long. Into this pipe a water gage is fitted. When the steam is on and the throttle opened, the water in the boiler rises a little, of course; but in the gage it falls at the same time nearly two inches. Still, when the gage was closed the glass would show the two inches of water.

This case, if we can understand it from the letter of our correspondent, is a curious one, but not singular. We have seen but one case similar, but have heard of one other. In both these cases the holes tapped in the steam space and in the water space were at first of varying diameter; that in the steam space being much smaller than that in the water space. In the one case, where the upper hole was half inch and the lower three-fourths, we failed to get a reliable water level on the gage. In the other case the experimentor finally got a reliable gage by making both holes of the same caliber. The "reason why" we confess we do not understand. We have our theory, but prefer the evidence of those who have investigated more fully than we did.

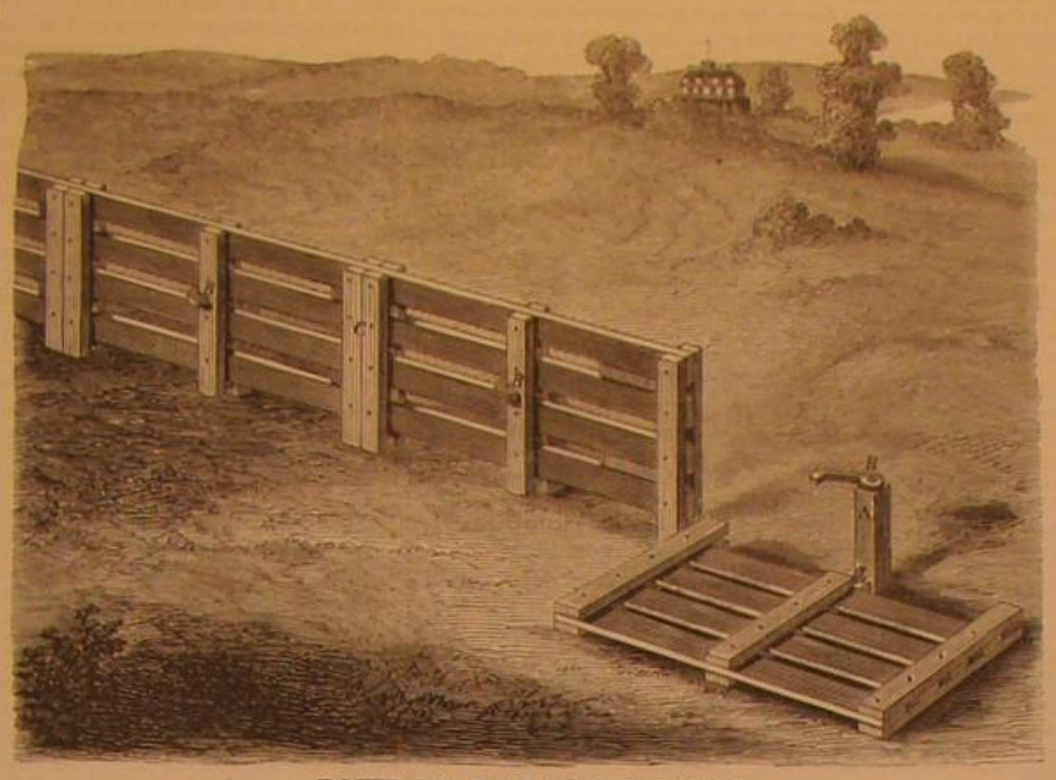
The November Meteors.—Just one year ago the public mind was much exercised at an expected display of celestial pyrotechnics which astronomers predicted would be of unusual brilliancy. Disappointed on that occasion, it is hardly to be expected that the same enthusiasm will be exhibited this year, although it is possible that the shower may make its appearance. In the year 1832, the inhabitants of Europe were favored with a meteoric display, which on the succeeding year delighted the American population. Last November the Europeans were again favored, and certain astronomers are confident that the present month will witness a repetition on our side of the water.

Improved Fence for Submerged Lands.

Throughout the country there are alluvial lands, which, while possessing a rich soil, are kept from yielding any benefit to the cultivator by the certain, or uncertain, contingency of an annual overflow. In many cases dyking is too expensive a process, and when an overflow or freshet occurs, fences, and even outhouses and barns are swept away by the flood. To protect fences, under such circumstances, from being carried away by the flood, is the object of the device illustrated in the engraving.

The permanent posts are quite low, as seen at A, and are firmly seated in the ground. The sections of fence are linked or hinged to these parts, and held in an upright position by means of a latch or catch, B, either of wood or metal, pivoted to the top of the post, and engaging with the middle upright of the section. The sections are secured one to the other by means of wooden keys, or wedges, seen at C, which lock the line together and make a secure and rigid fence. The short posts sustain the whole weight of the fence.

When the water rises, and there is danger of a destructive overflow, the keys may be driven out and the fence be allowed to fall flat on the ground, the sections being prevented from being carried away by their connection with the posts. The prostration of the fence need not be effected until the water is half way up the hight of the fence, when the work can be done by means of a boat. It is evident that in some situations such a device would be invaluable.



BOWLUS' LAY-DOWN FENCE.

It was patented through the Scientific American Patent Agency, Aug. 20, 1867, by L. H. Bowlus, who may be addressed relative thereto at Knoxville, Tenn. The entire patent, or State rights for sale.

Lapis Lazuli.

The name of this mineral is derived from the Persian language, and means blue color, or, with the Latin prefix, blue stone. The ancients were well acquainted with it, and have employed it as a substitute for other gems. The Greeks and Romans are said to have called it by the name of sapphire, denominating that with specks of iron pyrites the *sapphirus regilus*; Pliny called it the *cyanus*. It was formally used as a strengthening medicine.

Lapis lazuli very seldom occurs crystallized; its regular form is the oblique four-sided prism; it mostly occurs compact, and in grains and spects, with an uneven and conchoidal fracture; it is translucent on the edges; its luster is nearly vitreous and shining; structure foliated; its color is fine azure blue, with different shades, often interspersed with spots and veins of pyrites. It scratches glass, but is attacked by quartz and by the file; its specific gravity is 2·3; before the blowpipe and on charcoal it with difficulty runs into a white glass, but with borax it fuses with effervescence into a limpid glass. It consists of lime, magnesia, and silex, with soda, protoxide of iron, and sulphuric acid.

It is generally called in trade, the Armenian stone.

It is found in gangues of the older formations, and in Bucharia; it exists in granite rocks, and is disseminated in all veins of thin capacity; on the Baikal Lake it is found in solid pieces; also, in Siberia, Thibet, China, Chili, and Great Bucharia. Lapis lazuli is much used for jewelry, such as rings, pins, crosses, ear-rings, etc. The best pieces are generally cut out from larger lumps by means of copper saws and emery, then ground with emery on a lead wheel, and polished with rotten stone on a tin wheel. The rocks which yield lapis lazuli, where it is contained in specks, are likewise cut for ornamental purposes, such as snuff-boxes, vases, candlesticks, cups, columns, cane-heads, etc.; also, for architectural ornaments and stone mosaic; the larger specimens, having specks regularly disseminated on a white ground of the rock, are those selected for cutting. The most important use of this mineral is that of furnishing the celebrated and beautiful pigment called ultramarine blue, used by painters in oil, and said never to fade. The lapis lazuli takes a very high polish, but becomes dull again after being used for some time. It is sometimes imitated by lazulite (azure stone), or blue carbonate of copper, which, however, is not near so hard, and effervesces on testing with nitric acid. Those specimens having iron pyrites inclosed are difficult to polish well, on account of the unequal hardness of the two minerals.

Lapis lazuli has lately been discovered in California, but the color of the mineral from this locality is very indifferent, and its price is therefore much inferior to that from Persia.

The value of lapis lazuli, although depending upon its purity, intensity of color, and size, has nevertheless much diminished when compared with its former prices.

The Chinese, who have for a long time employed lapsis lazuli in their porcelain painting, call the pure and sky-blue lazuli in their porcelain painting, call the pure and sky-blue stone *zuisang*, and the dark blue, with disseminated iron pyrites, the *tchingtchang*, preferring the the latter to the former; they work the same for many ornaments, such as vases, snuff boxes, buttons, and cups. In the palace which Catharine II. built for her favorite, Orlof, at St. Petersburg, there are some apartments entirely lined with lapis lazuli, which forms a most magnificent decoration.

The process of preparing ultramarine was known as early as the fifteenth century. The color is now mostly prepared at Rome, in the following manner: those pieces which are free from pyrites specks, are first calcined and pulverized; the powder is then formed into a mass with a resinous cement (*pastello*), and fused at a strong heat; this is then worked with the hands in soft water, whereby the finest coloring particles are disengaged in the water, which will soon be impregnated with the blue color; a fresh portion of water then taken, and the same operation is continued until the remains are colorless. The ultramarine, after a short time, settles to the bottom of the vessels and is carefully separated and dried. If the lapis lazuli be of the best quality, the product will be from two to three per cent. That color which remains yet in the mass is of an inferior quality, and is called the ultramarine ashes; it is of a paler and more reddish color.

Good ultramarine has a silky touch, and its specific gravity is 2·36. It does not lose its color if exposed to heat, but is soon discolored by acids, and forms a jelly. In order to distinguish the pure ultramarine from numerous spurious and adulterating coloring materials, such as indigo, Prussian blue, mineral blue, etc., it is only necessary to test the article in question with some acid, when after a few minutes the real ultramarine is discolored, yielding a clear solution and a white residuum. The real ultramarine has always been at a very high price, on account of the small product obtained from the mineral. An ounce of the purest ultramarine is sold in France for two hundred to two hundred and fifty francs, which is not within the reach of all painters.

In the year 1828, the discovery was made by Professor Gmelin, in Tubingen, that sulphuret of soda was the proper material for imitating this precious and valuable pigment. By his experiments he succeeded in preparing this substance from silex, alumina, soda, and sulphur, producing a color in every respect corresponding with the true color of the lapis lazuli, and bearing the same relation to acids as the genuine ultramarine. This, for economy, has become a great object to painters and color men, since a whole pound of it may be purchased in France for twenty francs. As it bids fair to meet with a great consumption, being even substituted for cobalt in bluing paper, thread, and other stuffs, several manufacturers have already been induced to engage largely in its preparation; and there is now a very extensive establishment in full operation by M. Guimet, three leagues from Lyons, who likewise claims the priority of its discovery: the royal porcelain manufactory at Meissen, in Saxony, also prepares it. The process for making the artificial ultramarine, as it was first described by Gmelin, is here given, as it was published in the *Annales de Chimie*. The whole process is divided into three parts:

1. The pure hydrate of silica is prepared by fusing fine pulverized quartz or pure sand with four times its own weight of salt of tartar, dissoling the fused mass in water and precipitating by muriatic acid; also the hydrate of alumina is prepared from alum in solution, precipitated by ammonia.

2. Dissolve the silex so obtained in a hot solution of caustic soda, and add to seventy parts of the pure silex seventy-two parts of alumina; then evaporate these substances until a moist powder remains.

3. In a covered Hessian crucible, a mixture of dried sal soda, one part to two parts of sulphur, is heated gradually, until it is fully fused, and to the fused mass add small quantities of the earthy precipitate, taking care not to throw in fresh quantities until all the vapors have ceased; after standing for an hour in the fire, remove the crucible, and allow it to cool. It now contains the oltramarine, mixed with an excess of sulphuret, which is to be removed by levigation; and if the sulphuret is still in excess, it is to be expelled by moderate heat. Should the color not be uniform, levigation is the only remedy.—*Feuchtwanger.*

Science Familiarly Illustrated.

Leeches.

This animal has had a reputation from the earliest periods of medical science. Even from the time of Homer, the appellation of leech was given to the practitioners of the art of surgery, and in many of the languages of German derivation the word signifying a physician is identical with that given to the leech. From an English exchange we gather the following facts relative to the life and habits of this species of aquatic worm, which is indeed among the lowest classes of the animal chain of being:—

"There are about thirteen or fourteen species of the leech, some of which are found in most parts of the world; but the medicinal species is best known, and abounds in various parts of the world—as America, Russia, Hungary, Spain, Portugal, in the marshy plains of Egypt, and in various parts of Asia. It belongs to the class *annelides*, or ringed worms, its body being composed of a series of rings, or circular muscles, by the successive contraction of which it moves along either in the water or upon the surface of leaves, reeds, or other solid bodies. The tail extremity is in the form of a cup, or sucker, by which it adheres firmly to flat substances, on the same principle as a boy's leather sucker adheres to and lifts up a stone. The mouth is also in the form of a sucker, and is, moreover, furnished with three cartillaginous teeth, placed so as to form with each other a triangle. When examined and felt with the point of a finger, they seem soft and blunt; but the animal, when about to pierce the skin, seems to have the power of erecting them into firm, sharp-edged lancets, which saw through the integuments in a single instant, and almost without inflicting any pain. Having made the puncture, the blood is extracted by a process of suction, and is passed through the œsphagus into the stomach, or rather stomachs, of the animal, which consist of a series of communicating cells, that occupy the greater part of the interior of its body. The leech having thus gorged itself to the utmost, if undisturbed, remains in a half-torpid condition till it has digested its gory meal, and not unfrequently dies of the surfeit. If it survives it will be greatly increased in size. They can live for months and years on what appears to be pure water alone. This forms the singular circumstance in the diet of these animals. They delight to gorge themselves with a full meal of blood, even to surfeit; and yet with plain water they live, grow, and seem to have the greatest enjoyment of existence. It would appear as if their three lance-formed teeth, and their carniverous appetites, were bestowed more for the benefit of man than for themselves, and that, in their system of dietetics water is the rule and blood the exception.

The medicinal leech is a native of many parts of Britain, but is now becoming very rare. France is supplied chiefly from Strasburg, whence they are imported from Hungary, Turkey, Wallachia and Russia, and kept in ponds. They are carried into France on spring wagons, and are contained in moistened bags, each bag containing 120 leeches. Previous to 1834 upward of 46,000,000 of leeches were imported into France annually. At present the numbers have decreased to 17,000,000. They are imported into London and Leith by sea, packed in little bags, which are occasionally moistened with water during the short voyage. In general they arrive fresh and healthy; but they are not unfrequently liable to disease, which destroys great numbers. There are three sorts, or sizes, the largest and middle sorts being reckoned the best. A large leech is calculated to abstract half an ounce of blood, besides the quantity which flows from the wound afterward. The smaller sizes are comparatively inefficacious.

A common animal in the pools of this country is the horse leech. It nearly resembles the other, but is of a more uniform color, and not so decidedly marked with greenish streaks on the backs as the medicinal species. The horse leech has no great inclination to fasten on the human skin, but when it does so it takes its fill, just like the other, and no more. There is a popular but unfounded belief that if a leech of this description do fasten on the skin, it will continue to suck and discharge the blood till every drop in the body is exhausted. Hence they are the dread of every school boy who happens to wade with naked legs into their dominions.

The leech, like many other animals, appears to have a very nice sensibility in regard to atmospheric changes, and especially what regards the electric modifications of the air. Before storms, or any sudden change in the atmosphere, the leech is seen in great activity, and darting up to the surface of the water in its jar. These animals, too, at certain times, are found to move out of the water, and remain for a considerable period clustered on the dry upper surface of the jar; while on other occasions they will remain for days immersed in the water near the bottom. They produce small eggs, which form into cocoons, from which in due time the living young make their appearance.

Grindstone Grit as a Substitute for Fire Brick.

Mr. Ludwig Wolf, who has charge of a number of the tempering furnaces in the ax factory at Collinsville, Conn., says that "noticing the great amount of fire brick required to keep them in order, I thought of using grindstone grit—of which we have a large quantity—knowing the adhesive quality of the grit. I tried it, and found it to work well. It does not last so long as fire brick, but it keeps the fire cleaner than the brick, and does not form clinkers so fast. I do not know if it will work as well in fires where a heavy blast is required, but if it will it is cheap enough, as for other purposes it has little value."

Silica is the principal ingredient of grindstone grit, together with oxide of iron. It would appear to be well adapted for lining such furnaces as our correspondent manages.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Figures at the Hydrographic office show that the power at Rumford, Me., on the Androscoggin, due to the known hight of the fall and the estimated volume of water, is not less than 15,644 horse-power at low water.

The Western Union Telegraph company, have completed their lines, so that Helena, Montana, is in communication with New York.

The California papers announce new discoveries of asphaltum near Willmington, Los Angeles county, some of which comprise many acres. A company has of course been organized and they propose to make thorough tests of the new acquisition, relating to its value as a fuel.

A Wisconsin wine manufacturer had 3,000 pounds of grapes frozen last year. This year he made wine from them which proved to be 100 per cent better than that made from grapes not frozen.

A ship canal through the Florida peninsular is advocated by the Southern newspapers. Such a canal would be less than a hundred miles long, and greatly shorten the journey from New Orleans, to New York, and be the means of avoiding the dangers of the Florida coast.

A sugar refinery in London has one of Wilde's electro-magnetic machines, driven by a 15-horse power engine, employed in the refining of sugar, it having been demonstrated that a stream of electricity driven through a solution of brown sugar would bleach it, much better even than charcoal.

The total length of railroad necessary to connect San Francisco with New York is 3,300 miles. The cars are now running over 1,153 miles or a little more than half way.

Extensive works are under way in San Francisco for the manufacture of lead on a large scale. The supply of ores is very abundant and generally sufficient silver is in combination to pay for transportation and extraction.

The Central Pacific Railroad earned over $200,000 in October with less than 100 miles in operation from Sacramento to Cisco.

Passengers on the Pacific railway, E. D., between Ellsworth and Hays last week witnessed an exciting encounter between a herd of buffaloes and the express train. For three miles the buffaloes pushed along parallel with the train and although many shots were fired nothing could stop the tide of the stampeding beasts. Finally they swept across the track ahead of the locomotive, fairly worsting the iron horse by bringing him to a halt.

L'Ebenement, of Quebec, says that an immense deposit of black iron sand has been discovered on the banks of the St. Lawrence, near Batiscan.

The exhibition of the first bar of American tin at the St. Louis Fair has had the effect of increasing public confidence in the Missouri mines. Owners of land are not disposed to sell on large advance over their purchase price. Mining operations are progressing, though slowly, and large furnaces are being completed and will be running as soon as possible.

The plan is meeting with favor in England of instituting a system of accidental insurance for miners, the mine owners paying the premiums and insuring the men, while on the other hand the companies are to issue policies not to each individual by name but for such a number of strikers, boys, etc., employed. The individual miners might come or go without affecting the policy, and in case of fatal accident in the mine the insurance would be paid without reference to identity of the victims but according to number and rank.

From the great scarcity of fuel, steam engines have never been introduced for pumping in the silver mines of the Hartz mountains, but with an excellent system of races and reservoirs the water is got rid of by water wheels and turbines. The mines having reached a depth of 3,200 feet, adits were from time to time driven to lessen the labor of the machinery, but at last a point was reached which threatened the total suspension of the work and loss of employment to 2,500 miners and smelters. Eight years ago, as a last resort, surveys were made and a tunnel commenced for draining still deeper. This undertaking is finally finished, and has satisfied all expectations. Its length is 22 miles, and so exact were the surveys that in the 18 ends (one mile from each other) the bearings were but five inches out of reckoning for the whole length. Great rejoicing succeeded the completion of the work, a solemn thanksgiving in the Lutheran churches, processions, etc. It is now certain that the mines can be carried on until the year 1887. They were first worked in the year 926 and have been productive ever since.

Immense works have just been commenced in the south of France for rendering the Rhone navigable from Arles to the sea. Three miles of large sand banks which now completely block the river, are first to be removed; the Canal St. Louis must be extended two miles, a lock be erected at the mouth, and other improvements which will cost in their undertaking eight million francs. In the same province they have also begun draining the marshes and improving the state of the Camarque, a sort of island formed by the two branches of the Rhone.

Recent American and Foreign Patents.

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

IMPROVED SYRINGE.—Jas. J. Essex, Newport, R. I.—This invention relates to a new and improved syringe, which is applicable to all purposes for which a syringe is required, and which consequently may be termed an "universal syringe,"—it being capable of being used as an enemata apparatus, or as a double syringe and is portable and capable of being adapted for use in a moment of time. This improved syringe is of the modern class in which the pump (cylinder and piston) is dispensed with, and an elastic belt used instead. The invention consists, 1st, in a receiver, or reservoir, provided with a glass, or transparent plate, inserted in its side, so that when the device is used for enema-giving purposes, a precise quantity of liquid may be used, to wit, a gill, pint, etc, as may be required, and this receiver, or reservoir, is designed to accompany the apparatus, and form a part of the same. The invention consists, 2d, in a rose, or perforated nozzle, which is termed a "douche," whereby wounds may be irrigated with a delicate spray of warm or cold water, as may be required. This device is also valuable for cleansing or washing the eyes. The invention consists, 3d, in using in connection with an elastic bulb, as a suction and force pump, an elastic and metallic tube, placed at or attached to opposite ends of the bulb, and using in connection therewith an air chamber, all being so arranged that a continuous stream may be thrown from the eduction tube, and the device adjusted to suit the various uses required of it. The invention consists, 4th, in a novel and improved arrangement of packing, whereby perfectly tight joints may be obtained.

HAND HAY RAKE.—Albert J. Greene, Sterling, Mass.—This invention has for to object to furnish an improved hand rake, simple in construction, easily operated, and which will do its work well.

POINT FOR PRINTING PRESS.—Nicholas Hopkins, New York city.—This invention has for its object to furnish an improved device for the purpose of making holes in printed sheets, preparatory to their being folded into book form by machinery, said point holes being necessary to insure perfect register.

APPARATUS FOR CLEANING STOVE PIPE.—A. W. Smith, Pierpont, N. Y.—This invention has for its object to furnish an improved means, by the use of which horizontal stove pipe may be readily and quickly cleaned, without its being necessary to take down the pipe and soil the room.

BARN DOOR AND GATE FASTENER.—Lorenzo B. Hayes and Wm. Morris, Greene, N. Y.—This invention has for its object to furnish an improved fastening for barn doors, gates, etc., cheap, durable, and simple in construction, which will fasten the door both open and shut automatically, securing it at top and bottom, and which may be adjusted to compensate for the sag of the gate or door.

EXTENSION TABLE.—F. R. Wolfinger, Chicago, Ill.—This invention has for its object to improve the construction of F. R. Osgood's extension table, patented January 2, 1866, and numbered 51,855, so as to make it capable of a greater extension, while occupying no more room when folded.

HORSE HAY FORK.—Mark Coffin, Milton, Ky.—This invention has for its object to furnish an improved horse hay fork, simple in construction, easily operated, not liable to get out of order, and effective in operation.

BALING PRESS.—Joseph P. Taylor, Hudson City, N. J., and Jackson R. Baker, Jersey City, N. J.—This invention has for its object to furnish a simple compact, convenient and powerful baling press, and one which shall at the same time be easily operated.

ATTACHING WHEELS TO AXLES.—L. Crouch, Baraboo, Wis.—This invention has for its object to improve the manner of attaching the hubs of wheels to their axles, so as to make their connection more secure, convenient, and less liable to get out of order.

CORPSE PRESERVER.—Charles W. Compton, Newark, N. J.—This invention has for its object to furnish an improved corpse preserver, so constructed and arranged as to be easily and conviently handled and operated, economizing time, labor and ice.

DEVICE FOR SUPPORTING WINDOW SASHES.—Joseph B. Payson, Chicago, Ill.—This invention consists in an automatic or self-acting friction wedge placed either in the side of the window frame or in the edge of the window sash and constructed and arranged in such a manner that it will support the sash in any desired position within the scope of its movement by friction and act more powerfully when the sash is stationary or while it is being lowered than when it is being raised, but still admitting of the sash being either raised or lowered by the pressure of the hand upon it alone, no other manipulation being requisite. The device is concealed from view, holds the sash square in the window frame and prevents it from rattling.

REVERSIBLE CHAIR SEAT.—Mathias Hamburger, New York city.—The object of this invention is to so arrange the seat of barbers' and other chairs that the same can be easily reversed so that every new occupant may be provided with a fresh and cool seat.

LUBRICATING CARRIAGE AXLES.—Edrick Thomas, Kickapoo, Ill—The object of this invention is to lubricate carriage axles without removing the wheels from the axles. To this end the invention consists in boring a hole in the hub directly back of the spokes and inserting a tube to receive a bolt or plug, the metallic box of the hub being tapped and the hole closed by the bolt or plug when the latter is inserted in the hub. In order to lubricate the axle the bolt or plug simply requires to be removed, oil poured into the tube and the latter filled or stopped by inserting the bolt or plug.

LAMP FOR CAR AND OMNIBUS FARE BOX.—John B. Slawson, New York city.—This invention relates to a new mode of arranging the lamps which are provided in omnibus or car fare boxes. The object of the invention is to so place the light in the box that it will not blind the driver's eyes and that it will illuminate the trap upon which the money falls when thrown in by the passengers. The object of the invention is also to adapt the lamp to fare boxes already in use so that the box need not be changed.

MACHINE FOR SHARPENING HORSESHOES.—Wm. M. Butler, Waukegan, Ill—This invention relates to a machine by which the calks of horseshoes can be quickly and easily sharpened without taking the shoe off the horse's foot; the device operating so that a whole span of horses can be completely sharpened in about twenty minutes.

COMBINATION HINGE.—Antonio L. Mora, New York city.—This invention relates to a new and improved device for supporting in any required position the covers of trunks, chests, desks, boxes, and all articles of similar construction.

DOUBLE PLUNGER PUMP.—George Shield, Cincinnati, Ohio.—This invention consists in forming the pump barrel in two parts and in using two plungers one a solid or closed plunger and the other a shell or open plunger.

STEAM AND WATER ENGINE AND PUMP.—E. McClintock, New Brunswick, N. J.—This invention relates to a new and improved method of constructing and arranging the parts of steam and water engines and pumps whereby the power may be applied to the piston in the simplest and easiest manner, and the invention consists in employing two double-acting cylinders in each of which cylinders the piston acts as a four-way valve for the distribution of steam or other fluid or liquid for the other cylinder.

DEVICE FOR MAKING BRICK.—Daniel Woodbury, Minneapolis, Minn.—This invention consists in the construction of a machine by which a number of bricks may be taken from the yard (where they have been deposited from the molds to dry) and carried by hand to and arranged in the pile called by brick makers a "hake."

MACHINE FOR CUTTING TUBES.—Nicholas Thomas, Chicago, Ill.—The object of this invention is to furnish a machine or tool for cutting off the end of boiler tubes or tubes for other purposes and the invention consists in arranging in a suitable stock a cutting tool which is forced outward with a screw by means of a double inclined plane.

STEAM AND VAPOR CYLINDER.—Alexander Webster, Seneca Falls, N. Y.—This invention relates to the use of steam or vapor in the process of dressing woolen and other clothes and in other processes and for other purposes and it consists in adjusting a perforated steam pipe in a perforated cylinder with suitable provision for the discharge of the water of condensation.

SALT AND PEPPER SPRINKLER.—George W. Putnam, Peterboro, N. Y.—This relates to an invention for sprinkling salt, pepper, etc. In this invention the holes are made on one side of the cap or cover, and the bottle is held horizontally when used. This prevents clogging as the weight of the salt, etc., cannot press against the portion nearest the holes the weight being supported by the side of the bottle.

COMBINED CARRIAGE AND CRADLE.—C. W. Higgins, Waukesha, Wis.—This invention consists in so hanging or attaching the body of a child's carriage to the axles of the same that it can be readily attached and detached at pleasure, and in providing such body with rockers so that when detached it can be rocked upon the floor whereby a combined carriage and cradle is produced.

MEANS FOR DEPRIVING WOOL OF ELECTRICITY.—George R. Gardiner, Westerly, R. I.—This invention consists in certain means employed for preventing the development of electricity during the condensing operation, whereby a great amount of stock is prevented from being wasted and the condensing operation greatly expedited.

BLACKING BRUSH.—George R. Burden, Waltham, Mass.—This invention relates to that class of such brushes as are provided with two brushing surfaces the one for applying the blacking to the boot, and the other for rubbing and polishing the boot after the blacking. The invention consists in attaching or securing to the back of a blacking brush in any suitable manner to be readily detached, a box or receptacle of blacking, and in so hanging the brush on the same side of the blacking brush therero that it can be swung over to and upon the blacking in the box, for being coated or provided therewith when being swung back to its original position it will be so held that the blacking contained on it can be applied to the boot or shoe.

CAR WHEEL.—John Harris, Marquette, Wis.—This invention relates to an improvement in the construction of railroad car wheels for lubrication of the parts while at the same time they are held together solidly.

WAGON BRAKE.—Ezra N. Curtice, Spring Water, N. Y.—This invention relates to an improvement in the construction and arrangement of a brake on a wagon and consists in attaching a rocking brake shaft to the hounds and reach in front of the wheels on the ends of which are eccentric arms or projections on which are loosely hung the brake shoes or rubbers in such a manner that they shall bear against the wheel to operate them and shall be free from pressure on the wheel when the brake is not required.

STEAMBOAT PADDLE WHEELS.—E. C. Smith, Old Ripley, Ill.—This invention relates to an improvement in the construction of paddle wheels for propelling steamboats, and consists in attaching fixed eccentrics upon the frame, having loose revolving collars around them, which are connected with the paddles by jointed arms, in such a manner that upon each revolution of the wheel the paddles dip perpendicularly, as they descend into and rise with the water, and thus present a constant resistance at right angles to the line of the horizon.

DOOR LOCK.—Michael Knapp and John Knapp, Hudson city, N. J.—This invention relates to a door lock, in which iron bolts are used, the main bolt being locked by an auxiliary bolt, whenever the door is locked; while when unlocked the main bolt is perfectly free and can be moved directly by the key. The parts are so arranged that the key can only be turned in one direction, both for locking and interlocking. By the application of the auxiliary bolt the main bolt is held firm when locked and cannot be moved back by pressing from the outside.

HANGINGS FOR WALLS OF PARLORS AND SALOONS.—J. M. Souternon, New York city.—The object of this improvement is to introduce a new and beautiful covering, or hanging, for the walls of parlors and saloons, by employing for this purpose, instead of wall paper, a delicate tissue, or gauze fabric of silk, the surface of which is watered like moire antique, or ornamented with figures in various colors.

WHIP SOCKET.—E. W. Scott, Wauregan, Conn.—This invention relates to a new and improved fastening applied to a whip socket in such a manner as to hold the whip firmly therein, prevent it from moving or shaking laterally, and at the same time not interfere in the least with its ready insertion in the socket, and its withdrawal therefrom.

WAGON SEAT.—R. N. Rockwell, Glenwood, Iowa.—This invention relates to a novel application of springs to a wagon seat, more especially designed for the seats of lumber and business wagons. The object of the invention is to obtain, by a very simple and economical means, a spring seat which will not, in the application of the springs, interfere in the least with any of the parts of the wagon or the load which may be placed therein.

SNAP HOOK.—C. H. Atwood, New Britain, Conn.—This invention consists in combining a snap hook with a plate in such a manner that the plate will serve as a protection to the snap hook, and prevent the latter being injured by abrasion or rubbing, as is more frequently the case, when the device is applied to those bridles for which the invention is more especially designed, as horses are very generally addicted to the habit of rubbing their heads against posts and other fixtures, when attached or hitched thereto. The invention also consists in the mode of manufacturing the invention, whereby a good substantial article is sure to be obtained.

BEVEL AND TRY SQUARE.—John Graham, Ludlow, Vt.—This invention relates to a new and improved combination of a bevel and try square, whereby a very useful implement is obtained for carpenters and joiners.

HORSE YOKE.—Thomas J. Barnes, Cambridge, Ill.—This invention has for its object to simplify the construction of harness, and at the same time furnish an arrangement by the use of which the horses may be worked close up to trees, fences, etc., without injuring the trees, or catching upon the fences.

STOVE PIPE DRUM.—Eben Webster, Holland, Mich.—This invention has for its object to furnish an improved stove drum so constructed and arranged as to obstruct the escape of the heat into the chimney, and cause it to be radiated through the room, which also acts as a damper to regulate the draft of the stove, and which is a complete spark arrester.

ANNUNCIATOR.—Henry Gross and George S. Yingling, Tiffin, Ohio.—This invention is designed to furnish an improved enunciator for use in hotels and other places.

SPINNING WHEEL.—Jonas H. Rowe, Hudson, N. Y.—This invention relates to a new and useful improvement on the simple spinning wheel for household use, and it consists in a novel and useful modification thereof, whereby the operator can spin while sitting perfectly still on a stool or chair by the side of the machine. The object of the invention is to avoid the walking toward and from the spindle hitherto required, in order to draw out or attenuate the roping while being spun, and to cause the yarn as spun to be wound upon the spindle. To this end the invention consists in having the spindle head attached to a radius arm arranged in such a manner that it may be moved through the medium of a treadle, and the spindle made to approach and recede from the operator at the will of the same, due provision being made for the tightening of the belt.

PROPAGATING BED.—N. H. Lindley, Bridgeport, Conn.—This invention relates to a new and improved application of heated water to propagating beds in propagating houses, and has for its object the heating of the bed to a proper or required temperature, and at the same time keeping the temperature of the house sufficiently high to avoid the condensation of vapor, and a consequent damp atmosphere within the house. The great difficulty hitherto experienced in propagating plants by bottom heat has been the keeping of the bed, and the house in which it is placed, at a proper temperature with one and the same heating apparatus—the house, if kept at a proper temperature in cold weather, causing the bed to be unduly heated, and if the latter be kept at a proper temperature, the house being too cold, or of sufficiently low temperature to admit of the vapor condensing, and causing the atmosphere to be damp and unfavorable to the healthy development and growth of the surrounding plants. In order to avoid this difficulty two different heating apparatuses have, in some instances, been used, but this plan is attended with great expense and considerable trouble. This improvement will keep both the propagating bed and the house at a proper temperature with one and the same heating apparatus, which may be very economically constructed.

APPARATUS FOR RAISING AND SECURING THE LEGS OF HORSES TO SHOE THEM.—J. P. Champion, Phelps, N. Y.—The object of this invention is to raise and secure the leg of a horse in order to shoe or otherwise handle him safely with impunity, and it consists of an apparatus formed of straps and levers attached to a frame so arranged that a horse may be kept in position, and have one leg at a time lifted from the ground and held in a bent position securely.

RAILROAD CHAIR.—Peter Allen, Rutland, Vt.—This invention relates to an improvement in the construction of railroad chairs, and consists in making two plates of cast iron which form the bed and sides of the chair, and are connected transversely by two screw bolts and nuts, and are secured to the rails and the sill of the track by four spikes, two on each side, passing through both plates, and the flange or base of the rails.

LIFTING JACK.—Jacob Stoody, Ripley, Ohio.—This invention relates to a new and improved method of constructing jacks for lifting purposes, and the invention consists in operating upon an upright lifting bar by an eccentric lever.

SOLAR PRINTING CAMERA.—Lyman D. Bigelow, Albion, Mich.—This invention relates to a new and improved method of moving and guiding the condensing lens of a solar printing camera, whereby it is adjusted so as to correspond with the position of the sun during the day, and during the different seasons of the year.

CEMENT.—John James Bodmer, Newport, Great Britain.—This invention relates to the manufacturer of cements for various purposes, and the combination and use of new materials or substances therefor.

GAGE FOR SEED PLANTER.—H. C. Fairchild, Brooklyn, Pa.—This invention relates to an improvement in the gage of a seed planter, whereby the gage can be set on the hopper from the outside, the seed planter, to which the improvement is attached, being the one for which letters patent were granted in 1860.

WASHING MACHINE.—G. C. Selfridge, Saratoga Springs, N. Y.—This invention relates to a double acting washing machine, the ends box of which has a corrugated bottom and ends and both ends of the plungers being roughened. Thereby the plungers will be enabled to operate on both ends of the washing machine and twice as much work can be done than by the single washing machine.

CAR COUPLING.—Lewis O. Shultz, Mattoon, Ill.—This invention consists in attaching to the drawheads of the car a coupling pin and a guide piece and a hinged catch all of which are made to operate effectively without the aid of springs or weights.

SPRING BOTTOM FOR BEDS, SLATS, ETC.—J. W. Wilder, New York city.—This invention relates to a spring bottom which is appliable to beds, seats of chairs, lounges, sofas or any other article to which a spring bottom may be applied. It consists of a series of springs which are enclosed in tubes and acted on by plungers with large heads on which the cushion, mattress or other article is placed either directly or with intervening slats in such a manner that by the heads the cushion is preserved from being injured by the springs, and furthermore the springs by being enclosed in tubes are prevented from tilting over and consequently they are enabled to retain their power and elasticity for a long time.

METHOD OF ORNAMENTING GLASS LAMP SHADES AND GLOBES.—Richard Guthrie, and John Shearer, New York city.—This invention relates to a new manner of ornamenting plain glass globes or shades for gas or oil lamps, and consists in providing sectional pieces of colored or stained glass, and in fitting the same to wire or other clamps by means of which they can be suspended from the edges of the globe or shade.

MILK CAN.—Nelson C. Burnap, Argusville, N. Y.—This invention consists in rounding the bottom of the can for the purpose of avoiding the creases which were formed where a flat bottom is used, and in which dirt could easily accumulate but could not so easy be washed out again.

SLEIGH BELLS.—Cyrus R. Clark, Cobalt, Conn.—This invention relates to a sleigh bell to which a shank is cast in the usual manner. To each side of the shaft are secured by means of rivets or otherwise sheet metal plates, which project beyond the lower end of the shank, forming flanges, when inserted in a leather strap, the flanges project beyond the inside of the same, and are then bent out, so as to firmly lock the bell to the strap.

BED BOTTOM.—Frederick Leadbeater, Detroit, Mich.—This invention relates to a new and improved mode of attaching wooden slats to the end pieces of bedsteads whereby a very durable and elastic bed bottom is obtained, and one which may be constructed at a comparatively moderate cost.

BEVEL.—Leonard D. Howard, St. Johnsberg, Vt.—This invention relates to a new and useful improvement in jointed bevels and it consists in having the screw and thumb nut arranged or applied in such a manner that the head of the screw and the thumb nut will secure the blade to the handle or stock, and will be flush with the rules of the latter.

PARASOL AND UMBRELLA RUNNER.—Henry Kursh, Brooklyn, N. Y.—This invention relates to a new manner of arranging the fastening of the sheet metal runners of umbrella or parasol frames, so that the central stick will not be weakened by slots or recesses cut into it as by the ordinary method.

ANIMAL TRAP.—Jeremiah Schroy, Fort Ville, Ind.—This invention consists in an arrangement whereby the animal is forced with a box by a revolving door which is actuated by a spring and which is released by the weight of the animal.

ICE PITCHER.—Nathan Lawrence, Taunton, Mass.—This invention relates to a new and useful improvement in doubled walled or ice pitchers, such as are constructed of white metal and most generally plated. Hitherto these pitchers have had their inner wall or lining constructed with a bottom connected to the body or main portion by means of solder and these bottoms would very frequently become detached or be parted at their joints or seams so as to leak owing to the throwing of large lumps of ice into the pitcher. This invention is designed to obviate this difficulty and to this end I construct the inner wall or lining with a seamless bottom and also strengthen the same by means of ribs or with a "backing" whereby the difficulty above mentioned is avoided.

COMBINED TOOL.—B. W. Collier, Oxford, Miss.—This invention combines in one instrument a pair of pliers, a pair of clippers, a burnisher, a hammer, several punches, three or four wrenches, a saw set, a screw driver, a scraper and a set of holes for straightening wire, nails, etc.

ENGRAVING MACHINE.—John C. Guerrant and Benton J. Field, Leaksville, N. C.—This is an improvement on the engraving machine patented by the same parties Dec. 12, 1866, and numbered 60,506.

GASOLINE COOK STOVE.—Jacob D. Spang, Dayton, Ohio.—This invention consists of a simple device for utilizing and diffusing uniformly the heat from gasoline burners, for the purposes of cooking.

FURNACE.—David Hargar, Des Moines, Iowa.—This invention is for the purpose of conducting air from a pan, or from any cold air region, to a furnace or grate, and distributing it properly to the fire.

MACHINE FOR MAKING PAPER BAGS AND ENVELOPES.—E. B. Olmsted, Washington, D. C.—In this invention the machine is fed from a roll of paper, which it cuts into suitable pieces for bags or envelopes of any desired size and shape, gums, folds, prints, or stamps, and having united the edges firmly, delivers in perfect condition for immediate use.

WAGON BRAKE.—Thomas Smith, California, Mo.—This invention has for its object to furnish an improved manner of attaching the brake block to the brake bar, which shall be cheap, simple, durable and effective.

SELF CLEARING ANCHOR.—W. J. Armstrong and Charles Browne, Brooklyn, N. Y.—This invention has for its object to furnish an improved anchor, strong, durable, and simple in construction, and which shall be so constructed as to clear itself should it become fouled.

COMPOSITION FOR TEMPERING STEEL.—F. G. Harris, Willsborough, N. Y.—This invention has for its object to furnish an improved composition for tempering steel, which will give it a better temper, greater, toughness, elasticity, and hardness without brittleness, than any of the compounds now in use for this purpose.

DEVICE FOR STAMPING AND SHAPING LEATHER.—B. B. Harris, Lockport, Ill.—This invention relates to an improved device for stamping and shaping leather, and consists in a combination of toggle joints, levers, springs, follower, dies, and knife.

GATE LATCH.—Alfred K. Davis, Carey, Ohio.—This invention relates to an improved gate latch, and consists of two bars pivoted on an upright secured to the gate post or upon the gate itself, the bars being attached at one end to another upright or connecting bar, operated by a lever similarly pivoted or attached; or where the latch bars are pivoted to the gate post, then pivoted upon an upright or ear attached at the top of the gate post. The free ends of the latch bars hold the gate by extending over the front vertical bar thereof.

HORSESHOE.—Jacob Wheeler, Huntington, Ind.—This invention relates to an improved form of horseshoe, its object being to expand the hoof when hoof bound or the heel is contracted.

GATE.—S. M. Scothorn, Findley, Ohio.—This invention relates to an improvement in gates, and belongs to that class of double-slide gates in which the extension gate slides in the main gate.

CLEAT CHOCKS.—Amariah Lake, Smith's Landing, N. J.—This invention consists in an improved chock in which the cleat or cairl is bedded. The chock, which may be made of wood or metal (the latter being preferred), is made in the form of a frame having a beveled or grooved edge the ends of which are turned down to clamp the timber or stanchion.

WASHING MACHINE.—Joseph Bevis, Putnam, Ohio.—This invention has for its object to furnish a convenient and effective washing machine, by means of which the clothes may be washed quickly and thoroughly without friction or wear.

PESSARY.—M. J. Rhees, M.D., Mount Holly N.J.—This pessary is to be used as a support and covering to the mouth of the uterus in cases of female weakness, falling of the womb, etc.

COMBINED DOOR FASTENER AND POCKET KNIFE.—Benj. F. Porter, Manchester, N. H.—This invention consists in the combination with an ordinary pocket knife, of a device suitable for use as a fastener for doors.

RAIL JOINT CLAMP.—Francis Pidgeon, Saugerties, N. Y.—This invention consists in the use of a dovetail shaped clamp, thereby dispensing with all bolts and allowing the rail to contract or expand by heat or cold; also in bringing the weight of the train when passing over the joint to and upon the flat bottom to the rail, by carrying the clamp upon the outside of the rail up even with the top of the rail.

TABLE CUTLERY.—Matthew Chapman, Greenfield, Mass.—By this invention the blade, bolster, tong, and handle are all made of or forged from one and the same piece of steel, whereby a most durable, serviceable, and desirable piece of table cutlery is produced.

LAST.—Ambrose Taylor, Osawatomie, Kansas.—The object of the present invention is to provide some simple device as a fastening for the block to the last, whether the last be in use or not and which can be released or unfastened in the most ready and simple manner.

SUPPORTER.—J. B. Seeley, Philadelphia, Pa.—The present invention relates to an abdominal supporter consisting of two front parts, hinged, pivoted, or swiveled to the ends of spring bands, for encircling the hips of the person, the whole supporter being made of hard vulcanized india rubber or gutta percha.

FASTENING FOR THE FLY FRONTS OF PANTALOONS.—Isaac Stratton, Keene, N. H.—This invention consists in a device for fastening the lower part of the fly fronts of men's and boy's pantaloons, instead of employing buttons for the purpose, and is intended especially for the convenience of aged and other infirm persons whose fingers are disabled or crippled, and cannot button and unbutton with facility, and also for boys.

SADDLE.—Godfrey Marshall, Indiana, Pa.—This invention relates to the saddles of harness more particularly, and consists in making the top or frame to the saddle in one piece, having a raised flange or laps around its sides or edges upon its back or under side, and between such laps placing the cushion or pad made of the proper shape and provided with screw nuts, in proper position for receiving the tenet rings, screw sharps and other screw bolts, by means of which the pad is secured to the frame, at the same time also fastening the saddle straps.

HEAD REST.—Robert Hale, Chicago, Ill.—This invention relates to an adjustable head supporter, for use more particularly on railway cars while traveling, the particular object being to provide a supporter of such construction that rest and sleep can be obtained while traveling, while at the same time the supporter is portable, simple, and cheap in construction.

WAGON REACH.—Zenas Plumb, De Witt, Iowa.—This invention relates to an improvement in the construction of a wagon reach, either single or double, and consists in applying a swivel to it in such a manner that the fore and hind axles of a wagon or other vehicle can rock out of the level independently of each other when either wheel falls into a rut or strikes a stone or other obstruction, whereby all twisting or wrenching of the reach is prevented and injury thereof is avoided.

ADJUSTABLE ROTARY LOOM CAM.—Ransom Sargent, Norwich, Vt.—This invention relates to a new and useful rotary cam for making the treddles of a loom to spring the web, and consists of a series of disks or circular trucks attached to a series of shafts which have their bearings in plates or heads secured to a central shaft, the trucks of the sub-shafts set on pins to be movable and adjustable on their shafts in such manner that any one or more may be made to engage with cams of corresponding treadles, for working the treadles and springing the web to suit the pattern of the cloth to be woven.

PIVOT GAGE, STAFF AND FRAME FOR MILLSTONES.—Walter Ring, Gosport, Ind. Patented Oct. 29, 1867.—This invention relates to a device for gazing and stuffing or leveling millstones accurately and plumbing the spindle truly, by which this important part of a miller's work may be performed readily and perfectly by any one, even the most unskillful, with absolute certainty.

SHUTTLE.—George S. Crandal, Pitcher, N. Y. Patented Oct. 29, 1867.—This invention relates to devices attached to and connected with an ordinary weaving shuttle, for the purpose of regulating the filling during the operation of weaving as it runs from the spool to the eye of the shuttle, and also threading the shuttle with greater facility than in the old way.

MODE OF REGULATING A POSITIVE TENSION OF RUBBER THREADS IN ELASTIC FABRIC LOOMS.—F. Painter, East Hampton, Mass. Patented Oct. 29, 1867.—This invention relates to a new and useful improvement in looms for weaving elastic fabrics of vulcanized rubber threads, and consists in an arrangement of mechanical devices for stretching the rubber threads and holding them at a certain positive degree of tension while the fabric is woven.

FASTENING FOR AX AND OTHER HANDLES.—James Stewart, Money Creek, Minn. Patented Oct. 29, 1867.—The object of this invention is to fasten helves or handles in axes, picks, hammers, etc., for the purpose of securing them firmly and permanently in the eye.

FLOUR COOLER AND CONDENSER.—John Gray, Dubuque, Iowa. Patented Oct. 29, 1867.—This invention relates to a new and useful improvement in apparatus for cooling flour and the stones of a mill when grinding, and condensing the moist vapors or steam which are generated in the process of grinding grain.

BLIND HINGE AND FASTENER COMBINED.—Nathaniel B. Spooner, Plymouth, Mass. Patented Oct. 29, 1867.—This invention relates to a new and improved device for hanging window blinds or shutters, by which they are fastened when either opened or closed automatically; it is simple and cheap.

CHILD'S CRADLE.—D. A. Dunham, Palatka, Fla. Patented Oct. 29, 1867.—The design of this invention is to make a cheap and convenient child's cradle of a flour or other light and clean staved barrel, by cutting out a portion of the staves and supporting those which are left to form the cradle with the hoops.

UMBRELLA.—Wm. Money, Paterson, N. J. Patented Oct. 29, 1867.—This invention relates to a new and improved device for holding umbrellas or parasols in place on the handle, whether raised or lowered, and allowing them also to be raised and lowered easily.

Answers to Correspondents.

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

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

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

L. C., of Mass.—Cast nails of composition (brass) have been extensively used for boat building and ship building purposes. We have seen them from the size of an ordinary shingle nail up to large spikes. The cast metal is sufficiently tenacious for the purpose.

G. W. F., of Pa.—We know of no better method of razing or trueing a grindstone than cutting circumferential grooves in its face with a file tang and then using a bar of soft iron, as nail rod, to remove the intervening substance.

P. J., of N. Y.—Pen nibs made from the goose quill to be used in a handle, as steel pens, were manufactured in Taunton, Mass., at least twenty years ago. We have some specimens now on hand. They were never very popular.

S. A. M., of Oregon.—According to Bishop's History of American Manufactures, saw mills were used in Massachusetts before they were employed in England. The first mill was erected in the colony in 1633. In England it met with determined opposition, and as late as 1767 one was destroyed by the populace.

Q. A. C., of Ohio.—"Will not a belt slip on a smooth iron pulley sooner than on a rough one? Please give your opinion." Our opinion has been given on this subject before. The general practice of builders and operators of machinery should be a sufficient reply. All pulleys are now made with perfectly smooth faces. The reason is obvious: the larger the surface presented to the belt, of course the greater its adhesion. We remember when for lathe cones nothing but wood was believed to be sufficient, and the faces of the pulleys must be circumferentially scored. Now they are made of iron and polished.

C. G. H., of N. Y.—"How can I prevent stovepipe from rusting while not in constant use?" Heat it and coat it inside and out with paraffine, or with asphaltum dissolved in spirits of turpentine; then keep it in a dry place.

H. V. P., of Ohio, asks how he can mend rubber boots that have cracked. He has tried common rubber, melted, without effect. There is a rubber cement sold almost everywhere which will do the business. Directions accompany each box or can. Pure rubber for the purpose may be dissolved in petroleum benzole. The boots should be perfectly dry and warmed.

R. S., of Ohio wants to know how to get the bright blue which is seen on fire-arms, etc. The process is simply heating the piece to be blued in a clear charcoal fire until the requisite color is obtained, and then covering it with dry ashes. The article to be blued should be highly polished and clean.

J. H. H., of Conn.—Your request that we should write on the incompetency of so-called engineers as one of the reasons for boiler explosions, has already been complied with in several articles. The remedy is beyond our influence. Legislative interference or boiler insurance companies can alone alleviate the evil. We do not propose to harp continually a subject which is already trite.

H. K., of Wis., describes a "hair snake" which he found, and seems to suppose it to be a veritable horse hair. It gave the same sound, when stretched and vibrated, as a hair would under the same circumstances. If he will refer to page 280, in No. 18, current volume, he will find a sufficient reply.

J. M. T., of Minn., thinks a "direct-acting—overshot or breast—wheel, may give better results than any turbine. His plan is to confine the water in the bucket until the pressure of the column from above is cut off and transferred to the succeeding bucket. There will be no chance for back pressure, and after performing their work the buckets are withdrawn so as to be out of the reach of back water until wanted again. This wheel would discharge water only with the motion of the wheel, while others discharge one-fifth or more faster than the motion of the wheel." This appears to be a modification of the automatic bucket wheel. If properly constructed it may be a success.

J. E. R., of N. Y., inquires how to "cut gutta-percha and india-rubber so that it becomes a liquid." Probably our correspondent means by "cutting" dissolving. The solvent for gutta-percha is coal-tar benzole, and for india-rubber benzole of petroleum. India-rubber is "cut" by knives revolving or working in water.

G. H. M., of N. Y., asks "what is the greatest distance to which steam and hand engines have thrown a stream of water." We cannot give a decisive reply, but we have seen a solid stream thrown 220 feet. Makers of fire engines would be better authority.

G. W. M., Ohio.—"Do you know of a cement to stop up stove joints which will harden in time or by heat?" Pipe clay and clean sand equal parts; wood ashes and salt; or iron filings and sal-ammoniac. Either mixed with water will make a proper cement.

A. D., of Pa.—"Can black wool be bleached or dyed white?" No. The only dyeing of white we are aware of is in silk. The pearl white of silk is produced by dyeing; the silk in its natural state being of a pale yellow color and incapable of being bleached.

H. F., of Conn., wishes to convey water from a dam through 400 feet of 20-inch pipe to a flume to supply a turbine, and asks if cement pipe will answer. In reply we would say that we see no reason why the cement pipe will not do, as there is but ten feet of head or fall. It is used for aqueduct purposes with success. A good pipe may be made of pine plank built in the form of a tube and hooped with iron. This is excellent where the diameter exceeds 30 inches. But probably the best form of wooden tube is that patented by J. K. Mayo, composed of spiral veneers. A two-foot tube on this plan ⅝ of an inch thick has successfully resisted a hydraulic pressure of 110 pounds to the square inch.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

A metal-working shop, with two patents, for sale or exchange for Real Estate in city or country. Townsend & Sears, 218 Fulton st., room 7.

Manufacturers of Portable Saw Mills and Engines please send circulars and cash prices immediately. Address J. J. Hovell, Avon, Ill.

For sale low—the patent right of an improved Tag Holder—best out. Address A. Grashus, St. Paul, Minn.

Wanted—a Horizontal Face Plate Boring and Turning Lathe to swing 8 or 9 feet, new or second-hand. Address, with description and price list, T. H. Risdon, Mt. Holly, N. J.

Smith's Brick Machine.—This invention, which was illustrated on page 280 is further described and advertised in another column. See last page of this paper.

J. A. Althouze, New Harmony, Ind., wishes the address of Scissors Manufacturers.

Manufacturers of Loom Shuttles please send their address to Geo. L. Crandal, Pitcher, N. Y.

Wanted—by a thorough practical and licensed Engineer, who is a practical machinist and draftsman, and who uses no intoxicating drinks, a position as chief or assistant, either of a marine or stationary engine. Address Engineer, Adams' Express office, Georgetown, D. C.

A. Leize & Co., Reading, Pa., wish to correspond with Manufacturers of Machines to Saw, Plain, and Joint Barrel Staves.

For Sale Cheap—A Knee-Joint Press, of great Power, for Compressing Bale Cotton, etc. It can be worked by horse or other power, or by hand. Can be seen at Riverdale Mills, Mamaroneck, N. Y. John Mc Donald, Box 8½, Mamaroneck, N. Y.

Makers of Machines for Packing Fine-Cut Tobacco in Paper per and Foil. Send address to Baird & Tuley, 64 East st., Louisville, Ky.

Wanted—The address of the "Diamond Annular Drill Company." Lewis B. Tebbetts, Baltimore.

Wanted—A Manufacturer for my non-conducting illuminated base chimney burner, suitable for Benzine, or any light Petroleum oils, or fluid. Penrose Chapman, Box 145, Brunswick, Me.

Rights for Sale, of Browne's Patent Extension Cabinets for Sewing Machines. J. D. Browne, 177 West Second st., Cincinnato, Ohio.

EXTENSION NOTICES.

George E. Burt, of Harvard, Mass., having petitioned for the extension of a patent granted to him the 7th day of February, 1854, for an improvement in Machines for cleaning and assorting bristles, for seven years from the expiration of said patent, which takes place on the 7th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of January next.

William Burnett, of San Francisco, Cal., and John Absterdam, of New York City, having petitioned for the extension of a patent granted to them the 28th day of February, 1854, for an improvement in the use of insible disks in steam boilers, for seven years from the expiration of said patent, which takes place on the 28th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of February next.

James McCarty, of Reading, Pa., having petitioned for the extension of a patent granted to him the 31st day of January, 1854, for an improvement in rollers for scarfing the edges of skelps for lap-welded tubes, for seven years from the expiraton of said patent, which takes place on the 31st day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of January next.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,578.—ANVIL.—James E. Emerson, Trenton, N. J. Sept. 11, 1867.

2,738.—HAT-BLOCKING MACHINE.—Julius Sheldon, New York City. Sept. 27, 1867.

2,739.—RAILWAY WHEEL.—Cornelius Kingsland, McKees Port, Pa. Sept. 28, 1867.

2,742.—MANUFACTURE OF HATS, AND MACHINES FOR PRODUCING THE SAME.—Henry Kellogg, New Haven, Conn. Sept. 28, 1867.

2,746.—LUBRICATING PACKING.—Thomas Silver, New York City. Sept. 28, 1867.

2,779.—MACHINERY FOR SEWING BOOTS AND SHOES.—Augustus Destouy and Frederic Renaud, New York City. Oct. 2, 1867.

2,785.—TREATMENT OF COTTON AND OTHER FIBROUS MATERIALS USED IN DENTISTRY.—John A. McClelland, Louisville, Ky. Oct. 3, 1867.

2,799.—MACHINERY FOR THE MANUFACTURE OF BRAID.—George Rehfuss Philadelphia, Pa. Oct. 4, 1867.

2,859.—ELECTRIC TELEGRAPH APPARATUS.—Elisha Gray, Oberlin, Ohio Oct. 12, 1867.

Improved Portable and Folding Bedstead.

The object of this improvement is to construct a bedstead which may be capable of being folded together and easily transported, stowed away, or removed from the dwelling in case of fire. When ready for use it has the appearance of an ordinary bedstead, as seen in Fig. 1: but when folded for removal, or stowage, it presents the form seen in Fig. 2.

The side rails are made each in two parts, hinged at one end to the head and foot, and at the other together in the middle of the bedstead. The slat frame is also in two parts, one hinged to the head board and the other to the foot board. When in position for the reception of the bedding these frames rest on snugs, or pins, in the side rails. If the bedstead is to be packed or removed these frames are lifted respectively against the head and foot boards, and the side rails swung in, which brings the two ends of the bedstead together, when the whole is secured, as in Fig. 2, by a convenient hook under the head board that engages with a staple under the foot board.

This operation, or that of expanding the device, is the work of an instant, merely, and in either form the bedstead is convenient and easily handled. It can be easily packed on any occasion, whether for removing or transportation. It is complete in itself and obviates the annoyances so often experienced by householders in their frequent removals, the structure being a whole with no loose patch.

One great advantage in a bedstead of this construction is that it has no loose parts liable to be lost or broken, and the whole structure can be removed complete from a burning house in much shorter time than would be required for the ordinary bedstead. Its construction is easily seen by a glance at the engravings.

Patented through the Scientific American Patent Agency, Aug. 20, 1867. All communications should be addressed to the inventor, B. F. Woodside, at Atlanta, Ga. States rights are for sale.

Fig. 1

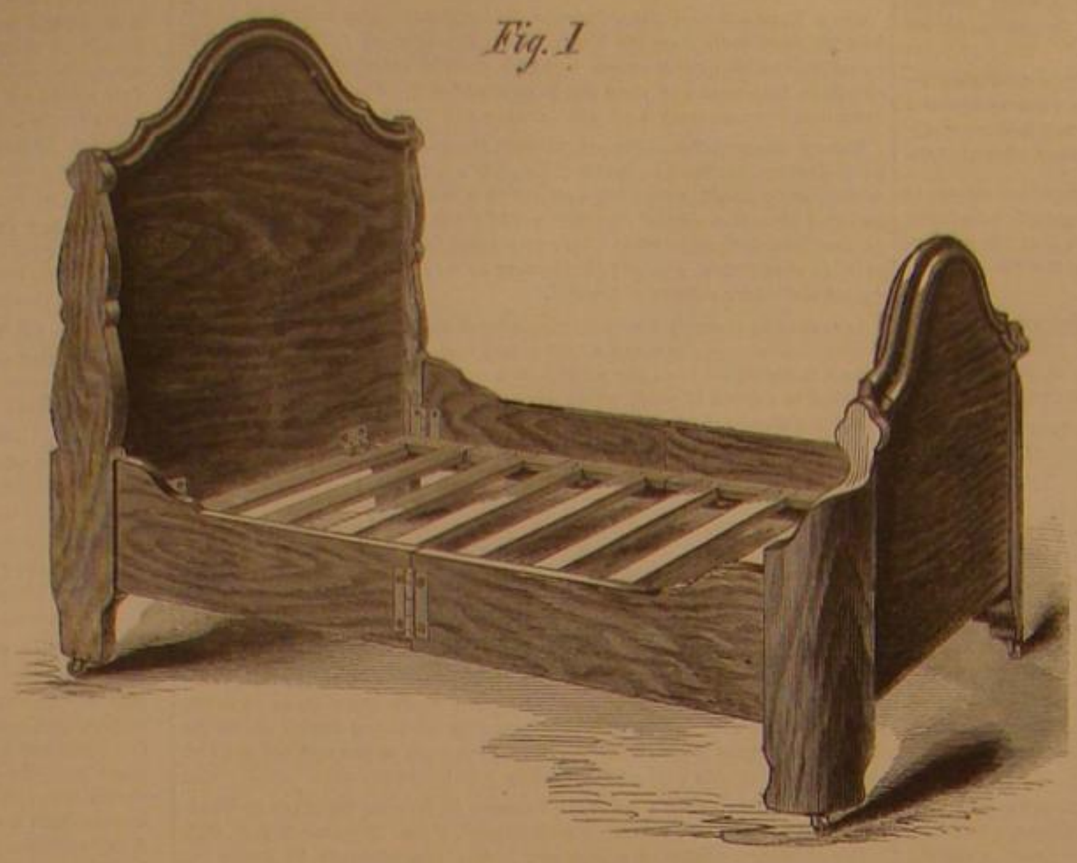
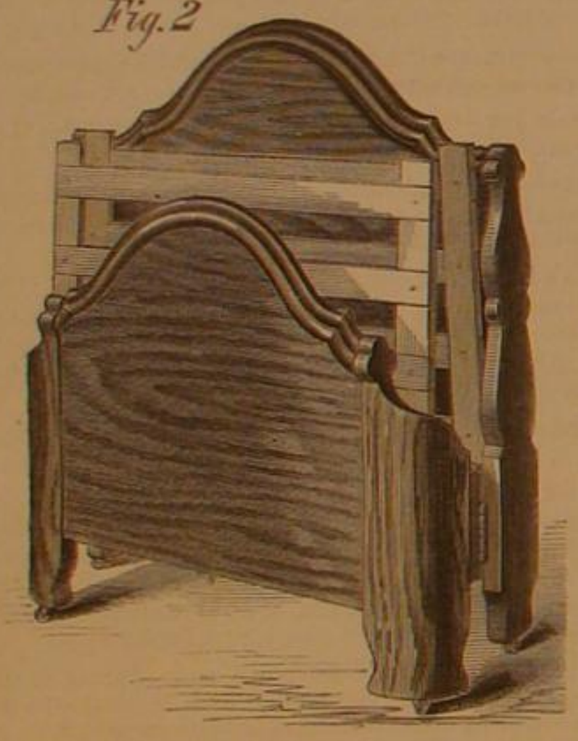


Fig. 2



WOODSIDE'S PATENT FOLDING BEDSTEAD.

The Russian Telegraph.

The complete success of the Atlantic telgraph cables has been the death blow of this enterprise, which was started immediately after the loss of the cable of 1865. The San Francisco *Bulletin* of the 8th ult. gives the particulars of the arrival and experiences of the construction party which for two years and four months have been working on the northwestern coast. Their summers have been passed in a country in which for weeks it never grew dark, and in the winter the daylight does not last more than two hours and a half; in which the thermometer in winter goes down to 58° below zero, and in some places of Russian America to minus 69° F.

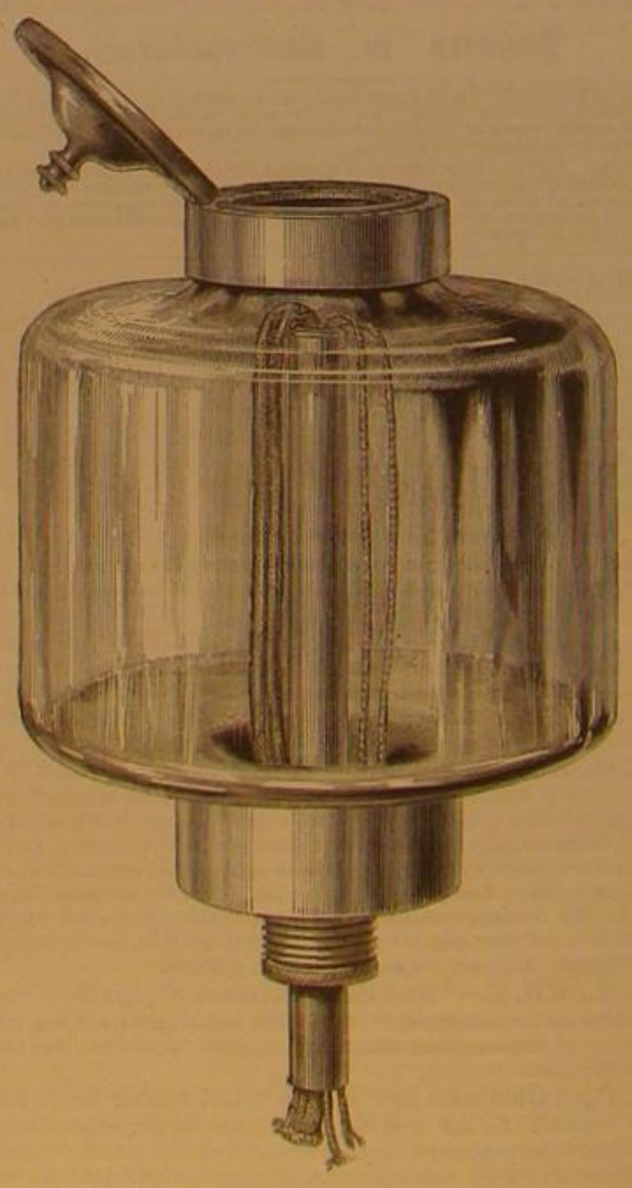
The company has explored the route of Russian America, and has located a practical route from the last station in British Columbia to the point where the line would leave the American continent, by a submarine cable, to reappear on the coast of Eastern Siberia, on the Asiatic continent. Since the company's ships left for San Francisco, in the autumn of 1866, seventy-five miles have been constructed in Russian America. In the northern part of British Columbia the work has also been going on within the past year. It has been demonstrated that the northern climate on this continent is not so inclement but what men can work in the winter, and also that extreme cold does not affect the electrical condition of the wire. As regards the northern portion of the continent, the work is now abandoned, all the valuable material and stores and all the constructors having been brought back, and the partially constructed line is left to the mercy of the elements and the good will of the Indians.

It is stated that during the three years the Western Union Telegraph Company have been engaged in this northern region, out of an average number of 250 men in summer and 150 in winter, they have not lost one by accident, by exposure, or by any disease incidental to the country or the work in which they were engaged.

The company had, in 1866, provided sufficient provisions with each party to support them until the vessels returned this year; and except where in traveling a party found unexpected obstacles, or were delayed, there were no cases of serious hardship. Those parties who were near the ports of the Russian Fur Company had the advantage of the Telegraph Company's credit. Those who were in the wilder parts of the country had to depend upon their guns and traps and Indian supplies for any extra delicacies at their tables. Deer and grouse were frequently obtained, and occasionally a little bear meat, and the party in the Upper Yonkton shot several moose. The Indians themselves were worse provided than usual, game and fish having comparatively failed the year before. In one or two Indian villages in the extreme north, the Indians were found reduced to that state of hunger which led them to commence eating their boots. It must be remembered, however, that the Indian stomach is able to derive more nutriment from a piece of old skin than the more delicate digestive organs of a white man would.

WICKERSHAM'S AMERICAN OIL FEEDER.

The advantages of automatic oil feeders over the old fashioned wasteful system of pouring the oil directly from the can into the journal box, are so obvious that none will be found now to question them. The ordinary oil cup has a central tube rising nearly to the top of the cup, the other end reaching the shaft, within which is a wick designed to lead the oil



to the journal by capillary attraction. Much practice is necessary to adjust the size of this wick to the amount of oil it is desired to deliver, which depends on the size and velocity of the shaft journal, weight, etc. If the wick fits too tight or the oil gets too low the supply of the lubricant is diminished, while if the wick is loose or the cup too full the amount delivered is too large. The cups, in fact, act on the principle of gravitation as well as of capillary attraction.

The one shown in the accompanying engraving is intended as an improvement on the ordinary metal cup, and has never yet failed to give perfect satisfaction. The cup itself is made of thick, but transparent glass, with a metallic hinged top for introducing the oil, and a metallic bottom with threaded stem for seating in the cap of the box. A central hollow stem is screwed into the bottom and reaches to the top. The leaders for the oil are syphons of wire, coated like bonnet or hoop skirt wire, and graduated by size and nature of covering to the amount of oil needed on the journal. The short foot of the siphon reaches into the oil, to the bottom of the interior of the cup if desired, and the longer end reaches the surface of the journal. From this description of its parts its operation, by the aid of the engraving, can be readily understood. It may be noticed that the engraving exhibits several siphons in one cup. This is merely to show their different sizes and qualities.

Being made of glass, the condition of the contents of the cup may at all times be seen. It needs filling or replenishing only occasionally—once in three or four weeks, or once in as many months, according to the service required.

The patent dates Oct. 22d, 1867, and the oilers are manufactured by J. B. Wickersham & Son, 143 South Front street, Philadelphia, Pa., who may be addressed for any further information desired.

Mining Economy.

Commissioner J. Ross Browne, in concluding his last report upon the mineral and metallurgical wealth of the Pacific slope, calls attention to the necessity of a more economical working of mines, more saving processes being the desideratum, and not new fields. A thorough knowledge of metallurgy and mining engineering is necessary. To this end the commissioner thinks we should have a national school of mines in the heart of the mining region, conducted on strictly scientific and practical principles, under the control of none but scientific and practical men. The argument he makes on this subject will command attention. He states that the subject of the concentration and parting of ores is now attracting more attention than any thing else in our mineral developments. The immense loss of gold is shown by an estimate based on statistics collected with much care. If we suppose the yield of gold in 1867 to be $70,000,000, the loss would be rated at least 25 or 30 per cent. Better methods of separation and concentration would have made the yield fully $100,000,000. In Montana nearly all the mining is in free gold. Absurd inventions and new-fangled methods, imported from the East, where there is no experience in mining, makes the loss 30 per cent, although it should be much less than in other districts where the gold is more or less associated with other metals. In Idaho, California machinery is generally used, which is the best made. The lodes are worked to better advantage, and the mills do well and keep close to the assays. None of them, however, are yet working sulphurets, except one at Pioneer with results unknown, but probably successful. The loss in that territory is probably 20 to 25 per cent. In Nevada the lodes are mostly silver bearing. At Austin the mills profess to save 80 per cent. In some instances they work up to 90. The loss is probably not more than 15 to 18 per cent. The ores are roasted almost universally. On the Comstock lode the loss is much greater. The Comstock mills do not, probably, save more than 65 to 70 per cent, notwithstanding all the ingenious devices for saving in the tailings. In California there is a large number of excellent mills; and while in many cases the cost of mining and crushing has been reduced to a minimum, the saving is also frequently quite close. Sulphurets are best treated by chlorination, although there are various new processes for which much is claimed. The chlorination process is said to save 90 per cent. It is interesting to notice, in connection with the above, the following statement of the per centage of mining loss in other parts of the world, which is compiled from official documents: St. John del Bey, Brazil, 30; other mines in Brazil, 30 to 35; Piedmont, 35; Hungary and Tyrol, 50; Zell, 35 to 40; Chili, 66; Australia, 40. These figures further illustrate the importance of seeking and adopting the best means to reduce the per centage of loss.

Moisture and Mortality.

Rain, on the whole, would seem to exert a kindly and healthy influence. There is nothing very deadly in it. It may occasion catarrhs and rheumatic complaints, but these are curable with a little management and medicine. And we are apt to put to its credit the washing away of many of the most injurious causes of disease by a good flushing of the sewers. Summer diarrhœa, cholera, and typhoid fever would be likely to be greatly lessened by a copious rain fall. So says the London *Lancet*, and an examination of a meterological and mortality chart for last year shows that in this city the deaths from all diseases were fewest in numbers during times when the number of inches of rain was the greatest. Dr. Trench, the medical officer of health for Liverpool, has satisfied himself by a series of careful observations, extending over a number of years, that there is an inverse ratio between the amount of rain and the amount of mortality from infantile summer diarrhœa. To the same effect are the tables given by Mr. McPherson, illustrating the relations of moisture to the mortality of cholera in Calcutta. According to these tables, the least mortality from cholera in Calcutta occurs in the months of July, August, and September, which are emphatically the wet months.

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VOL. XVII., No. 21....[NEW SERIES.]....*Twenty-first Year*

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PECULIARITIES OF MACHINES---THEIR INDIVIDUALITY.

An article cut from an exchange has revived in our mind some recollections which may have a practical bearing. Years ago we had some personal experience as a builder and manager of steam engines, both stationary and locomotive, and we had noticed the peculiarities of machines, which, according to the rules of mechanical skill and the exactness of human endeavor, should be alike, yet which presented such marked points of difference, if not of divergence, that mechanical talent was entirely at fault to account for the variation.

Every experienced engineer—to take steam engines as a sample—has noticed frequently, or repeatedly, that while one engine developed its full amount of power, or that quota which was expected of it, another, built after the same patterns, with the same tools, and by the same workmen, failed to fulfill the design of the constructor.

Sometimes it is difficult, if not impossible, to account for these differences, but it is noticeable that they are the more marked as the machinery is the more complex, so that it is natural to suppose that there is, somewhere in the details, a difference of construction, otherwise we must impute the variation to some mysterious agency whose operations are irremediable by mechanical skill. But even when the machine or implement is simple in its parts and built after unvarying gages, the differences may occasionally be detected. The little pocket pistol which may be one of thousands built by the same machinery and workmen will, in some cases, differ widely in its execution from others of the same lot, when a careful comparsion fails to detect the reason. That there must be some variation either in quality of material or construction the mechanic is assured, but he may not be able to ascertain what it is. Sometimes, however, the cause of difference may be detected. A case in point, which we remember, was that of two locomotives running on the same road, the machines being so nearly alike that their parts were interchangeable, yet which differed widely in their respective performances. Repeated examinations of the working parts failed to reveal the cause. The engineer of the inferior machine spent many hours in "tinkering" and "coaxing" his engine, yet still it refused to perform the work of its mate. As a last resort he measured the apertures of the exhaust pipes on both engines, and found that while those of the rival machine measured one-and-a-quarter inches, his measured one-and-three-eights inches. The pipes being of copper, he "drew in" those of his engine one-eighth of an inch, when it performed even better than the other, owing, undoubtedly, to the better care which had been taken of it and its more perfect condition. The difference in the diameter of these pipes was but a trifle, yet no doubt it was the reason of the variation in the work of the two locomotives.

So it may be often that a slight change in the proportions or the actual dimensions of parts may insure evenness and accuracy where the divergence and uncertainty may have been remarkable and mysterious. To ascertain and remedy these points of difference is the province of the intelligent, practical, and educated mechanic. Exactness and accuracy in tools—of which we spoke in a recent number—and educated skill are the true remedies for these difficulties. There is nothing about these differences which need be mysterious or undiscoverable.

But there are some curiosities about machines which seem to be unaccountable. Every user of a sewing machine knows that from some unknown reason the machine which yesterday performed its work so well, so almost enthusiastically, to-day refuses to do more than half its task, and does that half in a surly, indifferent manner. So with many other machines. Even the steam engine is subject to these fits. Is there some occult bond of sympathy between the operator and his machine, by which the latter is influenced by the mental condition of the former; for it is certain that these differences cannot always be attributed to atmospheric or other external influences? This matter is quite humorously and truthfully treated in the subjoined extract, to which we referred in the beginning of this article:—

"It is perfectly well known to experienced, practical engineers, that if a dozen different locomotive engines were made at the same time, of the same power, for the same purpose, of like materials, in the same factory, each of those locomotive engines would come out with its own peculiar whims and ways, only ascertainable by experience. One engine will take a great meal of coal and water at once; another will not hear to such a thing, but will insist on being coaxed by spadesfull and bucketsfull. One is disposed to start off, when required, at the top of his speed; another must have a little time to warm at his work and to get well into it. These peculiarities are so accurately mastered by skillful drivers, that only particular men can persuade particular engines to do their best. It would seem as if some of these 'excellent monsters' declared on being brought out of the stable, 'If it's Smith who is to drive me, I won't go. If it's my friend Stokes, I am agreeable to anything!'

"All locomotive engines are low spirited in damp and foggy weather. They have a great satisfaction in their work when the air is crisp and frosty. At such a time they are very cheerful and brisk, but they strongly object to haze and mists. These are points of character on which they are all united. It is in their peculiarities and varieties of character that they are most remarkable.

"The railway company who should consign all their locomotives to one uniform standard of treatment without any allowance for varying shades of character and opinion, would soon fall as much behindhand in the world as those greater governments are, and ever will be, who pursue the same course with the finer piece of work called Man."

BOILER FURNACE GRATES---THEY SHOULD BE SUITED TO THE COAL.

It has been found by long experience with coal-burning locomotives that furnace grates that will give very satisfactory results with one kind of coal, will give results with another kind (which although it may not show on analysis any material difference in the quantity of its combustible elements or indeed in the quantity of the ash) not at all satisfactory. This is due, for the most part, to the different nature of the substances which constitute the ash left from the combustion of the two species of coal.

If there is a great deal of silicious matter in the ash, which the high temperature in the locomotive furnace can partially fuse, it will run together and a hard vitreous clinker will be the result; and as in a locomotive furnace, owing to the power of the artificial draft produced by the rapid puffs of the exhaust steam, an immense quantity of coal is burned on a very small grate, it will not require a very rapid formation of vitreous clinker to cover the grate (if no means are provided to clean it) to impede the draft and reduce the steam so that the engine can no longer "make time." If, on the other hand, the ash is of a lighter nature, instead of fusing on the grate bars and making clinker, it will be carried through the tubes of the boiler, by the fierce draft, and peppered over the train and the passengers. It is obvious, therefore, that a grate which in the one case will burn the coal perfectly well, will in the other, cause the engineer to be disgusted at the inadequate supply of steam and complain loudly to his superiors of the inferior quality of the coals. With the coal which forms the sort of ash which the draft does not haul through the tubes and scatter over the train, a grate will be required sufficiently coarse for all the clinker to fall through it, and also provided with a suitable "rocking" arrangement to shake the ashes out. If by thus making the grate coarse enough to allow the ashes to pass through, the air spaces through it are too large for the proper and economical supply of air which is necessary to burn that portion of the coal which is consumed on the grate bars themselves—viz., the carbonaceous portion—the supply can be readily governed to the proper amount by simply partially closing the ash box doors.

For freight trains it may not be important which sort of coal is used—that is, the kind which keeps its ashes in the fire box, or the kind which sends them through the tubes and out of the pipe. But the case is quite different with passenger trains, for in one case only one or two brakemen are incommoded by flying soot and cinders; in the other, however, the passengers are peppered and begrimed by black dirt rendered sticky by contact with the exhaust steam mixed with the grease from the cylinders.

It will, we think, be admitted that by a proper construction of the grates, a railroad which has at command two species of coal possessing the characteristics alluded to, can add greatly to the comfort of the passengers by using the sort which keeps the greatest portion of its dirt within the firebox and at the same time maintain an evaporative power in the boilers equal to that produced by the other. When we come to coals which have different proportions of combustible elements, still greater attention must be given to the distribution of the air required for combination in order to insure the perfectness of the combustion.

Thus the greater the proportion of volatile combustible matter, the less must be the quantity of air admitted through the grate bars and the greater the quantity which must be admitted, distributed, and mixed with the combustible gases above the fire. This is clear, for the reason that the hydrogeneous portions of a coal must be burned above the fire, or else not be burned at all and pass unconsumed into the atmosphere and this, as is now well understood, can only be accomplished by introducing a sufficient quantity of air, which, when mixed with the combustible gases, will combine with them to the point of saturation and thus attain the highest temperature possible under the conditions; the carbon, on the other hand, is burned on the grate bars themselves and consequently the air for its combustion must pass through the spaces between them, and the supply of air should be governed to the proper amount by the dampers before alluded to.

From our own observations we are pretty well convinced that if the master mechanics on our railroads understood a little more about the principles of combustion and the chemical characteristics of the coals they are called upon to burn that not only would there be less complaint from passengers on account of the smut from the locomotives, but that there would be considerably less growling from the engineers about bad coal and "could'nt make steam."

IMPROVED CONDITION OF THE PATENT OFFICE.

We observe a marked improvement in the condition of the Patent Office. The Commissioner has increased the examining force very materially, both by new appointments and by promoting Assistants to be primal Examiners. Many of the classes most in arrears have been divided, additional space has been attained, and every department of the Office indicates progress and improvement. The machinery is not yet so perfect in its running as we expect to see it, but the motive power and room are supplied, and when the men occupying their new positions get better accustomed to their duties we bespeak for the Office an administration of its details worthy its patronage.

The Commissioner has latterly exhibited a commendable degree of enterprise in reorganizing the Office, obtaining additional room and appointing new Examiners, and we are assured that it will not be long before the back work of the Office will be brought up. As an evidence of the activity of the examining force of the Office, we would refer to the long list of patents reported weekly in these columns.

Mechanical Music.

A musician of this city has contrived an apparatus which he calls a "Pianautomaton," and which is designed, as its name implies, for automatically playing upon a pianoforte any piece of music desired. The instrument is described, externally, as a box of the width and length of the keyboard to which it is clamped. Through a slot runs the piece of music which is to be played, and which has this peculiarity, that all the notes are perforated through the sheet. The box has a crank which sets in motion a magneto-electric apparatus, and by its means a series of axial bars protuding below the box, strike the pianoforte keys and correctly perform the musical composition indicated by the holes in the paper. This contrivance rather belies its name in that music is ground out, as in the better known street instrument of humbler pretensions; but in another form, the apparatus is entirely self-acting, the insertion of the perforated paper causa small lever to come in metallic contact, thus completing an electric current, the instrument then continuing to play until all the music paper has passed through the aperture, when the lever being no longer held up, the circuit is broken and the performance terminated.

The axial bars strike the key notes with four different degrees of strength, either with a *legato* or *staccato* touch, and with a suitable connection with the pedals, all degrees of musical expression are attainable. It is apparent that this instrument can be made to produce effects of execution which no living artists could think of attempting. For example, a chromatic scale in octaves, thirds, or tenths; or produce the effect as if four, six, eight, or more hands were performing. There is no hesitancy in "reading at sight," and the variety of pieces need not be a limited *repertoire*, like a hand organ.

An Absolutely True Water Wheel Thirty-one Feet in Diameter.

Mr. S. F. Gold, of Cornwall, Conn., an amateur millwright, has built and put in operation a water wheel thirty-one feet in diameter, which he claims runs absolutely true, and can be kept in motion by the water through a two inch pipe.

If the wheel is of wood, and when dry runs true, and also runs true when wet and soaked, the wheel must be pretty nearly perfect. The head of the water delivered through a two-inch pipe is an element to be considered. However, the wheel is an achievement to be proud of, when it is considered that the maker is not a practical millwright.

AMERICAN MADE TOYS.—A correspondent, alluding to an article on the above subject, in a recent number of the SCIENTIFIC AMERICAN, says that "at Cromwell, Conn., is a large factory where all kinds of cast iron toys are made. At Bristol, same state, doll heads are made of untanned leather, which cannot be easily broken or injured. Large mechanical toys, as velocipedes, imitation steam engines, steamboats, fire-engines, etc., are made in Forestville, Conn., the only place in the United States where such toys are manufactured." Toys are also largely manufactured in Hartford, Conn.

WE have received from Messrs. Babbit Brothers some samples of their patent penholders which we find to be excellent The pen is held between springs so as to give elasticity. The holder is marked with the French and English measures of length

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 5, 1867.

Reported Officially for the Scientific American

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

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

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $300 on application.

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

70,384.—RAILROAD FREIGHT CAR.—J. H. Aldrich, Nashua, New Hampshire.

I claim the cattle-car, when substantially arranged as and for the purpose described.

70,385.—TOBACCO-SMOKING TUBE. — James M. Alexander, Delhi, Ohio.

I claim a tobacco-smoking tube, formed by combining an outer tube with an inner wire gauze, perforated or porous cylinder, in either of the forms above described, so that the smoke will be drawn to the mouth without passing through the tobacco, substantially as set forth.

70,386.—MODE OF TREATING TOBACCO. — Gustavus Arnd, New York city.

I claim, 1st, Treating tobacco with acids, such as acetic acid, formic acid, malic acid, lactic acid, or any other acid of a similar nature, substantially as and for the purpose described.

2d, Treating tobacco with vegetable substances, such as saccharine or other juices, and then subjecting the same to fermentation, substantially as and as and for the purposes set forth.

70,387.—ELEVATOR.—Edw'd H. Ashcroft, Lynn, Mass.

I claim the combination of the frame, H, with its friction rollers, h and g, and the screw, E, constructed and operating in the manner substantially as shown and described, and for the purpose set forth.

70,388.—METHOD OF COVERING STEAM GENERATORS.—E. H. Ashcroft, Lynn, Mass.

I claim, 1st, The combination and arrangement of bands, A, hooks or points a, and cement layer, B, substantially as shown and described, and for the purpose set forth.

2d, The combination and arrangement of covering, F, alternate layers, E D C B, and bands, A, constructed and operating in the manner substantially as shown and described, and for the purpose set forth.

70,389.—CONDENSER.—E. H. Ashcroft, Lynn, Mass.

I claim the combination and arrangement of the waste pipe, A, showering pans, B, reservoir, E, and supply pipe, C, operating in the manner substantially as shown and described, and for the purpose set forth.

70,390.—FIRE-PROOF SAFE.—E. H. Ashcroft, Lynn, Mass.

I claim, 1, In a fire-proof safe, a series of perforated water pipes, E, or their equivalents, arranged substantially as described and for the purpose set forth.

2d, In combination with said pipes, the inner perforated lining, B, and chamber, D, arranged and operating in the manner substantially as shown and described and for the purpose set forth.

3d, In combination of the chamber, D, and water pipes, F, constructed and operating in the manner substantially as shown and described, and for the purpose set forth.

70,391.—STEREOSCOPIC APPARATUS.—George Beigel, New York city.

I claim, 1st, Introducing the pictures into the stereoscopic apparatus in packs, or quantities, instead of singly or in pairs, as heretofore, substantially as and for the purposes described.

2d, The feed screw, D, and slide, C, for propelling the pack of pictures, substantially as set forth.

3d, The separating screw, F, provided with spiral steps, substantially as and for the purpose described.

4th, The tappet rod, e, bolt, d, and tooth, a, in combination with the projections, e', slide, C, and feed screw, D, substantially as and for the purpose set forth.

5th, The stop, f, in combination with the tooth, a, slide, C, feed screw, D, and case, A, constructed and operating substantially as and for the purpose described.

6th, The trap, H, in combination with the feeding and separating mechanism, constructed and operating substantially as and for the purpose set forth.

7th, The folding flap, K, hinged T-shaped brace, M, and hinged head, L, in combination with the eye-glasses, J, and case, A, constructed and operating substantially as and for the purpose described.

8th, The oscillating finger, N, in combination with the trap, H, and with the feeding and separating mechanism, constructed and operating substantially as and for the purpose set forth.

9th, The lower slide, O, in combination with the folding and separating mechanism, constructed and operating substantially as and for the purpose described.

10th, The method, herein described, of collecting the pictures in the lower part of the case, after they have been viewed, so that they can be removed in quantities or packs, as set forth.

11th, Giving to the lower slide, O, a faster motion than to the feed slide, C, substantially as and for the purpose described.

12th, The winding mechanism, Q, in combination with the slides, O C, and cords, s' t, constructed and operating substantially as and for the purpose set forth.

70,392.—LAMP EXTINGUISHER.—Wm. P. Bennett (assignor to himself and Henry Blake), East Pepperell, Mass.

I claim the application of the two rollers, a a, to the wick tube of the burner, so that the said rollers may operate with and be operated by the wick, substantially in manner and for the purpose set forth.

I also claim the combination and arrangement of the slotted arms, b b, with the two rollers, a a, and the wick tube, or with an additional tube or collar, f, applied to such wick tube, as specified.

I also claim the combination, as well as the arrangement, of the stops or guards, h h, with the rollers, a a, and the wick tube, applied and arranged together substantially as explained.

70,393.—EMERY WHEELS FOR GRINDING AND POLISHING SAWS, &c. George L. Benton (assignor to himself and John Greenwood), Rochester, N. Y.

I claim the emery wheel formed with the narrow grinding rim, a, and central depression, b, and made of the conical or convex shape herein described, the same operating in the manner and for the purpose specified.

70,394.—DEVICE FOR HOLDING SAP-BUCKETS.—Julius Bevins, Unadilla Forks, N. Y.

I claim the bar, A, the hook, B, and the curved hook, C, when they are arranged in the manner specified.

70,395.—GAS STOVES.—John K. Birkey, Philadelphia, Pa.

I claim, 1st, The tube, B, arranged in respect to the hollow cone, D, and wire gauze, or perforated disk, E, substantially as and for the purpose set forth.

2d, The plate, F, with its inclined inner edge arranged in respect to the perforated plate, of wire-gauze disk, E, substantially as and for the purpose described.

70,396.—CORN-SHELLER.—Thomas W. Bishop, Austin, Ind.

I claim, 1st, The combination with the shelling device, E E, of the gear-wheels, C and D, hub, D1, and central opening, D2, substantially as and for the purpose set forth.

2d, The serrated opening, G, substantially as and for the purpose described.

70,397.—SKELPING-DIES.—Mildred Blakey, Pittsburg, Pa.

I claim the construction and use of the skelping-dies, made either solid or separate, with a slot, or opening, b, extending longitudinally along their upper part, through or between them, substantially as and for the purpose hereinbefore set forth.

70,398.—GAS-CHANDELIER ATTACHMENT.—Alfred Bliss, New York city.

I claim the combination of a wheel, or reservoir, supplied with gas in any convenient manner, with a flexible tube, for the purpose indicated.

70,399.—RAILS FOR RAILWAYS.—Jonathan L. Booth, Rochester, N. Y.

I claim the combination of the body, A, nicked and indented as described, with the cap, B, substantially in the manner and for the purpose herein set forth.

70,400.—RAILS FOR RAILWAYS.—Jonathan L. Booth, Rochester, N. Y.

I claim the cap, B, in combination with a base, A, having a longitudinal depression in its upper surface, substantially as and for the purpose specified.

70,401.—STOCK AND POULTRY-FEEDER.—George Bowerman, Napoleon, Ohio.

I claim the bin or reservoir, C, valve, E, in combination with the rod, F, lever, G, and case, A, constructed and arranged as and for the purpose set forth.

70,402.—SPINNING-JACKS.—Henry P. Briggs, Clarksburg, Mass.

I claim, 1st, The lever, G, having a cam, F, at a suitable point thereon, for acting against the belt-shipper, substantially as described.

2d, The adjustable standard, N, and lever, M, in combination and arranged to operate with the carriage of a spinning-jack, substantially as described.

3d, The combination of the adjustable standard, N, lever, M, lever, G, and connecting-rod, I, or an equivalent connecting device, substantially as described.

4th, The levers, M and G, applied to the shipper, D, or the driving shaft of a jack for the purpose of bringing the fast pulley, C, into partial engagement with the race-shaft belt, substantially as and for the purpose above set forth.

70,403.—CLEANER FOR LAMP-CHIMNEYS.—Obidah B. Brown, Malden, Mass.

I claim a lamp-chimney cleaner, consisting of an elastic cylinder, or tube, attached to a handle, substantially in the manner described.

70,404.—STRAW-CUTTER.—Addison Buch, West Earl Township, Pa.

I claim the construction and arrangement of the metallic plate, A, and spring board, B, in combination with the bottom plate, C, and arrangement of the knife, D, and lever, H, in the manner and for the purpose specified.

70,405.—ILLUMINATING OILS.—Asa W. Burrows, Cleveland, Ohio.

I claim the above described compound, composed of the ingredients herein given, in the manner as and for the purpose set forth.

70,406.—CHURNS.—Philander Byrns and George Stannard, Mindora, Wis.

We claim the churn, B, perforated board, F, handles, E E, chair, A, and connecting rods, C C, when all are constructed, arranged and operated as and for the purpose set forth.

70,407.—STEAM ENGINE.—Charles W. Cahoon, Portland, Me.

I claim, 1st, A carriage, having a receptacle containing hot water under pressure, when the water has been heated at a place other than in or on the carriage, substantially as and for the purpose described.

2d, Also the combination of a carriage, receptacle, and engine, substantially as and for the purpose described.

3d, Also the combination of a non-conducting material with the receptacle upon the carriage, containing water heated and transferred as described, substantially as set forth.

4th, Also a reserve tank, containing water heated and transferred as described, for the purpose and substantially as set forth.

70,408.—BENT KNEE AND FRAME FOR SLEIGHS.—Daniel O. Card, Rawsonville, Ohio.

I claim the herein-described bent knee and beam, as a new article of manufacture.

70,409.—REGISTER PADLOCK.—J. L. Chambers, B'klyn, N. Y.

I claim, 1st, Constructing a lock with two independent bolts, which are so arranged as to act together, simultaneously locking both the hasp and bottom plate of the lock, said bolts being operated by a series of tumblers, which are worked by means of a flat key, substantially as described.

2d, Securely locking the tablet in position by means of the bottom plate, I, substantially as described.

70,410.—TELEGRAPH CLOCK.—Js. Chandler, Syracuse, N. Y.

I claim the application of cords and wires to the clock and weight, as herein described, for the purpose of indicating the time and striking the hour at various points.

70,411.—ELASTIC SASH ELEVATOR.—S. A. Chase, Boston, Mass.

I claim the mode of elevating window-sashes by means of elastic cords, substantially in manner and for the purpose as described.

70,412.—HOISTING APPARATUS.—Henry Chatfield, Wolcottville, Conn.

I claim, in combination with a hoisting machine, the toggle-arms, I I, arranged and operating in connection with the belt-shipper, H, brake lever F, and brake, G, substantially as and for the purpose herein specified.

70,413.—TONGS.—Samuel Collinson, Buffalo, N. Y.

I claim constructing tongs, with two or more tongues, b c, for grasping several articles at the same time, arranged and operating substantially in the manner set forth.

70,414.—LINING BARRELS WITH SHEET METAL.—Theodore R. Cook, Saratoga Springs, N. Y., assignor to Henry Lawrence, Norristown, Pa.

I claim rubbing out or burnishing down the metal lining against the wood of the barrel to make the metal lining fit the inside of the barrel closely, substantially as described.

I claim as a new article of manufacture a wooden barrel, lined with sheet-metal, which is made to fit the wood closely on the inside by being rubbed or burnished against it.

70,415.—FIRE-PROOF SAFE.—Thomas Cook, London, Eng., assignor to Chas. P. Button, New York City.

I claim the construction and application of a screw-fitting door to safes and depositories, substantially as above described.

I claim also the hinged arm, H, and the screwed axis G, for supporting the weight of the door, C, and guiding the same in a true horizontal plane during the opening and closing of the said door, as above described.

70,416.—DIFFERENTIAL WHEEL GEARING.—Chas. F. Cooke, York, and John Stanfield, Lambeth, Great Britain.

We claim, 1st, The novel combination and arrangement of differential wheel gearing, and its application to various purposes, in the manner substantially as described.

2d, The combination of our said differential wheel gear with parts for the purpose of forming crabs and other hoisting apparatus into self-acting weighing machines, in the manner substantially as described.

70,417.—MANUFACTURE OF BUTTER.—Joseph Sigler, Anderson, Ind., administrator of the estate of Jesse P. Crampton, deceased.

I claim the method herein described of improving common butter by churning it over, in combination with new or sweet milk, white sugar, nitrate of potash, and liquid rennet, or their equivalents, substantially in the manner and in the proportions herein set forth.

70,418.—VETERINARY NARCOTIC INJECTOR.—Moritz Crohn (assignor to himself, H. W. Volkers, and Guido D'Oench), St. Louis, Mo.

I claim the combination and arrangement of the bowl, A, the tube, B B', and the bellows, C c, substantially as and for the purpose set forth.

70,419.—FLOATING WATER POWER.—Commodore Daniels, Fremont, Ohio.

I claim, 1st, The sliding frame, G, in combination with boats, D, and wheels F, the whole constructed and operating as herein described.

2d, The sliding frame, G, in combination with boats, D, wheels, F, apron, N, anchor piece, g, the whole constructed and operating as and for the purpose substantially as herein set forth.

70,420.—CURING TOBACCO.—Benj. A. Davis Petersburg, Va.

I claim, 1st, The openings, with their covers, close under the roof, both front and rear, for the purpose of admitting air, ventilating and carrying off the evaporation from tobacco while in the process of curing, as herein described.

2d, The process of drying or curing tobacco under a glass roof, substantially in the manner herein described.

70,421.—COMPOSITION FOR PACKING JOURNAL BOXES, JOINTS, ETC.—John T. Davis, Jersey City, N. J., and Wm. C. Selden, Brooklyn, N. Y.

We claim, 1st, A composition of paper pulp, soapstone, and sulphate of zinc, or its equivalent, substantially as and for the purposes specified.

2d, A composition of paper pulp and sulphate of zinc, substantially as and for the purposes set forth.

70,422.—FASTENING FOR COACH LAMPS.—Marcus De Voursney, Newark, N. J.

I claim, 1st, A bracket, A, provided with arms, a, and a socket, b, in combination with the standard, B, and with a coach lamp, substantially as and for the purpose described.

2d, Fastening the socket to the back of the lamp by means of the arms, a, substantially as and for the purpose set forth.

70,423.—DEVICE FOR SETTING SAW TEETH.—Henry Disston, Philadelphia, Pa.

I claim the notched swage, F, in combination with adjustable rods, G and G', the lower ends of which are adapted to or arranged to embrace the collar and washer or the spindle of a circular saw, all substantially as and for the purpose herein set forth.

70,424.—DEVICE FOR SHARPENING SAW TEETH.—Henry Disston, Philadelphia, Pa.

I claim, 1st, The combination of a file or cutter, A, and a cross bar or guide, F, arranged in respect to the cutter as to determine the extent to which the latter shall penetrate the front of the saw tooth, all substantially as described.

2d, The combination of the above and a bar, G, or its equivalent, so arranged as to determine the extent to which the cutter shall penetrate the saw blade.

3d, The mode, substantially as described, of rendering the bar, F, adjustable to and from the file, A.

70,425.—SADDLE TREE.—D. A. Dixon, St. Louis, Mo.

I claim, 1st, The combination and arrangement of the loop, a', with the pommel, A.

2d, The construction of the cantle, C, substantially as described and set forth.

70,426.—OZONE GENERATOR.—Wm. Elmer and H. G. Hubert, New York City.

We claim, 1st, The combination and arrangement of the vessel, A, with the porous cup, B, the one filled with the granulated porous substance, W, and the other partly filled with the liquid chemical re-agent, Z, in the manner substantially and for the purpose set forth.

2d, The combination of the rod, E, cement stopper, c, and cap, T, with the vial, D, and cup, B, arranged so as to operate substantially in the manner specified.

3d, The granulated porous substance, W, and the liquid chemical, Z, in combination with a porous cup, B, so that the reaction between the said chemical, Z, and substance, W, will take place as set forth and for the purpose specified of producing ozone.

70,427.—CONSTRUCTION OF SHEET METAL BUCKETS.—James Fallows (assignor to Porter & Booth), Philadelphia, Pa.

I claim producing the flared or flanged base of a sheet metal vessel requiring such a base, by corrugating the sheet metal of the body of the vessel, substantially as described and set forth.

70,428.—SHUTTER-BOWING BOLT.—Walter H. Fitzgerald (assignor to himself and W. H. Sexton), Philadelphia, Pa.

I claim, 1st, In combination with a shutter bolt, the small friction bolt, d, on the plate, C, and the notches, 3-3, in the bolt bar, c'', the same being arranged to operate together as a stop or lock for the bolt bar, substantially as set forth and described.

2d, Also in combination with the subject matter of the preceding clause of the claim, the small friction bolt, f, and the recess, e, in the plate, C, and the vertical hole in the forward end of the bolt bar, c'', the same being arranged to operate together substantially as and for the purpose set forth and described.

70,429.—CATTLE-GUARD GATE.—Armstrong Freeman, Lowell, Mich.

I claim, 1st, The side rail, H, lever, I, chains, L, and levers, K, as arranged, in combination with the gate, A, for the purpose and in the manner as set forth.

2d, The gate, A, and roller, D, as, arranged, in combination with the standard, M', links, N, and weighted arm, N', in the manner and for the purpose herein described.

70,430.—CULTIVATOR.—Hugh J. Graham, Monmouth, Ill.

I claim, 1st, The slotted bar, C, in combination with the handles, F F, and upright bars, P P, substantially as described and for the purpose set forth.

2d, The curved iron, T, in combination with the notched bar, V, clutch, W, brace, Q, and sliding seat, D, arranged as set forth and for the purpose claimed.

3d, The movable bar, N, in combination with the handles, for the purpose described and substantially as arranged.

4th, The clutch or slide, W, and notched bar, V, substantially as described, and combined for the purpose set forth.

5th, The hinge, C, in combination with the curve, T, for the purpose of giving vertical and lateral movement, and for vertical adjustment.

70,431.—CHURN.—Jas. J. Gruver and Ambrose D. Wiggins, New Market, Ohio.

We claim the slotted bed piece, E, churn, F, when provided with tennon, h, and adjustable guide board, m, all arranged in connection with dasher bars, b b, pitmen, e e, and double crank shaft, d, as and for the purpose set forth.

70,432.—GAS COOKING RANGE.—David G. Haskins, Cambridge, Mass.

I claim, 1st, The combination of the base, A, and combustion chambers, a b, with the ovens or cooking apartments, B C, and the interposed inclined flue space, s, as and for the purpose specified.

2d, The combination of the base, A, and combustion chambers a b, the ovens or apartments, E C, and the reservoir, D, as and for the purpose specified.

3d, In combination with a gas cooking range constructed substantially as described, a water back, E, as set forth.

70,433.—LIGHTING ROOMS.—David G. Haskins and Joseph Winlock, Cambridge, Mass.

We claim the combination of a lamp, a, provided with an air passage as described, the screw, c, and air pipe, d, in combination with an air-propelling apparatus, as and for the purpose set forth.

70,434.—HARNESS.—Nathan T. Healy, Medina, N. Y.

I claim forming the hip straps E, without intermediate buckles and passing said straps loosely through the bearing, C, and providing a suitable adjustment of the same on the back strap, as herein set forth.

70,435.—PREPARING FISH FOR FOOD.—George H. Heron (assignor to himself and Samuel E. Day), Washington, D. C.

I claim preparing fish for food by the application of heat and a suitable acid, substantially as described.

70,436.—BEEHIVE.—Jesse Hiestand, Palestine, Ill.

I claim the construction of the body or lower portion of the hive of three vertical boards, A A A', and one inclined or sloping board, terminating at the bottom in a narrow entrance, a, at the top in a honey chamber, E, said hive being supported upon a frame, G, which is provided with protectors, g, substantially as described.

70,437.—PREVENTING TIN WARE FROM RUSTING.—Portus M. Hinman, Rochester, N. Y.

I claim the herein described method of protecting common articles of tin ware from rusting, by providing them with a zinc bottom or rim, substantially in the manner set forth.

70,438.—SECURING THE ENDS OF FELLEYS.—Hiram Inman and Horace Inman, Amsterdam, N. Y.

We claim the device for securing the ends of fellys constructed substantially as described.

70,439.—APPARATUS FOR MAKING EXTRACTS FROM BARK AND OTHER MATERIALS.—James W. Jones, Cumberland, Md.

I claim, 1st, Extracting the strength from bark or other material by upward hydraulic pressure, when the same is applied to a vessel having a box pipe with sliding valves and a false perforated bottom, substantially as described.

2d, The false bottom, C, and pipe, D, having sliding valves, d2 d3, when the same are combined and operated substantially as described and for the purpose set forth.

70,440.—BOOT CRIMP.—Franz Kali and Samuel Andrews, Rochester, N. Y.

We claim the heel block, D, for varying the position of the seam of the boot, and the metal lined sockets, c c', beneath the blocks, B C, of the crimp, for the insertion and adjustment of the screws, the whole arranged and operating as herein set forth.

70,441.—TABLE URN.—Ernest Kaufmann, Philadelphia, Pa.

I claim, 1st, A table urn which can be revolved on its stand, and is provided with two or more compartments or chambers, c, and faucets, E, substantially as and for the purpose set forth.

2d, The arrangement and combination of an urn, A, with two or more compartments, c, annular lip, a, stand, B, ears, b, lamp, D, and faucets, E, all constructed and operating substantially as and for the purpose shown and described.

70,442.—PICTURE ENVELOPE.—C. A. Kihlgren, Boston, Mass.

I claim the improved picture envelope made substantially as described, that is, with its flap folded, and of a length so as to be capable of being laid over both faces of the pocket, the same being as and for the object or purposes as hereinbefore explained.

70,443.—PUMP.—John T. Kimbel, Vernon, Ind.

I claim the combination and arrangement of the two solid pistons, H H, and the cylinders in which they work, with the ways and valves, L L, and supplying and discharging pipes, all substantially as described.

70,444.—WINDOW FASTENING.—Geo. B. Kirkham, N. Y. city.

I claim the fastening complete with its several parts, the body, A, the double-pointed bolt, B, the slide, C, the catch, E, and the key, as described and represented.

70,445.—HOT AIR FURNACE.—James A. Lawson, Troy, N. Y.

I claim, 1st, The radiators, D, constructed and operating substantially as described, that is to say, in such manner as to receive the heat at their junction with the fire chamber, divide the currents, and then converge or reunite them at the upper end of the said radiator.

2d, The employment of two sets or series of radiators, arranged and operating substantially as described for the purposes set forth.

3d, The employment, in connection with the two sets of radiators, of two horizontal pipes or conduits, E E, communicating with the upper ends of said radiators, and with the exit pipe, G, near their centers, substantially as described.

4th, The dome or roof of the fire chamber, so constructed as to extend up between the sets of radiators, substantially as and for the purposes described.

70,446.—ELASTIC SPRING FOR CARRIAGES.—Thomas Long, Vandalia, Ill.

I claim an india-rubber spring constructed substantially as herein described.

Also, the combination of an india-rubber spring, constructed as described, with an elliptic spring, for the purpose set forth.

70,447.—BLAST FURNACE.—F. W. Lurmann, Osnabruck, Prussia.

I claim, 1st, The slag discharge piece, D, constructed and arranged substantially as described.

2d, The slag discharge piece, D, in combination with the plate, C, to which it is fitted, substantially as described.

3d, The shape of the discharge opening or openings of the piece, D, being made flaring at its ends, and of diminished diameter in the middle or central part, substantially as described.

4th, Combining with the slag discharge piece a series of water channels or pipes, substantially as and for the purpose above set forth.

5th, Combining with the metallic plate, C, a series of water channels or pipes, substantially as and for the purpose above set forth.

6th, The method of controlling the discharge of slag from blast furnaces, by regulating the temperature of the slag discharge piece, substantially as described.

70,448.—BED BOTTOM.—J. I. Mabbett, Titusville, Pa.

I claim the slats, a b, open at one end, and connected at the other, combined with cross pieces, c d, blocks, g h, and rubber springs, i i, connecting the bottom with the bedstead, when all are arranged as set forth and described.

70,449.—MACHINE FOR CUTTING STONE.—James W. Maloy, Boston, Mass.

I claim, 1st, The combination of the spindle, which carries the cutting or finishing tool, with the adjustable block, g, substantially as and for the purpose described.

2d, The adjustable block, g, carrying the spindle, whether the latter is vertical or horizontal, in combination with the movable cross head, e, as set forth.

3d, The pointer, k, in combination with the adjustable block, g, and spindle, h, substantially as and for the purpose specified.

4th, The former, c, in combination with the cutting and polishing mechanism, substantially as set forth.

5th, The combination, with a sliding table, b, and rotating portion, c, of a former, c', as specified.

6th, The combination of the movable pointer, k, with the former, c', when operating substantially as and for the purpose described.

70,450.—MILK CAN.—Hugh L. McAvoy, and Ezekiel Mills (assignors to E. Mills), Baltimore, Md.

We claim, 1st, The milk can, with spiral metallic strengthening stays around its cylindrical portion.

2d, The combination of the solid metal neck, F G, with the screw cap, H J K, when constructed and arranged as and for the purposes specified.

70,451.—EVAPORATOR FOR SORGHUM AND OTHER SIRUPS.—Solomon McWorter, Barry, Ill.

1st, I claim the combination and arrangement of the evaporating pan, A, and the steam boiler, B, substantially as described and set forth.

2d, The combination of the pipe, D, with the boiler, B, as and for the purpose set forth.

3d, The employment of the stiffening-ribs, a, in combination with the flat crown sheet of the boiler, as described and set forth.

70,452.—COTTON BALE TIE.—Henry B. Merritt, St. Louis, Missouri, assignor to J. H. Merritt, Memphis, Tenn.

I claim a tie piece; A, when constructed substantially as described and set forth.

70,453.—FOUNTAIN PEN.—George Rudolph Metten, St. Louis, Mo., assignor to Horace Baldwin, Painesville, Ohio.

I claim, 1st, In combination with an air tight and flexible ink sack, which is applied within the handle or holder of a fountain pen, so as to be free to collapse as the ink flows from it, I claim a tube, c, which extends beneath the pen, f, and is provided with a valve, g, at the point of discharge, so that in the act of writing the ink shall be caused to flow to the pen with greater or less freedom, according to the force and rapidity of the strokes, substantially as specified.

2d, A fountain pen, which is provided with a thin, air tight, flexible sack, applied within the pen handle or holder by means of a ring, c, in combination with a removable pen sheath, and supply tube, c, substantially as described.

3d, In combination with the flexible sack, b, and ink supply tube, c, I claim the conical valve or plug, g, acting as a regulator during the act of writing, and serving to close the aperture when there is no pressure applied to the nib of the pen, substantially as described.

70,454.—LUBRICATING OIL.—Cyrus Moore, East Saginaw, assignor to himself and Abel Blakeslee, Detroit, Mich.

I claim, 1st, The method of manufacturing a lubricating oil by the process described.

36. The use of the ingredients, and in the proportions substantially as described, for the purpose designed.

70,455.—COMPENSATING FORGE CRANE.—Thomas Morris, Clarbeston, England, assignor to himself, John Morris, and Thomas C. Knowles.

I claim the lever, P, adjusting weight, R, and chain, q, in combination with the weight, L, sheaves, J, chain, K, and carriage, F, arranged and operating substantially as and for the purpose set forth.

Also, in combination therewith, the lever, W, and its connecting rods or chains, y y, operating substantially in the manner and for the purpose specified.

Also, the guides, S S, and step bolts, u u, provided with elastic shields, v, arranged and operating with the lever, P, for the purpose and in the manner described.

70,456.—HOSE COUPLING.—Andrew J. Morse, Boston, Mass.

I claim, in combination with the tail piece of the coupling, having a screw thread upon its outer surface, the encompassing ring having two screw threads, one for screwing upon the outer surface of the hose, and the other for connecting the ring to the tail piece, substantially as set forth.

Also, the recess, l, and tapering screw or surface, f, in combination with the encompassing ring and tail piece, substantially as set forth.

Also, the screw threads at the respective ends of the encompassing ring, h, made to run in opposite directions, substantially as described.

70,457.—IMPLEMENT FOR TRANSPLANTING FLOWERS, ETC.—Edgar G. Nichols, Beaufort, S. C.

I claim, 1st, The making of a transplanter in two separate and similar parts which, when united, inclose the roots of the plant and the soil next to them, preventing the soil from falling away from the roots in removing.

2d, The so curving or bending, or manufacturing of the blades, as shown in this specification and the drawings annexed, or the making of them in any manner which is substantially the same, that while they inclose the necessary space, yet shall they enter the soil with the least possible disturbance thereof.

3d, The shaping of the lower end of the shank to reach across the top of the blade, stiffen it, and allow thinner metal to be used for it.

4th, The making of a portion of the shank horizontal, forming a step for the foot to drive down the blade.

5th, The flattening of the handles on the sides approximating, to prevent slipping or rolling of the handles when clamped together.

6th, The making of a transplanter with handles so long that it can be used without any stooping at any part of the process, saving thus the largest and most unhealthy part of the labor.

70,458.—MACHINE FOR CUTTING TEETH OF FILE BLANKS.—Hiram Bassett Nickerson, Boston, Mass., assignor to Silliman B. Allen, Frank A. Allen, J. R. Winsor, and George B. Amy.

I claim the combination as well as the arrangement of the two cutters, A and B, provided with mechanisms for raising and depressing them, as specified, with the file-supporting carriage, C, having mechanism for imparting to it an intermittent motion in one direction, substantially as and for the purpose hereinbefore explained.

And I also claim the combination of such mechanism substantially as described, or its equivalent, for arresting the operation of a cutter, and its depressing mechanism or hammer, and maintaining such out of action preparatory to and while the other cutter and its operative mechanism may be at work, to produce the balance of the cuts to be made by such cutter last mentioned, the said additional mechanism being the cam bar, r2, the levers, s' t', the rod, u', latch lever, v', connecting rod, w', and springs, x' and y'.

Also, the combination of parts constituting such additional mechanism.

And in combination with the file-supporting carriage, C, its operative mechanism, and the two cutters, A B, provided with mechanism for effecting their elevations and depressions, I claim mechanism substantially as described, or its equivalent, for gradually increasing the force of the blow of a hammer while the cutter thereof may be passing from the narrower to the wider parts of the file blanks, as explained, such last mentioned mechanism being the pattern guide, m', stud, n', forked lever, o', projection, p', wedge, q', and buffer, m, arranged as explained.

Also, the combination of the guide, m', stud, n', forked lever, o', projection, p', wedge, q', and buffer, m, the whole being for the purpose as explained.

And in combination with the file-supporting carriage, C, its operative mechanisms, and the two cutters, A B, and their mechanisms for effecting their proper elevations and depressions, I claim the spring presser or its equivalent.

Also, the combination of the self-adjusting cutter head, with the carrier slide, b, and the force transmitter, c, applied to the carrier as set forth.

Also, the combination or mechanism for operating the feeding-screw, such consisting of the ratchet, x, the pawls, y z, rocker levers, a' b', levers, c' f', and rods, c' e', rod, k2, hoop, l', and eccentric, f, arranged, constructed, and applied together so as to operate as specified.

70,459.—EYES FOR PICKAXES.—George Nimmo, Jersey City, N. J.

I claim the eye for pickaxes and other tools, formed in the manner and for the purposes specified.

70,460.—PROPELLER FOR VESSELS.—Charles M. O'Hara, London, England.

I claim, 1st, A propeller, for vessels of navigation, made of sector form, and hung or suspended, so as to operate or oscillate in a vertical plane, substantially as shown and described.

2d, Driving or operating the propellers by means of engines, the cylinders or steam chambers of which are of curved form longitudinally, and provided with circular piston rods substantially as shown and described.

3d, The plates, H, in combination with the oscillating propellers, C C, substantially as and for the purpose specified.

70,461.—COVER FOR TEA-KETTLES, ETC.—William W. Page (assignor to Arnold H. Holdridge and Daniel E. Paris), Troy, N. Y.

I claim a ball and cover combined to vessels or kettles constructed with a cam or bulge at or near one end of the ball, so that it will operate on an arm, or one end of the cover, to raise it upward and let it down as the ball is shifted from side to side, when constructed substantially as herein described and set forth.

70,462.—GRATE.—Peter A. Palmer, Troy, N. Y.

I claim the alternate stationary bars, B, in combination with the shaft, C, bars, E, and frame, A, or their equivalents, as and for the purposes herein set forth.

70,463.—BREECH-LOADING FIRE-ARMS.—William R. Pape, Newcastle-on-Tyne, Great Britain.

I claim the vertical rotating spindle, carrying beveled catches, 1 and 2, and spring, 6, operating in combination with the lumps, D, and horizontal slots, B and C, in the rear of the breech, substantially as and for the purposes specified.

70,464.—TAG.—Robert Parks, Philadelphia, Pa.

I claim the tag, A, constructed with cuts or incisions, a a, and parts, b c d or b d, folded over and secured substantially as and for the purposes set forth.

70,465.—WATCH-KEY.—Eugene Paulus, Philadelphia, Pa.

I claim a combined watch-key and push-piece, which is made a steady part of the case, the head or winding crown being directly screwed in the pendant, leaving the pipe free and movable, so as to act on the case spring to open the watch, and also to wind it up by taking it out, the whole constructed and operating substantially as described.

70,466.—ROPE-MAKING MACHINE.—Howard Perkins, Mansfield, Mass.

I claim the self-adjusting regulators, K, constructed as described, in combination with their elastic cords, N, as and for the purposes set forth.

70,467.—FRAME FOR SUSPENDING MAPS.—Wm. F. Phelps, Winona, Minn.

I claim, 1st, A horizontal bar, having longitudinally sliding arms, provided with hooks, substantially as described and for the purpose set forth.

2d, The standard, E, having steps, K, in connection with the sliding standard, D, and spring, I, when arranged to operate as shown and described.

3d, The adjustable standard, E, and horizontal bar, A, provided with the sliding arms, C C, when arranged to operate as described for the purpose set forth.

70,468.—WINE PRESS.—A. L. Rand, Peoria, Ill.

I claim, 1st, The box, A, provided with the perforated plates, g, lifting plate, e, and dripping-board, m, and inclined chute, I, when constructed and arranged to operate substantially as described and for the purpose set forth.

2d, The screw-rod, F, in combination with the tubular column, G, lifting-plate, e, followers, b i j, lever H, and rod, E, when constructed and arranged to operate substantially as described, and for the purpose set forth.

70,469.—GAME TABLE.—Louis Raymond, Rockland, Del.

I claim the combination of the circular recessed and figured platform, the horizontal, circular, covered or enclosed way, and the abutment or deflecting surface, D, all arranged as and for the purpose herein described and represented.

70,470.—CHURNS.—Thomas Rettew, West Vincent Township, Pa.

I claim, 1st, The churn, A, as a whole, when constructed, arranged, and operating as shown and described.

2d, Encasing the lower part of the churn to form a chamber for the circulation of air, as shown and described.

3d, The wheel, D, plate wheel, m, and the detent, n, as shown and described.

70,471.—TEMPERING SEEEL.—Asa R. Reynolds and Napoleon B. Reynolds, Auburn, N. Y.

We claim tempering articles made in whole or in part of steel, by means of a head of flowing water, and a guiding and holding hardening, or tempering head, substantially as herein described.

70,472.—HORSE-HOE.—T. Rice and Luke R. Hitchcock, Canandaigua, N. Y.

We claim the combination of the curved perforated braces and hoe, as shown by figs. 1 and 2, for the purpose of cultivating garden and field crops in the best and most desirable manner.

70,473.—HITCHING-STRAP.—A. J. Ross, Rochester, N. Y., assignor to O. C. Ross, Penfield, N. Y.

I claim the strap or cord, B, provided with the length, l, for passing over and around the horse's head and through the rings of the bit, and the buckle, E, or equivalent, for fastening tightly under the chin, the whole arranged and operating in the manner and for the purpose herein set forth.

70,474.—PREPARATION OF PAPER-PULP FROM REEDS, &c.—Robert W. Russell, Brooklyn, and Thomas Howland, Stockport, N. Y.

We claim, 1st, The above mentioned process of making paper-pulp, papier mache, and other articles, from vegetable fibrous substances, disintegrated as aforesaid by the said steam-blowing process, without maceration, boiling or chemicals.

2d, The method of treating vegetable fibrous substances which have been subjected to the said steam-blowing process for the purposes aforesaid, by beating, grinding, crushing, or bruising, and washing the same, before the boiling of the same in any chemical solution, substantially as described.

3d, The new articles of manufacture above described, that is to say, pulp of different kinds, suitable for the manufacture of paper and papier-mache, made either with or without the use of chemicals, substantially as above described.

70,475.—CARRIAGE-SEAT SPRINGS.—Wm. Scott, Plymouth, Mich.

I claim the arrangement and combination of the spiral spring, A, the socket, B, and the plate, C, provided with the circular flange, D, substantially as described for the purpose designed.

70,476.—MANUFACTURE OF REFINED INGOTS OF IRON AND STEEL.—Christian Shunk, Armstrong County, Pa.

I claim the employment and the application of certain metals, herein set forth (or an equivalent, or either of the same separate from the other), in the refining and converting molten crude iron into refined ingots of iron and steel, or semi-steel, by the pneumatic process, and of bar or wrought iron converted into refined steel ingots by the "pot" or crucible mode for melting the iron.

70,477.—PORTABLE GAS-GENERATING FURNACE.—Wm. M. Sloane, Buffalo, N. Y.

I claim, 1st, The combination and arrangement of the vaporizing chamber, B, with a common heating furnace, or stove, A a1 a2, for the purpose and substantially as described.

2d, The combination and arrangement of the retorts, C C, with the fire-chamber of a common heating furnace, or stove, for the purpose and substantially as herein described.

3d, The combination and arrangement of the furnace, or stove, A a1 a2, vaporizing chamber B, retorts C C, and conducting pipe, d, in the manner and for the purpose substantially as set forth.

4th, The valve, G, for automically regulating the supply of the hydro-carbon fluid to the vaporizing chamber, B, substantially as described.

5th, The valve, H, for automatically removing or conducting the surplus gas into the smoke flue of the furnace, substantially as described.

6th, The combination of the gasometer, J, gas pipe, E, branch pipe, b', and waste valve, B, for operating in the manner and for the purpose substantially as herein described.

70,478.—ROOFING COMPOUND.—George O. Smith and J. H. Smith, Chicago, Ill.

We claim a roofing compound of the ingredients herein named, substantially as set forth.

70,479.—METAL PLANERR.—Jas. Hervey Sternbergh, Reading, Pa.

I claim the combination as well as the arrangement of the emery-wheel, E W (or other grinding or polishing wheel or stone), adjustable at various heights to suit the work, by means of the screw, C, in connection with movable table, T T, carrying the slide rest, S R, and vise, V V, or other suitable arrangement for holding the article to be planed or ground off, for the purpose mentioned, substantially as set forth and described.

70,480.—MAIL BAGS.—Edward Sevens and John A. Knight, St. Louis, Mo.

We claim the bar, B2 the loop, b1, and the partition, B1, combined and operated as herein shown and described.

70,481.—MACHINE FOR CUTTING SOLES OF BOOTS AND SHOES.—Edgar M. Stevens, Boston, Mass.

I claim; 1st, The spindle, C, constructed with the spiral and straight grooves in combination with the adjustable spring rod, p, when operating in the manner and for the purpose set forth.

2d, The gauge, h, in combination with the lever, g g', and tripping device, i, substantially as and for the purpose described.

3d, The arm, F, attached to the cross-head, D, and provided with a dog, d, and trigger, G, in combination with the knife-head, E, as and for the purpose described.

4th, The adjustable and detachable scrap cutter, K, as described.

5th, The combination of the cutter, K, the block or holder, I, and the knife-head, E, as described.

6th, The spindle, C, constructed with the spiral and straight slots or grooves, as described.

70,482.—MOLD FOR CASTING CAR-WHEELS.—John Blake Tarr, Chicago, Ill.

I claim a lining of the form of a car-wheel, made of soapstone or other analagous solid refractory material, in combination with a strong sectional metal casing, such lining being in sections and applied within the sectional metal casing, so as to be adapted for giving form to a cast-steel car wheel, and the casting and lining of such strength combined as to be capable of sustaining the pressure which is requisite to insure a condensation of the steel of which the wheel is cast, all substantially as herein set forth.

70,483.—LATHE-WAY SMOOTHERS.—Alfred Thomas, Worcester, Mass.

I claim, 1st, the combination with the frame, C, cross-bar, L, piece, K, and slide-piece, E, of frame, F, shaft, H, and smoothing-wheel, J, substantially as and for the purposes set forth.

2d, The combination of the smoothing-wheel, J, shaft, H, and pulley, I, with the side-piece, E, substantially as and for the purposes set forth.

70,484.—WIRE-BELLS FOR CLOCKS.—Hiram C. Thompson, Bristol, Conn.

I claim, 1st, The coil or ring, A, when formed on a wire bell, substantially as and for the purpose set forth.

2d, The bell-stand, figs. 2 and 3, substantially as and for the purpose described.

70,485.—MODE OF TREATING VEGETABLE SUBSTANCES FOR MAKING PAPER PULP.—Benj. C. Tilghman, Philadelphia, Pa.

I claim the process of treating vegetable substances which contain fibres with a solution of sulphurous acid in water, either with or without the addition of sulphites, or other salts of equivalent chemical properties, as above explained, heated in a close vessel under pressure, to a temperature sufficient to cause it to dissolve the intercellular incrusting or cementing constituents of said vegetable substances, so as to leave the undissolved product in a fibrous state, suitable for the manufacture of paper, paper pulp, cellulose, or fibres, or for other purposes, according to the nature of the material employed.

I also claim as new articles of manufacture the two products obtained by the above described process, that is to say, the fibrous material, substantially as described, and the solution containing the soluble matters, substantially as described.

I also claim the use and application, in the manufacture of paper, paper pulp, cellulose, and fibres, of the fibrous material produced by treating vegetable substances which contain fibres with a solution of sulphurous acid in water, either with or without the addition of sulphites, or other salts of equivalent chemical properties, as above explained, heated in a close vessel under pressure to a temperature sufficient to cause it to dissolve the incrusting or intercellular constituents of said vegetable substances.

I also claim the use and application of sulphites or other salts of equivalent chemical properties, as above explained, in combination with a solution of sulphurous acid in water, as an agent in treating vegetable substances which contain fibres, when heated therewith in a close vessel under pressure to a temperature sufficient to cause said acid solution to dissolve the intercellular or incrusting constituents of said vegetable substances.

I also claim the recovery and re-use of sulphurous acid and sulphite from the acid liquids which have been digested on the vegetable fibrous substances, by boiling said liquids, or neutralizing them with hydrate of lime.

70,486.—APPARATUS FOR CASTING CAR WHEELS.—Samuel H. Whitaker, Covington, Ky.

I claim, 1st, A flask for casting together two or more metals, consisting of the drag, F, curb, I, cope or cut-off, J j, suspended head, K, and gates, N and O, the whole being combined and adapted to operate as set forth.

2d, In the described combination, the flask, F I J j K N O, and press, A B C D E, or their equivalents, for casting a steel rim, and compressing and welding the same around an iron web or body while in a semi-molten condition, as set forth.

3d, The parts, A, B, C, D and E, forming a press for compressing the steel tire of a car wheel, while in a semi-fluid condition, as set forth.

70,487.—WINDOW SASH FASTENER.—Chester F. Wickwire, Cortland, N. Y.

I claim, 1st, The slotted bent lever b, operating upon the pin, d, for the purpose of holding the sash in position when raised.

2d, The slotted lever, b, in combination with the slotted plate, g, for the purpose of locking or permanently fastening the sash when down, or locking it at any particular point.

70,488.—FASTENING EYELETS.—Wm. W. Wilcox, Middletown, Conn.

I claim, 1st, The arrangement of a rough surface ring, b, between the flange of an eyelet and the material to which the same is to be fastened, substantially as and for the purpose described.

2d, Providing the rough surface ring, when used in combination with an eyelet, with oblique teeth, as and for the purpose set forth.

70,489.—BED BOTTOM.—H. W. Williams, Stowe, Vt.

I claim the flat steel springs, A, their sliding boards, B, with connecting rods, C, and horizontal levers, D, when arranged and combined as herein described, and for the purposes set forth.

70,490.—TIP FOR THE FEET OF CHAIR LEGS.—Edward S. Winchester, Boston, Mass.

I claim the India rubber tip constructed as described, that is, formed as a ferrule, to be placed upon the foot of the chair, the ferrule increasing in thickness from its center, B, to its open end, A; also increased from its center, B, to the closed end, or base thereof, on which the foot of the chair rests.

70,491.—SLEDS.—A. T. Woolsey and A. F. Hubbell, Sandusky, Ohio.

We claim the construction of a runner, A, and side rail, A', of one entire piece, in the manner and for the purpose set forth.

70,492.—CAR TRUCKS.—Walter Youmans, Lansinburg, N. Y.

I claim connecting the body or platform of the car with the truck frame or frames, substantially as described, so that the former shall be free to move up and down on the latter with springs interposed, and so that the body, or platform shall not move longitudinally or laterally independently of the truck frame, or frames, when this is combined with the connection of the axles with the truck frame, so that the said axles shall be free to move under it, substantially as described, and by the means described, or the equivalents thereof.

And I also claim connecting the ends of the under bolster with the wheel axles by means of clamping blocks, substantially as described, in combination with the double cross bars, or tee equivalent thereof, connected with the clamping blocks both above and below the horizontal plane of the axes of the wheel axles, substantially as and for the purpose specified.

70,493.—HATS.—Daniel K. Albright, Philadelphia, Pa., and Leo H. De Lange, Bordentown, N. J.

We claim, 1st, The band, D, connected to the body and brim of a hat, and arranged in respect to the same substantially as and for the purpose herein set forth.

2d, The holes, c, in the brim, and the holes, d, in the body of the hat, in combination with and arranged in respect to the band, D, as described.

70,494.—GAS STOVES.—Chas. E. Alden, Philadelphia, Pa.

I claim, 1st, The casing, B, wire gauze or perforated plate, E, and holes, I I, in combination with the adjustable casing, F, the whole being constructed and arranged substantially as and for the purpose herein set forth.

2d, The combination of the above internal tube, m, and valve, n.

70,495.—HEATING AND VENTILATING APPARATUS FOR RAILWAY CARS.—C. F. Allen and L. W. Campbell (assignors to themselves, A. T. Hall and A. L. Ambler), Aurora, Ill.

We claim, 1st, The combination of the grating, G, and sleve, D, with the bonnet, A, partitioned pipe, C Q g, pipe, L, water chamber, E' or M, and register pipe, R x, substantially in the manner and for the purpose described.

3d, The combination of the chamber, E, chamber, M, warming apparatus as described, and register pipe, R x, substantially in the manner and for the purpose described.

3d, The construction of the warming apparatus for a car or coach, in the manner substantially as described, and arranging the ventilator in such relation thereto that the portion of the air forced into the ventilating pipes will be employed for promoting combustion, while the other or greater portion is heated and distributed in the car, all substantially as described.

4th, The register, F, applied to the ascending conduit, Q, above the water chamber, E, substantially as described.

70,496.—NAIL MACHINE.—John M. Allen, Cambridge, Mass.

I claim a machine for cutting nails, without waste, from plate or sheet metal, in which the dies are formed longitudinally on the surfaces of the rollers, in the manner and for the purpose described.

70,497.—RAILWAY CHAIR.—Peter Allen (assignor to himself, L. Valliquette and Cleophus Brodeur), Rutland, Vt.

I claim the plate, B, in combination with the plate, B', with the tongue, b, fitted in a recess in the bed, a, constructed and secured with screw bolts and spikes, as herein described.

70,498.—ANCHORS.—W. J. Armstrong and Charles Browne, Brooklyn, N. Y.

We claim, 1st, Attaching the crown, B, to the shank, A, by passing a tenon formed upon the lower end of said shank through a mortise formed in the said crown, and securing them in place by blocks, D, firmly attached to the side of the projecting end of said tenon, substantially as herein shown and described, and for the purpose set forth.

2d, Forming the stock, E, in two parts, and attaching them to the upper end of the shank, A, by passing tenons formed upon the inner ends of said parts through a mortise formed in the upper end of said shank, and securing them in place by means of blocks, F, firmly attached to the projecting ends of said tenons, substantially as herein shown and described, and for the purpose set forth.

70,499.—SNAP HOOK.—C. H. Atwood, New Britain, Conn.

I claim, 1st, the snap hook constructed as described, consisting of the circular solid plate, A, having loop, B, and lugs, a, cast upon it, between the latter the straight bar, D, pivoted and held in place against the turn-up end, by means of the spring, C, as herein set forth, for the purpose specified.

2d, The casting of the projection, C, with the plate, A, in the same plane with the same, and then bending C in hook form, substantially as and for the purpose specified.

70,500.—CARD RACKS.—E. D. Averell, New York city.

I claim the arrangement on a curved or circular surface of a stand or frame of a coiled wire or spring and forming in combination with said stand or support a card or paper holder, essentially as herein set forth.

70,501.—WHIP ROLLING MACHINE.—Henry Axtell, Huntington, Mass.

I claim, 1st, A device for rolling whips consisting of a frame, A, having a reciprocating bar, J, an adjustable bar, G, between which the whip is rolled the bar, J, being operated by power and the bar, G, by the levers, F and F', with their treadle attachment, the whole being arranged substantially as and for the purpose described.

2d, The device for drawing the whip through the rolling machine consisting of the cord, k, having the weight, m, passing over the pulleys, g and g', in combination with the rest of my machine, substantially as described.

70,502.—HORSE YOKE.—Thomas J. Barnes, Cambridge, Ill.

I claim, 1st, An improved horse yoke made in two parts, A and B, and in substantially the form and manner herein shown and described.

2d, The combination of the short chains, C, and equalizing bar, D, to which the draft chain is attached with the parts, A and B, of the yoke, substantially as herein shown and described and for the purpose set forth.

70,503.—COTTON-BALE TIE.—J. W. Barnum, New Orleans, La

I claim the device herein described and as shown upon the drawings when provided with the two overlapping semi-annular grooves or curved supporting points, A A', as described when constructed as described and used for fastening the ends of wire rope or of common untwisted wire that is employed for banding cotton bales, as set forth.

70,504.—PNEUMATIC RAILWAY.—A. Ely Beach, Stratford, Ct.

I claim, 1st, The enlargement of the tube at or near the stopping station, substantially as and for the purpose herein shown and described.

2d, The method of preventing the leakage of air at the openings, substantially as herein shown and described.

3d, The method of supporting the cars and rails, substantially as herein shown and described.

4th, The recess, F, for lighting the tube, substantially as herein shown and described.

70,505.—CAR COUPLING.—G. M. Beardsley, Fenton, Mich.

I claim the double hooks, D D, with operating arms and levers in combination with the arrow-headed coupling bar its frame and springs, all constructed and arranged as described and for the purpose as set forth.

70,506.—CANE AND UMBRELLA COMBINED.—Henry Beebe, Hudson city, N. J.

I claim, 1st, The two tubes, B F, in combination with the handle, A, and body, E, of the cane or umbrella stick and locked together by the T-shaped slots and the shaft, k, of the lamp burner, substantially as shown and described.

2d, The sleeve, D, drawn over the tube, B, and provided with openings, e e', and the mica or other transparent material, f, secured between them in combination with a cane or umbrella stick, substantially as and for the purpose specified.

3d, The perforated tube, I, in combination with the two tubes, B F, provided with the cross slots and the lamp, G, substantially as and for the purpose set forth.

4th, The conical wire cloth or perforated metal tube, C, secured within the tube, B, provided with openings, x, the tube, F, and lamp, G, in combination with a cane or umbrella stick, substantially as and for the purpose specified.

70,507.—ADJUSTABLE CALKS FOR HORSESHOE.—William Jones Berne, Cincinnati, Ohio.

I claim, 1st, The mode of securing the sockets, A, by means of the set screws, A2, arranged to operate in combination therewith, substantially as set forth.

2d, In combination with the sockets, A, the use of an elastic substance, A3 interposed between the heel of the shoe and the socket, substantially as set forth.

3d, The toe piece, B, rigidly attached to the cross piece, C, for attaching the same to the shoe, substantially as set forth.

4th, In combination with the toe piece, B, the front extension, B2, hinged thereto, and arranged to operate substantially in the manner set forth.

5th, The combination of the cross piece, C, the toe piece, B, hinged extension, b2, of the toe piece, rods, E, and straps, D, attached to the sockets, A, substantially as set forth.

70,508.—WASHING MACHINE.—Joseph Bevis, Putnam, Ohio.

I claim, 1st, The combination of the stationary washboard, B, movable washboard or presser, C, and cam, D, with each other and with the tub, A, substantially as herein shown and described and for the purpose set forth.

2d, Connecting the movable washboard, C, to the cam, D, by means of the yoke, G, crosshead or bar, H, bolts, I, and spring, J, or by an equivalent adjustable and elastic device, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the swinging frame, N, having a canvas or equivalent bottom, R, attached to it with the washboards, C and B, substantially as herein shown and described and for the purpose set forth.

70,509.—SOLAR CAMERA.—Lyman G. Bigelow, Albion, Mich.

I claim, 1st, The universal jointed connection, K, constructed and arranged substantially as described for the purposes set forth.

2d, I claim operating a solar-printing camera from east to west and to and from the zenith (being a combination of two motions) by turning a single screw, substantially as shown and described.

70,510.—PREPARING CEMENTS FROM SLAGS.—John James Bodmer, Newport, Great Britain.

I claim the use of slag or scoria produced by blast or other furnaces (or when produced by other means), in combination with lime or with lime and alumina in the formation of cement, substantially as described.

70,511.—DEVICE FOR OPERATING FOLDING VALVES.—Eugene Bourden, Paris, France.

I claim the combination with the valve, and suitable orifice or orifices formed therein, of the membraneous or flexible valve, and lever for operating the same, substantially as and for the purposes herein set forth.

70,512.—CARBURETING GASES AND AIR.—John F. Boynton, Syracuse, N. Y.

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

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

70,513.—ALLOY FOR THE MANUFACTURE OF METAL SHEETS, FOIL, ETC.—Leopold Brandeis, Brooklyn, N. Y.

I claim to produce metal sheets of any thickness, perfectly pliable, not easily acted upon by weather and temperature, of great strength and durability, for roofing, plumbers', tinmens', and chemical use, for grocers, tobacconists, perfumers, and confectioners, by making an alloy of lead and other metals in suitable proportions and shape by protecting this alloy with a coat of tin surrounding it, and to produce from this alloy, so prepared, sheets or leaves of any size and weight, and for the devices of application of hot water or steam between the rollings.

70,514.—WOOD PAVEMENT.—J. L. Brown, New York city.

I claim the employment of arched formation timbers, laid crosswise of the the street, in combination with any suitable earthy foundation, and sections of wooden pavement resting upon such foundation, and overlapping the arched timbers, substantially as described.

70,515.—BLACKING BRUSH.—G. R. Burdon, Waltham, Mass.

I claim the combination and arrangement of the brush, E, with the grooved head, G, ring, I, spring, M, joint, J, holder, A, and blacking box, L, substantially as described for the purpose specified.

70,516.—MILK CAN.—N. C. Burnap, Argusville, N. Y.

I claim a milk can when provided with a rounded connection between sides and bottom, and when combined with a similarly rounded protecting bottom, B, having a flange, a, and with a ring, C, all made substantially as and for the purpose herein shown and described.

70,517.—CARRIAGE SEAT BACKS.—John Burt, Sturgis, Mich.

I claim the within-described vehicle seat, in which the back and ends, with round corners, are formed from a single piece of wood of proper length and thickness, shaped and bent to the desired shape, as set forth and described.

70,518.—MASH COOLER.—Franklin P. Bush (assignor to himself and Jeptha Garrard), Cincinnati, Ohio.

I claim, 1st, The arrangement of tun, A, central annular waste way, D

rotary centrally discharging coils, J, central supply pipes, G I, stuffing box, B, and rake, L, for the purpose set forth.

2d, In the described combination the rotary coils, J, discharging into a central waste way, D, in the manner set forth.

70,519.—MACHINE FOR SHARPENING CALKS OF HORSESHOES.—William M. Butler, Waukegan, Ill.

I claim, 1st, A machine for sharpening horseshoes, made and operating substantially as herein shown and described.

2d, The device for moving the cutter, C, forward or backward consisting of the spring, E, nut, f, and shaft, B, all made and operating substantially as herein shown and described.

3d, The device for moving the cutter laterally consisting of the slotted frame, A, screw, K, sleeve, l, and shaft, B, all made and operating substantially as herein shown and described.

4th, The frame, A, when provided at the corners with projections, a, and setscrews, b, so as to be easily fastened on any sized shoe and when provided with slotted flanges, h h, and bolts and nuts, l, for the same purpose, substantially as set forth.

70,520.—SHIPS' COMPASS.—James, Earl of Caithness, Middlesex county, England.

I claim the combination of a mariner's compass and a weighted pendulum secured to the compass box and having near the upper end a ball which fits in a stationary socket, all substantially as and for the purpose described.

70,521.—PISTON PACKING.—Luther W. Campbell Aurora, Ill., assignor to himself, A. T. Hall, C. F. Allen and A. J. Ambler.

I claim, 1st, So arranging a series of concentric elastic rings, K G and E, having alternately inclined faces that acting in combination with the conical hub, A, and packing rings, H H, they shall maintain an uniform outward pressure upon the latter by the action of the steam alternately entering each end of the cylinder, substantially as set forth.

2d, The combination of the perforated heads, B B', conical hub, A, and rings, E F G K and H, arranged to operate substantially as set forth.

70,522.—PISTON PACKING.—Luther W. Campbell, Aurora, Ill., assignor to himself, A. T. Hall, C. F. Allen and A. J. Ambler.

I claim, 1st, So arranging a double series of concentric elastic rings, F G and H, that acting in combination with the central ring, E, having double inclined faces, E2, they may by the pressure of the steam, alternately admitted to the opposite ends of the cylinder, be alternately expanded, substantially in the manner and for the purpose set forth.

2d, The combination of the hub, A, perforated plates, B B', ring, E, having a central flange, E1, and double inclined faces, E2, and the concentric rings, H G and F, constructed and arranged to operate substantially as set forth.

70,523.—APPARATUS FOR RAISING AND SECURING THE LEGS OF HORSES TO SHOE THEM.—J. P. Champion, Phelps, New York city.

I claim the apparatus for raising and securing the legs of horses to shoe them safely, arranged and applied as herein shown and described.

70,524.—CYLINDER PRINTING PRESS.—Henry C. Chandler, Indianapolis, Ind.

I claim moving the bed, B, under the impression cylinder, C, at the time of making the impression by means of the pins, S, and standards, R, segmental cog bars, G, and cog bars, F, in combination with the devices for giving the return movement to the bed by means independent of that which carries it under the cylinder, in the manner substantially as set forth.

70,525.—TABLE CUTLERY.—Matthew Chapman, Greenfield, Mass.

I claim as a new article of manufacture table cutlery having the blade, bolster, and handle forged or swaged from one solid piece of steel, substantially as herein described.

70,526.—SLEIGH BELLS.—Cyrus R. Clark, Cobalt, Conn.

I claim attaching sleigh bells to their straps by means of two or more sheet metal plates, b b, which are secured to a shank, a, that is cast with the bell, A, all made substantially as and for the purpose herein shown and described.

70,527.—HORSE HAY FORK.—Mark Coffin, Milton, Ky.

I claim the arrangement of the rope, C, having the ring, F, knot, c', and trigger, E, with the bent tines, A D, pulley block, B, and rope, G, as herein described for the purpose specified.

70,528.—METHOD OF STOPPING AND STARTING CARS.—Elisha T. Colburn, Boston, Mass.

I claim the combination of the slide bar, D, and its locking pawls with the brake mechanism consisting of the levers, F, the blocks, G, the rope, I, and the wheel or wheels, H, the whole being substantially as specified.

I also claim, as an accelerating mechanism for a car, the combination of the slide bar, D, the rope, I, and the wheel or wheels, H, arranged and applied to the axles as set forth, the said bar, D, being connected to the draw bar or tongue of the car, as explained.

70,529.—COMBINED TOOL.—B. W. Collier, Oxford Miss.

I claim the instrument above described having the parts combined and arranged substantially as and for the purposes specified.

70,530.—CORPSE PRESERVER.—C. W. Compton, Newark, N.J.

I claim, 1, Forming the bottom or cooling board, A, in two parts hinged to each other, substantially as herein shown and described and for the purpose set forth.

2d, Forming an air chamber or chambers, a', in the bottom or cooling board, A, substantially as herein shown and described and for the purpose set forth.

3d, The ice chamber, D, extending down upon the sides of the trunk to or nearly to the bottom board, A, and extending around the head of the corpse, substantially as herein shown and described and for the purpose set forth.

4th, Forming the corpse preserver in three parts, A B C, substantially as herein shown and described and for the purpose set forth.

5th, Forming the adjacent ends of the parts B and C, inclined or wedge shaped, substantially as herein shown and described and for the purpose set forth.

6th, The combination and arrangement of the body chamber, G, ice chamber, D, and air chambers, a' E and F, substantially as herein shown and described and for the purpose set forth.

70,531.—WEIGHTS FOR SCALES.—H. W. Comstock, Lafayette, Ind.

I claim the substitution of glass in place of other substances as weights for weighing scales, thereby producing an anti-corrosive and cheaper weight, as specified.

I also claim a filled glass weight when so constructed that the material used as filling shall be entirely surrounded by the glass, as specified and described.

70,532.—ATTACHING WHEELS TO VEHICLES.—L. Crouch, Baraboo, Wis.

I claim the nut, E, provided with the screw thread upon its outer circumference and secured to the hub, A, by means of screws, in combination with the axle box, C, nut, E, and cap, E, substantially as described for the purpose specified.

70,533.—WAGON BRAKE.—Ezra N. Curtice, Spring Water, N. Y.

I claim, 1st, The brake shaft, F, supported in the boxes, a a, on the wagon reach and hounds and the straps, c c, on the braces, b b attached to the axle, A', arranged and operating as and for the purpose described.

2d, The eccentric arms, e e, on the ends of the brake shaft, F, in combination with the rubbers, d d, arranged and operating as described.

3d, The combination of the brake shaft, F', the rod, g, and the draft pole, E, arranged and operating as and for the purposes described.

60,534.—MANUFACTURE OF SUCTION BOXES FOR PAPER MAKING.—Francis Curtis, Newton, Mass.

I claim the improved manufacture of suction box as composed wholly or in part of hard rubber, substantially in manner and for the purpose as before described.

70,535.—SLEIGH KNEE.—Isaac Dan, Sanford, N. Y.

I claim the blocks, B and C, as constructed and used in combination with the knee and the bar, E, as and for the purpose set forth.

70,536.—SLEIGH KNEE.—Isaac Dan, Deposit, N. Y.

I claim the knee constructed of wood and metal in the manner herein set forth and used with the runner, for the purpose specified.

70,537.—GATE LATCH.—Alfred K. Davis, Carey, Ohio.

I claim the pivoted latch bars, D D', and connecting bar, E, and their respective equivalents, all as set forth in combination with the lever, F, operating and arranged in manner substantially as and for the purposes herein shown and described.

70,538.—FEED-WATER HEATER FOR STEAM GENERATORS.—John W. Doughty and Horatio B. Beckman, Newburg, N. Y.

We claim the chamber, T, with pipe, P1, in connection with the feed pump, or any other instrument of supply, well, W, blow off pipe, P2, steam-connecting pipe, Q1, water-communication pipe, E G Q2, with the cap, F, and boiler, B, as shown in the drawing, and for the purpose as set forth.

70,539.—STRAW CUTTER.—Stephen Elliott, Richmond, Ind.

I claim constructing a straw cutter, as above described, when the same is composed of the spiral spring, K, lever, B, cross piece, H, uprights, F and G, cross piece, D, lever, E, rod, I, and frame, A, arranged and operated substantially as above described.

70,540.—SYRINGE.—Jas. J. Essex, Newport, R. I.

I claim, 1st, The employment or use, in connection with a syringe, of a receiver or reservoir, A, provided with a glass or other transparent plate, A x, and with a screw cap, b, and tube, B, substantially as and for the purpose set forth.

2d, The combinaton of a metallic and an elastic bulb, when the former are attached to opposite ends of the latter, and used either in connection with or without an air chamber, for the purpose specified.

3d, The rose jozzle, or douche, composed of the cup, i, and perforated plate, j, when used in connection or combined with a syringe provided with an elastic bulb, substantially as and for the purpose specified.

4th, Providing the male screw of the connections or joints with a socket, g, to receive the packing and prevent its lateral expansion under pressure, where the two parts of the connection or joint are screwed together.

5th, The arrangement of the rigid discharging pipe and the flexible suction tube and their valves at one end of the bulb, substantially as herein shown and described.

70,541.—SEED PLANTER.—H. C. Fairchild, Brooklyn, Pa.

I claim, 1st, The slide, D, operated from the outside by the screw, a, and the arm, c, substantially as described.

2d, The hole, d, through the cylinder, substantially as and for the purposes herein set forth.

70,542.—PAINT BRUSH.—Wm. H. Forker, Meadville, Pa.

I claim the cap, E, and the ferrule, F, forming the cup, E F, in combination with the cylinder, D, with the staves, J J J J, the conical nut, C, and the screw, H, when the same are constructed as described in the aforesaid combination, for the purposes set forth.

70,543.—CONDENSER FOR CARDING ENGINES.—Geo. R. Gardiner (assignor to himself and Benjamin W. Bentley), Westerly, R. I.

I claim, 1st, The roller, C, one or more, made either hollow or solid, and charged or covered with a composition, herein described, or its equivalent, and placed on a condenser, in relative position with the cylinders, B, thereof, substantially in the manner as and for the purpose set forth.

2d, The guards, G, attached to the guide bars, F, on frame, D, and arranged in relation with the rovings, a, substantially as and for the purpose specified.

70,544.—SCISSORS SHARPENER AND CLOTH RIPPER COMBINED.—A. W. Gifford (assignor to William A. Richardson and Henry D. Ward), Worcester, Mass.

I claim a combined scissors sharpener and ripper, constructed for operation substantially as described.

70,545.—MACHINE FOR SPLITTING WHALEBONE.—Nathan Goddard, Boston, Mass.

I claim the arrangement and combination of the series of knives, A B C D, and adjustable rollers, F, or the same and the adjustable throat piece, G, the whole being applied to a frame, E, substantially as and for the purpose specified.

70,546.—WEIGHING AND MEASURING CUP.—E. A. Goodes, (assignor to himself, E. L. Miller, and W. H. Morford), Philadelphia, Pa.

I claim a cup provided with scales, a b and c d, whereby it may be used for weighing and measuring purposes, in the manner substantially as herein set forth, as a new article of manufacture.

70,547.—LEVEL AND TRY-SQUARE.—J'n Graham, Ludlow, Vt.

I claim, 1st, The indicator, composed of a T-shaped bar, F, connected by a toothed segment, d, and pinion, e, or their equivalents, with an index, f, which traverses over a graduated ring, g, all being arranged and applied to a square, to operate in the manner substantially as and for the purpose set forth.

2d, The combination of one or more supplemental movable or adjustable squares, G J, with a T or try-square, substantially as shown and described.

3d, The slide, I, provided with a bevelled or V-shaped notch, o, at one end, and a series of slots, p, at the opposite end, when said slide is applied to or used in connection with a T or try-square, substantially as and for the purpose specified.

4th, The plate, H, provided with the ribs, l m, and slot, n, when said plate is used in combination with a supplemental square applied to a T or try-square, substantially as and for the purpose set forth.

76,548.—FARM GATE.—Orson Graham, Lima, N. Y.

I claim, 1st, The collar, C, and collar, D, in combination with the gate, E, and folding part, F, when made and used substantially as specified.

2d, The folding part, F, when made as specified, and used in combination with the gate, E, substantially as specified.

70,549.—FENCE.—Isaiah M. Green, Sen., Clinton, Ill.

I claim the groove, C, in the post, A, and rod, D, passing through eyes in the ends of the wires, c c, in combination with the key, b, and their seats in the rails, B, all arranged and operating substantially as and for the purpose set forth.

70,550.—HAY RAKE.—Albert J. Greene, Sterling, Mass.

I claim, 1st, In a hand hay rake, the arrangement of the axle, B, teeth, C, blocks or hinges, D, rod, F, and shaft, E, with each other, substantially as herein shown and described.

2d, The combination of the spring or springs, G, with the rod, F, axle, B and shafts, E, substantially as herein shown and described, and for the purpose set forth.

3d, Adjusting the tension of the spring, G, by means of a thumb screw, H, substantially as herein shown and described.

4th, In a hand hay rake, the arrangement of the arm, K, and rod, L, with the axle, B, and shafts, E, substantially as herein shown and described, and for the purpose set forth.

70,551.—PHOTOGRAPHIC PROCESS.—Manfred M. Griswold, Columbus, O.

I claim, 1st, The black baked photographic plate, prepared substantially as hereinabove set forth, as a new article of manufacture.

2d, The composition of the enamel or collodion for producing the original white surface, substantially as described.

3d, Baking the plate subsequent to the application of the white collodion film, substantially as set forth.

4th, Restoring the white color to the surface of the plate, subsequent to its being baked, as set forth, or in any manner substantially the same.

70,552.—ANNUNCIATOR.—Henry Gross and George S. Yingling, Tiffin, O.

We claim, 1st, The self-controlling figure drops, B, constructed substantially as described, in combination with the upright guides, C, upon which they slide, as and for the purpose set forth.

2d, The double springs, D, constructed substantially as herein shown and described, in combination with the drops, B, and with the upright guides, C, as and for the purpose set forth.

3d, The levers, F, constructed substantially in the form and manner herein shown and described, in combination with the connecting rods, E, and double springs, D, for the purpose of releasing the drops, B, and with the tumbler, H, by means of which the bell hammer is operated, as and for the purposes set forth.

70,553.—ENGRAVING MACHINE.—J. C. Guerrant and B. J. Field, Leaksville, N. C.

We claim, 1st, The holder, A, adjustable in a horizontal plane upon a center coincident with the the axis of rotation of the post which carries the graver shaft, substantially as described.

2d, The arrangement of the extensible rod, G G', connecting the tracing arm, H, with the graver arm, D, substantially as described.

3d, The adjustment of the connecting rod, G G', at the point of attachment to the tracing arm, so as to vary the degree of penetration of the graver, substantially as described.

4th, The rotating graver, D, in combination with the vibrating and counterpoised graver arm, D'.

5th, The vibrating slotted guide plate, K, constructed and operating substantially as described and represented.

6th, The guide rod, L, planted in the adjustable slide rest, M, and affording a guide for operating the cutter on a given vertical line.

70,554.—MODE OF ORNAMENTING GLASS SHADES AND GLOBES.—R. Guthrie and J. Shearer, New York city.

We claim the removable sectional glass ornaments or hangings for lamp shades and globes, arranged substantially as and for the purpose herein shown and described.

70,555.—HEAD REST.—Robert Hale, Chicago, Ill.

I claim the head rest, constructed as described, consisting of the cap, A, having the neck strap, C, the adjustable strap, D, secured at one end to the visor, B, and at the other by a hook, E, to the roof of a car, or an equivalent support within the car, as herein described for the purpose specified.

70,556.—REVERSIBLE CHAIR SEAT.—Mathias Hamburger, New York city.

I claim the reversible seat, B, when hinged, by means of pins, a a, in the chair frame, A, and when combined with the stop, b, and pin, C, all made and operating substantially as herein shown and described.

70,557.—FURNACE.—David Harger, Des Moines, Iowa.

I claim the combination of the pipe, A, having the apertures, a a, and provided with the sliding cover, d d, with the furnace, C D F, the several parts being constructed, arranged, and operating together, substantially in the manner and for the perpose specified.

70,558.—MACHINE FOR STAMPING AND SHAPING LEATHER.—Benjamin B. Harris (assignor to himself, F. G. Harris, and Seneca Sly), Lockport, Ill.

I claim, 1st, The combination of the toggle joint and levers, all as set forth, with the follower, C, hung from the frame, A, having the stage post, B, hung from it, and playing through a loose mortise, in manner substantially as herein shown and described.

2d, The die or knife plate, I, carrying the knife, k, sliding in the dovetailed groove, g, on stage, G, which is furnished with the hole, m, and bolted by the dovetailed pin, L, to the stage, G, all as set forth, in combination with the toggle joint, levers, and followers, substantially as herein shown and described.

70,559.—COMPOSITION FOR TEMPERING STEEL.—F. G. Harris, Willsborough, N. Y.

I claim the composition formed of the ingredients combined with each other in the proportions herein described and for the purpose set forth.

70,560.—CAR WHEEL.—John Harris (assignor to John S. Vine) Marquette, Wis.

I claim the flanges, c c', upon the hub, B, and plate, d forming the chambers for the lubricating material upon the sides of the rim, D, as herein shown and described for the purpose specified.

70,561.—CURB FOR WATER WHEELS.—John H. Hartsuff, New Castle, Pa., assignor to himself, R. W. Cunningham, and R. C. Dunlap.

I claim the tongues, D D, provided with the hinged flaps, E E, and used in combination with the wheels, A and B, constructed and operating as and for the purpose set forth.

70,562.—BARN DOOR OR GATE FASTENING.—L. B. Hayes and William Morris, of Greene, N. Y.

We claim, 1st, The combination of the vertical bar, C, spring catch, E, and catch, I, with each other, and with the door or gate, A, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the band or collar, L, and block, K, having a pin, k', attached to its edge, with the bar, C, substantially as herein shown and described and for the purpose set forth.

70,563.—TOOL FOR CUTTING BOLTS.—J. E. Heath, Niles, Mich.

I claim, 1st, The combination of the plate, A, cutters, C C, levers, D D, and springs, a a, arranged as described.

2d, The slotted guide plate, B, projecting between the cam lever, D D, from the plate, A, as shown, in combination with the jointed arms, E E, cam levers, D D, and cutters, C C, substantially as and for the purpose set forth.

70,564.—PHOTOGRAPHIC PRINTING FRAME.—John Heddon, Elkhart, Ind.

I claim the hinged back, of five pieces, more or less, so constructed that any or more may be fastened together, or an opening be effected at either of the joints, thus admitting the examination of the printing from either end of the frame.

Also, the broad flanges, in connection with the adjustable grouping board, which movable perforated board, or any other material answering the same purpose, I also claim, this being equivalent to the movable or sliding frame for carrying the back up or down.

I claim the adjustable and sliding back, also, the vignetting arrangement for excluding the light from the sensitive paper, by the use of two pieces of board, or other material, with a tube for conducting the rays of light to the negative.

I claim this invention, separately and as a whole, in combination one with the other, substantially as set set forth above.

70,565.—HOISTING APPARATUS.—Philip Higdon, Lewisport, Ky.

I claim the combination of the frame, A A1 A2, shaft, B, pulleys, D F J K pinion, G, cords or ropes, E I, rack, d, either jointed or inflexible, and movable sheave, L, all arranged and operating substantially as described.

70,566.—CHILDREN'S CARRIAGE AND CRADLE.—C. W. Higgings, Waukesha, Wis.

I claim a children's carriage, when constructed substantially in the manner and for the purposes described.

70,567.—LAMP EXTINGUISHER.—F. B. Hill, Cleveland, O., and W. H. McCoy, Des Moines, Iowa.

We claim the combination of the cap, C, pendent bars, e, rod, B, crank, d, and spring, f, arranged to operate in the manner and for the purpose herein specified.

70,568.—REGISTER POINT FOR PRINTING PRESSES.—Nicholas Hopkins, N. Y.

I claim, 1, The hinged plate, B, having a metallic point, C, attached to its movable part, to be used in connection with a piece of furniture in making up the form, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of one or more rubber or other elastic bearers, D, with the movable part, b2, of the hinged plate, B, substantially as herein shown and described for the purpose set forth.

70,569.—TOY.—Kellis Horde, Washington, D. C.

I claim the plunger, B, combined with tube, A, and lever, a, for operating toys, substantially as described.

70,570.—BEVEL.—Leonard D. Howard, St. Johnsbury, Vt.

I claim the applying of a blade screw and nut to a bevel, in the manner shown, or in an equivalent way, so that the head of the screw and the nut will be flush with the sides of the handle or stock, as set forth.

I also claim the cap, C, applied to the end of the handle or stock, and provided with the concave or countersink, d, at one side, and the socket, E, at the opposite side, to receive, respectively, the screw head and the screw nut substantially as shown and described.

70,571.—BOOT BLACKING AND POLISHING MACHINE.—S. W. Huntington, Augusta, Me.

I claim the combination in a machine, such as described, with one or more rotating brushes, of an adjustable trough or blacking receptacle, substantialy in the manner and for the purposes herein shown and set forth.

70,572.—SADIRON HEATER.—George Hurdman (assignor to Chas. F. Clark), Wolverhampton, England.

I claim, as my invention, the improvements in charcoal-box sad irons, hereinbefore described, that is to say, the combination of the rod, pin, or guide, g, and eyes or brackets, f f, with the body and lid or cover of charcoal-box irons for the purpose of permitting of the sliding of the lid or cover upon the body, substantially as described and illustrated.

Also, the combination with the said parts, f g, of the turn or button, h, for fastening the lid or cover, and the knob or handle, l, for holding the iron during the sliding of the lid or cover, substantially as described and illustrated.

70,573.—VAPOR-LAMP BURNER.—W. W. Jacobs, Hagerstown, Md.

I claim the combination of tube, A, pan, D, screw cap, B, and wick, C, constructed and arranged substantially as shown and for the purpose set forth.

70,574.—KNIFE CLEANER AND SHARPENER.—L. J. Johnson, Montville, Conn., assignor to himself and Erskine A. Cole.

I claim, 1st, The composition of the box, A, with the corks, c c, and the handle, F, containing the knife sharpener, L, the cylindrical covered box, G, with the cylindrical cup, H, and polishing apparatus, I, substantially as shown and described and for the purpose specified.

2d, The combination of the cylindrical polishing band, I, and cork, J, with the box, A B, as shown and described and for the purpose specified.

70,575.—DRESS ELEVATOR.—George William Keller, Philadelphia, Pa.

I claim the spiral spring girdle or belt, A, provided with openings, B, in combination with spring, C, cord, D, and strings, E, substantially as herein set forth.

70,576.—DOOR LOCK.—Michael Knapp and John Knapp, Hudson City, N. J.

We claim, 1st, Guiding the secondary tumbler, D, through the slotted guides, d, and through the grooved tumblers, b b, said secondary tumbler provided with the projections, g, as described, and connected with the spring, h, operating as and for the purpose specified.

2d, The combination and arrangement of the bolt, B, tumblers, b b, secondary tumblers, D, guides, d, and springs, a c h, all operating as described, for the purpose specified.

3d, So constructing a lock that the same can only be locked and unlocked by turning the key in one direction only, as set forth.

70,577.—PEGGING JACK.—John K. Krieg, New York city.

I claim the construction of the hollow last holder, in combination with the pin rod inserted therein and adjustable, for the purposes and as specified.

70,578.—CULTIVATOR.—S. A. Kroner, New Britain, Pa.

I claim, 1st, The trestle, H, in combination with the handles, B, and beam, A, for the purpose of shifting the handles, in the manner and for the purpose specified.

2d, I claim the movable sides, C and C', in combination with the plates, D and F, the slide, E, and pin, G, in the manner and for the purpose set forth.

3d, I claim the arrangement of the shares, K, in combination with the movable sides, C and C', plates, F and D slide, E, trestle, H, and clevis, I, in the manner and for the purpose herein specified.

70,579.—UMBRELLA RUNNER.—Henry Kurth, Brooklyn, N.Y.

I claim an umbrella runner provided with the locking device consisting of the supporting piece, f, locking ring, e, in combination with pins, C and d, in the handle, substantially as described.

70,580.—CLEAT CHOCK.—Amariah Lake, Smith's Landing, N.J.

I claim a cleat chock made and employed substantially as herein shown and described.

70,581.—MACHING FOR PEGGING BOOTS AND SHOES.—Wm. R. Landfear, Hartford, Conn., assignor by mesne assignments of David Whittemore.

I claim, 1st, Passing the pegs severed from the peg wood from the severing knife to the driving bar, through a slot in the axle of the feeding sleeve, substantially in the manner and for the purpose described.

2d, The combination of the bar, A1, bolt, B', and set screw, C', arranged substantially as specified, for securely holding down the peg wood during its passage through the machine, as set forth.

3d, The application of an adjustable brake to control the movement of the feeding sleeve, in the manner described.

4th, The plates, F' and C', arranged as described, and forming grooves for the passage of the awl and driver in front of the feeding sleeve, as specified.

70,582.—CONSTRUCTION OF ICE PITCHERS.—Nathan Lawrence (assignor to Reed & Barton), Taunton, Mass.

I claim, 1st, An ice or double-walled pitcher having its inner wall or lining spun or swaged out of one piece of metal, or swaged out of a single piece, so that the bottom will be seamless or without a joint, substantially as described.

2d, The securing of the ribs, b, to the bottom of the inner wall or lining, substantially as and for the purpose specified.

70,583.—BED BOTTOM.—Frederick Leadbetter, Plymouth, Mich.

I claim connecting the slats, B, to the ends of the bedstead by means of the wires, C, connected to the ends of the slats, as shown, and attached at their outer ends to bars, D, which are fitted loosely on V-shaped wires, E, driven in the ends of the bedstead, and having spiral springs, f, upon them, as herein set forth.

70,584.—PROPAGATING TANK AND BED.—N. H. Lindley, Bridgeport, Conn.

I claim the valves, E E', as described, and their adjustability in combination with the hot water channels, C D, propagating bed, a, hot air space, a x, and deflector, c, substantially as described for the purposes specified.

70,585.—BRICK MACHINE.—Stephen W. Long, Louisville, Ky.

I claim, 1st, The arrangement in a brick machine of two plungers, I K, so as to form a measure, and to exert upon the clay compressive forces in directions perpendicular to each other, substantially as described.

2d, The combination of the plungers, I K K', sliding molds, J J' J', chambers, o o' o'', and pug mill, G D, all arranged and operating substantially as and for the purpose herein specified.

70,586.—ICE TONGS.—R. M. Mansur, Augusta, Me.

I claim the ice tongs or hook provided with the elastic arms, A, and the angular, sharpened, or pointed prongs or teeth, C, constructed and operating in the manner and for the purpose set forth.

70,587.—HANDLE FOR SHIPS' PUMPS.—Knud Markuson (assignor to himself and Leonard A. Burnham), Gloucester, Mass.

I claim the improved pump handle, as made in two parts, A B, connected together by two hinges, or by a hinge and latching or locking devices, applied to their opposite sides, the whole being substantially as specified.

I also claim the arrangement and combination of the rotary rod, made as described, and the socket for the head of such rod, with the two handle parts, A B, connected substantially as explained.

70,588.—MANUFACTURE AND APPLICATION OF BISULPHITE OF LIME.—Wm. Marr, New York, City.

I claim, 1st, The new article of manufacture, liquid bisulphite of lime, prepared substantially as herein described.

2d, The improved mode of arresting fermentation in beer, ale, and other fermented liquors, by the application of liquid bisulphite of lime, substantially as herein described.

3d, The application of liquid bisulphite of lime for preventing fermentation in saccharine and other fermentable liquids.

4th, The application of liquid bisulphite of lime for preserving meat and fish, substantially as described.

70,589.—HARNESS SADDLES.—Godfrey Marshall, Indiana, Pa.

I claim a harness saddle constructed with its cushion or pad substantially as and for the purpose described.

70,590.—STEAM ENGINE.—Emory McClintock, New Brunswick, N. J.

I claim the combination of the valve ports, S S' E E' U U' L L, in the cylinders, C C', and the passages, a b c d and a' b' c' d', in the double-acting pistons, P P', said pistons serving as four-way valves, all substantially as herein described, for the purposes specified.

70,591.—LIFTING JACK.—Wm. McMillen, Milan, assignor to himself and Z. King, Cleveland, Ohio.

I claim the arrangement of the legs, A A', in combination with the lever, C, and link, B, when pivoted or jointed in the manner substantially as described.

70,592.—PLANING MACHINE.—Rufus N. Meriam, Worcester, Mass.

I claim the slides, F F*, carrying the shafts, C C*, and constructed with racks, d d*, in combination with the blocks, B B*, formed with standards, E E*, and the pinions, e e*, whereby the said shafts may be raised or lowered with reference to the bed, a, constructed and operating substantially as herein set forth.

70,593.—SASH SUPPORT AND FASTENER.—Fenwick R. Miller and Edwin Prescott, Pittsburg, Pa.

We claim the upper cam, d, in combination with the lower cam, d, so constructed, arranged, and connected, substantially as described, as to press against the rail or frame of the window in opposite directions by means of the weight of the upper cam, and the lock and support the sash in any position in which it may be placed, while the depressing of the lower cam shall also raise the upper cam, and thus leave the sash free to be raised or lowered.

70,594.—MODE OF SECURING WHEELS ON AXLES.—J. Miller, Jr., Baltimore, Md.

I claim the combination of the box, A, spring, B, plate, C, and the linchpin, D, or their equivalents, operating in the manner described and for the purposes substantially as set forth.

70,595.—CYLINDER OF STEAM HAMMERS.—Robert Mitchell, Wolverhampton, Great Britain.

I claim the peculiar arrangement of steam ports and ways in the cylinders of double acting steam hammers and forging machines, substantially as and for the purpose hereinbefore described, and illustrated by Fig. 5 of my drawing.

70,596.—APPARATUS FOR MOVING BUILDINGS.—John H. Moore, Binghamton, N. Y.

I claim the hinged latch, G, and the catch, H, in combination with the reach or sand board, C, and bolster, F, all constructed and arranged substantially as and for the purposes set forth.

70,597.—HINGE.—Antonio L. Mora, New York City.

I claim, 1st, the pawl, D, and the spring, E, constructed, arranged, and operating substantially as and for the purposes described, in combination with a ratchet hinge.

2d, The pin, f, by which the pawl is tripped, substantially as described, in combination with the pawl, D.

2d, In combination with the pawl, D, I claim the ratchet, C, and the stop plate, F, substantially as described.

4th, In combination with a hinge, I claim the plates, A and B, substantially as and for the purposes described.

70,598.—LUNCH BOX.—Jonn F. Morgan, Boston, assignor to Cornelius S. Hurlbut, Springfield, Mass.

I claim a lunch or dinner box as an article of manufacture, the end plates and side plates of which are joined to each other and to the bottom plate of the box by hinges, and the end plates of which are made of two parts or pieces connected by hinges, which traverse the end plates diagonally, and one side plate of which is made of three parts or pieces connected together by hinges, so that the box can be folded flat without detaching any part of it, beside the top or cover, from the other parts, substantially as herein set forth.

70,599.—PERMUTATION LOCK FOR DOORS, ETC.—John H. Morse, Peoria, Ill.

I claim, 1st, The push pin, S, with its spiral spring, s, acting on click, K, in combination with hub plate, D, with its notches, d.

2d, I also claim the rubber pad, o, or its equivalent, on lug, J.

3d, Also the bolt, K with its slot, H, and lug, G, on lug bar, E, all working in the manner and for the purpose specified.

70,600.—INSTRUMENT FOR ADMINISTERING BALLS TO HORSES.—Chas. P. Moyer, Womelsdorf, Pa.

I claim, 1st, The india-rubber or pliable cup, E, the cup, A, and the plunger D ,used substantially as and for the purpose set forth.

2d, The shield, C, in combination with the tube, B, and plunger, D, when used as and for the purpose specified.

70,601.—MACHINE FOR MAKING PAPER BAGS.—E. B. Olmsted, Washington, D. C.

I claim, 1st, The combination of the feed and printing roller, F, with the inking roller, I, the cutting roller, F', and the gumming roller, G, substantially as and for the purpose described.

2d, The combination of the cutting edge, h, and knife, k, when used in an apparatus for making paper bags or envelopes, and when the parts are constructed, combined, and operating in the manner and for the purpose herein specified.

3d, The combination of the two folding devices, M and K, substantially as and for the purpose shown.

4th, The combination of the roller, N'. and leaves, n n', when constructed and operating in the manner and for the purpose set forth.

70,602.—MEDICAL COMPOUND.—Bird Paine, McMinnville, Tenn.

I claim the combination of pulverized ipecacuanha with the other remedies as described, above, whereby the well known deleterious effects of quinine in large doses are prevented, and the aggregate healing properties of the combination greatly enhanced.

70,603.—ORE SEPARATOR AND CONCENTRATOR.—Thomas N. Paine and Samuel Stephens, Grass Valley, Cal.

We claim, 1st, The pan constructed with the copper-lined recess, h, at its top to save the gold or amalgam, substantially as herein desctibed.

2d, The adjustable distributing spouts, constructed with the parts, d e and f, and having the adjusting screw, g, the whole operating substantially as and for the purpose herein described.

3d, The round arms, E, with the separated brushes, r r r r, for agitating the surface of the pulp, operating substantially as herein described.

4th, The ring rising automatically, and the rod, b, together with the endless screw, L, and the cone.pulleys, K and K', when used for raising the ring, H, substantially as herein described.

5th, The movable feed-trough, G, and the reservoir, M, supported by the rollers, k k, and the plate, l, operating substantially as and for the purpose described.

6th, The revolving belt, n, with its brushes and the perforated plate, p, when used in the feed trough, G, substantially as herein described.

7th, The two-part shaft, constructed with a hollow stationary slotted shaft, C, and the hollow movable slotted shaft, D, when constructed with the balls and the grooves in their ends to prevent friction, operating substantially as and for the purpose herein described.

70,604.—WINDOW-SASH SUPPORTER.—Joseph R. Payson, Chicago, Ill.

I claim the friction plate, A, with its projection, B, in combination with the inclined surface, a, and the spring, E, all aranged as shown, or in an equivalent way, for the purpose specified.

70,605.—WRENCHES.—Edward Perry, Hopkinton, Mass.

I claim the combination with the frame or stock, A, of the movable jaws, E E, screws, D D, and rosette, C, substantially as and for the purposes set forth.

70,606.—RAIL-CLAMP JOINT.—Francis Pidgeon, Saugerties, N. Y.

I claim, 1st, The combination of the dove-tailed rails, E, and dove-tailed clamps, G H, substantially as described, for the purpose specified.

2d, In combination with the above, the outer section of the clamp flush with the head of the rail, substantially as described, for the purpose specified.

70,607.—WAGON REACHES.—Zenas Plumb, assignor to himself and John C. Polley, De Witt, Iowa.

I claim constructing a wagon-reach in two parts, connected by a swivel-joint, substantially as and for the purpose described.

70,608.—FERTILIZER.—Henry E. Pond, Franklin, Mass.

I claim the new fertilizer, substantially as before described.

70,609.—COMBINED DOOR FASTENER AND POCKET KNIFE.—Benjamin F. Porter, assignor to himself and Timothy S. Mitchell, Manchester, N. H.

I claim the door fastener, B, constructed and arranged to operate as described, in combination with a pocket knife.

70,610.—TOY HUMMING WHEEL.—W. D. Porter (assignor to himself and James H. Platt, Jr.,), Petersburg, Va.

I claim the toy wheel, E, formed by the union of two concave disks, united at their peripheries, and provided with one or more openings, D, and the loops, A, when said parts are constructed and arranged as herein shown and described.

70,611.—SACK FASTENER.—Theodore Purse and Henry C. Draper, Ashley, Mo.

We claim the sack fastener, consisting of the two pieces of wire, A B, ninged or pivoted at C, when bent and arranged to operate substantially as described.

70,612.—PRIMING METALLIC CARTRIDGES.—Joseph Rider, Newark, Ohio, assignor to himself and E. Remington and Sons, Ilion, N. Y.

I claim, 1st, A shell without an end piece, and a flange turned and projecting forward on its inside, substantially as and for the purpose described.

2d, I also claim, in combination with a shell having an inward flange, a oase, B, having a recess for a cap, and holes extending from said recess to the charge in the cartridge, and removable and replaceable, substantially as and for the purpose described.

70,613.—DREDGING, SPICE, AND PEPPER BOX.—George W. Putnam, Peterboro, N. Y.

I claim a dredging or spice box, perforated upon its sides, substantially as herein shown and described.

70,614.—HARVESTER.—Amos Rank, Salem, Ohio.

I claim, 1st, The side delivery scraper, hinged to the outer divider, or its equivalent, so as to allow it to conform to the undulations of the ground, in combination with a grain platform or receiver, which is arranged behind the cutting apparatus of a harvester, and applied so as not to revolve, substantially as described.

2d, A slatted tilting or hinged platform, D, arranged behind the finger beam of a harvester, in combination with a scraper, G, which operates as shown, for the purpose set forth.

70,615.—SULKY PLOUGH.—John H. Rankin, Versailles, Mo.

I claim, 1st, The cultivators, C, constructed as above described and for the purpose set forth.

2d, The cultivators, C, screw, l, nut, l', cords, e, drums, f, an axle, g, and handle, h, in combination with the frame, A, all arranged as above described and for the purpose set forth.

2d, The ploughs, D, constructed as above described and for the purpose specified.

4th, The cultivators, C, ploughs, D, adjusting bars, b, rail, d, screws, l, nuts, l', cords, e, drums, f, on axle, g, and handle, h, in combination with the frame, A, as above described and for the purpose set forth.

70,616.—PESSARY.—M. J. Rhees, M. D., Mount Holly, N. J.

I claim a pessary, made substantially as described.

70,617.—WELL TUBES.—John W. Ricker, Chelsea, Mass.

I claim a series of perforated conical shaped thimbles, a, applied to a well tube, constructed and operated substantially as and for the purpose described.

I also claim a well tube provided with a series of perforated conical shaped thimbles, a, from which the sand is ejected by the employment of tubes, C D, substantially in the manner set forth.

70,618.—SPRING BEDSTEADS.—Robert Roberts, St. Paul, Ind.

I claim, 1st, in combination with the bedstead, A, support, B, and cleats, F, the frame, C, springs, D, slats, E, and webbing, I, arranged substantially as and for the purpose set forth.

2d, The head piece, G, when attached by hinges to the inner and detached frame, C, substantially in the manner set forth.

3d, The combination of the slats, E, springs, D, webbing I, and hinged head piece, G, arranged substantially as set forth.

70,619.—WAGON SEAT.—R. N. Rockwell, Glenwood, Iowa.

I claim the board or plank, A, with the springs, B B', attached, in combination with the pendent pins, E, attached to the bottom of the seat, C, all arranged substantially in the manner as and for the purpose set forth.

70,620.—BAG Fastener.—Ephraim Romans, La Porte, Ind.

I claim the combination of the frame, a, plate, b, and cord, f, substantially as and for the purpose described.

70,621.—CONFORMATORS.—E. Roseen, New York city.

I claim, 1st, The bar, n, constructed with joints, 5, and hinges, 6, so that its curvature can be preserved when the apparatus is flattened out, substantially as described.

2d, The adjustable bars, v v, in combination with the curved bars, m and w, substantially as described.

3d, The combination and arrangement of the bar, j, provided with a hook at its end, the bars, s and o, and the set screw, 3, connecting the bars, s and t, substantially as described.

70,622.—SPINNING WHEEL.—Jonas H. Rowe, Hudson, N. Y.

I claim, 1st, The arrangement of the vibrating arm, F, carrying the adjustable spindle head, G, said arm supported from the adjustable bar, E, and resting upon the spring, e, with the adjustable bar, D, and connecting rod, L, pivoted in said arm, F, as herein described, for the purpose specified.

2d, The combination of the bent spring, e, with the vibrating arm, F, adjustable rod, C, and connecting rod, L, as herein described, for the purpose specified.

70,623.—ROTARY CAM FOR LOOMS.—Ransom Sargent, Norwich, Vt.

I claim the rotary loom cam formed of a centre shaft, a, provided with heads, b', on the periphery of which are hung the truck shafts, c, in the adjustable boxes, d, for carrying the adjustable circular cams or trucks, E, to operate on the cam blocks, D, placed on the treadles, C, constructed, arranged and operating substantially as and for the purposes herein described.

70,624.—ANIMAL TRAP.—Jeremiah Schroy, Fort Ville, Ind.

I claim the drop, o, in the removable chamber, C, when such drop is provided with the fixed shoe or prolongation, r, arranged as described, whereby the weight of the animal upon said shoe prevents its being raised, as herein set forth.

70,625.—CAR COUPLING.—Lewis O. Schultz, Mattoon, Ill.

I claim the catch, F, the coupling pin, C, the guides, D and E, and the lifting rod, d, constructed and arranged substantially as described, in combination with the draw head of a railroad car, for the purpose set forth.

70,626.—GATES.—L. M. Scothorn, Findley, Ohio.

I claim, 1st, The double post, B, constructed as and for the purposes substantially as above set forth and described.

2d, The upright movable post, C, working in a groove in the post, B, and provided with the roller, c, substantially as above set forth and described.

3d, The main and extension gates, consisting of vertical and horizontal bars, D d, F, G, H and H', or their respective equivalents, and provided with rollers, D' D', g' g', in manner and for the purposes substantially as above set forth and described.

70,627.—WHIP SOCKETS.—E. W. Scott, Wauregan, Conn.

I claim a whip socket provided with a fastening composed of a lever arranged or applied substantially as shown and described, to hold the whip steady or firm in its socket, as set forth.

70,628.—ADJUSTABLE PROP-JOINTS FOR CARRIAGES.—Anson Searls, San Francisco, Cal.

I claim, 1st, An adjustable or extension prop joint.

2d, A socket, pivoted, or center joint, all substantially as described, and for the purposes set forth.

70,629.—TRUSS.—Isaac B. Seeley, Philadelphia, Pa.

I claim a supporter made of hard, vulcanized India rubber, substantially as and for the purpose described.

70,630.—WASHING MACHINE.—G. C. Selfridge, Saratoga Springs, N. Y.

I claim the combination of the slotted cover, C, hinged lids, D D', sectional wash board, E, double oscillating plungers, I, arms, H, rock shaft, G, removable connecting rods, K, working above the lid of the suds box, pins, b, crank shaft, J, as herein described for the purpose specified.

70,631.—FOLDING UMBRELLAS.—A. B. Shaw, Holderness, N.H.

I claim the combination of the auxillary runner, F, and its series of spreaders, G, with the staff, the main runner, D, and its series of spreaders, E, and each of the ribs, formed in two parts, c d, and applied together, substantially as described.

Also, the connection of the ferrule to the staff by means of the spring, arranged within and applied to such ferrule and staff, substantially as set forth.

Also, the connection of the ferrule to the staff by means of the screws and the spring applied to them, substantially as specified.

70,632.—FOLDING UMBRELLAS.—A. B. Smith, Holderness, N.H.

I claim the combination of the rib-locking mechanism, with the braces and with the ribs, each made in two parts, e f, and applied together, so as to enable the lower ones, e, to be moved with respect to the upper ones, f, substantially in manner as specified.

Also, the rib locking mechanism, composed of the slide rod, o, the collar, n, the series of locking rods, l, the staples, k, and the arms, i, the whole being constructed and arranged together as explained and represented.

Also, the combination of the spring, r, with the stick, and the locking apparatus applied to the ribs, and arranged to operate substantially as described.

70,633.—HARNESS PAD TREE.—Palmer Shaw and Edward S. Dawson, Syracuse, N. Y.

We claim the elastic plate, e, covering the joint between the cut-off end, a, and the pad, A, and connecting the two parts, substantially as described for the purpose specified.

70,634.—PUMP.—George Shield, Cincinnati, Ohio.

I claim, 1st, The combination and arrangement of the hollow plunger, C, valve rod, D, valve, d, solid or closed plunger, E, plate, e, and stuffing-boxes, a a, as herein described, for the purpose specified.

2d, The solid or closed plunger, E, in combination with the hollow plunger, C, valve, d, and discharge passage, A', as herein described, for the purpose specified.

3d, The double-plunger pump, constructed as described, consisting of the barrel, A B, with branches, A' B', stuffing-boxes, a a, hollow plunger, C, solid or closed plunger, E, valve, d, plate, e, chamber, F, and pipes, G g, as herein described, for the purpose specified.

70,635.—LAMP.—John B. Slawson, New Orleans, La.

I claim, 1st, Arranging the burner, B, at or near the end of the reservoir, A, substantially as and for the purpose herein shown and described.

2d, Arranging a reflector, C, at or near the corner of the reservoir, the said reflector being made substantially as herein shown and described.

3d, A lamp, A, when provided with a burner, B, which is arranged at or near to its end, so that it will be at or near one corner of the fare box, in combination with the reflector, C, which is made and arranged substantially as and for the purpose herein shown and describeb.

70,636.—APPARATUS FOR CLEANING STOVE-PIPES.—A. W. Smith, Pierpont, N. Y

I claim the scraper, formed by the combination of the semi-circular plate, D, handle, E, brace and guard wires, F, and spring, H, with each other, substantially as herein shown and described, and for the purpose set forth.

70,637.—PADDLE-WHEEL.—E. C. Smith (assignor to himself and A. G. Sommerfeldt), Old Ripley, Ill.

I claim the fixed eccentrics, a a, in combination with the collars, c c, the disks, C C, or their equivalents, provided with the circular holes or rings, 1 2 3 4, the pins, e e, on the collars, c c, the jointed arms, b b, the paddles, D D, and the shaft, A, the whole constructed, arranged, and operating, substantially as and for the purpose herein described.

70,638.—GRATE BAR.—J. R. Smith, Salem, Mass.

I claim, 1st, The double-curved ribs, A, in combination with the flanges, B B, and connections, a, substantially as and for the purposes set forth.

2d, The combination with the double-curved ribs, A, of one or more projections, b, flanges, B B, and connections, a a, as and for the purposes set forth.

3d, The combination with the side of the bar, of the peculiarly constructed filling piece, composed of the parts lettered B' B', C D, and E, for the purposes stated.

70,639.—WAGON BRAKE.—Thomas Smith, California, Mo.

I claim, 1st, The band, C, and bolt, D, constructed and secured to the brake-bar, A, substantially in the manner herein shown and described, and for the purpose set forth.

2d, The clamps, G, constructed as described, in combination with the rod or bolt, D, and band, C, substantially as and for the purpose herein set forth.

70,640.—COVERING FOR WALLS OF PARLORS AND SALOONS.—J. M. Soutrenon, New York city.

I claim as an improved article of manufacture, a covering for parlor walls, composed of ornamental silk gauze combined with a backing of paper or other suitable material, as and for the purpose described.

70,641.—GASOLINE COOK-STOVE.—J. D. Spang, Dayton, O.

I claim, 1st, The disk, c', with perforated rim, c'', substantially as described.

2d, The disk, c', perforated rim, c'', in combination with the ring, b', and burner, C, substantially as described.

70,642.—FINISHING BRAD.—Henry Stanton, Syracuse, N. Y.

I claim as an improved article of manufacture, the finishing brad, made as herein shown and described, as and for the purpose set forth.

70,643.—HORSE-RAKE.—Henry K. Stoner, Lancaster, Pa.

I claim the arrangement and construction of a cylinder, A, with an arm, B, extending from it at right angles, when the rake tooth, F, passes through a lug, C, perforated for its reception, and held by a headed bolt or its equivalent, through its eye, f, in a lug, D, said lugs, arm, and cylinder, all of one piece, substantially in the manner shown for the purposes specified.

70,644.—LIFTING-JACK.—Jacob Stoody, Ripley, Ohio.

I claim the stand, A, the bar, B, the eccentric, D, with lever, E, and rack, F, constructed, arranged, and combined substantially as shown for the purposes set forth.

70,645.—FASTENING FOR PANTALOONS.—Isaac Stratton, Keene, New Hampshire.

I claim, in combination with the fly front of the pantaloons, the elastic cord c, arranged in the eyelet holes, a and b, substantially as and for the purpose specified.

70,646.—AMALGAMATOR.—Arthur Swazey, Chicago, Ill.

I claim, 1st, Providing the long arm, A, with the buoyant valve, F, and stop-cock, G, arranged to operate as described, and for the purpose set forth.

2d, The movable plates, d, when arranged to operate substantially as described and for the purposes set forth.

3d, The spiral, c, when arranged to operate automatically by the movement of the liquid, substantially as described and for the purpose set forth.

4th, The construction of the tube in sections, so that portions of the same may be removed as described and for the purposes set forth.

5th, An inverted siphon-shaped tubular amalgamator of movable sections with a buoyant valve, F, stop cock, G, movable plates, d, and self-acting spiral, c, when arranged to operate within the tube as described and with its bent portion surrounded with a steam jacket, I, for the purposes set forth.

70,647.—REFRIGERATOR FOR BREWERS.—Augustus H. Tait and Joseph W. Avis, New York city.

We claim, in combination with the fermenting vat, D, the arrangement of cooling apparatus substantially as described for the injection into the wort of jets of cooled air, for the purpose described.

70,648.—LAST.—Ambrose Taylor, Osawatomie, Kansas.

I claim the spring hook, E, secured by its straight shank, F, in the block, B, and engaging with the hook, C, in the recess, D, of the last, A, all constructed and arranged to operate as herein set forth for the purpose specified.

70,649.—BALING PRESS.—Joseph P. Taylor, Hudson city, N. J., and Jackson R. Baker, Jersey City, N. J.

We claim, 1st, The combination of the levers, F, yoke, C, levers, E, lifting pawls, H, and toothed racks, L, with each other and with the follower or platform, N, and bed plate or frame, B, substantially as herein shown and described and for the purpose set forth.

2d, The spring pawls, I, constructed as described having the lever, J, projecting through the side of the frame to be operated upon by the foot and the lower end projecting downward through the bottom of the press to act as a brake against the smooth surface of the vertical bars, L, in their descent when the upper part of said pawl is released from the rack, as herein shown and described

3d, The arrangement of the cover, T, constructed as described, ropes, W, keys, V, posts, U, catch bars, S, and box, O, as herein described for the purposes specified.

70,650.—LUBRICATING CARRIAGE AXLES.—Edrick Thomas, Kickapoo, Ill.

I claim the Babbit-metal tube, F, with the bolt or screw plug, E, and the hole, a, in the metallic box, C, all arranged in the manner substantially as and for the purpose set forth.

70,651.—RETAINING LINK FOR SHUTTLES.—Martha Thomas, Lower Merion, Pa.

I claim the within-described retaining link composed of a strip, e, of metal with hooks, a and b, arranged at each end, as and for the purpose herein set forth.

70,652.—MACHINE FOR CUTTING TUBES.—Nicholas Thomas, Chicago, Ill.

I claim the construction and arrangement of the stock, A and A', socket screw, B, screw, D, having its lower end inclined below its square shank, b, inclined horizontal cutter, E, spring, F, blocks, G H, and horizontal spring knobs, d I, as herein set forth for the purpose specified.

70,653.—MEANS OF SUSPENDING GASOLIERS AND DROP LIGHTS.—Samuel B. H. Vance (assignor to Mitchell, Vance & Co.), New York city.

I claim, 1st, The apparatus composed of a system of lazy tongs the arms and pivots of which are constructed with an internal gas passage communicating with a suitable burner, substantially as and for the purpose specified.

2d, The parallel guides, g, attached to the stem, f, and arranged and operating in relation with the system of lazy tongs, substantially as and for the purpose specified.

70,654.—BOTTLE STOPPER.—William Von Hote, N. Y. city.

I claim the nut, b, and headed screw, d, entering each other and with the intervening follower, c, clamping the elastic plug, a, whereby the parts operate uniformly on each other and form a stopper of nearly uniform diameter throughout, substantially as described.

70,655.—PROCESS OF PRESERVING EGGS.—Arthur Wadgymar, St. Louis, Mo., assignor to himself, Byron Sloper and W. C. Gould.

I claim, 1st, The process of killing the animal life of the egg by the use of the substances above described, or their equivalents.

2d, The process of toughening the membrane next the shell of the egg by the use of the substances above specified, or their equivalents.

3d, The process of closing the pores of the egg shell by the use of the substances above specified, or their equivalents.

4th, The process of preserving eggs by the combination of the above-named substances, or their equivalents, when used substantially in the manner set forth.

70,656.—DEVICE FOR SCOURING MARBLE.—William Weaver, Nashua, N. H.

I claim, 1st, The box, A, provided with a movable bottom constructed substantially as and for the purpose set forth and of any suitable material.

2d, The use of a water tank, E, in combination with the sand box, A, substantially as and for the purpose set forth.

3d, Confining the bottom, B, to the box by means of bolts, and nuts, said nuts being constructed so as to answer as handles for the scourer, substantially as represented.

70,657.—COMBINATION BENCH.—William Weaver, Nashua, N. H.

I claim, 1st, The fixed and movable portions, A and C, of the top when arranged for adjustment substantially in the manner and for the purposes set forth.

2d, The movable sliding upper portion of the bench composed of the fixed and movable top and transverse sliding pieces, B B, when arranged substantially as and for the purpose specified.

3d, The movable and adjustable rising skids, F, arranged in the manner and for the purpose specified.

4th, The drilling mechanism constructed as shown and described combined with a bench, substantially in the manner and for the purpose set forth.

5th, The movable and reversible block, D, constructed in the manner and for the purposes specified.

6th, The movable and adjustable step, E, arranged for operation substantially in the manner and for the purpose set forth.

7th, The employment of the adjusting screws, a and g, or the equivalent thereof, substantially in the manner and for separate purposes as set forth.

8th, The edging notch, e, in the end of the portion G, of the bench, for the purpose specified.

9th, The combination of the movable sliding upper portion, as described the skids, F, clock, D, step, E, screws, a and g, or the equivalent, with or without the drilling mechanism, the whole constructed and arranged for adjustment and operation substantially as and for the purposes set forth.

70,658.—STEAM-CYLINDER FOR FINISHING CLOTH.—Alexander Webster, Seneca Falls, N. Y.

I claim the combination and arrangement of the perforated cylinder, A perforated steam pipe, B, water pipe, E, and plate, D, substantially as described for the purpose specified.

70,659.—STOVE-PIPE DRUM.—Eben Webster, Holland, Mich.

I claim 1st, The construction of the inverted, conical, slotted cone, B, secured at its base to the inner circumference of the drum, A, and containing the inverted, conical slotted cone, C, whose apex extends slightly through the apex of the outer cone, B, and to whose base the short cylinder is secured having an outer ring resting and supported upon the flattened base of the cone, B, sliding freely thereon, all arranged and operating as described for the purpose specified.

2d, The inverted slotted cone, B, whose base supports the inner slotted cone, C, by the ring around its base turning freely thereon, the inner cone extending above and below the outer cone, as herein shown and described.

70,660.—HORSESHOE.—Jacob Wheeler, Huntington, Ind.

I claim the combination of the hinged tie or brace, D, with the hinged quarters, B.

70,661.—PITMAN-HEAD AND CRANK-WRIST CONNECTION.—Wm. N. Whiteley, Springfield, Ohio.

I claim 1st The pitman-head box, F, constructed with two bearings, whose axes are at right angles to and cross each other, substantially as and for the purpose set forth.

2d, In combination with the pitman-head box, F, the hollow wrist-pin, fig. 6, provided with the escape hole, D, so at to form a reservoir for a liquid lubricant within the journal, substantially as set forth and described.

70,662.—MACHINE FOR PEGGING BOOTS AND SHOES.—David Whittemore, North Bridgewater, Mass.

I claim 1st, The laver, V, with its bent slot, U, and pawl, a, in combination with the bar, T, and the ratchet on the surface of the feed-sleeve, all constructed and operating substantially as described.

2d, The slide, S', operating as described, and worked by lever, L', substantially in the manner and for the purpose specified.

3d, The supplemental pawl, l, engaging the ratchet wheel, m, when the pawl, c, is disengaged from it, for the purpose of prevenering the peg-wood from slipping backward while the feed roll is freed from the action of pawl, c, and the knife is severing the peg, thus aiding in imparting steadiness and precision to the movements of the peg-wood, as set forth.

4th, The knife, g, constructed arranged and operating in the manner described.

70,663.—BED-BOTTOM.—J. W. Wilder, (assignor to himself and E. Butterick), New York city.

I claim the spring-bed bottom, constructed as described, consisting of the rectangular frame, A, the slats, a b, which are provided with metallic tubes c, enclosing springs, d, which support the plungers, e, having rounded heads upon which the flexible slats of the rectangular frame, D, rest, substantially as described for the purpose specified.

70,664.—SHRINKING TIRE.—Levi Wilkinson, New Haven, Ct.

I claim the combination of the block, A, and brackets, B and C, with the screws, c and d and g and h, when the whole are constructed and fitted to produce the result, substantially as herein described and set forth.

70,665.—CLOTHES-LINE HOLDER.—J. L. Wilcox, Preble, N.Y.

I claim the endless clothes-line, M, in combination with the pulleys, d, lever, i, and ratchet, c, and pawl, g, as described, and for the purpose set forth.

70,666.—ELEVATED RAILROAD.—Wm. H. Williams, Little Falls, N. Y.

I claim 1st, The elevated railroad consisting of a track or tracks suspended over a street by means of towers, A, and cables, H, substantially as described.

2d, The supporting towers, A, constructed as above described, namely, by combining and arranging together substantially as shown, the transverse arches, E, and the compound diagonal arches, F, said arches all springing from the columns, B.

3d, The hollow connecting beams, G, which tie the arches to each other in combination with the supporting cables, H, which pass through said beams, so that they are protected and also held in place by the beams, substantially as shown.

70,667.—WASHING MACHINE.—Geo. L. Witsil, (assignor to Thomas E. Hauberger), Philadelphia, Pa.

I claim the stelliform case, with radiate sides, C, and door, D, turning upon a tubular journal, G, and having diagonal internal ribs, I, the several parts being constructed and arranged in relation to one another substantially as set forth.

70,668.—EXTENSION TABLE.—F. R. Wolfinger, Chicago, Ill.

I claim 1st, The end rails, C, formed in three or four parts, c1 c2 c3 c4, in combination with the central folds, D, substantially as herein shown and described.

2d, The combination of the narrow strips or leaves, I, with the central parts, c2 c3, of the end rails, C, substantially as herein shown and described.

3d, The central strips, J, having the legs, K, in combination with the central parts, c2 and c3, end folds, E, and central folds, D, substantially as described for the purpose specified.

4th, The narrow leaves, I, resting upon the parts, c2 c3, in combination with the leaves, G1 G2 G3 G4, as herein set forth for the purpose specified.

5th, The arrangement of leaves, G1 G2 G3 G4, and narrow strips, I, whereby the leaves, G2 G3, are folded upon the end rails, G, having the leaves, G2 and strip, I, in the same horizontal plane to form the top of the table, and the leaf, G1, folding down over the ends of the said leaves, G3 G4, as herein shown and described.

6th, The leaf, G1, hinged in an elevated position upon the side rail, B, and supporting the leaves, G1 and G2, the outer end of the leaf, G1, adjusted by the spring catch, H, as and for the purposes specified.

70,669.—MACHINE FOR HAKING BRICK.—Daniel Woodbury, Minneapolis, Minnesota.

I claim a machine for haking brick, constructed and operating substantially as herein shown and described.

70,670.—WHEEL HUB-BOX.—Elbridge G. Woodside, San Francisco, Cal.

I claim, 1st, Surrounding the box, A, with an elastic packing, B, substantially as described, for the purpose set forth.

2d, Also, in combination with the packing, B, the end packings, c and d', substantially as described, for the purposes set forth.

70,671.—PREPARATION OF FERTILIZERS.—William S. De Zang, Geneva, N. Y.

I claim the application of slags, of reducing and smelting furnaces, as a fertilizer, using the slags and adapting them for this purpose, substantially as described in the above specification, viz., in a finely pulverized condition also in combination with acids and alkalies, and also in intimate admixture with certain ammoniacal compounds, above specified.

70,672.—FIRE-ALARM TELEGRAPH.—J. M. Fairchild (assignor to himself, J. K. Bundy, and J. M. Townsend), New Haven, Conn.

I claim, 1st, The arrangement of the sliding partition, F, the platform, C, and partition, D, with the box, A, and combined with a signalling apparatus, substantially in the manner herein set forth.

2d, Operating the key of telegraphic instruments by means of a mechanism connected therewith, but perfectly insulated therefrom, substantially in the manner herein set forth.

3d, The arrangement described of the pins or projections, a b c, etc., upon the wheel, R, when constructed so as to be adjustable to different signals, substantially as set forth.

4th, The arrangement of the lever, W, so as to arrest the movement of the wheel, R, at each revolution, as and for the purpose described.

70,673.—MECHANISM FOR OPENING AND CLOSING TELEGRAPHIC CIRCUITS.—J. M. Fairchild (assignor to himself, J. K. Bundy and J. M. Townsend), New Haven, Conn.

I claim, 1st, The arrangement of the two spindles, J K, in connection with their respective wires, upon the non-conducting plate, G, so as to open and close the circuit, substantially as set forth.

2d, The arrangement of the grooved cam wheel, C, and the lever, F, combined with the spindles, J K, so as to open and close the circuit by the turning of the wheel, C, substantially as set forth.

70,674.—PIGEON-HOLES FOR POST-OFFICES, ETC.—Henry G. Pearson, New York city.

I claim the employment of a perforated or openwork shelf for the reception of letters, packages, etc., as and for the purposes designed.

I also claim the same when applied as to be readily removable, as and for the purpose described.

REISSUES.

2,794.—FIRE-PROOF CEILINGS AND ROOFS.—Joseph Gilbert, Philadelphia, Pa.

I claim, 1st, A ceiling composed of girders, corrugated plates and socket bearers adapted to the said plates, and supported by the girders, all substantially as described.

2d, In combination with the above I claim the bricks or blocks, X X, applied substantially in the manner and for the purpose described.

2,795.—DITCHING MACHINE.—Henry C. Ingraham, Tecumseh, Mich.

I claim, 1st, The combination of the double flanged wheel, A, and belt, Q, which, revolving in the same direction, will carry the earth loosened by the plow over the wheel, substantially as set forth.

2d, Attaching the draught and also the plow frame to the axis of the wheel, A, substantially as and for the purpose set forth.

3d, The combination of the double mold board plow, H, and single mold board, J J, with the belt, Q, and double flanged wheel, B, substantially as set forth.

4th, Hinging the main frame, C, to the tongue irons, substantially in the manner and for the purpose set forth.

5th, The arrangement of the double flanged wheel, A, and chute, F, when the latter is so constructed as to serve also as a scraper for clearing the earth from the wheel, substantially as set forth.

6th, The arrangement of the segments, M and N, frame, V, and lever and catch, H, substantially as set forth.

7th, The combination of the lever, R, rod, T, bent arm, K, and wheel, L, for the purpose of adjusting the depth of the plow, H, substantially as set forth.

8th, The combination of the lever, O, and pawl attached to the frame, C, and segment, U, for raising the wheel, A, and the other mechanism, substantially as set forth.

9th, The combination of the double flanged wheel, A, endless belt, Q, tightening pulley, x, and pulley, I, arranged to operate substantially as set forth.

2,796.—METHOD OF OBSTRUCTING ICE IN RIVERS AND HARBORS.—Peter Voorhis, New York city.

I claim the employment of removable ice obstructors, arranged to operate substantially as set forth.

DESIGNS.

2,818.—BURIAL CASKET.—Benj. R. Bacon, Philadelphia, Pa.

2,819.—TRADE MARK.—John T. Bailey (assignor to himself and James Cascaden), Philadelphia, Pa.

2,820.—CANS.—Christian Barry, Philadelphia, Pa.

2,821.—REFLECTOR.—Elizabeth Himes, New Albany, Ind.

2,822.—MELODEON-CASE.—John R. Lomis, New Haven, Ct.

2,823.—MOULDINGS.—Edward Martin, Burlington, Vt.

2,824.—SMOKING PIPE.—Wm. Masters, New York city.

2,825.—ORNAMENTAL TABLE GLASSWARE.—H. Sellers McKee, Pittsburg, Pa.

2,826.—COFFIN HANDLE.—James S. Ray, East Haddam, Ct.

2,827.—TRADE MARK.—Jas. N. Schoonmaker, Pittsburg, Pa.

2,828.—BAND SLIDE.—Edward Sealy, Newark, N. J.

2,829.—PENDANT FOR HAT BAND.—Edward Sealy, Newark, N. J.

2,830.—OIL CLOTHS.—Wisner H. Townsend, New York city.

NOTE.—Nothing is more indicative of the progress of inventions than the long list of patents reported in these columns from week to week. The increase in the number of applications for patents this year, over any previous one, is very great. Through the agency of this office alone, SEVENTY-FIVE PATENTS were issued last week, and are reported above. During the month of October, we had the pleasure of forwarding official circulars of allowance of their patents to 351 inventors, whose cases were conducted through the Home Department of the Scientific American Patent Agency, beside a large number through our Washington Branch Office. With more than twenty years experience, and a large business, which enables us to bring to our assistance a large number of first class mechanicians, some of which have been with us for more than a score of years, we are enabled to do the work of preparing applications for patents cheaper and more expeditiously than can be done elsewhere.—EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., *37 Park Row, N. Y.*

23,703.—MACHINE FOR MAKING DRAIN PIPE.—Bradford S. Pierce, New Bedford, Mass., and Mason B. Pierce, Woodstock, N. Y. Dated April 19, 1859. Reissue No. 1,897. Dated Feb. 28, 1865. Application for Reissue received and filed Oct. 24, 1867.

1st, We claim a mold consisting of a case capable of being properly secured around the material while the pipe is being molded, and of being freed from the pipe when the molding is completed, in combination with a core and also with a core socket, having a provision for freeing the socket or pipe, or both, from the core, the whole operating substantially as set forth.

2d, A mold in which the core socket is made separate and distinct from the other parts, and so formed and so combined with such other parts that it is capable of being connected with them when the mold is ready for use, and of being continuously kept connected with them during the entire process of molding and finishing the pipe, substantially as and for the purposes described.

3d, The arrangement of the mixing apparatus and of the core-relieving devices above the platform which conveys the molds in the manner and for the purpose substantially as specified.

4th, The combination of the core socket with the revolving disk, which receives the core and the mold, when the disk contains a provision for enabling the socket or pipe, or both to be freed from the core, the whole operating substantially as described.

9,531.—SCYTHE FASTENING.—Pinckney Frost, Springfield, Vt. Dated Jan. 11, 1853. Reissue No. 534. Dated Feb. 9, 1858. Application for Reissue received and filed Oct. 26, 1867.

I claim the loop bolt provided with the groove, b, and the hook or loop, e, in combination with the set ring, and also provided with a groove, d, all constructed and arranged substantially as and for the purpose set forth.

40,695.—THRASHER.—David Lippy and Jas. Bradley, Mansfield, Ohio. Dated Nov. 24, 1863. Application for Reissue received and filed Sept. 19, 1867.

We claim the cranks, c c c, of shafts, F, and bars, b b b, all arranged and operating substantially in the manner and for the purpose set forth.

69,755.—COMB.—Jas. H. Briggs, Brooklyn, N. Y. Dated Oct. 25, 1867. Application for Reissue received and filed Oct. 25, 1867.

I claim the longitudinal flanges, b, on the metallic part, B, constructed as described, and fitting over longitudinal shoulders, a, in the part or parts, A, as herein set forth for the purpose specified.

57,132.—WASHER FOR BOLTS.—Gibbons G. Hickman, Frank Hickman, and R. L. Baldwin, Coatsville, Pa. O. P. Baldwin, Brooklyn, N. Y., and J. C. Sharpless, Downington, Pa., assignees of Gibbons G. Hickman, aforesaid, and said F. Hickman, R. C. and O. P. Baldwin, and said J. C. Sharpless, assign their right to Hamilton Graham. Application for reissue received and filed Oct. 16, 1867.

1st, I claim a bolt having a groove, furrow, depression, or other equivalent provision, to receive or hold a projection or lip on the washer, so as to prevent the latter from turning on the bolt, substantially as and for the purpose set forth.

2d, Providing the washer with a lip or lips to be bent into a groove in the bolt, either with or without the lip, to be bent against the side of the nut according to the circumstances of the case, substantially as and for the purpose described.

64,028.—COOLING MILK.—Watson Peck, Babcock's Grove, Ill. Dated April 23, 1867. Application for reissue received and filed July 16, 1867.

I claim the combination of a pipe, B, provided with a receiver, C, or its equivalent, with a cooling vat, A, arranged to operate substantially in the manner and for the purposes herein set forth.

69,746.—WINDOW-SASH FASTENER.—Hobert G. Arnold, Rochester, N. Y. Dated Oct. 15, 1867. Application for reissue received and filed Oct. 1, 1867.

I claim a sash lock composed of bolt, H, tumbler, G, and notched plate, the whole combined and arranged substantially as and for the purposes set forth.

1,770.—METHOD OF SETTING THE LOGS IN SAW MILLS.—Dennis Lane, Montpelier, Vt. Dated July 9, 1861. Application for reissue received and filed Oct. 21, 1867.

1st, I claim the employment or use of the ratchets, H I J K, having teeth at different distances apart, in connection with the adjustable dog, F, placed on the rod, O, which is provided with retaining pins, h, the ratchet being placed on the shaft, F, having pinions, G G, at its ends, which gear into racks, D D, attached to bar, C, all being arranged as and for the purpose set forth.

Second, The bar, C, when provided with projecting uprights or side supports or rests, h h, for the log, substantially as described and for the purposes set forth.

3d, The dogs, I I, arranged imposts, K K, of the bar, C, substantially as described and for the purpose set forth.

4th, The side supporters or rests for the log on the setting-up bar or slide, when such rests, either one or more, are provided with a means of setting off the log, either more or less therefrom, substantially as described for the purpose set forth.

5th, The pendant, A1, attached to setting up lever, N, in combination with an incline plane, substantially as and for the purpose described.

22,310.—NUT MACHINE.—The Union Nut Machine Company, Unionville, Conn., assignees of Julius B. Savage. Dated Dec. 14, 1858. Application for reissue received and filed Oct. 18, 1867.

1st, We claim the combination of a shears with a table transferer and edge swages, substantially as described.

2d, The combination of a shears with a table transferer and face swages, substantially as described.

3d, The combination of a shears with both face and edge swages, by means of a supporting table and transferer, substantially as specified.

4th, The combination of edge swages with face swages, for the purpose of a table and transferer, substantially as described.

5th, The combination of face swages with a transferer supporting table, and a punch, substantially as described, and these in combination with edge swages, substantially as set forth.

6th, The combination of a shears, a punch supporting table, edge swages, face swages, and transferers, the combination being substantially such as described.

7th, The arrangement, in succession, of, first, a shears, second, swages, and third, a punch, substantially as herein described, so that a blank is first cut off, then swaged, and finally punched, as set forth.

8th, In combination with a punch, I claim edge swages acting to center the blank to be punched while resting upon a table, the combination being as described.

9th, In combination with edge swages, substantially such as specified, I claim a supporting table upon which the nut rests, while subjected to the action of such swages, the combination being substantially such as described.

10th, I claim, in combination with a supporting table, a transferer with a notched or angular acting face, operating both to turn and move a blank, as described.

19,408.—WHEEL AND AXLE ATTACHMENT OF HORSE-POWER, ETC.—Abram Wright and George F. Wright, Clinton, Mass., assignees by mesne assignments of George E. Burt and George F. Wright. Application for reissue received and filed Aug. 29, 1867.

We claim the use of chill-hardened cast iron axles when applied to the moving platform of treadmill or endless chain horse-power and secured either by a bolt and nut to the link or cast solid upon it, constituting a member of the same.

59,538.—COFFEE HULLERS.—Albert Angell, Newburgh, N. Y. Dated Nov. 13, 1866. Application for reissue received and filed Oct. 19, 1867.

1st, I claim the application to use without strippers or rubbers for hulling or cleaning coffee or other articles, of springs, or their equivalents, for pressing the strippers or rubbers against the coffee or other articles, substantially as described.

2d, The combination with the roughened or serrated cylinder, B, of independent spring strippers, D, arranged within a hollow segment or case that partly incircles the cylinder, substantially as specified.

3d, The divided spring strippers, D, constructed with roughened or serrated parts, arranged side by side, and also in a series, one in advance of the other, within a case, C, for operation in combination with a serrated or roughened cylinder, B, substantially as described.

65,018.—STEAM-GENERATOR GAGE COCK.—Thomas Shaw, Philadelphia, Pa. Dated May 21, 1867. Application for reissue received and filed Oct. 11, 1867.

I claim the construction and arrangement of the valve whereby to control the pressure, substantially as set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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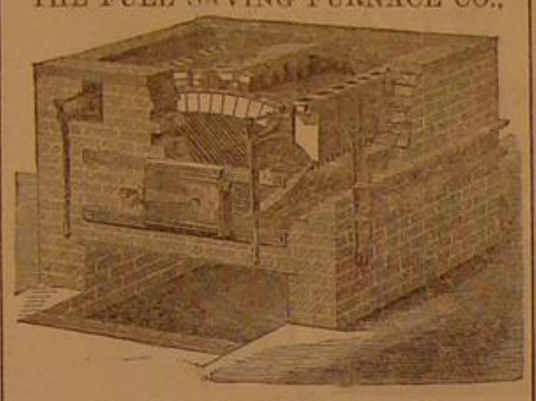
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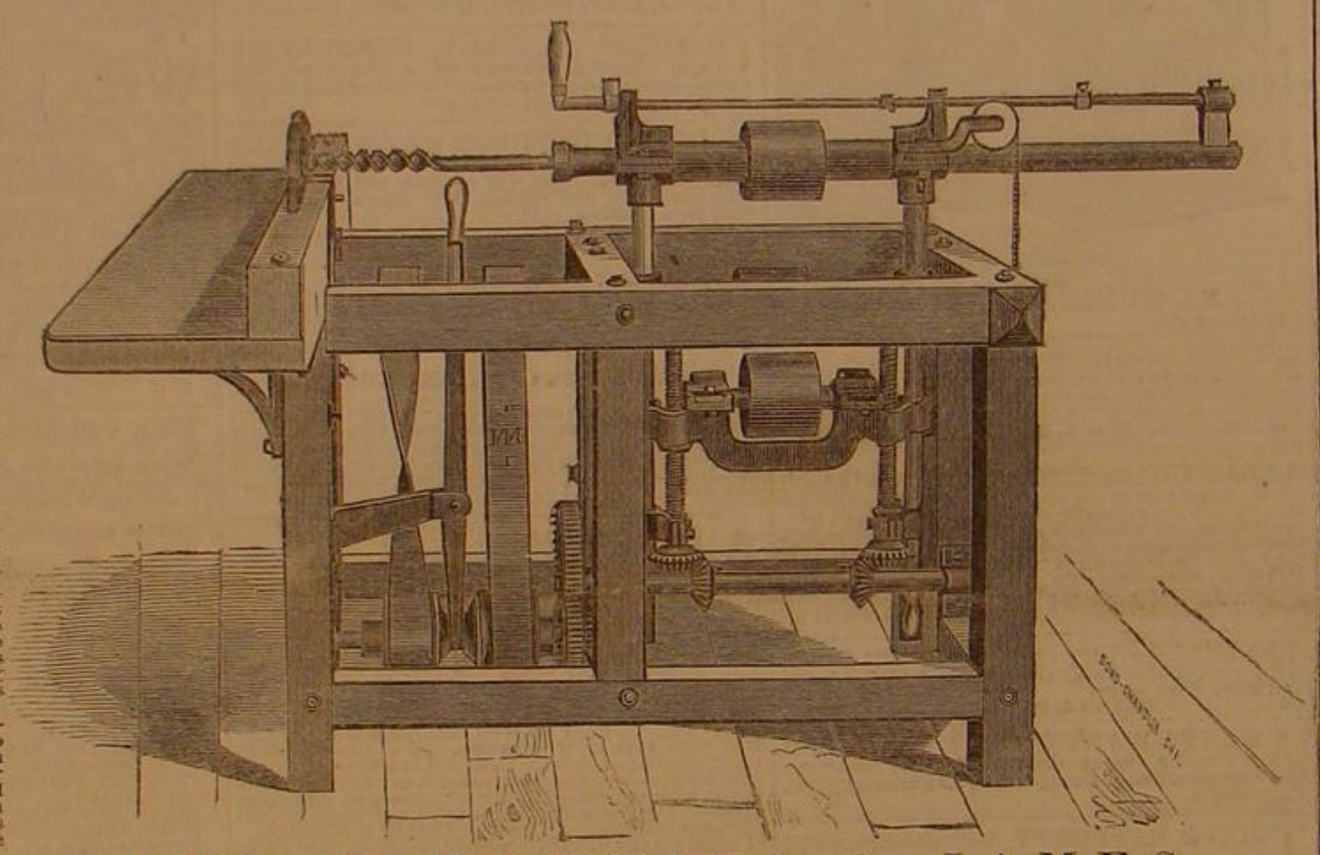
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Capacity, Speed, Accuracy, and Ease of Working, are among its chief points of excellence. We claim that it will do more than double the amount of work that any machine now in use can do in the same time, for the reason that the machine is self regulating by means of a small lever that the workman can move without changing his position at the machine.
The boring bar can be moved up or down to any required point instantly, instead of raising and lowering the table, as by other machines, and that by hand.
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Vol. XVII.—No. 22. [NEW SERIES.]

NEW YORK, NOVEMBER 30, 1867.

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Improved and Simplified Band Saw.

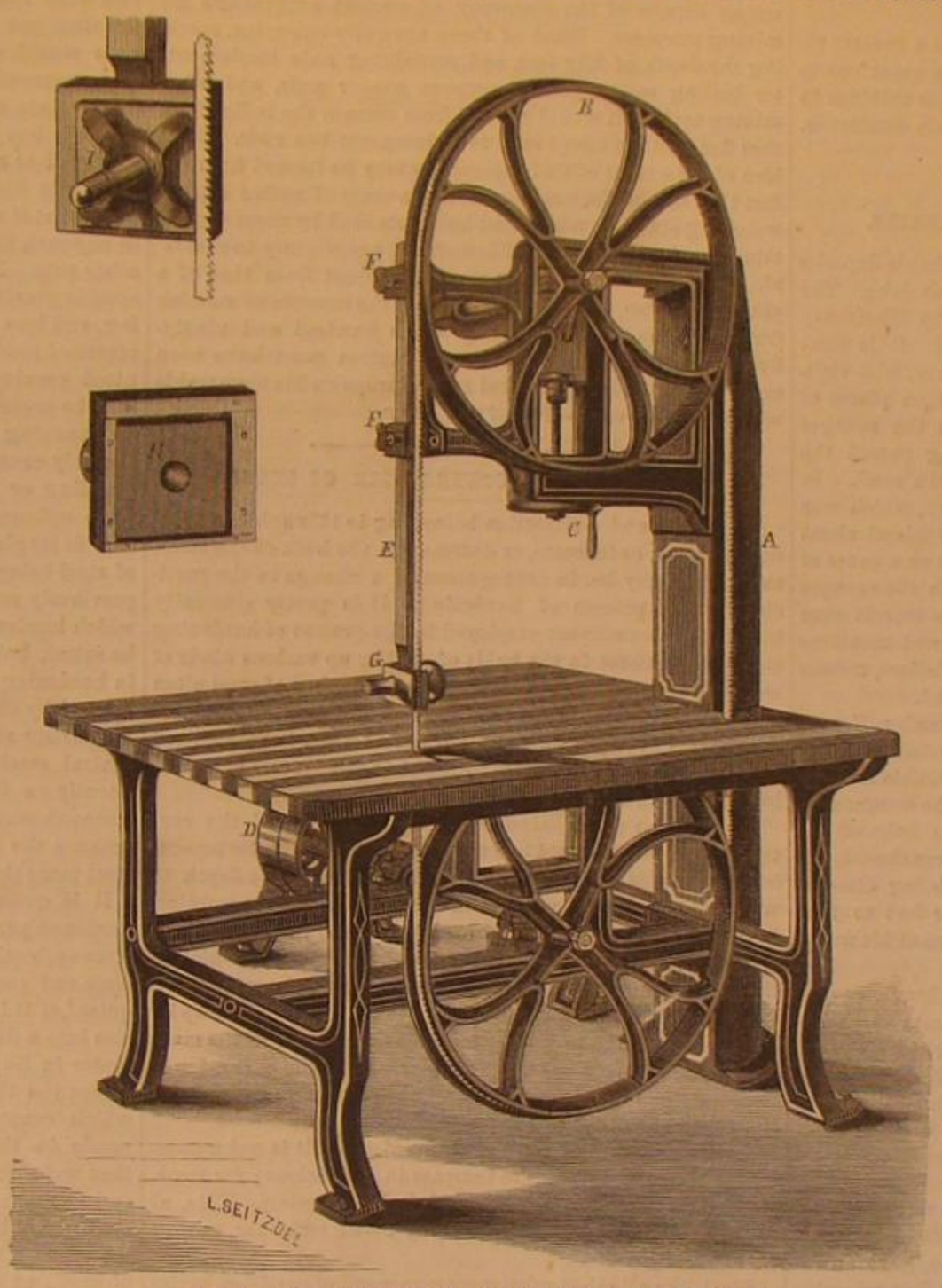
The endless or Band Saw has not heretofore received that degree of attention from our mechanics to which its merits entitle it. In England it is extensively used for wood work, and lately has been successfully employed on iron, especially for locomotive work. Visitors to the late fair of the American Institute must have observed the operation of the machine of which we give herewith illustrations, one being a perspective view of the machine complete, and the others of the saw guide.

With the exception of the table top, the machine is entirely of iron, the frame being strong while it is light. The standard, A, supports a frame, on which is an upwright sliding block and arm sustaining a horizontal shaft running in boxes. On this shaft is hung the upper wheel, B, which by means of the screw and hand wheel, C, can be elevated or lowered as the length of the saw demands. The lower portion of the frame under the table supports the lower shaft and wheel, which is driven by the pulleys, D. The two wheels have a flange against which the back of the saw bears, and the faces of the wheels are covered with vulcanized rubber resting on a bedding of strong cloth. This gives sufficient adhesion to the saw to insure its action as a belt without slipping.

From the front of the upper frame depends a vertical bar, E, sliding in boxes, to which it may be secured, at any hight required to accommodate the stuff to be sawed, by the thumb nuts, F. On the lower end of the bar is a guide, G, having four sides with recesses of varying depth to accommodate the various width of different saws. This guide is in two parts, held together by a screw bolt and graduated in the distance of their faces by means of the screw bolt and a four-pronged spring. The construction of the guide is better seen at H and I, the latter of which shows a section of the saw lying in one of the recesses. This guide can be turned quarter or half-way round to bring either of the different widths of recesses to engage with the saw.

The great advantage of the band saw over the reciprocating saw is, that there is no lost time in its operation, and no effort required to keep the work to the table, as the action of the saw tends to this result. Beside, there is no need of a pump or blower to clear away the saw dust, as it is carried continually downward. It was patented through the Scientific American Patent Agency, Aug. 28, 1866. Messrs. First & Pryibil, the patentees and manufacturers, state that the saw travels at the rate of 4,000 feet per minute, and by actual experiment, will do four times the amount of work performed with an ordinary up and down saw. Its work is very smooth, requiring less after labor in finishing. Certainly it is a simple and economical machine, as is evident from its construction and operation. The manufacturers join the ends of the saw by silver solder, used in connection with a clamp made specially for the purpose, and the original temper of the plate is perfectly preserved.

All communications relative to the machine should be addressed to First & Pryibil, 175 and 177 Hester street, corner Mott, New York city.

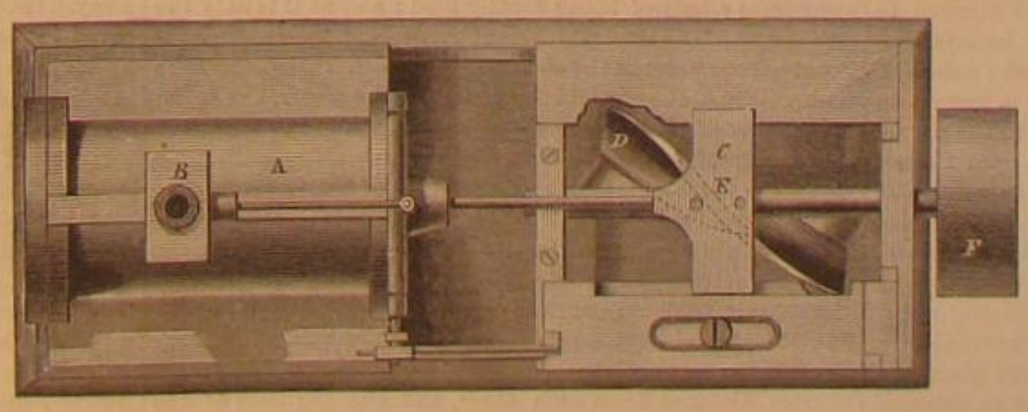


FIRST & PRYIBIL'S PATENT BAND SAW.

Plan for Converting Reciprocating into Rotary Motion.

There have been quite a number of ingenious devices contrived to take the place of the crank, and avoid what are popularly supposed to be the defects in this method of converting motion. Whether this supposition is correct or not, it is probable that these attempts will be repeated indefinitely. That shown in the annexed engraving is one of the simplest, and the inventor says it has answered all his expectations. He has two engines of the same dimensions, taking steam from the same boiler, one, the ordinary crank engine, and the other running with the spiral cam, the latter giving by far the best results.

The engraving presents a top view of the engine, A being the cylinder, B the steam chest, C the crosshead, and D the spiral cam. From the lower surface of the crosshead project two pins, seen at E, which engage with the sides of the cam flanges and impart a rotary motion to the shaft on which the cam is mounted, and through the pulley, F, to machinery. The model or pattern of the cam may be formed by turning a block of wood of the length of stroke required and of the same diameter. On both heads parallel lines are struck, and the ends of these lines connected by two other lines on the circumference, which, when the diameter of the block is, say, ten inches, will be ten inches apart and parallel to each other. Then with a pair of dividers, opened somewhat less than half the diameter of the block, arcs are described from the opposite ends of the side lines. Then by opening the dividers to the full half diameter of the block and describing two other arcs, the thickness of the wings or flanges of the cam is determined. After repeating this operation on the opposite end of the block, the material is removed to the center of the block, leaving the parts between the arcs intact, and the cam is formed. The inventor says: "The flanged cam takes the place of the crank, and it has the great advantage that the power is applied always at the same distance from the center of the shaft, and under the most favorable circumstances, so that no dead center exists and a continuous revolving motion will be imparted to the shaft without requiring a fly wheel. It can be applied in all cases where a reciprocating rectilinear motion is to be converted into a rotary motion, and is used with great success on reaping machines in place of the crank. The cam is so constructed at its ends that when the outside pin in the crosshead passes the extreme outer end of the cam, the inside pin, being at this moment the propelling power, does not pass the dead point until the outside pin has passed, when that becomes the propelling power until it reaches the opposite end of the cam."



HURLBUT'S SPIRAL CAM ENGINE.

Patented through the Scientific American Patent Agency March 26, 1867, by William H. Hurlbut, who may be addressed relative to the invention at Mirabile, Caldwell Co., Mo.

Preserve the Forests.

As compared with Europe, or with our own prairie States, New England and New York are regions of forest. There is scarcely any part of these States where the forest does not make a prominent feature of the landscape, and in most parts it predominates. Of course we do not mean the unbroken, primeval forest, but that succession of woodlands and tree-crowned hills which reveal to the traveler at at once, as he comes from other countries, that he has reached a land where nature is still wild, and fuel cheap. But around the cities and along the seashore already wood begins to be scarce, and attention must be given to the planting of trees. Accordingly, in Barnstable, Nantucket, and Bristol counties, Mass., something has been done in this novel species of husbandry, as it would have seemed to our grandfathers. There can be no doubt that forests have a great influence on the moisture and fertility of the soil. It is traditional that whole regions in Spain which are now barren or only used for pasturage a part of the season, were, before the noble woods of the country were cut down, free from drouth and rich in crops. In France, the same tendency has been checked by legislation, which interfered, as early as 1669, to prevent the felling of forests without permission. The legislation is now very stringent, and in addition the Government exercises the right of compulsory plantation of trees on the land of citizens who will not be hired by the public money to plant for themselves.

The French law of 1859 forbids the cutting down of any wood larger than twenty-five acres, unless it shall appear to the proper authorities that such wood is not necessary to protect the soil on mountains or steep slopes, or against the encroachments of rivers; or to preserve springs and water courses from drying up, and the seashore from being blown or washed away; for the defence of the frontier or for the public health. It was found that to cut off the forests caused the hillsides to be stripped of soil, and the springs to dry up; that torrents and freshets were much more injurious afterwards, and that the sea sand encroaches upon the arable fields as soon as the woods near the shore disappeared. Every one who has paid much attention to the subject knows that these changes take place, giving rise sometimes to remarkable phenomena. For instance, the long beach at Plymouth, when the Pilgrims landed there, was covered with trees, and an island of considerable extent outside of the beach was also wooded. Since the trees have been cut the sea has washed the island away so that it is covered by every tide, and the beach has become so narrow in some parts that the heavy seas break through it, and needs to be strongly protected by artificial means. As the security of the harbor of Plymouth depends upon this beach, the folly of cutting down the trees is now manifest.

The effect of the laws against cutting, and in favor of planting trees, in France, has been such, that of late years, instead of a steady decrease in the extent of woodland in the Empire, there has been a constant gain. In 1860 the wooded surface of France was 8,783,343 hectares, or less than 22,500,000 acres, the whole number of acres of land in France being at least 125,000,000. In 1865 the number of hectares in wood had increased to over 9,000,000, or nearly a million acres more than fifteen years. In a few of the other European countries preservation of wood has been undertaked, but nowhere with so much success as in France. Until within a few years, since coal has commanded a high price, the natural increase of wood in Massachusetts has kept pace with the amount cut off in each year.

But there is reason to believe that for the last year or two it has not been so, and in this part of the State especially,

there has been a great cutting down of firewood, the timber there having been used up some time ago.

It is true that planting has also been going on, but not on a large scale—not enough to prevent those changes in soil and climate which certainly follow the destruction of standing forests. It would be well, therefore, for our farmers and the owners of estates to consider whether they ought not to take some greater pains to plant and preserve the growth of wood, which for fuel, for protection to the soil, and for ornament, will become of more and more value each year.

The countries in Europe, which most nearly resemble our own in respect to forests are Russia, in which there are 450,000,000 acres of woodland out of a total of 1,000,000,000 acres; and the Scandinavian peninsula, where it is said three fourths of the country is covered with wood. Canada and the extensive possessions of England to the north of Canada are counterparts in this hemisphere of Norway, Sweden, and northern Russia, and will be more and more drawn upon as our population increases and the woods recede. They are now of much value to Great Britain in this respect, for the English and Irish forests have almost entirely gone, and but few remain in Scotland.

England has thus far found in her coal mines a greater resource than anciently in her forests, but it is a great loss to her to have parted with those entirely. Let her children in America profit by her example and preserve their woodlands. —*Springfield Republican.*

THE COPPER REGION OF LAKE SUPERIOR.

Attention was very early called to the remarkable deposits of native copper upon the shores of this great lake. The first mention of it appears to have been in the Missionary Reports of the Society of Jesus, for 1659-60. It is next spoken of by Claude Allouez, a Jesuit missionary, who visited this region in 1666. He speaks of having seen pieces of copper of ten or twenty pounds weight, which the savages reverenced as household gods, and of having passed the site of a great rock of copper, then buried in sand. In 1670 Father Dablon reports a marvellous story, which was told him by the Indians, concerning a copper island about fifty leagues from the Saut, which he interprets as a cause of poisoning from the metal, loose pieces of which the savages used in cooking their meat. Charlevoix, whose travels were published in 1744, corroborates these accounts, and mentions the fact that a brother of the order made chandeliers, crosses and censers of the copper which was there found.

About 1763, a practical Englishman, Alexander Henry, passed through this region. He narrowly escaped being massacred by the Indians, but in spite of his trouble he kept his eyes open to his own interest. In 1771, he commenced mining operations in the clay bluffs, near the forks of the Ontonagon river. The following year he transferred his workmen to the vein on the north shore, but being discouraged by the contraction of the lode from four feet to four inches, he became disgusted, and finally abandoned his workings.

In 1819, General Cass and Mr. H. R. Schoolcraft, passed through this region, and visited the famous mass of native copper on the Ontanagon. In 1823, Major Long and his party saw the scattered boulders of this formation. Nothing, however, came of all these observations, the general impression being that the wildness of the country and its distance from settlements rendered these enormous natural resources valueless, at least for many years.

The first impulse to mining in this district was given by Dr. Douglass Houghton, State geologist of Michigan, who, in 1841, in his annual report to the legislature, gave an account of the geology of the country, and the first scientific description of the copper deposits. Subsequently, he devised an admirable plan for developing the resources of this region, and had commenced carrying it into practice when his sudden death by drowning put a stop to these important observations.

In 1843 was ratified with the Chippewas a treaty, which put the United States in possession of the territory as far west as the Montreal river, and southerly to the boundary of Wisconsin. The same year numbers of persons entered land in this neighborhood, by the provisions of a joint resolution of Congress in reference to the "lead lands" of Illinois, passed as far back as 1818. At first the applicant was allowed to select a tract three miles square, but afterward he was limited to one mile square. He was required to make selection within a year, to mark the corners, to leave a person in charge to point out the bounds, and to transmit to the proper department a description and plat of the same. On the receipt of this plat, the applicant was entitled to a lease of three years, renewable for three additional years, on condition that he should work the mines with due diligence and skill, and pay the Federal Government six per cent. of all the ores raised.

As a natural consequence of these liberal provisions, a great influx of speculators and their agents took place into this territory. The first mining operations were commenced in 1844. Masses of native copper, containing silver, were found, and numerous veins were discovered. About a thousand permits were granted by the department, and nine hundred and sixty-one sites selected. Sixty leases for tracts three miles square, and one hundred and seventeen for tracts one mile square, were granted, and mining companies were organized under them. Most of the tracts covered by these were taken at random, and without any explorations whatever; indeed, a large portion of them were on rocks which do not contain any metalliferous veins at all, or in which the veins, when they do occur, are not found to be productive. The excitement reached its hight in 1846. Quantities of stock were sold which represented no value whatever, and this reckless speculation injured the reputation of the mines.

In 1847 the country was almost deserted, only about half a dozen companies, out of all that had been formed, being engaged in mining.

In 1846, further grants of land were suspended as illegal, the resolution in regard to *lead* not covering *copper* lands, and the following year Congress passed an act authorizing the sale of the lands and a geological survey. For the latter purpose, Dr. Charles T. Jackson was appointed, but after having spent two seasons in these explorations, he resigned, whereupon the work was confided to Messrs. Foster & Whitney, who have given a very full and satisfactory account of the geology of the country and its prospects as a mining region. Meanwhile, the actual miners had made considerable progress in their excavations, and as they purchased lands after thorough examination, confidence was gradually restored. By the time the United States Survey had been completed, and its results published, in 1850, copper mining had become an established business.

The report of Foster & Whitney contains some very interesting details of the discovery of ancient excavations for mining purposes. Some of these are quite extensive, reaching the depth of fifty feet, and containing rude implements for boiling water, stone hammers, copper gads, and other mining tools. It would appear, from some of the indications, that fire was the agent used to disintegrate the rock. Some idea of the extent of their operations may be formed from the fact that one of the explorers found a mass of native copper weighing six tuns, which had been detached by these ancient miners and supported on billets of oak, preparatory to removal. The age of these works may be inferred from that of a pine-tree stump, growing out of one of the mounds of rubbish from the mine. This contained three hundred and ninety-five annual rings, so that the exploration must have been made before Columbus started from Europe on his memorable voyage of discovery.—*Piggot on Copper.*

EXPANSION AND CONTRACTION OF STEEL.

Expansion and contraction belonging to this subject is the enlargement, or increase, or decrease, in the bulk of the steel, as the case may be, in consequence of a change in the particles by the process of hardening. It is pretty generally known to those who are employed in the process of hardening steel, and to those in the habit of fitting up various kinds of work requiring great nicety, that the hardening of steel often increases its dimensions; so that such pieces of work, fitted with nicety in their soft state, will not fit when hardened, and the workman has therefore to resort to the process of grinding or lapping to make the work fit.

The amount of the expansion (or the amount of the contraction) of steel cannot be exactly stated, as it varies according to the size of the steel operated upon, and the depth to which the steel hardens; also in the different kinds according to the amount of carbon combined, and even in the same steel operated upon at different degrees of heat. Steel which is the most liable to injury by excess of heat is the most liable to these expansions, and steel which is less liable to injury by heat is most liable to contractions. As, for example, the more carbon the steel contains, the greater will be the expansion of the steel; and the nearer the steel approaches to the state of iron, the less will be this increase of bulk.

Although the steel expands in hardening, it is not universal for pieces of all sizes to increase in dimsnsions; for sometimes it is smaller in dimensions after hardening. This, at first sight, appears anomalous; but I will endeavor to give an explanation of it.

Steel, like all other substances composed of particles, varies in its dimensions with a change in temperature. It follows that when the steel is at a red heat, the natural positions of its particles are in a measure displaced, and it is expanded to a greater bulk; and when immersed in water and suddenly cooled, such a change of its particles takes place as to make it hard and brittle. It also contracts to a smaller bulk by the loss of heat; but this cannot so rapidly occur at the central part, because it is protected by the surface steel. Consequently, large pieces of steel do not harden all through; or, in other words, do not harden properly to their centers, but toward the center the parts are gradually less hard, and will sometimes admit of being readily filed; and as it is only the outer parts of the steel which harden properly, consequently it is only those parts of the steel which harden that increase in bulk. When the steel is immersed in the water, the water begins first of all to act upon the outer crust of the steel, and then cooling it gradually toward the center. The outer crust being the first to part with its heat, it is of course the first to contract and become smaller. The outer crust in contracting is held in a state of great tension, by having to compress the central steel (the central steel at the time being expanded by the heat). While the surface steel is in this state of tension, and the central steel in this state of compression, the particles of the surface steel (by the strain) are displaced to a greater distance from each other, and the particles of the central steel (by the compression) are compressed into a denser state. The particles of the central steel being compressed into a denser state, it causes the central steel, after it has become quite cool, to occupy less space than what it did previous to hardening. The particles of the surface steel become hard while in this state of tension, consequently the hardened part of the steel becomes fixed, and cannot return to its original bulk; consequently, the hardened part of the steel occupies more space than what it did previous to hardening.

If the displacement of the particles of the outer steel predominates over the compression of the particles of the central steel, the piece of steel under operation will then be larger in dimensions. If the compression of the particles of the central steel predominates over the displacement of the particles of the outer steel, the piece of steel under operation will then be smaller in dimensions. In other words, if the expansion of the outer steel amounts to more than the compression of the central steel, the piece of steel will increase in bulk; if the compression of the central steel amounts to more than the expansion of the outer steel, the piece of steel will then decrease in bulk. The expansion of the steel is greatest when it is heated to a high degree of heat before immersion. This effect is owing to the particles being displaced at a still greater distance from each other, and which may, in some measure, account for the brittleness of steel when overheated. This expansion is, in some measure, reduced by tempering; and this effect is caused by the hardness being reduced and allowing the particles to partly rearrange themselves to their natural positions.

It is believed by some that the hardness of steel is caused by the compression of the whole of the particles into a denser state; in confirmation of this they say that steel after hardening always looks closer and finer in the grain. Now, if this were the only cause of steel becoming hard, how does the steel get larger in dimensions? Pieces of steel of all sizes would, according to this, universally become smaller. The compression of the particles of the central steel into a denser state certainly does take place, as I have before remarked, but the particles of the outer parts of the steel are displaced at a greater distance from each other, or the steel could not become larger in dimensions. It is believed by some that if a piece of steel (in hardening) increases in bulk in one part, that it must decrease in bulk in proportion in another part. Now, if this were the case, how is it that the specific gravity of some pieces of steel is reduced by hardening, and how is it that workmen have often to grind or lap pieces of steel to make them fit the same places which they fitted previous to hardening. It may be said that the steel may be prevented from fitting the place it previously fitted by becoming crooked or oval in hardening; but if this were the only cause, how could it be made to fit its place again by grinding or lapping? It would be impossible (unless it were softened and upset) to make the lean or concave side of it fit its place again. I may also inquire, what is the cause of steel being whiter in color after hardening? As I have previously remarked that it is only those parts of the steel which harden properly that increase in bulk, it may perhaps be asked, how is it that a piece of bar steel becomes shorter in hardening? The answer is that the central steel is compressed by the surface steel endways as well as sideways, by the surface steel contracting shorter by the loss of heat. The central steel contracts after the outer crust is fixed, consequently an internal strain is caused; and, if the steel becomes shorter than what it was previous to hardening, it is because the force of this internal strain shortens the outer steel more than it expands in hardening.

It is quite reasonable to suppose, if the particles of the hardened parts of the steel are removed to a greater distance from each other, that the steel would look considerably more open and coarser in the grain; consequently, it may be inquired, if it is not the compression of the whole of the particles into a denser state, what is the cause of steel looking closer in its texture after hardening? The answer is, if we accept the theory that it is the crystallization of the carbon which causes the hardness in steel, that the carbon expands in the act of crystallization (in a similar manner that water expands by extreme cold in crystallizing into ice) and fills up every pore or crevice, and gives the steel the appearance of being closer and more solid.

Such is a slight sketch of the expansion and contraction of steel; and, although a great deal more might be said, I have not thought it necessary to entangle the reader with a lot of theories, although it may be necessary for his amusement, and for the exercise of sound judgment, to occasionally glance at them in treating fully the purely mechanical operations.

The expansion of steel is prevented in some measure by annealing the steel about three times previous to its being finished, turned, or planed; for instance, after the first skin is cut from the steel it should be annealed again, after which another cut must be taken from it and again annealed, and so the third time. This may appear to some like frittering away time, but in many instances the time will be more than saved in lapping or grinding to their proper sizes after the articles are hardened, especially when it becomes necessary to lap or grind them by hand labor, for hardened steel works with great difficulty; therefore in some instances it becomes a matter of importance in hardening to keep the article as near as possible to its original size. I have myself had articles to harden which could not be lapped or ground to their finished dimensions in the turning lathe owing to their peculiar shapes, so that the workman has been compelled to adopt the slow process of lapping with a copper file and emery dust, mixed with oil. I have known those articles which were only once annealed, to take several hours to lap them to the finished dimensions after they were hardened; and I have known articles of the same kind, and of precisely the same dimensions (in their soft state), made from the same bar of steel and heated to the same temperature (as near as the eye could judge), and hardened in water of the same temperature, which have been annealed three times, scarcely requiring to be touched with the copper file after they were hardened. As there may be some persons who may perhaps require an article to be after hardening as near its original size as possible, and who may not perhaps be provided with such things as buffs, laps, or stones, I presume therefore that this hint will not be out of place in making those acquainted with it. Another hint deserves a place. I have found that articles

made of steel which have been well forged will always keep truer and keep their original sizes better in hardening, and be less liable to break in hardening, than articles which are made of the steel in the state it leaves the manufacturer; for instance, if a very long screw tap, or reamer, etc., be required for any special purpose, it will be well to take a piece of steel sufficiently large to admit of being forged to the required dimensions. If for a long screw tap, three quarters of an inch in diameter, seven eighths round-bar steel swaged down at a cherry-red heat to three-quarters and a sixteenth will suffice (the one-sixteenth is allowed for turning); but if the edges of seven-eighths square steel be hammered down so as to form eight squares and then swaged down to three-quarters and a sixteenth, it will prove even better for the purpose than the seven-eighths round-bar steel, it must be obvious that if similar methods be adopted with larger articles, they will be less liable to break in hardening.—*Ede on Steel.*

Correspondence.

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

The Chicago Artesian Well.

MESSRS. EDITORS:—In two or three numbers of your paper I have read notices of this truly great and wonderful work, which, though originated and prosecuted upon theories outside of old fashioned mundane science, has proved more successful than any thing of the kind ever attempted in this country. The history of the work, as detailed by its principal agent, Geo. A. Shufeldt, Jr., is briefly this: A gentleman named Abraham James, claiming to act by spiritual impressions, pointed out the locality where the well is now flowing, and insisted that at a certain depth artesian water could be had by boring. Upon the strength of his representations the work was commenced, and water in large quantities, and, for deep well water, of very pure quality, was struck within a few feet of the depth he had designated, and flows out at considerable hight above the surface, at the rate of 1,200,000 gallons per day. As Chicago, before this proof was given, was not known by most people to be situated over the bottom of a geological "basin," the whole matter is considered by its projectors a signal proof of spiritual intelligence and communication. But the work being finished,—no matter by what authority,—its details show clearly, that instead of its being wonderful that an artesian well is obtained there, it is one of the most beautiful *proofs* of the truth of the common theory of such wells; and to demonstrate this is the object of this paper.

It is supposed by Agassiz and others that the first rocks which appeared above the primeval ocean upon this continent—and perhaps on the earth—are those which constitute the Laurentian Range, bordering Lake Superior and running outwardly to the Atlantic. What we know is—for the rocks testify to it—that on the outward slope of this range, along the Mississippi river and its eastern branches, as we go downward geographically, or hydrostatically, we go *upward* geologically; that is, the different stratas of deposited rock—many of which outcrop along the river's bank—all lie like the tiles upon the roof of a house, overlapping and running under each other; but—to follow out the figure, the eave of the house is the highest; and, of course, the water falling upon it would run under instead of over the stratas.

The first deposit upon the Laurentian (which is an igneous rock thrown up by internal convulsions), is what has been called by some the St. Peter's Sandstone. This commences on the St. Croix river, one of the principal eastern branches of the Mississippi, at about one hundred miles south of the lake, and fifty or more from the ridge which forms the watershed between the lake and all the eastern branches of the upper part of that river. For thirty miles along the St. Croix this stone forms its banks, into which it has cut its way in ages past to a depth of one hundred feet or more, leaving nearly perpendicular precipices upon each side.

This stone is impervious to water, and is probably the foundation stone of all that part of northern Wisconsin which abounds in tumarack, cedar, and cranberry marshes. It is covered with a thick deposit of drift, forming low hills of loose, pebbly soil, between which are the swamps and lakes, and some alluvial deposits. Following down the Mississippi river, this sandstone, which is called by the Iowa State Geologists the Potsdam Sandstone, is last seen near the north line of that State, and there dips under the lower Magnesian limestone, which in about forty miles dips under another thin bed of sandstone, over which soon commences the thick and extended deposits of the Galena, or lead-bearing limestone, the latter the principal rock of the river bluffs for over one hundred miles. A little north of the latitude of Chicago commences a bed of Hudson river shale, which is overtopped by a thick deposit of Niagara limestone, which disappears under ground at a point on the river exactly west of Chicago. From this point the geological deposits going south and east rise with great rapidity up to the coal measures of central Illinois, through various stratas of limestone, mostly of a fine building quality.

Now what I wish to show is, that the drill of the Chicago well penetrated through all these stratas, which were not wanting, until it reached and went through the St. Peter's sandstone, and struck the water which fell upon the earth along the Southern Laurentian slope, and has run beneath that bed of rock, ready to spout from any hole which reaches it. This, if true, would account for the great purity of the water as compared with other artesian fountains, as it has encountered on its way no soluble mineral substances, and was originally strained through the sand drift of upper Wisconsin.

The diary, kept apparently with great care during the boring of the second well, shows plainly that after going down about three hundred feet, through various limestones and marble, the drill struck the Niagara limestone, which forms the surface rock on the Mississippi, directly west of Chicago. It is described as a grey limestone, one hundred feet thick, with layers of flint. This description tallies exactly with the character of the stone exposed in the bluffs at this place. Underneath this was found a bed of shale, the same in character as that which lies below the limestone here, but which is still partially above the bed of the river. This proved to be about one hundred and fifty feet thick (here it has been bored into a great distance, but not through). From the bottom of this shale downward, the character of the rock is not so well defined in the diary. The Galena and lower beds of limestone seem to be wanting, and the drill appears to have reached the still lower sandstones, under which the water is stored.

The conclusions which I draw from the above are, 1st, That artesian water can be obtained at any point in this region by going deep enough to penetrate the St. Peter's or Potsdam sandstone; and 2d, That along the Mississippi river, as low down as the latitude of Chicago, it can be had at a depth several hundred feet less than at that place. C. B.

Lyons, Iowa.

The Cave of the Puy de Dome.

MESSRS. EDITORS.—In your issue of Nov. 9th, I notice a communication from "M. A. D." requiring a solution of a natural phenomenon existing in the south of France. As you intimate, the facts are scarcely correct, as represented by "M. A. D." They are these: In the locality mentioned a spring issues from underneath a deposit of lava, which is remarkably cold, sometimes even covered with ice, in the hottest part of the summer; and in the winter has a temperature exceeding that of the air surrounding. Now there is nothing very extraordinary about this spring, excepting its excessive coldness (exhibited by the production of ice) in excessively hot weather, and this wonderful quality so much dwelt on and exaggerated possibly, by the guides who conduct tourists to the mountain (Puy de Dome), admits of a very simple explanation to the educated man, though a great mystery to the uneducated natives, and to some of those who ought to know better. This explanation consists in the fact that the rock through which the waters of this spring percolate, is of a very porous texture; in the hot weather a very rapid and abundant evaporation takes place, which reduces the temperature and causes the water to escape at or near the point of freezing. At my visit there, there was no ice in the spring, though I was assured that the occurrence sometimes took place. Under the circumstances, it is possible, and I believed the assertion for that reason, and not because one is told so. In the winter, in cold weather, as a matter of course, the water would be warmer, and in certain states of the atmosphere would give off vapor, as other springs do under the same circumstances.. This vapor is magnified into steam, and the double contrariety of cold in summer and heat in winter makes a pretty wonder for the uninstructed villager or traveler. Possibly the wonderful evidences of intense volcanic action to be seen here, predisposes one to be rather too credulous as to mysterious phenomena. HENRY STEWART.

Norristown, Pa.

Treatment of Kerosene Lamps.

MESSRS. EDITORS:—In your issue of Nov. 2, page 275, your correspondent "Experimenter" has given advice, which I cannot but think detrimental to the safety of the Kerosene burning public. He states that "if the wick fits the tube, it is impossible to drive the flame down into the lamp by blowing into the chimney," and further, recommends that method of extinguishing the lamp. Now your correspondent must be more fortunate in the possession of a good and perfect burner than nine-tenths of the people, for nine-tenths of all the burners used are made with *vent holes* along the side of the tubes, or in close proximity thereto, much larger in area, and much nearer the explosive mixture in the lamp than by way of the tube, with never so loose a wick as usually used.

The theory of lamp explosions, as I understand it, is this: First, Kerosene of itself is not explosive, nor is the gas which rises from it, but it is the admixture of that gas with a large body of air that makes it dangerous. Kerosene, or coal oil, is a dense body, which gasifies slowly, requiring, during the process of combustion in lamps as used, air to take the place of the oil consumed; this air, passing down by the heated tube through the *vent* holes, as before stated, becomes warm, and by its heat eliminating a certain amount of gas, small in proportion to its own incoming body. The prolonged burning of the lamp, say for four or five hours, reduces the quantity of oil, enlarges the space for the explosive gaseous mixture, and imparts also a great heat to the contents of the lamp, which then gives forth vapor more freely, so as finally to produce the proportion of one part gas to nine of air, which I take it is the maximum point. This heat also increases the volume inside the lamp, causing this dangerous mixture to exude by these same vents, close beneath the flame, then catching from some deflection of the flame or its proximity thereto, explodes the lamp while standing on the table, and more often still when carried in the hand, or in going down stairs. Thus it will be seen that to blow the flame *down* is to invite destruction, unless the burner is properly constructed, as comparatively few are. The proper method is to draw the wick into the tube by means of the ratchet, which, while avoiding danger, will prevent any odor arising from the oil in the wick. PENROSE CHAPMAN.

Brunswick, Me.

Artesian Wells---Why the Water Flows---Is It Centrifugal Force?

MESSRS. EDITORS:—A correspondent has published in a recent number of your journal, a theory of the nature of spouting water, in which he attributes the discharge of the water to the centrifugal motion of the earth—the tendency of matter to fly from the center. I have heard this opinion advanced before, and the existence of perennial springs, on the Adelsburg mountains in Switzerland, and in other places, adduced as evidence in support of the theory, but I do not believe it to be founded on fact.

I bored the Chicago Artesian; they are 711 feet in depth; they commenced filling with water at a distance of ten feet from the surface, and continued full of water all the way down. Why did not the centrifugal force throw this water out? and why was no water discharged until the drill had penetrated a particular subterranean stream? Before this point was reached there was plenty of water in the wells, and we could pump out an abundant supply; and this is true of hundreds of other artesian wells scattered throughout the country, they do not discharge the water above the surface, but plenty of it can be obtained by pumping. Why does not the centrifugal force throw the water out of these wells? And why do they not all become flowing wells, as would be the case if the theory were true? Or, in case of dry wells, why does this force not throw out the stones and chippings of the drill as well as the water? For these reasons I am inclined to adhere to the opinion that water, in flowing wells, comes from a higher source, and that the crust of the earth is everywhere penetrated by these underground streams to an extent of which at present we have no conception. For the benefit of another of your correspondents I here state that the temperature of the water in our wells is 57° Fah., and is uniform winter and summer. It was incidentally mentioned in your paper that the flow was intermittent: this is not the case; but it is without change in quantity or force all the year round. The form of the overflow resembles the white plume of a soldier, and is extremely beautiful. GEO. A. SHUFELDT, JR.

The Philosophy of the Soap Bubble.

MESSRS. EDITORS:—On page 291, No. 19, current volume of your famous journal I find a communication from Mr. Alfred O. Pope, detailing his experiment by which he imagines he has proved Sir David Brewster's theory regarding the color of soap bubbles. I do not find fault with the experiment, but with the deductions drawn from it. He does not tell us how his experiments prove that secretions were formed and until he demonstrates that they were formed he has not proved Brewster's theory. All admit that the thicker the film of the bubble the brighter the colors will be. Oleate of soda and glycerin in solution make a thicker film than a solution of common soap. Consequently, when the liquid begins to flow down the sides of the bubble and collect in drops at the bottom the top gets thinner and the colors then become paler and there being a constant change in the thickness of the film all over the bubble there is as constant a change of color until a deep blue or black makes its appearance at the top of the bubble which becomes so thin that the cohesive force is overcome by the weight of the sides and bottom, and the bubble bursts. CHEMIST.

Cincinnati, Nov. 5, 1867

Recipe for Making Boots Water Tight.

MESSRS. EDITORS:—As the cold, muddy weather of fall is approaching, it may be of interest to many of your readers to know how to preserve their boots and make them at the same time pliable and water proof. It can be done in this way: In a pint of best winter-strained lard oil, dissolve a piece of paraffine the size of a hickory nut, aiding the solution with a gentle heat, say 130° or 140° F. The readiest way to get pure paraffine is to take a piece of paraffine candle. Rub this solution on your boots about once a month; they can be blacked in the meantime. If the oil should make the leather too stiff, decrease the proportion of paraffine, and *vice versa*.

I have used this for eight years past, and boots have lasted me two winters, the uppers always remaining soft, and never cracking. I have tried beeswax, rosin, tar, etc., but never found any other preparation half so good. C.

Dayton, Ohio.

ARTIFICIAL RUBIES, not mere copies in glass, but made veritably out of the same substance—alumina—of which the natural gems are composed, have been produced by M. Ebelsman of the Sèvres Porcelain Works, near Paris. The process consists in employing a solvent, which shall dissolve the mineral or its constituent, and may thus, either upon its renewal or by a diminution of its solvent powers, permit the mineral to aggregate in a crystalline state. Certain proportions of alumina, magnesia, oxide of chromium, or oxide of iron, and fused boracic acid, are placed in a crucible made of refractory alumina enclosed in a second one, the whole being exposed to a high heat. The materials are first dissolved in the boracic acid, then as the heat continues, the latter evaporates, the alumina and coloring matter combine, crystallize, and present the exact appearance of the spinel ruby. In this way crystals of the same form, hardness, color, composition, specific gravity and effect on light, as the cymophane, and other precious stones are prepared.

WINE CONTAINING ZINC.—Dr. Wittstein has recently found that most European wines contain zinc in the form of salts, its presence being due to the fact that the isinglass used in purifying the wine is adulterated with about 2½ per cent of oxide of zinc.

THE CHEMISTRY OF METEORITES.

M. Daubrée, already so distinguished for his researches on metamorphism, has recently published the results of his Synthetical Experiments on Meteorites, and has thus brought before us, from an entirely different point of view, an inquiry into the nature and origin of the silicated magnesian rocks and minerals.

M. Daubrée first describes his experiments on *the imitation of the meteoric irons*. The most characteristic feature of these masses is the crystalline pattern, which is brought to view on a polished surface by the action of an acid. Simple fusion of the meteorite of Caille (Var) in a *brasque* of alumina (to avoid the contact of carbon, which would have combined with the iron), was insufficient to reproduce the appearance, although the resulting substance was certainly crystalline. Further experiments, in which soft iron was associated with some of the other substances that commonly accompany meteoric iron, such as nickel and protosulphide of iron and silicon, yielded a highly crystalline result, but not yet of the true character. If, however, to the soft iron was added phosphide of iron, in the proportion of from two to five or ten per cent, and, still better, if there was introduced at the same time nickel, and if a mass of as much as two kilogrammes in weight was operated on, there appeared, when the cooled lump was polished and etched, in the midst of dendritic patterns of great regularity, lines of a brilliant material dispersed in a reticulated form.

A third mode of attempting the imitation was that of melting down certain terrestrial rock substances, as peridote, lherzolite, hypersthene, basalts, and melaphyres. By this means specimens of iron were obtained which, both in composition and structure, bore strong resemblance to many of the siderolites. Especially was this notable in the metal obtained from the lherzolite of Prades (Eastern Pyrenes). These artificial irons were then found, like the natural meteoric ones, to contain nickel, chromium, and phosphide of iron, the latter in long needles recalling the appearance of the natural patterns.

Imitation of the Meteoric Stones.—Contrary to what might have been expected from the appearance of the black vitrified crust on the surface, the substance produced by the melting down of meteorites obtained from above thirty different falls, was in every case highly crystalline. Those of the common type present a group of metallic granules, disseminated in a stony mixture of peridote and enstatite, the former generally on the surface as a thin crystalline pellicle, the latter in the interior as long acicular crystals. A notable contrast was yielded by the aluminous meteorites, such as those of Juvinas, Jonzac, and Stannern, which produced, instead of crystalline, a vitreous mass.

But perhaps the more remarkable results were those obtained synthetically by melting down pieces of rocks characterized by the minerals peridote and enstatite. For this purpose peridote (olivine), from the basalt of Langeac (Haute Loire), and lherzolite, from Vicdessos and Prades, were fused in earthern crucibles. They melted easily and yielded crystalline substances, the latter especially closely resembling the original rock. The proportion of enstatite (the bisilicate of magnesia) was found to be increased by the addition of silica.

When similar mineral substances were melted in presence of a reducing agent, the iron (which in the other case remained combined in the silicate) segregated itself in grains of various sizes, separable by the magnet. Thus a perfect analogy was established between the above rocks and the meteorites, as well in the stony minerals as in the iron, which always contained nickel.

Furthermore, some remarkable characters in the structure of the stony meteorites were found to have been imitated, especially the delicate parallel lines attributed to cleavage, which are visible when a thin slice is examined under the microscope, and the globular structure where the little spherules are sometimes smooth at the surface, at others drusy, or roughened with the points of minute projecting crystals, like the meteorite of Sigena, November 17, 1773.

When hydrogen was employed as the reducing agent, the results were very similar, and the reduction would take place at a temperature not exceeding red heat.

Again, another method of imitation, the reverse of the foregoing, was by oxidation. From silicide of iron, heated in a *brasque* of magnesia by the gas blowpipe, a substance was obtained extremely similar to the common type of meteorite. The iron was separated partly as native iron, partly as a silicate, forming peridote, some of it in the crystallized state. Further details of resemblance were attained by heating a mixture of silica, magnesia, and nickeliferous iron, phosphide and sulphide of iron. The stony gangue of the melted product was found to be free from the latter three substances; and instead of the simple phosphide introduced in the experiment, there was observable the triple phosphide of iron, nickel, and magnesium, first noticed by Berzelius in meteoric irons.

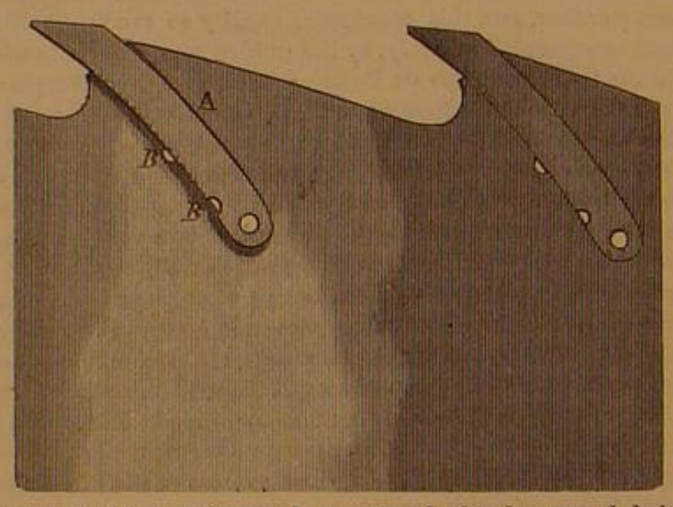
The preceding experiments suggest some important deductions on the condition of the planetary matter from which the meteorites have been diverted to our own globe. M. Daubrée makes no attempt to enter the lists with Von Haidinger, Baron Reichenbach, Prof. Lawrence Smith, and others, on the questions attending the entry of these bodies into our atmosphere, and the circumstances of their fall; but, considering that their surface alone is modified by these conditions, he infers that their interior mass remains the same as when it was wandering in space, and may to a great extent be taken as a sample of the material of the planetary bodies of which they are the fragments.

Seeing how nearly the composition and structure of the meteorites are reproduced by the two methods of experiment, M. Daubrée refers by their aid to the original mode of formation of the bodies from which these meteorites come.

If they were produced from silicated minerals by reduction, in which carbon was the reducing agent, it may be objected that the iron could scarcely have remained in the metallic state; and if hydrogen be supposed to have been the reducing agent, water ought to have been formed at the surface, whence it appears more simple and reasonable to recur to the idea of an oxidizing process. Allow that silicon and the metals existed at one time in the meteorites, not combined with oxygen as they now mostly are, and this by reason either of too high a temperature to allow them to remain in combination, or of too great a separation of their particles, then, as soon as, by their cooling down or by their condensation, the oxygen was able to act upon the other elements, it would at once combine freely with those for which it had most affinity, and if not sufficient in quantity to oxidize the whole, or not enabled to act long enough, would leave a metallic residue. In fact; there would be produced the silicate of magnesia and iron, peridote or olivine, and granular portions of nickeliferous iron and of sulphides and phosphides of iron. These views, while applicable to a large proportion of the meteoric bodies, would require modifications for those rarer varieties which consist essentially of pyroxene and anorthite. While the magnesian silicates crystallize so readily after simple fusion, these latter substances would only melt to vitreous and amorphous masses, and in order to become crystalline would have needed the presence of water.—*Address to the Geological Society*, 1867.

CLEMSON'S ADJUSTABLE SPRING-HELD SAW TEETH.

The engraving shows a saw tooth differing not only in form but in manner of being retained in place, from others. Its simplicity of shape and consequent ease of manufacture and management is one of its advantages, while the form of the slot as compared with that of the tooth is another. The tooth is dovetailed, or rather its edges conform to the slot, which



is of a V-shape. The tooth is curved the lower end, being struck on a circle. It is retained in place by a spring pressure as the curve of the slot in the plate differs slightly from that of the tooth, as seen at A. When partially worn the teeth may be moved outward from the center of the plate although still held by the spring of the tooth. When, however, worn quite short, the two halves of the holes, B, in the plate and tooth may be brought together and a pin or screw inserted. This is only necessary when the tooth is removed so far from the slot as not to be affected by the spring of the tooth against the plate. These half holes may be several in number, if required, but it is found in practice that one on the plate and one on the tooth is sufficient. The dissimilarity of the curvature in the tooth and the slot in the plate amounts to about one-sixteenth of an inch.

The patent of Aug. 14, 1866 claims holding the teeth by elastic pressure, which is the peculiarity of the device, and others are being secured by a pending application through this office. Address for further information William Clemson Middletown, N. Y.

COATING IRON WITH COPPER.

The *Mechanics' Magazine* furnishes the following account of a simplified process of copper plating employed in the extensive electro-metallurgical establishment of M. Oudry, located in the village of Auteuil, three miles out from Paris. Such complete success has attended the introduction of this new method of depositing copper upon wrought or cast iron, that the inventor and founder of this establishment, relinquishing to his compeers the ordinary applications of copper plating which are limited to articles intended principally for purposes of interior decoration, produces chiefly such articles connected with the external decoration of stately and superb edifices, which are, therefore, exposed to all the destructive effects of air and water, to the deteriorating alterations of heat and humidity, and to the corroding action of gas and frost. To M. Oudry was entrusted the plating in copper of all the cast iron monuments of the city of Paris, including the fountains of Venus and Diana in the Champs Elysees, that of Visconti in the Louvais square, that of the four seasons, and the monumental designs which embellish the Place de la Concorde. Among other works deserving notice is the reproduction in galvanoplastic of the bas-reliefs composing the Trajan column, exhibited at the Louvre, and the surface of which cannot be less than 700 square yards in extent.

Were people in general to know the price paid for success in any department of scientific knowledge and application, it is very questionable whether they would not be more inclined to pity than to envy the representative. The present proprietor of the establishment at Auteuil has had his due share of labor and anxiety in bringing the art to so high a degree of perfection. For many years he was engaged in conducting experiments of a troublesome and complicated nature, in order to arrive at his end, which was copper plating of any required thickness upon cast and wrought iron by a direct operation. This was the only method, in his opinion, available for effectually resisting oxidation, when the specimens plated possessed a large area of surface, together with numerous details of tracery, graving, and ornament. Similarly, this was the only plan which promised success in plating bodies composed of several pieces and connected together by bolts or rivets, and which might be exposed to stain and friction, such as pistons, screws and armor plates. Under the same category may be included substances undergoing a heavy pressure, such as rollers. All these require not merely a plating of copper, as understood by the ordinary term, but absolutely a thick crust of copper upon them. To obtain this result it was necessary to immerse the objects in a bath of sulphate of copper, and to keep them there for several days in the presence of an electrical current. It was found that if the pieces were cleaned and plunged into a preliminary bath to obtain a superficial film, and then transferred to a bath of a stronger and more acid nature, the iron, owing to its impurities, having been but imperfectly cleaned, and consequently but very slightly coated, was at once attacked by the acid, and the result was the very reverse of what was desired. Instead of the object being plated, it was rapidly corroded and destroyed. After many attempts to succeed by the use of two successive baths of different strengths, M. Oudry was compelled to renounce the endeavor and to turn his attention to another plan of operation. The one he has finally adopted consists in discarding the preliminary bath and the cleaning, and replacing them by a fluid coating of an isolating and impermeable character. By this new process, the exact *modus operandi* of which is a secret, the monuments we have alluded to were plated, together with 20,000 gas lamps and fittings ordered from Auteuil for the city of Paris. These lamps are composed of a pedestal and shaft, the former of which is seldom retouched, but the shaft is generally adorned with garlands, and requires to be filed up. This having been done, the workmen cover the surface with a very thin film of benzine, and so soon as this coating is dry a second, and then a third, is applied, the whole three operations embracing a period of three days. Subsequently, the surface is rubbed over with charcoal powder, and then it is fit for the plating. Any part that is not required to be plated is covered with a paste of some conducting earthy substance. The objects having been duly prepared are transfeared to large wooden vats containing the baths, are tied together with copper wires, and surrounded with numerous earthern jars of a porous description, in which are placed plates of zinc furnished at the top with strips of copper, to which are attached the conducting wires encircling the objects to be plated. The contact of the copper and the zinc sets up the galvanic action which commences directly the earthern jars are filled with dilute sulphuric acid, and a saturated solution of sulphate of copper is introduced into the vats. The strength of the solution is maintained constant by supplying or feeding it with crystals of the sulphate of copper. Notwithstanding that the theory of the process depends upon these conditions being fulfilled, yet the beauty of the plating and the practical success is very much due to the thousand and one little devices and dexterous manipulations only to be acquired by long practice and experience. About three or four days suffice to render the operation complete, the thickness being the 1-25th part of an inch, and the objects are then taken out of the bath, washed in water slightly acidulated, brushed with a wire brush, and rubbed with green paper to relieve the dull tint the newly plated copper assumes. The finishing touches consist in brushing the objects with a brush steeped in a preparation of ammoniacal acetate of copper, which attacks the surface of the fresh coating, and imparts an agreeable greenish tint to it, and finally rubbing them with a hard brush well waxed.

Our readers will recognize in the battery adopted at the establishment of Auteuil, that of the well known Daniell's constant battery, the especial feature of which is to furnish regular currents of uniform intensity, by means of the partition separating the two liquids, and through the pores of which they come into contact. In all these substitutions for solid metal of the same nature as the superficial film, the question of cost enters largely, and a few remarks will be *apropos* to the subject. A gas lamp of the newest pattern, in Paris, weighs 4½ cwt., and costs, including casting, filing up, copper plating, and bronzing, exactly £8, being at the rate of a fraction under fourpence per pound. The same article cast in bronze will only weigh, in consequence of the reduced thickness, 2¾ cwt., but owing to the price of that metal the cost would amount to a trifle over £30. It has been estimated that the difference between these two specimens for the whole city, amounts to a saving of nearly half a million pounds sterling. The Emperor of the French has marked his approbation of the energy, enterprise, and skill of M. Oudry, by presenting him with the cross of the Legion of Honor; and all those who have witnessed the success which has attended his efforts at the Exposition, will concur in the opinion that the honor had been well earned and deservedly merited.

CASTINGS IN SOFT STEEL.—It is noted as a fact in casting steel to patterns, that Messrs. Vickers, Sons & Co., of Sheffield, Eng., have cast a hydraulic cylinder 8 inches in diameter and 2½ thick, perfectly sound and malleable. The Wm. Butcher Steel Works, Philadelphia, Pa., have recently cast a hydraulic cylinder 12 inches in diameter and but 1¾ inches thick, perfectly sound and malleable, which is a much more difficult casting to make, on account of the thinness of the metal.

Artificial Grindstones.

We have already noticed in this journal the success which has attended the application of Mr. Ransome's beautiful process to the manufacture of artificial grindstones—a success which is so marked that there seems little doubt that the use of natural stones for grinding purposes will eventually become the exception instead of the rule. Among other firms, Messrs. Bryan Donkin & Co., the well-know engineers, of Bermondsey, have tried experiments which very decisively prove the advantages of the artificial over the natural stones. Messrs. Donkin were first supplied with a pair of Mr. Ransome's artificial grindstones in December last; and early in the present year they carefully tested these stones and compared their efficiency with some Newcastle stones at their works. Both the natural and artificial stones were mounted in pairs on Muir's plan—a system in which the peripheries of the two stones of each pair rub slightly against each other, with a view of causing them to maintain an even surface—and the two sets of stones were tried under precisely the same circumstances, except that the Newcastle stones had a surface speed more than 20 per cent greater than that of the others.

The trials were made as follows: A bar of steel, ¾ in. in diameter, was placed in an iron tube containing a spiral spring, and the combination was then arranged so that the end of the bar projecting from the one end of the tube barely touched one of the artificial stones, while the other end of the tube rested against a block of wood fixed to the grindstone frame. A piece of wood of known thickness was then introduced between the end of the tube and the fixed block, and the spiral spring, being thus compressed, forced the piece of steel against the grindstone. The same bar of steel was afterward applied in the same way, and under precisely the same pressure, to the Newcastle stone, and the times occupied in both cases in grinding away a certain weight of steel from the bar were accurately noted.

The results were that a quarter of an ounce of steel was ground from the bar by the artificial grindstone in *sixteen minutes*, while to remove the same quantity by the Newcastle stone occupied *eleven hours*, and this notwithstanding that the surface speed of the latter was, as we have stated, more than 20 per cent greater. Taking the 20 per cent greater speed of the Newcastle stone into account, it will be seen that the 11 hours run by it were equal to 13¾ hours at the same speed as the artificial stone, and the proportional times occupied by the two stones were thus as 16 minutes to 13¾ hours, or as 1 to 52, nearly!

Such a result as this is something more than remarkable, and it is one which would scarcely have been credited, even by those who made the experiments, if it had not been fully corroborated by subsequent experience in the working of the artificial grindstones. Since the experiments above described were tried, Messrs. Donkin have set another pair of the artificial stones to work, and these, which are now in regular use, have given more satisfaction than those first tried. The saving in time, and consequently, in labor, effected by the use of the artificial grindstones is, in fact, so great that Messrs. Donkin have determined to use these stones exclusively in future; and we may add that the artificial stones are so much preferred by the workmen that those men, even, who are employed in shops at some distance from that in which the stones at present in use are situated prefer taking the trouble to go to them to using the Newcastle stones in their own shops. In addition to their great efficiency, the artificial grindstones possess the advantages of being able to be manufactured of any size, and of any degree of coarseness of grain, and they can thus be specially adapted to any particular class of work, while the process of their manufacture insures their being of uniform texture throughout, and free from the flaws and hard and soft places found in natural stones. Altogether, we believe that the general adoption of the artificial grindstones is merely a matter of time.—*Engineering.*

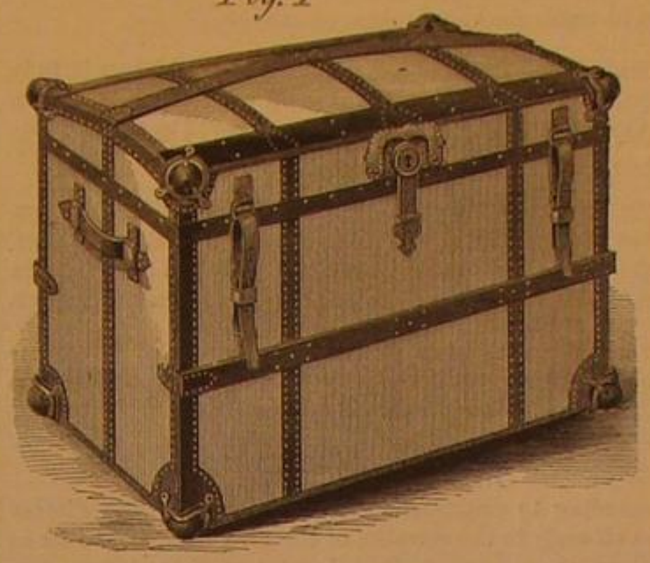
Mutability of Species.

In a recent communication to the Geological Society of Paris, M. A. Gaudry pointed to some striking facts favorable to the theory of the mutability of species. The sand pits in the environs of Paris, and indeed all drift deposits in general, are very rich in remains of the mammoth or primitive elephant, and of the *elephas antiquus*. These remains chiefly consist of molar or back teeth, in which characteristic differences may be easily recognized. They consequently pertain to two different species, and in order to ascertain whether there exists any close parentage between them, M. Gaudry goes back to the pleistocene period, which lies between the upper tertiary or pliocene, and the drift strata. Now the pleistocene forest-bed of Norfolk contains a quantity of molars of each of the above species, but it also comprises others slightly differing from both, and also intermediate between those of *elephas antiquus* and *elephas meridionalis*, the latter ceasing to exist when the former and the mammoth begin. These again disappear after the drift, and are followed by other species. Here then we perceive a succession of species, each of which have sprung from the preceding one. During the tertiary period there existed a breed of horses to which palcontologists have given the name of *hipparion;* they had small lateral fingers, thus forming a link between pachydermata and solipedes, which latter was considered perfectly distinct so long as the genus *equus* was characterized by a single finger at each foot. Now, Mr. Owen, on examining the horses' teeth found in the cavern of Oreston, discovered that the *equus plicidens* to which they belonged was intermediate between the hipparion and the present horse. In the *equus plicidens* the enamel of the teeth presents more folds than in the living breed: but in the molars found in our gravel pits, M. Gaudry has perceived gradations between those presenting many and those presenting fewer folds, whence he concludes that our horse is a descendant of the *equus plicidens.* A hippopotamus, the remains of which were discovered at Grenelle a few years ago, appears not to differ materially from the race that now inhabits the rivers of Africa; and yet at the time the owner of these venerable relics was disporting himself in the Seine, the climate was much colder here than it is now; so that Mr. Gaudry concludes with great plausibility that, if we had the whole skeleton, some differences would probably appear.

HOUSE'S IMPROVEMENT IN TRUNKS.

Whether unjustly or not, the porters and baggage men employed at our hotels and railroad stations have been characterized as "baggage smashers," a term for which the trunk makers may be partially responsible. Wherever the fault may be it is certain that much damage and injury to

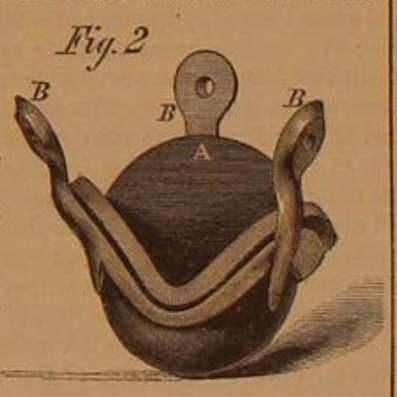
Fig. 1



property, often of a fragile nature, ensues when one is compelled to travel. Almost invariably a severe blow on the corner of the trunk will break the back or burst the trunk. The object of the contrivance shown in the accompanying engravings is to prevent a portion, at least, of this damage by providing cheap but efficient guards. One of these is seen detached in Fig. 2, and its application to a trunk exhibited in Fig. 1.

A frame of malleable metal—either malleable iron or cast brass—encompasses a triangular cup of thick vulcanized rubber, shown plainly at A, Fig. 2. This cup is formed with a flange which rests on the bars of the metallic frame. Each of the three prongs, B, of the frame have screw holes by which the shield is attached to the corners of the trunk. The appearance of the trunk or chest when these are attached is clearly exhibited in Fig. 1 without the necessity of further reference.

Fig. 2



It is easily seen that these fixtures can be quickly secured to any trunk, chest, valise, etc., and while preventing the jar and breaking of the trunk or its contents, render both more secure. To those who travel—and everybody travels more or less nowadays—this simple device will recommend itself. The elasticity of the rubber and its resistance to abrasion insures great security.

It was patented Feb. 1866, by J. A. & H. A. House. For particulars J. C. Gillmore, agent, may be addressed at No. 26, Fourth Avenue, New York city: Mr. Gillmore sells either the trunks with improved attachment or furnishes the shields to trunk manufacturers.

The First Steam Voyage Across the Atlantic.

The importance of the navigation of the ocean by steam first came to be fully realized in this country in the year 1818. Many scientific men doubted the feasibility of such navigation, but there were a few men of intelligence and enterprise who had the greatest faith in its practicability. Among this latter class was Mr. Scarborough, of Savannah, Ga., the senior partner of the firm of Scarborough & Isaacs, one of the leading commercial houses in the South. In 1818 Mr. Scarborough, willing to show his faith by his works, came to New York and made purchase of a ship of about 350 tuns burthen which was then on the stocks, determinated with her to settle the mooted questions as to the ability of steam vessels to successfully navigate the ocean. The ship was named the *Savannah.* Mr. Scarborough then engaged the services of Captain Moses Rogers, a person we are informed "of great mechanical skill and ingenuity, who had been familiar and identified with the experiment of Fulton." Captain Moses Rogers was placed in charge of the engine and machinery of the *Savannah.* An able and faithful sailor was now wanted to navigate the vessel, and such a man was now found in Captain Stevens Rogers of this city. Under his command the *Savannah*, having been duly equipped with engine and machinery, steamed out of New York harbor on the 27th day of March, 1819, bound to Savannah on her trial trip, which was most successfully made.

On the 26th of May in the same year she left Savannah for Liverpool, making the trip in twenty-two days, during eighteen of which she was propelled by steam power. From Liverpool the *Savannah* went to Copenhagen, Stockholm, St. Petersburgh, Cronstadt and Arundel, and from the latter port returned to Savannah, making the passage in twenty-five days.

The log book of the *Savannah* was sent to the Navy Department in 1848. Captain Stevens Rogers is yet living in this city. For a number of years past he has been collector of city taxes, but at the election in June last he was suspended. It has been often suggested that it would be no more than a simple act of justice on the part of the government to settle a pension upon the pioneer of ocean steam navigation, but no active steps have as yet been taken to accomplish the substantial recognition of his services.—*New London Star.*

Editorial Summary.

THE GLACIAL EPOCH.—At a late meeting of the New York Lyceum of Natural History, Mr. J. W. Reid presented a paper on the drift deposits of the United States. He accounted for the intense cold necessary to produce the immense glaciers of that period by the precession of the equinoxes, which, every 10,500 years, has the effect of transferring the great oceanic waters from one hemisphere to the other, the sun at that period remaining eight days longer in one hemisphere than in the other. At present, the winters of the southern pole are eight days longer than with us; an ice continent more than twice the area of Europe has formed there, and a map will show the great preponderance of water in the southern hemisphere. The extreme of cold at the Antarctic pole was reached in 1248, since which date the climate has been growing milder, while north of the equator it has been growing colder, and but ten thousand years remains before the temperature which twenty thousand years ago formed glaciers reaching to the top of Mount Washington, will be the prevailing one of North America.

ROSY AURORA.—Among the latest explanations of the red glow and splendor of sunrise and sunset, which has been given, is that of Dr. E. Lommel, in Poggendorff's *Annalen*, in which he shows it to be an effect of diffraction of light as viewed through a series of dark or partially dark screens. He lays it down as an axiom that a point of white light, viewed through a sufficient number of groups of screens, appears not merely reddish itself, but also is surrounded by a still more strongly red-colored aureole of diffracted light. The lower strata of the atmosphere is full of minute corpasaular bodies—dust, organic and inorganic, carbon or watery particles—which serve as dark screens, and when the sun is low, the rays traversing a long range of atmosphere, undergo diffraction, and by superimposition of adjacent points of light, the effect of redness is deepened. A mere red glow, without brilliance, is occasioned by solid particles, as we see the sun red when viewing it through smoke, aqueous vapor, when present in the air, makes a diffused reddish light.

A GRAND ENTERPRISE.—The French government contemplate a new and vast project, which if carried out will be of incalculable importance to that nation. This is to enlarge the *Canal Deux Mers*, so that large vessels may pass directly from the Atlantic ocean to the Mediterranean, without passing under the guns of the fort of Gibraltar. At present the canal connects with the Garonne river at Toulouse, and falls into the Mediterranean near Agde; the river reaching the ocean at Bordeaux completing the chain of communication. In order to fill the canal when it is enlarged, it is proposed to intercept the innumerable mountain streams, from the Pyrenees and mountains of Auvergene, and imprison them in huge reservoirs whence the water can be drawn as needed.

TESTING SWORD BLADES BY MACHINERY.—The Austrians fasten the sword by its haft into a frame and submit it with a known and adjustable velocity, to a certain number of strokes at the mid length of its edge against a block of beech wood. The sword is also subjected to a slanting or glancing blow at a given angle and velocity against the side of a cylinder of hard wood. The edge is tested by blows against a piece of wrought iron of a given breadth, and proof of the blade's elastic temper is obtained by bending and suddenly releasing it within certain limits. The peculiarity of these trials is that the nature and extent of every test is determinative and may be made adjustable.

PRESERVING GRAIN by storage in a vacuum is a plan recently recommended by an English gentleman, Dr. Louvel. This gentleman proposes constructing large sheet iron cylinders, which are to be filled with the wheat or corn, and the air exhausted as far as possible by an air pump. The inventor has placed in a cylinder of the kind, wheat that had lain in a river for twenty-four hours, and become saturated with moisture. At the end of five days it was found in excellent condition, and made first rate flour and bread. A more practical application of this plan seems to be for the preservation of ship's biscuit from weevils and other parasites.

THE insuring of steam boilers and other property affected from explosions is the object of a new company recently started at Hartford, Conn. Heretofore, there have been no companies in this country which have issued policies covering this class of risks, although in England they have been in successful operation for a number of years. We are very glad that manufacturers and others requiring the use of steam can now insure themselves against loss in event of an accidental explosion, if fire does not ensue from the result. The name of the new company is the Hartford Steam Boiler and Inspection Company. Capital $500,000.

THE ADVANTAGES OF A STOVE-PIPE HAT.—Every reformer and most of our writers have something to say condemnatory of the stiff high crowned hat and advocate the soft felt hat as a substitute. While the Hon. Charles Sumner was recently inspecting a sleeping car on a Michigan railroad the train suddenly started. This threw him forward and he struck the ground with his hat, damaging that article considerably, and inflicting a slight injury on his head and face. Had Mr. Sumner worn a felt hat, his head instead of its covering would have sustained serious injury. The stove-pipe hat will undoubtedly have one distinguished advocate at least after this.

TEXTILE FROM HOP VINES.—Another discovery in the field of textile material, is that of a Belgian, who has shown that a second, most valuable, and heretofore useless product, can be furnished by the hop vine. After the hop blossoms have been gathered, the stems are steeped like hemp; when this operation has been completed the stalks are dried, beaten with a wooden beetle, and then the threads come off easily. After carding and working in the ordinary way, a very strong cloth is obtained. The thickest stalks also yield the material for several kinds of rope.

WHERE THE MONEY GOES.—A letter from a lady in Paris, just received, says: "Never will so many Americans be in Paris at one moment again;" and she added, "what a deal of money they leave. I know some New York and Western ladies who have bought such quantities of laces. Every lady who comes to Paris must buy a real black lace shawl and silks. One lady bought twenty thousand dollars' worth of European luxuries, mostly for presents to friends, and one gentleman, on his way to his Western home, takes fifteen trunks filled with laces, silks, etc."

THE SPECTRUM TEST.—So delicate is the spectrum test in determining the presence of certain metals that it is possible to recognize in this way the 1-60,000th part of a grain of potassa or baryta; the 1-1,000,000th of a grain of lime or strontia; the 1-60,000,000th of a grain of lithic, and the 1-160,000,000th of a grain of soda. Dr. Letheby, a distinguished London chemist, has detected by this means the presence of blood in the stains of linen which had been laid away for seventeen years.

HOW TO PRESERVE EGGS.—In 1791, Wm. Jayne, of Sheffield, England, obtained a patent upon the following method which he averred would preserve eggs in a good and fresh condition for two years or more:—Keep the eggs in a compound made of 1 bushel quick lime, 32 oz. salt, 8 oz. cream of tartar, with enough water to form a mixture so that an egg will swim with its top just above the liquid. If any of our readers should test this simple method we should be glad to hear the result.

FOR POLISHING STEEL.—A German engineer states that oxide of chromium is the best substance for polishing steel. The article can easily be prepared by heating bi-chromate of potash to redness. It is also used for painting on porcelain. One equivalent of chromic acid is reduced to oxide of chromium, and on well washing the residue of the ignition neutral chromate of potash is washed away and the oxide is left behind.

COLORING WOOLEN YARN.—An agricultural exchange asserts that yarn, plain or mixed, can be colored a firm blue, even superior to that attained with indigo, by mixing common purslane (*portulaca oleracea*) macerated fine, and boiled for some hours with logwood chips, in the proportion of a half bushel of the former and quarter of a pound of the latter. Two ounces of alum is used as a mordant for every pound of wool.

THE AGE OF INVENTION.—It appears from the records of the Patent Office, that in 1864 the number of applications for patents was 6000; in the following year the number increased full fifty per cent; in 1866, 15,000 applications were filed, and this year will probably increase the number to 25,000. The number of caveats filed last year was twenty-seven hundred, and this year there will be upwards of four thousand.

HOW TO REMOVE FOUL AIR FROM WELLS.—Ebenezer Robinson, of Philadelphia, Pa., suggested, in 1793, a very quick and simple method of removing foul air from wells, cesspools, etc. He says he found the plan to succeed even where the air was so bad that neither flame nor life could be supported. His plan was to lower a leathern hose pipe into the well, and by means of a large bellows, inject fresh air.

THE MUD CROP OF PARIS. Among the many economies of municipal administration in Paris is the sale of the yearly "mud crop." In 1823 this yielded only $15,000. It now brings $120,000, and when left for some time in rotting tanks is sold for manure, at the increased valuation of $600,000. If we could but make the mud crop of our American cities equally profitable!

MULTUM IN PARVO.—A very neat and convenient article in the shape of a pen holder has been introduced to the public by the Morse Eraser Company, of Philadelphia. It combines with a pen holder of ordinary shape and size, a pencil sharpener, eraser, and burnisher. Add to it a penknife, which can be easily done, and the article will be complete.

THE NEW PLANET recently discovered by Prof. Peters, of Hamilton College, N. Y., and at very nearly the same time by Prof. Tietjen, of Berlin, makes up the full number of these heavenly bodies now known to one hundred. The name of Undina has been given to the stranger.

A PARTY of capitalists recently visited Marsh,s Railroad, (an illustrated description of which was published in this paper before the enterprise was commenced), which is being built on the summit of Mount Washington, and a new company has been organized, fixing the capital at $200,000. The Giant's Grove is being graded previous to erecting a large hotel on it, and the turnpike has been completed from that point to the railroad at the foot of Mount Washington. A little over a mile of the railroad has been constructed, and it is expected the balance will be finished next year.

THE MARITIME INTERNATIONAL EXHIBITION, which is to be held next year at Havre, promises to be interesting, as it will certainly be in many circumstances novel. The idea of it was suggested by the circumstance that the marine productions and objects connected with them have necessarily been only partially represented in the Champ de Mars. There are to be three classes of subjects: navigation and life-saving apparatus; various articles of commerce and manufactures; and matters connected with fishing and pisiculture. The whole is to be under the very highest patronage.

THE establishment of a National School of Mines is to be proposed in Congress at the coming session. It is estimated that $10,000,000 per annum may be saved by the adoption of a better system in the working of our ores.

WE regret to hear of the death of Prof. McGauley, connected with the *Scientific Review*, the organ of the Inventors' Institute, London. Professor McGauley resided for a time in Canada, and his friends there will regret to learn of his death.

IT is said that the only fruit which grows in every climate is the strawberry. It is the only fruit which somewhere on the earth is picked every day the year round.

THE NOVEMBER METEORS.

According to programme, the expected meteoric display came off early in the morning of the 14th inst., and so far as numbers are concerned, Prof. Loomis, of Yale College, pronounced the exhibition more remarkable than the one our European neighbors were favored with one year ago, and but little inferior to that seen in the United States in 1833. Reasoning from analogy in the case of the shower thirty-four years ago,—as we mentioned in our last issue,—astronomers confidently predicted this meteoric exhibition, and arrangements were made in most of our observatories for making systematic records of the shower. During the greater part of the night the task of mapping down on star charts the course and exact time of appearance of solitary meteors, was an easy one; but towards morning their appearance became so frequent that the observers ceased their efforts to time and map them, and only counted. The authority above quoted states that at New Haven the shower reached its greatest magnitude at 4.30 A. M., over five hundred being then counted by one observer in an hour. And as one individual can watch but about one-sixth of the hemisphere, according to the usual method of computation, 3000, at least, were at this time visible in the whole heavens, and without doubt, twice that number actually came within the field of vision, but were eclipsed by the superior light of the full moon. From all parts of the country, have come reports of the beauty and brilliancy of the shower. Even the inhabitants of our Pacific States witnessed it, although, of course, it reached its full grandeur at an hour much earlier than with us. The display was not visible in England, or on the Continent.

The time when the shower attained its greatest brilliancy was, in this section, two hours later than that given by European observers of last year, and next year the display, if there be any, will not begin until ten o'clock A. M., Washington time, and will, therefore, be seen only in the Pacific Ocean.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Foxdale mine in the Isle of Man, is already one of the richest lead and silver mines in Great Britain; but its value has been very much increased by the discovery of an ore hitherto unknown to exist in that country. The name of the ore is "Fahlerz" (tetrahedrite). It yields an immense amount of silver.

A steamer has left Havre, having on board a large number of French locomotives, consigned to Russia. The report that the Creusot works had received an order for eighty locomotives—a report which has been freely published by our exchanges—it appears is a little premature, the affair not as yet being definitely concluded. The pecuniary assistance proposed to be afforded by the Russian government this year, to the work of railway construction in that empire, is about $15,000,000.

White chrome ore is found in Hanover, near Gettysburg, Pa., which yields about 55 per cent of iron. This ore is of the same kind as is now shipped from Havre de Grace, to Sheffield Eng., to be used in the cutlery establishment of that place.

The first sleigh-bell ever made in this country was manufactured at Chatham, Conn., in 1780, and that town still retains a monopoly of this business.

In the city of Dresden, albumenized paper is manufactured at the rate of upwards of 6,000 reams per annum, a quantity that would suffice to print more than 120,000,000 *cartes de visite*. The whites of 2,000,000 eggs are annually consumed in preparing this paper the yolks of which, are used by tanners for preparing the finer kinds of leather. After preparation, the paper is carefully assorted, and from ten to fifteen per cent is rejected for photographic purposes but is used by Dresden printers for color printing.

The Inventors Manufacturing company established one year at Terryville, Conn., operate the largest shears and scissors factory in the country, and turned out last year about 60,000 dozen, worth from $600,000 to $700,000.

The "Lake Shore" railway lines between Buffalo, Cleveland and Toledo, are about to consolidate with the Michigan Southern on the one hand and with the New York Central on the other, thus placing the whole route under one board of management. If effected, this combination will represent some $150,000,000 of railroad capital.

At the head of Thunder Bay, on Lake Superior, two veins of native silver have been discovered; one seventeen the other eighteen feet in width, and one of them extending some three or four miles.

Jasper is now procured to almost any required extent at St. Gervaise, in Savoy. One quarry has a depth of 60 feet and a surface of at least 24,000 square yards.

The exports of iron and steel of British manufacture from the United Kingdom has undergone a wonderful expansion of late years. In 1847 these exports amounted to 550,000 tuns; in ten years this increased to 1,500,000 tuns. Comparing 1866 with 1847 there is an increase of no less than 206.38 per cent. Last year appears to have been the best twelve months on record in valuation of exportations.

The Spanish journals state that the small-arms manufactory at Placentia is working night and day, executing an order given by the French Government for muskets of the new pattern. A French agent is on the spot, and has offered a premium of 30 reals for each Chassepot delivered before the time stipulated.

The failure of the great house of Decoqueville, whose iron founderies are to be sold by public auction on the 30th inst., is traced to the fatal effect of the Paris Exposition on French trade.

Recent American and Foreign Patents.

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

SELF-SETTING GAME TRAP.—Alfred Wilkin, McConnelsville, Ohio.—This invention has for its object to furnish an improved trap which shall be durable, cleanly, entirely free from the odor of animals, requiring little care to keep it in working order and capable of destroying large numbers of animals at one setting.

BOLT FASTENING.—V. Lapham, El Paso, Ill.—This invention has for its object to furnish an improved fastening for thill coupling bolts, clevis bolts, and other pivoting bolts which will hold the bolt securely in place and which can at the same time be easily and quickly attached and detached.

LAMP.—James Lee, New York city.—This invention has for its object to furnish an improved lamp so constructed and arranged as to guard against explosion by preventing the undue heating of the upper part of the oil reservoir and at the same time to guard against the lamp's being broken should it accidentally fall.

HAY RAKE AND TEDDER.—J. M. Law, Portlandville, N. Y.—This invention has for its object to furnish an improved attachment for hay rakes by means of which hay may be shaken out and stirred up or turned quickly, conveniently and thoroughly.

LEVELING ATTACHMENT FOR STEAM HARVESTERS, ETC.—Benjamin F Cook, Olema, Cal.—This invention relates to a new and improved leveling attachment to be applied to steam harvesters and other agricultural implements which are mounted on wheels for the purpose of keeping the main frame in a horizontal position in its transverse section when the machine is passing over inclined ground. The invention consists in interposing between the back axle of the machine and the bolster above it a wheel having its rim beveled or made inclined and connected with a windlass or capstan in such a manner that the wheel may be turned with facility and the main frame of the machine brought to or retained in a horizontal position when the wheels on which the machine is mounted are passing over inclined surfaces.

HOISTING APPARATUS.—A. F. Crosman, Steamer *Ossipee*, North Pacific Squadron, U. S. Navy.—This invention is designed to facilitate the hoisting of small boats at the sides of ships and other vessels. The invention consists in a novel arrangement of the davit tackles whereby the tackle of both davits are operated and the boat hoisted or lowered by the manipulation of a single rope. The invention further consists in a novel means for releasing simultaneously both ends of the boat from the hooks of the tackle blocks when the boat is lowered so as to reach the water and thereby prevent the capsizing of the boat a contingency of not unfrequent occurrence when the water is rough.

DRYING ATTACHMENT FOR PAPER-RULING MACHINES.—R. J. Groshans, Buffalo, N. Y.—This invention consists in applying to paper-ruling machines a revolving fan in such a manner that the ink on the freshly ruled paper will be rapidly dried and the paper under the influence of the blast generated by the revolving fan be made to drop evenly into the box or receptacle prepared to receive it.

COMPOSITOR'S COPY HOLDER.—P. A. La France, Elmira, N. Y.—This invention relates to a new device for holding the manuscripts on printers' type cases and consists in the arrangement and construction of a platform which rests on suitable supports provided for that purpose on the type case and which can be easily moved laterally on the said type case to enable the compositor to reach all the types.

MACHINE FOR UPSETTING, CUTTING AND PUNCHING IRON.—J.J. Rose Elmwood, Ill.—This invention has for its object to improve the construction of the machine patented by the same invention Aug. 1, 1865, and numbered 49,158.

BELT FASTENING.—David Wigger, New York city.—This invention relates to a new belt fastener which is so arranged as to be easily opened, and which, when closed, can be securely locked, and which is of great strength and durability.

FISHHOOK.—A. I. Lenhart, New Brunswick, N. J.—This invention relates to a new and improved fishhook of that class which are provided with a spring, a catch or fastening, and one or more supplemental hooks, which, when the fish seizes the bait, are released and spring so as to penetrate the fish and secure it. The invention consists in a novel construction of the device, or the arrangement of the parts, whereby the capture of the fish, when the latter nibbles or seizes the bait, is rendered almost certain.

BLEACHING PAPER STOCK.—S. T. Merrill, Beloit, Wis.—This invention has for its object the bleaching of paper stock in a more economical manner than hitherto, and consists in subjecting the stock to the action of chlorine gas while the former is undergoing the process of comminution in what is known as the "rag engine," or the stock agitated in a close vessel.

RAILWAY TRAVELING HOOK.—Wm. R. Oatley, Rochester, N. Y.—This invention relates to a new and improved hook by which travelers in railway cars may suspend any hand luggage from the hat racks over the seats. The invention consists in connecting two hooks together by a swivel joint, one hook being of sufficient dimensions to catch over a rail of the rack, and the other hook of such size that a strap, string, or cord may be readily suspended or fitted upon it.

COMBINED CHIMNEY AND VENTILATOR.—A. S. Whittemore, Willimantic, Conn.—This invention consists in combining a chimney or flue with a ventilator in such a manner that the compartments of a building may be thoroughly ventilated and the chimney or flue at the same time rendered perfectly fire proof.

PAPER RULING MACHINE.—Edmund A. Warren, Brooklyn, N. Y.—This invention relates to a new and improved machine for ruling paper, and it consists of a rotating cylinder provided with nippers to grasp and hold the sheets of paper to be ruled, and also provided with adjustable cams, the above parts being used in connection with a pen beam, and all constructed and arranged so as to operate in a perfect manner.

MOWER AND REAPER.—A. W. Tucker, Waxahachie, Texas.—This invention relates to a new mower and reaper, which is made adjustable so that the cutting apparatus can be set to a higher or lower level, and so that it can be thrown out of gear at pleasure; an endless apron is arranged directly in rear of the cutting apparatus, to receive the cut straw or grass, which can be discharged from the apron either in continuous succession or in swaths at suitable intervals.

PUNCHING MACHINE.—Morris Selferth, Morristown, N. J.—This invention relates to a new punching machine, for perforating plates or for stamping or notching the same, and consists in the use of an automatic cleaner, by which the plate, after a hole or depression has been punched, is lifted off the lower stationary punch, so that it can be easily adjusted upon the same, for the punching of the next hole or mark, while the die is moved up by the cam of the driving shaft.

HOUSE VENTILATOR.—Robert Boyd, Evansville, Ind.—This invention relates to an improved method of ventilating dwelling houses, halls, hospitals, and public buildings, whereby the fresh air from the outside may be conveyed inside, and the vitiated or foul air escape therefrom.

BRIDLE BIT.—A. H. Rockwell, Harpersville, N. Y.—This invention relates to a new bridle bit, which is an improvement on the ordinary four-ring bit, and which has on a flexible mouth piece two sliding bars, which are connected with a nose strap or face piece, in such a manner that by pulling the reins the said bars will be forced together, thereby pressing with great force against both sides of the upper jaw of the horse.

VACUUM AIR ENGINE.—J. R. Cameron, Pittsburgh, Pa.—The object of this invention is to form a vacuum by the expansion of air by heat, and by other appliances, by which the piston of a working cylinder may be driven by the simple pressure of the atmosphere, and power obtained thereby for driving machinery or other purposes.

SCREW DRIVER.—T. D. Voorhees, Easton, Pa.—This invention consists in making a portion of the ordinary screw driver just below the handle of a round form, and placing upon it a loose ferrule or thimble.

ROTARY STEAM ENGINE.—Edwin Chapman, Rochester, Minn.—This invention relates to a certain useful improvement in the class of steam engines known as rotary engines, and it consists principally in the manner in which the abutments are operated, and in the manner in which the steam is discharged with the cylinder, and exhausted therefrom.

CHEESE PRESS.—E. J. Crane, La Porte, Ind.—This invention relates to a new and improved method of constructing cheese presses, whereby the same are made self acting, and the invention consists in arranging two levers with suitable supports in such a manner that the cheese presses itself when properly arranged upon its table.

COMBINED SCHOOL DESK AND SEAT.—J. P. Scott, Lewisburg, Pa.—This invention relates to an improvement in the construction of a school desk, combined with a seat, and consists in such an arrangement and combination of parts that the seat and the desk may be separately adjusted in hight to suit pupils of different sizes, and that the seat and a lid of the desk may be folded up when not in use, and to be compact and out of the way when desired.

MACHINE FOR CUTTING PAPER STOCK.—Abijah L. Knight, Baltimore, Md.—In this invention the rags are fed to a vertically cutting knife, by means of a combination of smooth and fluted rollers, to which an intermittent motion is imparted.

CAR AXLE.—Samuel S. Burt, Marquette, Mich.—In this invention the axle boxes are fixed to a stout iron yoke, the ends of which pass over the wheels. Each wheel runs on a short axle, independently of all the others.

GOLD SEPARATOR.—Wm. C. Stiles, Nevada City, Cal.—This invention is an improved instrument for panning or separating gold from earth. It consists of an inclined vibrating table, having a series of pannings, screens, and counter inclines, arranged along its surface, and operating in connection with gentle streams of water fed to it from different points above it.

LATCH FOR GATES, ETC.—Mark J. Bria, Oxford, Ind.—This invention consists in a novel arrangement of a lever latch for gates, etc., whereby a person may open the gate from either side, without reaching over the top of the same.

LATCH FOR DOORS, ETC.—Edward King, Taunton, Mass.—This invention consists in a novel connection between the latch and handle, or knob spindle, whereby the action of the latch is made free and certain, and the same are rendered more durable.

SKATE.—George W. Shearer, Crown Point Center, N. Y.—This invention consists in a novel manner of connecting the runner or blade to the foot rest or block of the skate, through an arrangement of springs and levers, whereby an easy and elastic movement is imparted to the skater, and also of so grooving the under surface of the runner as to combine all the advantages of both a plain and grooved runner.

HAND DICE BOX.—Justus E. Zender, New York city.—This invention consists in making a hand dice box of metal, and of lining any hand dice box with felt cloth or its equivalent, whereby the same are made stronger and more durable, and whereby the noise occasioned by the shaking of dice is partly diminished, or prevented altogether.

DEVICE FOR SUPPORTING AND FASTENING WINDOW SASHES.—Amos Cutter, East Boston, Mass.—This invention consists in an attachment for the sash or window frame, so as to be susceptible of being brought against the window or sash frame, as the case may be, with a greater or less amount of force, by the simple turning in or out of a thumb screw, or its equivalent.

VALISE OR TRAVELING BAG.—N. Groel, Newark, N. J.—This invention consists in an application to the corners of the leather constituting the sides of the bag or valise, of metallic corner pieces, in such a manner as to partly stiffen and strengthen the same, and thus to increase their wear and durability.

TAG HOLDER.—A. Grushus, St. Paul, Minn.—This invention consists of a holder made of spring wire, in a peculiar shape, whereby a tag may be fastened to and detached from the cloth, or other material, with great facility.

ADJUSTABLE WATCH KEY.—J. S. Birch, New York city.—This invention has for its object to furnish an improved key for watches, which may be so adjusted as to fit any watch, whether large or small.

ATTACHMENT FOR DOORS.—C. J. Fisher, Waukon, Iowa.—This invention has for its object to furnish an improved attachment for doors, which will prevent the knob or latch from injuring the wall, which will hold the door securely in any position to which it may be opened, and which will also securely fasten the door when closed.

SASH FASTENER.—George Brosius, Ranch's Gap, Pa.—This invention relates to an improvement in sash fasteners. The breaking of window weight cords, the difficulty and annoyance of putting in new, and the rattling of the guillotine window, have stimulated the invention of various devices dispensing with the sash weights and providing for the locking of the sash, and to this class of devices the present invention belongs.

SELF ACTING SLEIGH BRAKE.—C. Gardiner, Esperance, N. Y.—This invention relates to a self-acting sleigh brake, and consists of a cross bar carrying two bent levers, one on each side of the sleigh; hinged in each lever is a pawl, which catches on the ice or snow when the cross bar is forced back. The bar is operated by means of a connecting rod, secured to a sliding on the tongue or pole, and fastened to the neck-yoke pin, or attached in some other suitable manner.

SHEEP TROUGH.—Frank Ketcham, Monongahela City, Pa.—This invention relates to an improved sheep through, and consists in a reversible trough so constructed that one trough is always dry and clean.

RAILROAD SUPERSTRUCTURE.—J. A. Maxwell, Savannah, Ga.—This invention relates to an improvement in railroad superstructure, and consists in a combination of the cross-tie and stringer systems of laying the rails, whereby the advantages of both are secured.

TOBACCO PRESS.—T. N. Reed, Danville, Va.—This invention relates to an improved tobacco press. It consists of a box of iron, or some other suitable material, in which are two false sides, or boards, movable within the box frame in the direction of a line at right angles to their planes.

QUILTING FRAME AND CLOTHES HORSE.—G. A. Mallory and J. J. Fish, Oxford, N. Y.—The nature of this invention consists in constructing a frame so arranged as to be adapted equally to use as a quilting frame and a clothes horse, and capable of adjustment for either purpose, as desired.

CARPENTER'S SQUARE.—O. H. P. Robinson, Belfast, N. Y.—The object of this invention is to enable carpenters and builders to lay out the mortises in framing houses with dispatch and accuracy. It consists in making a slot in the main bar of the square, for scribing the mortise directly within it, instead of measuring and scribing on the outer side of the square, in the ordinary manner.

YOKE FOR GRAIN ELEVATOR.—Eliza Jane Jewell, Brooklyn, N. Y.—This invention relates to a new manner of constructing and arranging the sliding yoke of a grain elevator, and consists, first, in making the yoke of cast iron instead of wood, as has heretofore always been done; and second, in the use of adjustable guides between the yoke and the wooden frame, whereby unequalities arising from the expansion or construction of the rame or yoke, either, can be regulated.

PUNCH AND SHEARS.—J. C. Jordan, Watertown, Wis.—This invention relates to a machine wherein sheet iron and other metals can be cut or punched, as may be desired, and the invention consists in so shaping the main lever of the machine that it will at the same time force down a punch, by a cam, and operate the shears, one of the blades of which is secured to the said lever.

STRAW CUTTER.—Hiram Parks, Athens, N. Y.—This invention relates to a straw cutter in which a curved knife is used, and is secured to a revolving shaft, so as to make a drawing cut, and so as to cut a whole bundle of straw with the same facility with which the usual machines cut a small quantity.

BLACKING BRUSH.—Chas. A. Paret, Nashville, Tennessee.—This invention relates to an improved blacking brush and consists in passing an endless elastic band crosswise through four staples upon the back of the brush stock to hold the box of blacking and in a groove along the side of the stock to receive a scraper.

MACHINE FOR SHAPING AND PRESSING HOODS.—Solomon and Henry Squire, Monson, Mass.—This invention relates to a machine for shaping and pressing hoods and consists of hollow metal block of the required shape into which a heater is inserted or the same may be heated by a gas jet or lamp. This block is hinged upon a stand midway between two uprights which work in grooves in the side of the frame and are surmounted by a yoke piece supported by springs a jointed presser is suspended loosely from the center of the yoke by an adjustable suspension rod and metal lip overlapping the plates.

CULTIVATOR.—M. Barnett and Eli Wood, Hardinsburg, Ind.—This invention has for its object to furnish an improved cultivator, so constructed and arranged as to run lighter, be more durable and less liable to get out of order than the cultivators now in common use.

WASHING MACHINE.—Allan Neilson, Allegheny City, Pa.—This invention relates to a washing machine in which two or more corrugated conical rollers, which are secured in such a manner in a swinging frame above a flexible washboard, that their axes cross each other, while their under surfaces are with their whole length on the said board, so that by oscillating the said frame, the rollers will rotate on their larger diameter and slip on their smaller end, and will thus at once beat and rub the clothes to be washed.

FRICTION CLUTCH AND PULLEY.—C. D. Palmite, Oswego, N. Y.—This invention consists in the employment of a pulley fitting loosely upon a shaft, and driven by a belt from any suitable power, in combination with an elbow-shaped friction lever, may, by the said wedge, be pressed against the inner circumference of the pulley rim, thereby connecting the pulley with the sleeve and shaft, and driving the latter.

EXCAVATOR OR DITCHING MACHINE.—Isaac V. Adair, Varick, N. Y.—This invention has for its object to furnish an improved machine designed especially for use in removing the earth from ditches after it has been loosened by a ditching plow.

PENCIL HOLDING ATTACHMENT FOR CARPENTERS COMPASSES.—W. G. Hillegass, Philadelphia, Pa.—This invention relates to a device by which carpenters steel pointed compasses can be provided with a pencil point, whenever desired so that the said pencil can be applied in a convenient manner; while heretofore the pencil had to be tied to one of the legs of the compass by means of a thread or string.

Answers to Correspondents.

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

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

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

G. A. D., of Me.—"How can stains be removed from soapstone and the polish renewed?" It depends on the nature of the stains. If grease, soap will remove them.

R. R., of Canada—"Do you know of a cheap composition to coat glass for making mirrors; I have heard of such a thing being used in Europe?" We know of no process or material cheaper than those usually employed.

J. K. B., of Canada, desires to know the value of "magnetic or black sand," large deposits of which have been discovered near his place of residence. In reply we would state that the black band ore is in high repute for facility of reduction. The ore in the United States varies so greatly in quality that its mining is attended with uncertainty.

L. A. L., of ——.—"Is there any fluid or solid substance through which a magnet will not attract?" None known.

S. A. G., of Ind., wants to know what glistens in the small bits of stone he has sent us. It is mica, utterly valueless except when found in large masses. He asks, also, what to put in his plating solution to make the gold or silver deposit bright. You cannot deposit blacking on your boots and have it bright without brushing or burnishing; neither can you deposit metals by the galvanic battery and have the coating bright without burnishing.

H. C., of Mass.—The "skivers" or knives used by curriers in dressing the flesh side of skins have no edge similar to that of an ordinary cutting tool. The edge is quite "stunt," or of a short bevel, and the feather edge is turned by a "steel"—a round spindle—so that it forms an angle with the blade of nearly if not quite 180°. There is much art and experience required in its use.

P. McC., of N. J., says that mill picks should not be drawn at the edge, but should be forged thick and drawn back of the edge, the cutting portion being left as hard as water can make it.

F. G. W., of Mass., asks several questions relative to steam engine vacuums, condensation, pressure of the atmosphere, etc., all of which can be more readily answered by a treatise on natural philosophy or the life of James Watt than through these columns. We respectfully refer him to elementary works on steam engines.

A. F. F., of Ill., asks if he can construct an annealing furnace for sheet brass and do the work properly by means of an endless grate, or a grate attached to an endless apron. We see no reason why the plan is not practicable.

J. J. N., of Pa., asks for a rule to set the heads of a lathe when it is designed to turn a taper, the length of shaft and degree of taper being given. He offers for an example a piece one foot long the taper to be half an inch; "how far should I set the head from the taper line?" If the taper is to reach from end to end of the shaft the head should be set over just one quarter of an inch, in all cases one half of the taper required. But it may be he makes no allowance for the space taken up by the dog. We know of no absolute rule perfect under all circumstances. The experienced eye is the best rule for ever varying cases, always keeping in view that for every quarter inch the tail is thrown over double the taper is given, etc.

J. V., of Ala., sends a diagram and description of a flying machine which he thinks will work, and asks us to publish it. We prefer to wait until we receive some account of a machine actually at work. We have piles of these suggestive and conjectural letters on aerial navigation, not one of which seems to us at all practical.

A. G., of Fla., replies to J. H. S., of O., that he can harden his cultivator plow without springing by chalking it well upon both sides, heating it to a cherry red and dipping it gradually into water.

E. B. Y., of Pa., asks "what acid or other substance will separate the carbon from carbonic acid or carbonic oxide so as to leave the oxygen only?" The information, if we could give it, would be acceptable not only to E. B. Y., but to the scientific world at large. We regret that we share in the universal ignorance of any means of accomplishing this end.

F. R., of N. Y., propounds a series of questions to which we reply: 1st; The article sold by druggists under the name of benzine is derived from petroleum, and is identical with naptha. 2d; Common petroleum or burning oil is better than benzine for preserving sodium. 3d; Napthaline is a solid camphor-like substance, found in gas tar. Gasoline is one of the most volatile liquid products of petroleum. 4th; Albumen is preserved on a large scale by drying. 5th; The atomic weight of oxygen is 16; the equivalent is 8. 6th; "Maynooth's iron battery" has not come into use. The inference you may draw is that its merits have been over stated. 7th Fresenius' Anayiysis and Miller's Chemistry are among the best authorities on chemistry.

E. C., of N. Y., referring to the instance given in our issue of the 16th inst of a piece of wood having imprinted itself upon a bar of iron states that he noticed recently in Fitchburg, Mass., a granite boulder, upon which was a representation of the bottom or end of a post which had been standing upon it for a number of years, the impression being about one-sixteenth of an inch deep. He calls upon some correspondent for a satisfactory explanation of this singular fact.

"Inquirer" calls for some table giving the percentage of alcohol in the various liquors, wines and brandies, more reliable than that of Brande, which is usually found in the books? Any such table can be only correct for particular samples, the percentage varying with the honesty of the distiller and age of the liquor. We refer Inquirer to an exhaustive article on alcohol in Muspratt,s Chemistry.

B. F. E., of Ohio, replies to the inquiry of F. K., of Mo., for a simple recipe for softening hard water "that one quart of bran cooked in a bag and boiled in ten gallons of hard water will bring the lime to the top which can then be skimmed off." This plan, he asserts, is superior to using sal-soda or wood ashes and is just the thing F. K. wants.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

A metal-working shop, with two patents, for sale or exchange for Real Estate in city or country. Townsend & Sears, 218 Fulton st., room 7.

Manufacturers of Portable Saw Mills and Engines please send circulars and cash prices immediately. Address J. J. Hovell, Avon, Ill.

For sale low—the patent right of an improved Tag Holder—best out. Address A. Grushus, St. Paul, Minn.

Wanted—a Horizontal Face Plate Boring and Turning Lathe to swing 8 or 9 feet, new or second-hand. Address, with description and price list, T. H. Elsdon, Mt. Holly, N. J.

Inventors Take Notice.—Having Spare Machinery, Power, etc., we would build light machinery, models, tools, or a patented article, requiring good machinists' work. Address Littlefield Brothers, Randolph, Mass.

Wanted!—Joshua Beal, Baton Rouge, La., wishes to communicate with Agents or Manufacturers of machinery used for the manufacture of cotton wrapping twine.

Parties desiring the services of a first-class inventor to get up new machinery, drawings, etc., address, with confidence, A. E. W., inventor and draftsman, 114 Fulton street.

Geo. W. Douglass, of New Haven, Conn., wants a heavy Power Press immediately.

We want a contract to build Sash, Blinds, and Doors; have New works. Address A. Woodworth, Cambridge, N. Y.

Wanted—A Second-hand Fire Dryer for Paper Making. Address S. D. Paddack, Elbridge, N. Y.

Sleigh Bells.—Manufacturers of Sleigh Bells will please send their address to Wm. R. Oatley, Rochester, N. Y.

The Babbittonian Penholder has advantages over any in the market, receiving pens of all sizes, holding them outward to prevent spattering, and having both the English and the famous French scales of measurement. Babbitt Bros., 42 John street, New York, furnish them, postpaid, at 35 cents for the silver, and 15 cents for the white holder.

H. N. Winans, 11 Wall st., New York, Manufacturer of The Anti-Incrustation Powder, for removing and preventing Scale in boilers, desires the address of parties using Steam, that he may send circulars of interest on the subject.

Jones & Stelfor, Austin, Texas, wish to procure the best Tire Bending Machine, and Foot or Hand Punching Machine.

Stationary Engine For Sale, 10 Horse-power, modern build, short stroke, with tubular boiler, 2½-inch tubes, was only used about six weeks. Price $450 on board cars. Apply to Abram Logan, Tidioute, Pa.

Wanted Immediately—Address of all Manufacturing Companies in United States—especially of Tin Plated Ware—for entirely new articles of Manufacture. Jno. I. D. Bristol, Detroit, Mich.

J. N. Bebont, Savannah, Ohio, wishes to communicate with makers of pumps suitable for operation by a wind mill.

NEW PUBLICATIONS.

ASTRONOMY. An Elementary Work on Physics, by W. T. Rolfe and J. A. Gillet, both teachers in the High School at Cambridge, Mass. Boston: Crosby & Ainsworth. New York: O. S. Felt.

The authors show how we know the earth rotates on its axis; that the earth and planets with their satellites revolve in elliptical orbits about the sun; and that the sun and the stars are moving through space, or about other stars. They have also endeavored to show how, by measuring a line a few miles in length on the surface of the earth, and a few angles, we are able to find the size of the earth, and to pass out into space and measure the distance from the earth to the sun, from the sun to the planets, and from the earth to the fixed stars—a distance so vast that the velocity of light is the only unit suitable for expressing it.

ELEMENTS OF NATURAL PHILOSOPHY. By the same authors and publishers as above.

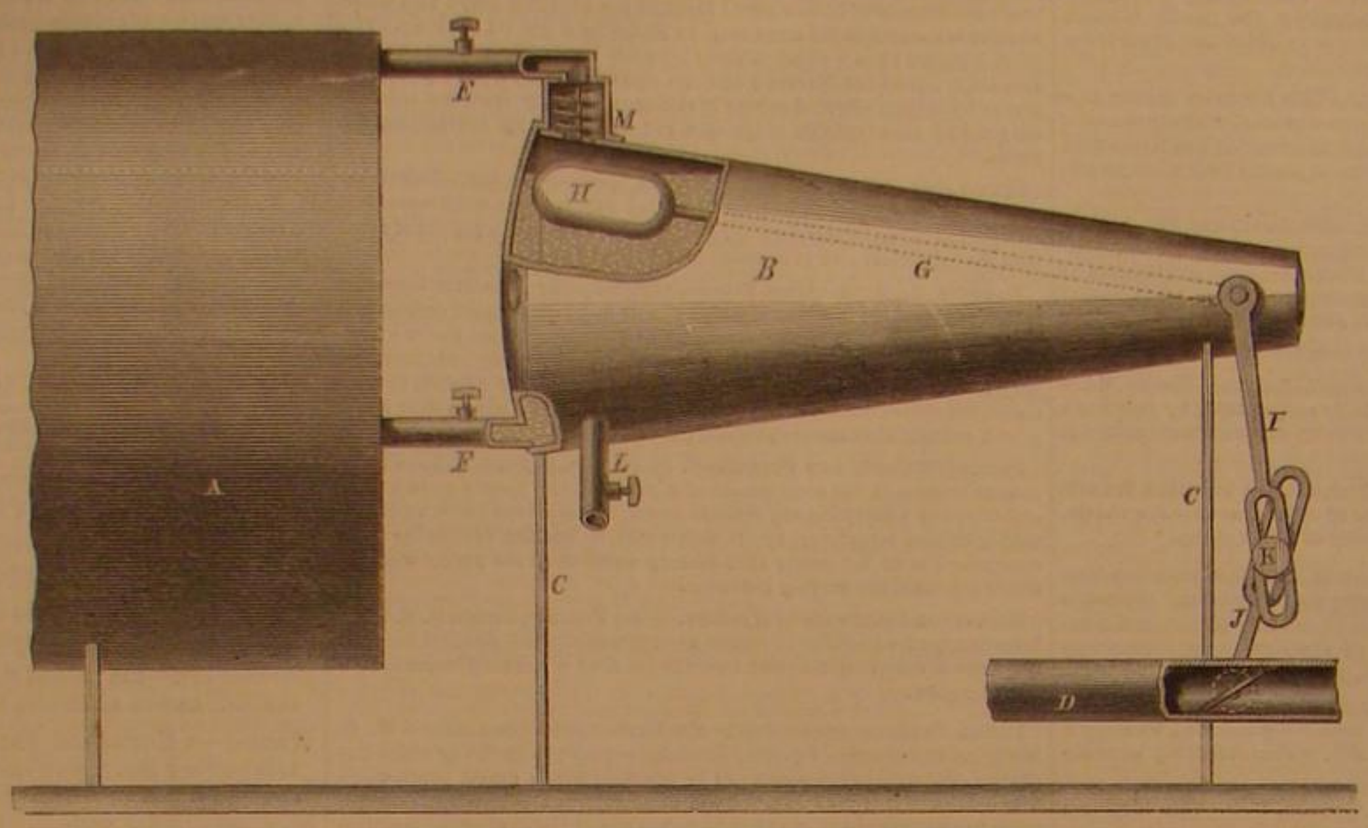
This work is designed as a first book in physics, to be used in grammar and district schools. The work consists of three sections: the first treating o pressure; the second of motion; and the third of machines and sources o mechanical power. Under the latter are taken up the so-called "mechanica powers," and the sources of mechanical power—namely, hand power, horse power wind power water power, and steam power; and an account is given of the most important machines by which each of these is made to do work. Under water power are included the subjects usually put under hydraulics. This work, as well as the work on Astronomy, is profusely illustrated.

EXTENSION NOTICES.

Samuel G. Lewis, of Kellyville, Pa., having petitioned for the extension of a patent granted to him the 14th day of February, 1854, and reissued the 23d day of October, 1867, for an improvement in making thick paper, for seven years from the expiration of said patent, which takes place on the 14th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day January next.

Device for Regulating the Amount of Water fed to a Boiler.

Not a few of the boiler explosions that occur are directly attributable to lowness of water, and often this state of water cannot be detected by the gage, on account of some fault either of construction or operation. Under such circumstances an automatic, absolute, and reliable device for regulating the amount of water fed to the boiler is a desideratum. The inventor of the device shown in the accompanying engraving is confident that this is what is needed. A is the boiler to which is connected the water reservoir, B, which is a cone-shaped vessel supported by the standards, C. The water is fed into this reservoir by the pipe, D, and to all intents and purposes the reservoir is a portion or extension of the boiler, being connected with the steam space—seen above the dotted water line in A—by the pipe, E, and with the water space by the pipe, F, both of which are furnished with cocks. Inside this reservoir is a lever shown by the dotted lines, G, having at the large end of the cylinder a float, H, which rests upon the water, and is secured to a transverse shaft at the other end which has keyed to it the arm, I, that is slotted, as is also the valve arm, J, and both are connected and adjusted by a bolt, K. In the pipe, D, is a valve worked by the float, H, through the medium of these arms, I and J. L is a waste pipe with cock for drawing off the water when desired. The dome, M, attached to the steam pipe, E, contains a coil of copper wire intended by the inventor for the purpose of preventing incrustation in the reservoir.



JORDAN'S STEAM BOILER REGULATOR.

The operation is apparent. As the water lowers in the boiler the float, which rests on its surface, descends, opens the valve in the feed pipe, D, and permits a greater inflow of water from the pump, while the contrary result occurs when the water rises. Of course, if the accuracy of the apparatus is at all to be depended upon, this is a perfect regulator of the water in a boiler. The inventor also introduces in the lower end of his pipe a ball valve, which, when the pump is attached to the reservoir into which the hot water or condensed steam passes, prevents all the thumping experienced when pumping hot water.

This device was patented Sept. 24, 1867, through the Scientific American Patent Agency by R. J. Jordan, assignor to himself and E. Darling, of Elkhart, Ind. Address for particulars the former at Elkhart, Ind., Box 264.

Public Improvements in Paris.

Mr. Wales, in a recent, private letter, thus speaks of the progress in public and private improvements now going forward in Paris:—

"A new cattle market has just been opened in the outskirts of Paris, which covers a space of nearly three-fourths of a mile square. It is solidly built in dressed, cream-colored stone, and enclosed by strong walls, with a very handsome entrance. Every accommodation that modern experience has suggested is provided,—offices, fountains, water for the cattle, stalls, pens, and storehouses. A railway connects with the circular one that runs around the city, so that cattle from any point in France can be brought straight in without transhipment. The whole space is covered by a roof, but open at the sides. From 5000 to 6000 cattle, 20,000 sheep, 2500 calves, and as many pigs, can easily be accommodated. A communication by bridges connects the market with the new slaughter houses on the opposite side of a canal. No animals for slaughter are ever seen in the streets of Paris, and the streets are always kept perfectly clean. The Scientific American recently published an elaborate account of the Paris markets, which certainly surpass those of any other city in the world. The municipal government exercises the most rigid inspection over every article exposed for sale, and no poor, half-decayed meat or vegetables are allowed to be sold or offered for sale.

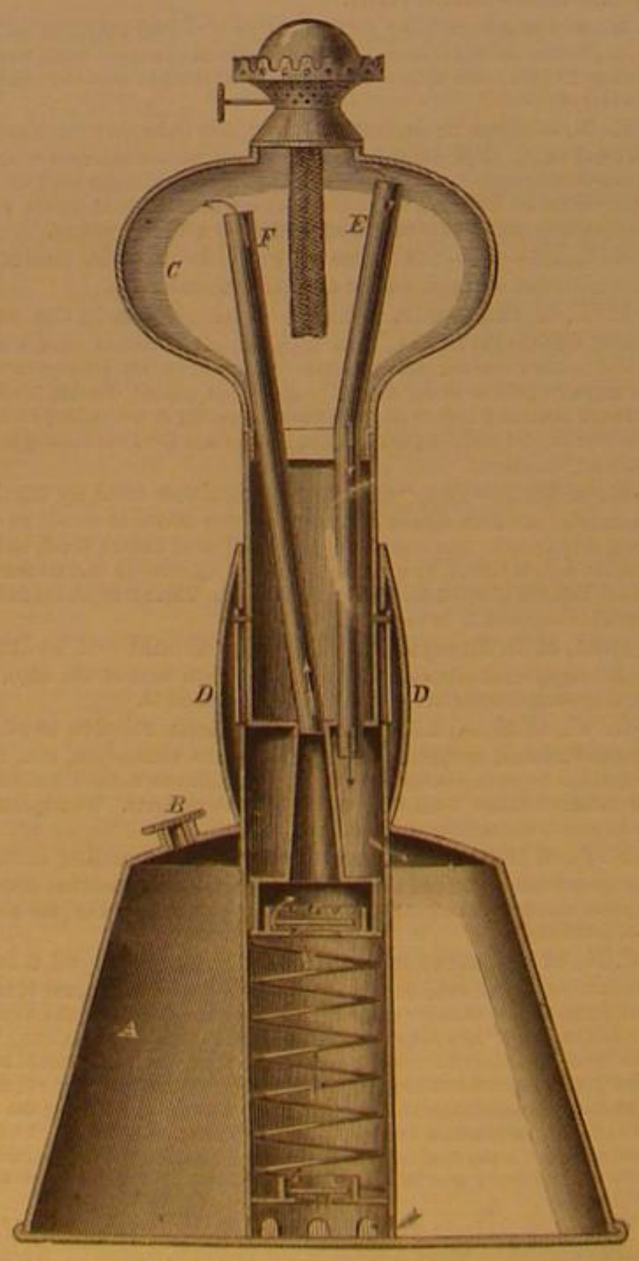
"Nothing in Paris so much impresses an American as its splendid public buildings, and the perfect order that prevails in its busy thoroughfares. At this moment a new opera house is nearly completed, which is the most elegant building of the kind in the world. It will cost forty million francs, the expense being equally divided between the Imperial Government and the municipality of Paris. It is also a great mistake to assert, as many do, that the private residences of New York are finer than those in Paris. During the ten years past Paris has improved wonderfully in this respect, so that now she outrivals all other modern cities. I wish the authorities in New York could be induced to copy some things which are so valuable to the people of Paris."

Antiseptic Properties of the Sulphites.

At the recent Dundee meeting of the British Association Dr. Polli communicated a paper bearing on this subject containing facts which he had obtained as the results of extended observations. Sulphurous acid was said to be the most active agent in preventing or arresting all organic fermentation. As the acid, however, was not sufficiently applicable in experiment, Dr. Polli had undertaken an investigation as to the action of the sulphites of lime, hyposulphite of magnesia, sulphate of magnesia, sulphide of soda, and granulated sulphite. These substances were found to possess all the properties of sulphurous acid, with the advantage that their action was more uniform and certain and constant. In experimenting on animals and himself, he found that large doses could be taken without risk. On killing animals treated with sulphites, and others not so treated, he found that the former were most slow to decompose, and, indeed, remained quite fresh when the others were putrescent and offensive. Another series of experiments showed that in one class the administration of the sulphites, was sufficient to effect a more or less rapid cure in cases where blood poisoning was present, as in fevers, but this fact he did not attribute to any curative power in the sulphites, but to the fact that they arrested decomposition, and by so doing allowed the animal to recover by the recuperative power existing in its own constitution. The author thought his observations conclusive as to the excellent influence of the sulphites on the septic diseases, and remarked that it was for the purpose of thus benefitting others that he had brought his researches under the attention of the scientific world.

HOFFMANN'S IMPROVEMENT IN LAMPS.

The intention of the inventor of this lamp is to construct one not liable to explosion if kerosene or similar fluids are



used, to keep the outside of the lamp perfectly clean, to save much of the labor of filling and trimming, and to prevent the evaporation of the oil by heating. It may be constructed either of metal or glass. A is the oil reservoir, the oil being poured in at the cap, B. Into this reservoir is fixed a tube which supports the lamp or wick holder, C. This is also secured upright by the braces, D. From the upper vessel descend two tubes, E and F, one of which, E, returns any excess of oil in the upper vessel back to the reservoir, and the other, F, leads the oil up into this wick holder. The spiral spring in A sustains the upper cup in position. In the tube are two loose valves, G and H, held to the seats by transverse bars or snugs, and packed with rubber. The apertures seen under H permit the oil to flow into the lower part of the tube. From these references to the engraving—which, it will be noticed, is sectional—it will be seen that the internal details form a pump. By pressing down the upper vessel, the valves, G and H, are worked, and the oil in the reservoir is forced up through the tube, F, to feed the wick. Before this vessel can fill, the oil will flow over into the pipe, E, and pass back in the direction indicated by the arrows, to the reservoir.

By these arrangements the oil, being so far removed from the flame of the lamp, can never become heated, thus preventing the generation of gas from the oil; not a particle of oil can escape from the inside of the lamp to soil the outside, and all danger of explosion from the communication of the flame to the oil is avoided.

The arrows in the engraving show plainly the course of the oil from the reservoir to the upper vessel, and its return, if too much is pumped up. By a change in the wick tube any burning oils or fluids may be used in this lamp. The lamp, or the oil reservoir may be filled while the lamp is lighted without danger, and it is believed that this separation of the lamp proper from the oil reservoir will entirely prevent explosions.

Patent papers for this invention were obtained through the Scientific American Patent Agency, Oct. 1, 1867, by Peter Hoffmann; who desires to sell rights to vend and manufacture.

Makers of lamps, and others interested, will please address him at Constableville, Lewis county, N. Y.

Machine for Extracting Tannin from Hemlock Bark.

Mr. Langley, at the November meeting of the Massachusetts Institute of Technology, described a machine for the above purpose, now in process of construction at the South Boston Iron Works, under his superintendence, and from his designs. By this machine much time and labor will be saved, and the old tedious process of long contact of the coarsely ground bark with the skins to be tanned considerably shortened.

The hemlock bark, in pieces of half an inch to an inch thick, and several inches long, is soaked for about fifteen minutes in water at 200° Fah.; it is then fed into a hopper, which conducts it to a three-rolled machine, something like the rollers of a sugar or cane mill, through which it passes, coming out lacerated and compressed: it then falls into a vat of hot water, where it is agitated by a wheel, that the tannin from the crushed cells may be dissolved in the water; it is then raised by a series of buckets on an endless chain, somewhat in the manner of a grain elevator, to another hopper, whence it is fed to another series of three rollers; here it receives its final compression, and comes out in flakes or sheets, like coarse paper, and almost free from tannin. The buckets are made of coarse wire, that the water may drip through during the elevation. In order to avoid the blackening action of iron, wherever this metal is brought into contact with the solutions, it is thickly coated with zinc.

The extracts thus obtained are of a fine crimson color, highly concentrated—indeed almost saturated solutions of tannin; they require to be largely diluted, being from three to six times too strong for application to the skins; thus the tanning principle of a cord of bark, which the machine can treat in an hour, is concentrated into a barrel of the extract. Even supposing that the tanning process cannot be shortened, as far as the best quality of leather is concerned, any one will see the immense advantage of taking a machine to the hemlock woods, and bringing back tanning extract by the barrel instead of so many loads of bark. This process will open an immense and profitable commerce between this country and others where tanning materials are not indigenous.

The Spread Locomotive Truck.

In No. 17, current volume, page 263, a reply to J. P. J., of Pa., states that the locomotive truck was invented in 1831, and that Wm. Mason, of Taunton, the well known inventor and manufacturer, improved it by spreading the wheels to admit of the use of a cylinder on a level with the center of the driving wheels. This referred to outside cylinders, of course.

A correspondent from Massachusetts states that he was in the employment of Mr. Mason when he delivered his first engine, and that previously he had superintended the construction of spread truck locomotives in another establishment.

We knew only that the Mason engines achieved a deservedly wide-spread popularity mainly for this and possibly for other minor improvements, and had always supposed he was the first builder to spread the truck sufficiently to allow of the cylinders on an "outside" engine to be leveled to the centers of the drivers. The statement of our correspondent, however, is conclusive on this point. To whomsoever it may be accredited it was a long step in the right direction.

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VOL. XVII., No. 22....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, NOVEMBER 30, 1867.

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HAND-TOOLING---ITS ADVANTAGES TO THE MACHINIST.

With the improvement in automatic or self-acting tools the acquirement of skill in manipulation has not preserved the importance to which it is justly entitled. The hand tool for turning does not preserve the high position which it formerly occupied, yet its use is exceeding valuable, and even necessary, in many instances. There is an extensive class of work in machine building on which it can be advantageously employed; yet we are not aware that in this country its use is generally taught as a part of the apprentice's education. It ranks next in importance to the file, and a machinist who can handle it with facility is always an important hand in a shop.

Curved and irregular forms, which must be turned, may be finished much more readily by the hand tool, if judiciously and properly used, than by the fixed lathe tool. For instance, common iron washers, which are placed under the head of a screw or a nut, may be turned and water polished by the hand tool very rapidly. We can hardly imagine any other method of finishing them. The washer is driven on an arbor with just sufficient force to retain it in place, then the arbor put upon the lathe centers, with a dog to engage with the face plate, and revolved as rapidly as a drill—almost as rapidly as a piece of wood to be turned. A diamond pointed tool, made from a triangular file, will speedily remove the scale, when another tool, used with water, will give a splendid finish, the washer so treated presenting an elegant appearance. So in "skinning" or lightly turning a small shaft or arbor the hand tool is invaluable; and in finishing out curves and bevels on a shaft.

The formers for brass musical instruments, which taper for much of their length and then expand by a gradual but varying curve into the "bell" can be more easily and rapidly finished to the gage by the hand tool than by any automatic lathe however perfect and complicated.

The heads of steam engine cylinders are often beaded and ornamented by projecting rings. No ordinary engine lathe with its fixed tool, however handy the operator, can so rapidly and elegantly finish these ornaments as the hand tooler with his simple implements. So in hundreds of cases a practical knowledge of the hand tool is an immense advantage to the workman and profit to his employer.

Sometimes it is necessary to "chase" a screw thread instead of finishing it with the ordinary tool in a screw lathe. By the use of the chaser—which is but a modification or another application of the common hand tool—a screw thread can be finely finished and all its irregularities and roughness removed. Screws of odd sizes may thus be cut which would otherwise perhaps require dies made for that special purpose and occasion.

Skill in the use of the hand tool can be easily acquired; judgment and discretion are as necessary to its successful use as practice. The tools required are cheaply and easily made; the small tools being formed either from old files or bars of steel, and the shoulder tool being merely a stock of wood with a handle transversely attached, and carrying in a groove a straight steel bar properly shaped at the point and held by a screw. Machinists of foreign education at present excel in this specialty, but there is no reason why our American mechanics should not become adepts in hand tooling.

ECONOMY IN COKE MAKING---THE UTILIZATION OF THE WASTE GASES.

The only use that has heretofore been made of the gases driven off from bituminous coal during the prcess of coking has been to supply the heat necessary to make the coke. It will require but a glance to show that even with a coal with but a small proportion of gaseous matter in its composition, only a portion of its gas is really necessary to give the heat required to completely perform the operation of coking. The only attempt that we are aware of that has been made to utilize all the gases driven off is by the process of Messrs. Carver & Co., of St. Entienne, in France, and they issued a small pamphlet which was given to visitors to the show of articles made from the gases driven off in coking exhibited by the *Société de Carbonization de la Loire* in the Paris Exhibition. This pamphlet was explanatory of their process which is eminently successful. The gases from the coking coal are collected and drawn off through pipes, and cooled sufficiently to condense the tar, ammonical liquids, etc., contained in them; this purifies the gas and it can be used for the same purposes as that made by the ordinary illuminating gas works. From the tar and liquids thus condensed, benzine, napthaline, sulphate of ammonia, a number of artificial manures, and a number of dye stuffs, are made: fabrics are also exhibited colored by these dyes. All these valuable products are, therefore, made from the gases which are permitted to be wasted by the usual process.

This company estimate that the profit they net from these substances is 2½ francs for each tun of coal coked. And to give an accurate estimate of the profits which accrue from this source it is only necessary to say that the coking ovens of the company, and which have been in operation for over nine years, use annually upward of 80,000 tuns of coal in making coke. The pamphlet of Messrs. Carver & Co. contains a calculation that some three and a half million tuns of coke are made annually in France; this amount corresponds to some four millions of tuns of coal, a large portion of the volatile constituents of which are wasted and from this it is estimated that between twelve and thirteen million of francs are lost annually by the ordinary wasteful method. On the whole this is one of the most eminently successful examples of the application of practical chemistry to the arts that we have had the pleasure to record. It is a striking example of the benefits of the technical and industrial education which has been followed for many years in France, and indeed on the continent generally. We trust that before many years our practical men may enjoy equal advantages with respect to the application of theory to practical operations connected with the industrial arts not only as regards chemistry alone but in all other branches. To effect this we must have schools of a decidedly practical nature, and text books devoid of speculation and so clearly composed that the facts that they are written to convey may be clear to the average understanding of those seeking instruction from them. A traveller in Europe with any mechanical perceptions, cannot fail to be impressed with the importance of the continental system of technical instruction by the superb engineering and the wonderfully perfect metallurgic operations to be seen on every side.

THE PETROLEUM FUEL---WILL IT SUPERSEDE COAL?

The petroleum excitement reached its climax immediately after the trials with the retort apparatus on the U. S. S. *Palos*, in Boston Harbor. The results after these experiments were proclaimed on all sides as eminently successful; "the days of coal were numbered," so said one of the experts at a Babylonian banquet given in Boston in honor of "the great event of the age." A commodore in the U. S. Navy was so impressed with these trials that he forthwith petitioned the Department to order an extended trial at sea. There is a point in connection with the *Palos* matter that should not be ommitted, and that is that the report of the Board of Naval engineers, who were ordered to attend the trials and to strictly investigate them, has not, to our knowledge, been made public. It would seem that if this report was a favorable one, it would have been placed before the public long ago, and that too in a very conspicuous manner; if this had been the case it is pretty clear that it would have carried much more weight, and would also have influenced stock subscriptions to an extent considerably greater than the parade of the after-dinner speeches of the *savans*, sailors, and engineers who made an excursion on the *Palos* in Boston Harbor.

Since this event in the petroleum world the excitement has been gradually subsiding and the dying embers are only kept at a dull-red heat by skillful letter-writing by the correspondents of the New York press, in other cities. The Cunard line have not adopted it, neither is it used on railroads and it would seem that if the petroleum companies themselves have any confidence in the wares they are trying to persuade the public to buy, they would be introduced practically so that there might be a fair comparison with coal, particularly as it is claimed by them that the apparatus can be put in any furnace with very little labor.

The Dental Vulcanite Question.

We recently published a judicial decision in the vulcanite question which was adverse to the dentists. A meeting of dentists was held at Cincinnati, on the 7th inst., to take into consideration the dental vulcanite question, and the following resolution was adopted:

Resolved, That we approve of the action of the executive committee and all they who have been active for the dental profession of the West, in contesting the claims of the Goodyear Dental Vulcanic Company against the profession, and that we request them to continue the defense to the ultimatum, believing, notwithstanding the decision of Judge Wilson, of New York, that the importance of the subject demands full and final investigation by the best tribunal in the country.

ANTI-FRICTION METAL FOR RAILWAY AXLES.

Nothing interferes more with the success of mechanical inventors than the element of friction. Not even the law of gravitation offers such obstacles to the intentions of inventors. To overcome the resistance of friction, especially on shaft journals, there have been devised several combinations of different metals which together should give the greatest resistance to pressure and heat. One of the most notable successes in this line has been that of the well-known Babbitt metal, which even now holds a high place in the estimation of mechanics.

But, it is claimed that there are compositions which far surpass this in the points which are sought to be obtained. There is reason for this claim in the case of one, at least, and we are doing but an act of simple justice to call the attention of our railway men to the advantages of the "Star Metal," which is manufactured largely by the Star Metal Company at their establishment in Brooklyn, N. Y., and Chicago, Ill.

We lately visited the former concern and witnessed the various processes of manufacture, except the actual mixing of the metals, which is preserved a profound secret. The basis, however, of the Star metal is spelter or zinc. In this foundery are employed, at present, seventeen furnaces, in constant operation. The patterns are molded in ordinary furnace sand in iron flasks. The metal box is held in a shell of brass, as by experience it was found preferable to a box made entirely of the Star metal. The metal is run into the brass shell, with which it is united by partial fusion. The box is then cleaned and dressed to exact size by the file. The bearing is trued and polished by vulcanite emery rollers which form the half circle to a gage so that the bearings are as perfect as they could be made by boring or turning. The use of emery for this purpose will prove at once to the practical mechanic that this metal differs greatly from Babbitt, which if ground with emery would become filled with the flinty particles. The metal is, in reality, very hard, instead of being soft, and is so brittle that it does not clog the file any more than iron and much less than hard brass. This quality of hardness may seem to be an objection, as it is commonly believed that bearing metal should be soft, but the manufacturers claim that this very quality is one of the peculiar advantages of the metal. Its resistance to heat is remarkable, its melting point being but a trifle lower than that of ordinary brass, and it is very difficult to heat it by friction. It will not cut the journal when hot, as brass does, and it will outwear either brass or the Babbitt composition.

These boxes are in use on a large number of our most extensive railroads in the country, and have received in all cases the most unqualified commendation. The company say in their circular that "in the examination of the actual comparative wear between Star metal and other (solid brass or Babbitt) bearings, upon the roads in this country testing Star metal, we find, taking the difference in wear and in weight into the calculation, that those roads should pay but 14⅝ cents per pound for their (solid brass or Babbitt lined) bearings, to compete in price with Star metal bearings. We therefore claim that those roads lose, per pound, in using brass or Babbitt lined bearings, the amount they pay for same over 14⅝ cents per pound; that it is more economical to use Star metal bearings costing 37 cents per pound than others, even at 14⅝ cents, on account of less wear upon the journal by the Star metal, and for the reason of its not cutting the same when hot; that it requires less power to draw a train running with Star metal bearings from the fact that where the journal and bearing wear least, there is less friction."

When tested against the brass or Babbitt lined boxes the Star metal bearings have invariably proved superior in the relation of from 40 to 75 per cent. The tests have been made by placing equal numbers of the Star metal boxes and of others under the same car, so that each should have the same amount of wear, and travel the same distance.

New Facts in Spectrum Analysis.

A very curious observation, on the spectrum of a terrestrial flame closely resembling that of certain yellow and red stars, has been communicated to the Italian society—called the Forty—of Modena, by M. Secchi. This flame is that which proceeds from a converter in which Bessemer steel is being made and at the time when the iron is completely decarbonized. The spectrum presents a series of very fine and very numerous lines, similar to those of *a* Orionis and *a* Herculis only reversed. This results from the great number of metals burning in the flame, and is the only flame comparable with the colored stars. There is nothing improbable in this fact when we consider the composition of ærolites in which as is well known, iron predominates.

M. Secchi had formerly ascertained that the spectrum of the color of sea water is deprived successively of its red, yellow and green as its depth increased, and at the greatest depths it appears of a violet blue. He tried to ascertain if the same fact held true in the case of glaciers, and has made experiments in an artificial grotto some three hundred feet deep, in the Grindenwald glacier. The ice wall was nearly fifty feet thick, the solar light that penetrated through was of a fine blue tint, so that human countenances had a cadaverous aspect almost alarming. On looking toward the entry at a certain distance, the cavern appeared to be lit up with a

red light, undoubtedly the effect of contrast. The thickness of the superposed mass was not enough to show a greater effect than the almost complete absence of the red, and a great diminution of the yellow. The ice was perfectly compact, limpid, and with few air bubbles.

Origin of the Connecticut Clock Business.

Bishop, in his "History of American Manufactures," says that the wooden clock manufacture was commenced in Waterbury, Conn., by James Harrison, in 1790, on whose books the first is charged January 1, 1791, at £3 12s. 8d. In East Windsor the brass clock manufacture was carried on by Daniel Burnap. Specimens which are still preserved are said to be nowise inferior in workmanship to the best English clocks of that or any later period. Clocks were also made in East Hartford by a Mr. Cheeny. In 1793, Eli Terry who had been instructed by Burnap in the business as practiced by him and Cheeny, removed from East Windsor, where he had carried on clock-making, to Plymouth, in Litchfield County. His subsequent enterprise and improvements in the art in that place entitle him to be considered the parent of the manufacture in Connecticut. At that time, Thomas Barnes, of Litchfield, and Gideon Roberts, of Bristol, were also known as clock-makers. The kinds of clocks made by these were brass and wooden clocks, with long pendulums, and their price was, for a wooden clock and case, from $18 to $48, the higher priced ones having a brass dial and dial for seconds, and the moon's age, and a more costly case. Brass clocks with a case, cost from $38 to $60. So limited was the sale at those prices, that three or four hundred constituted a stock in trade, and they were carried out for sale by the maker on horseback, the case being procured by the purchaser at from $5 to $30, according to his taste. Terry made both kinds, using a hand engine for cutting the teeth of the wheels and pinions, and a foot lathe for the turned work. In November, 1797, he patented an improvement in clocks, watches, and time-pieces, covering a new construction of an equation clock, showing the difference between apparent and mean time. In 1802, in which year Willard of Boston took a patent for his time-pieces, Terry began the business on a larger scale by water power, and, five or six years after, his success in making them by the thousand, which had been ridiculed as chimerical, enabled him greatly to extend the manufacture, which others now commenced on the wholesale system. In 1814 he introduced a new era in the business by commencing on the Naugatuck river the manufacture of the shelf or mantel clock, which he patented in 1816. The cheapness of these created a wide demand. Several improvements made by him in the mechanism, and the later progress in machinery generally, have increased the annual production in that State to hundreds of thousands, and given to every household a clock, equal to the old ones, at a cost of $2 and upward. His descendants have been engaged in the business to the present time, and his pupil, Chauncey Jerome, since 1821.

Apart from the importance of horological machines in every department of life, and especially in relation to science and business, there are few of the mechanic arts which have furnished more numerous and striking examples of great and useful inventions among its members than the clock and watchmaking business. Many, both in Europe and America, have first exercised in this way their ingenuity, which has afterward conducted to discoveries of universal utility. Rittenhouse, Fitch (also a native of Connecticut), Whittemore, who, before any of the above, also constructed without a model, an efficient wooden clock, Dr. Franklin, and others, might be named. Clock-makers are said to have been the first who employed *special machines* for their manufactures, the wheel-cutting engine having been invented by Dr. Hooke about 1655, and the screw-cutting lathe by Hindley, a clock-maker of York, England, in 1741. The fusee engine and slide rest, the value of which are known to all mechanicians who use metal, are of later introduction, although the latter, in an imperfect form, was used at Rome in 1648, and attained its present form in 1772.

The Assembly of Connecticut, in October, 1783, awarded a patent for fourteen years to Benjamin Hanks, of Litchfield, for a self-winding clock. It was to wind itself by the help of the air, and to keep more regular time than other machines. The principle was made use of in New York and elsewhere.

Practical Application of the Transparency of Metals.

Metals have generally been considered as opaque bodies, not permitting the passage of light through their substance. It is, however, very easy to show, by the use of an extremely thin film, as of gold or silver deposited upon glass, that light passes quite freely through it, and this property has latterly been turned to very good advantage. One of the earliest applications was as a substitute for the ordinary soot-blackened or colored glass, used in observing the sun during an eclipse, or at other times; and the silvering of the objective glass of the great telescope of the Paris Observatory has permitted an investigation of the sun's disk such as could not otherwise be prosecuted. Viewed through a lens, or even a plane glass thus silvered, the sun appears of a soft, bluish color, very sharply defined against a black background, formed of the sky. All the peculiarities of the solar image, the different spots and foci in their variations of intensity, and the less luminous marginal regions, are shown with the greatest clearness, and even the filmiest clouds and vapors which seem to sweep over the disk can be readily perceived. The examination can be kept up any length of time without strain to the eyes. The physiological influence is very different from that of colored glasses, the use of which is sometimes very objectionable. Since all the different rays of light pass through the metal (although greatly tempered) except the outermost red rays, which are excluded, together with the dark heat rays, the silver must be deposited in the usual galvanoplastic or chemical manner, so as to form a very delicate film. Gold and platinum may also be used, but silver possesses several advantages.

This property, in the part of metals, of greatly subduing the rays of light without extinguishing them to any extent, and of excluding almost entirely the rays of heat, is now applied to other practical purposes. Weak eyes can use spectacles thus prepared to the greatest advantage, where colored glasses are not to be thought of. For persons whose business keeps them before a glowing fire, such glasses are invaluable, since the sight is not strained by the light, nor the eye-ball injured by the heat, which is measurably excluded. Screens of glass, to be placed before fires, have also been made on the same principle.

By inserting plates of glass thus treated in the panels of doors, or using them as window panes, it will be easy to observe from within all that is going on outside, while it will be impossible to see into the room unless there be another window on the opposite side, so as to show through. The application of the silver to the glass converts it into a mirror, which reflects the light, and to the observer is as opaque as mirrors are generally. The use of such windows wherever an observer within has occasion to notice persons outside without being seen, will be readily understood in the case of prisons, workshops, stores, etc., where, however, as already remarked, there must be but the one opening. The platinized glass has been found most convenient for this purpose.

These few illustrations of a general principle, capable of a great variety of practical applications, show, at the same time, how often the man of science, seeking for the solution of some problem in his theoretical investigations, reaches a result capable of a thousand uses in every day life, which are eagerly caught up and turned to profitable account.—*Phil. Ledger.*

Brunel's Mishaps.

Although Brunel died at the comparatively early age of fifty-three, it is even matter of surprise that he lived so long. He had more perilous escapes from violent death than fall to the lot of most men. We have seen that at the outset of his career, when acting as assistant engineer to his father, in the Thames Tunnel, he had two narrow escapes from drowning by the river suddenly bursting in upon the works. Some time after, when inspecting the shafts of the railway tunnel under Box Hill, he was one day riding a shaggy pony at a rapid pace down the hill, when the animal stumbled and fell, pitching the engineer on his head with great violence; he he was taken up for dead, but eventually recovered. When the Great Western line was finished and at work, he used frequently to ride upon the engine with the driver, and occasionally he drove it himself. One day, when passing through the Box Tunnel upon the engine at considerable speed, Brunel thought he discerned between him and the light some object standing on the same line of road along which his engine was traveling. He instantly turned on the full steam and dashed at the object, which was driven into a thousand pieces. It afterwards turned out to be a contractor's truck, which had broken loose from a ballast train on its way through the tunnel. Another narrow escape which he had was on board the *Great Western* steamship, where he fell down a hatchway into the hold, and was nearly killed. But the most extraordinary accident which befell him was that which occurred while one day playing with his children. Like his father, Sir Marc, he was fond of astonishing them with sleight-of-hand tricks, in which he displayed considerable dexterity; and the feat which he proposed to them on this occasion was the passing of a half-sovereign through his mouth out at his ear. Unfortunately, he swallowed the coin, which dropped into his windpipe. The accident occurred on the 3d of April, 1843, and it was followed by frequent fits of coughing, and occasional uneasiness in the right side of the chest; but so slight was the disturbance of breathing that it was for some time doubted whether the coin had really fallen into the windpipe. After the lapse of fifteen days, Sir B. Brodie met Mr. Key in consultation, and they concurred in the opinion that most probably the half-sovereign was lodged at the bottom of the right bronchus. The day after, Mr. Brunel placed himself in a prone position on his face upon some chairs, and bending his head and neck downwards, he distinctly felt the coin drop towards the glottis. A violent cough ensued, and on resuming the erect posture he felt as if the object again moved downward into the chest. Here was an engineering difficulty, the like of which Mr. Brunel had never before encountered. The mischief was purely mechanical; a foreign body had gone into his breathing apparatus, and must be removed, if at all, by some mechanical expedient. Mr. Brunel was, however, equal to the occasion. He had an apparatus constructed, consisting of a platform which moved upon a hinge in the center. Upon this he had himself strapped, and his body was then inverted, in order that the coin might drop downward by its own weight, and so be expelled. At the first experiment the coin again slipped towards the glottis, but it caused such an alarming fit of convulsive coughing and appearance of choking that danger was apprehended, and the experiment was discontinued. Two days after, on the 25th, the operation of tracheotomy was performed by Sir Benjamin Brodie, assisted by Mr. Key, with the intention of extracting the coin by forceps, if possible. Two attempts to do so were made without success. The introduction of the forceps into the windpipe, on the second occasion, was attended with so excessive a degree of irritation that it was felt the experiment could not be continued without imminent danger to life. The incision in the windpipe was, however, kept open by means of a quill or tube, until May 13, by which time Mr. Brunel's strength had sufficiently recovered to enable the original experiment to be repeated. He was again strapped to his apparatus; his body was inverted; his back was struck gently, and he distinctly felt the coin quit its place on the right side of his chest. The opening in the windpipe allowed him to breathe while the throat was stopped by the coin, and it thus had the effect to prevent the spasmodic action of the glottis. After a few coughs the coin dropped into his mouth. Mr. Brunel used afterwards to say that the moment when he heard the gold piece strike against his upper front teeth, was perhaps the most exquisite in his whole life. The half-sovereign had been in his windpipe for not less than six weeks!

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 12, 1867.

Reported Officially for the Scientific American

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

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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On application for Reissue	$30
On application for Extension of Patent	$50
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On filing application for Design (three and a half years)	$10
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

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

70,675.—Meat Mangler.—A. T. Adams, Indianapolis, Ind.
I claim the combination of the two jaws with the plates, l l, bars, m m, and springs, n n, all arranged and operating as and for the purpose specified.

70,676.—Moth-proof Case.—James W. Aikin and John H. Stone, Philadelphia, Pa.
We claim a sheet metal moth-proof case for a lady's furs, having the perforated central cylinder A, and the recess, b', in combination with the cylinder, B, and the elastic band ring, b''', the said parts being constructed, arranged, and combined to operate together substantially as and for the purpose described.

70,677.—Needle Machine.—Walter Aiken, Franklin, N. H.
I claim the machine or combination, substantially as described, for the purpose set forth, that is, as composed of the rotary cutter, A, the grooved rest, E, the series of rotary arbors, K, their carrier or wheel, I, and operative mechanism, the shaft, F, and the mechanism for revolving and moving it longitudinally, and the bolt, s, and mechanism for operating such bolt, substantially as explained.

70,678.—Machine for Making the Tongues of Machine Knitting Needles.—Walter Aiken, Franklin, N. H.
I claim the combination of the carriage, C, the feeder, G, the bowl-forming dies, w v, and the flattening dies, d'' e', all provided with mechanism for operating them, substantially as described.
I also claim the combination of the carriage, C, the feeder, G, the nicking and bowl-forming dies, n' o' w' v', and the flattening dies, d'' e', all provided with mechanism for operating them, substantially as set forth.
I also claim the combination of the carriage, the feeders, the bowl-forming dies (or the latter and the nicking dies), the punch and punch dies, and the rounding dies, h' l', all provided with mechanism for operating them, substantially as specified.
I also claim the combination of the carriage, the feeder, the bowl, the punching dies (or the latter and the nicking dies), the punch and punch die, the rounding dies, and the separting dies, k' l', all provided with mechanism for operating them, substantially as explained.

70,679.—Hot Air Furnace.—Biddle Arthurs, Pittsburgh, Pa.
I claim the drum or heater of sheet or plate iron, with an opening in its bottom and front, connecting with a fire space, c, of brick, the edges of the heater or drum around such opening having flanges, i, built into the furnace walls, constructed and arranged substantially as described for the purposes specified.

70,680.—Saw.—James E. Atwood, Trenton, N. J., assignor to himself and Cyrus H. McCormick, New York city.
I claim the tooth, A, when held in its position by ratchet, c c c, for the purpose herein described.

60,681.—Carriage Wheel.—Charles C. Ayers, Chelsea, assignor to himself and Henry A. Breed, Lynn, Mass.
I claim the combination as well as the arrangement of the metallic annulus or inner tire, D, with the wooden felly and the spokes and hub, as explained.
I also claim the combination as well as the arrangement of the metallic annulus or inner tire, D, with the wooden felly, the hub, spokes, and outer tire as described.
I also claim the combination as well as the arrangement of the metallic annulus, D, the wooden felly, the springs and chambers therein, the spokes, and the hub, as described, the hub, under such a combination of the spokes with it and the felly, being suspended from the upper half of the felly and on springs, while the wheel may be in revolution and use.

70,682.—Construction of Salvers.—Seth C. Babbitt, Meriden, Conn, assignor to the Meriden Britannia Company.
I claim the mode or process of stiffening the rim or outer edge of a soft-metal or Britannia salver, substantially as described.
I claim a Britannia or soft-metal salver constructed substantially as described.

70,683.—Truss.—Charles A. Baker, Auburn, N. Y.
I claim the front pad or plate, E, provided with the rod, A, auxiliary pad, B, and straps, D G and H, all constructed and arranged substantially as and for the purpose set forth.

70,684.—Chalk-line Reels.—James Bathgate, Cincinnati, O.
I claim the combined arrangement of the reel, C c, chalk receptacle, D, cap, E, apertures, F G, and line, H, all constructed and employed as and for the purposes specified.

70,685.—Machinery for Laying and Twisting Rope.—Stephen Bazin and James A. Bazin, Canton, Mass.
We claim the sliding guide pulley, N, in combination with the crane, M, and the winding reel, O, operating substantially as described for the purpose set forth.
We also claim the rolls, r, so arranged as to revolve simultaneously, in combination with the fleeters, b', and the guide pieces, a', or their equivalents, for the purpose of insuring the equal delivery of the strands, substantially as described.

70,686.—Tapering Drill.—Jason A. Bidwell, East Boston, Mass.
I claim, 1st, A twisted reamer, c, which is adapted to serve, in conjunction with a spirally grooved drill, a, for making tapering holes in metal, substantially as described.
2d, The construction of a cutting shoulder, e, upon the shank c', of a twisted reamer, c, substantially as described and for the purpose specified.

70,687.—Bed Bottom.—Albert Bingham (assignor to Wm. T. Mudget), Newtonville, Mass.
What I claim as my invention in a spring bed bottom is as follows, that is to say, having its bolster piece, D, its series of pins, e, and slats, g, supported by springs, f, so as to be movable vertically together thereon, and so that each slats may move independently of the bolster piece and its guide pins, the whole being substantially as described.
I also claim the improved spring bed bottom as constructed, not only with each of its slats, supported at its foot or lower end on a stationary cross bar, but as having a bolster piece, D, series of pins, e, and slats, g, supported by springs, f, so as to be movable vertically together thereon, and so that each slat may move on its spring independently of the bolster piece and its guide pins, the whole being substantially as specified and represented.

70,688.—Machine for Finishing Woolen Cloth.—Edwin Birkenshaw, Ashuelot, N. H.
I claim my improved arrangement of the two teasling cylinders, the shearing mechanism, and their two sets of feed rollers, one teasling cylinder under such arrangement being disposed over the other, as described.
I also claim the combination and arrangement of the series of rollers, D D, etc., with the shearing mechanism, the feed rollers, and the two teasling cylinders, arranged in manner as described and represented.
I also claim the combination, as well as the arrangement of the bridge, F, the series of rollers, D D, etc., the shearing mechanism, the feed rollers, and the two teasling cylinders, arranged as described, the said feeding cylinders and feed rollers being provided with a series of guide rollers arranged with them, as described, and the rotary shearer brush and the teasling cylinders being provided with mechanism for operating them, substantially as herein before explained.

70,689.—Car Coupling.—Luther Boyd and Philip Kriegbaum, Springfield, Ohio.
We claim the movable head, B, as constructed in combination with stationary head, C, slides, e e, and springs, d d, all arranged and operating in the manner and for the purpose herein set forth and described.

70,690.—EVAPORATION AND VAPORIZATION.—M. S. Bringier Ascension Parish, La.

I claim, 1st, The application of one or more series of tubes of small diameter to the external surface of boilers, kettles, or other vessels, as herein described for the purpose set forth.

2d, The use of a revolving coil of wire gauze, or the equivalent thereof, inside steam-boilers, as herein described for the purpose set forth.

3d, The combination of one or more series of small tubes externally applied to boilers, with an internal revolving coil or cylinder of wire gauze, or its equivalent, as herein described for the purpose set forth.

70,691.—PROCESS FOR EXTRACTING SACCHARINE MATTERS FROM SUGAR CANE.—M. S. Bringier, Ascension Parish, La.

I claim, 1st, Extracting saccharine matter from sugar cane, or other vegetables containing it, by maceration and disintegration, as herein described, when the same is effected by the process and apparatus I have described, or any other which is substantially the same in its mode of operation.

2d, The combination of the receiving-boiler, A, steam pipe, B, pipes H, C, and D, with the shaft, E, when the latter is provided with the disintegrating appliances herein described, for the purpose set forth.

70,692.—MOP WRINGER.—Oscar M. Brooks and Elisha J. Matteson, Janesville, Wis.

We claim, 1st, The inclined supports, e and h, when pivoted at opposite ends of the horizontal yokes, H, and used to support two parallel and similarly operating rolls, B B, substantially as described.

2d, The combination and arrangement of a treadle, F, pivoted at the ends of two horizontal yokes, H, with the connecting links, f and g, springs, i, inclined supports, e and h, and horizontal yokes, H, when the whole are constructed, arranged and used substantially as described.

70,693.—WASHING MACHINE.—Alexander R. Campbell, Cheltenham, Mo.

I claim the rock shaft, e, semi-circular corrugated dasher, E, corrugated dash board, g, smooth dash board, h, shafts, k, cross bar, M, braces, n, cover, o, standards, d, dove-tailed slots, q, and the corrugated circular and square ends of a washing machine, all in combination, when constructed and operating substantially as shown and specified.

70,694.—MODE OF ATTACHING FERRULES TO HANDLES.—Asa L. Carrier, Washington, D. C.

I claim the ferrule, b, constructed and applied to tool handles, umbrellas and canes, substantially as described and operating as and for the purposes set forth.

70,695.—HORSE HAY FORK.—William Carroll, Hillsdale, Mich., assignor to himself and S. H. Rhodes, Clyde, Ohio.

I claim the toggle joint, E, springs, D, and nibs, I, in combination with the tubular shaft and rod, substantially as and for the purpose set forth.

70,696.—CAR TRUCK.—S. A. Chase (assignor to himself and Stephen Smith), Boston, Mass.

I claim, 1st, The combination with the main axles and wheels of a car truck of the upper rollers when supported in elongated bearings, substantially as and for the purposes described.

2d, The combination with the journals, c c, of their elongated bearings and lubricating chambers, substantially in the manner and for the purposes set forth.

70,697.—JOURNAL BOX FOR CARS.—G. H. Clemens, Baltimore, Md., assignor to himself and Henry A. Chadwick, Washington, D. C.

I claim, 1st, The hollow box, E, having the blocks of wood arranged therein, said box being formed spherical on its upper surface to permit of its adjusting itself to the journal, as herein described.

2d, In combination with the box, E, constructed as described, I claim the case composed of the parts, G and H, constructed as set forth.

70,698.—CHAIR.—Harrison Cole, Cincinnati, Ohio.

I claim the three-legged chair standard, A, in combination with the brace, A, and the lugs, C C C and C' C' C', for attaching it to the floor and chair bottom, substantially as shown.

70,699.—DOOR AND WINDOW FASTENER.—Washington J. Corthell and Philip Richards, Boston, Mass.

We claim the combination and arrangement of the knob and shank, d and e, the projection, f, a d the spring, h, with the bolt, b, constructed with its recess, e, moving back and forth in the case, a, substantially in the manner and for the purpose above set forth.

70,700.—HORSE HAY FORK.—J. S. Culver, Springport, N. Y.

I claim the attaching of shoulder pieces to the main stem of the hay elevating fork, substantially as and for the purpose delcribed.

70,701.—BRACKET FOR LAMPS.—Robert Devereux (assignor to himself and Bernard H. Muehle), Buffalo, N. Y.

I claim the circular rim, A, having an opening, D, for the purpose and substantially as herein set forth and described.

70,702.—BLIND STAPLE.—Frank Douglas, Norwich, Conn.

I claim as a new article of manufacture a blind staple of corrugated wire, as herein described.

70,703.—BLUING PAPER FOR LAUNDRY PURPOSES.—Theodore Dreidel, Cincinnati, Ohio.

I claim the prepared bluing paper for laundry purposes, substantially as set forth.

70,704.—MODE OF PRODUCING HYDROGEN GAS.—Cyprier Marie Essié Du Motay and Charles Raphael Maréchal, Metz, France.

We claim the method of and means for obtaining oxygen gas from atmospheric air, substantially as and for the purposes herein set forth and described.

70,705.—MODE OF PRODUCING OXYGEN GAS.—Cyprier Marie Essié Du Motay and Charles Raphael Maréchal, Metz, France.

We claim the method of and means for obtaining oxygen gas from atmospheric air, substantially as and for the purposes herein set forth and described.

70,706.—CLOTH-FOLDING MACHINE.—Henry Dunphy, New York city.

I claim, 1st, The arrangement for holding the folders in the machine consisting of the clamps, e, in combination with the cheeks a a, of the holders, B, the whole constructed and operating substantially as described and specified.

2d, The rollers, F F, provided with narrow rings of leather, rubber, or other similar material, in combination with the folding apparatus, substantially as described and specified.

3d, The hinged ironer, D, in combination with the folding apparatus, substantially as described and specified.

4th, The laterally and back-and-forward adjusting, retaining, and stretching apparatus consisting of the roller, n, bar, p, and traversing blocks, o and r r, in combination with this apparatus, substantially as described and specified.

5th, The roller, n, tapering toward both ends for spreading and stretching the cloth in combination with the laterally and back-and forward adjusting mechanism and the folding apparatus, substantially as described and specified.

70,707.—STEAM ENGINE.—Charles E. Emery, Brooklyn, N. Y.

I claim, 1st, Lining the interior surfaces of the cylinders of engines operated by steam or heated gas with glass, porcelain, enamel, or equivalent substance, in manner substantially as described to produce the results specified.

2d, The combination of the cylinder, X, with the cylinder, N, or its equivalent.

3d, The elongated piston, A, in combination with the lining or protecting material, X X.

4th, The combination of the pipe, b, with the piston rod or trunk, all substantially as and for the purposes herein set forth.

70,708.—PAPER FILE.—William Fallon, Washington, D. C.

I claim the combination of a folding extension back to file binders with flap in front, and india-rubber strap with reinforce on each end and clasps for same, as described herein.

70,709.—SALT SIFTER.—William A. Fenn, Wolcott, N. Y.

I claim, 1st, The arrangement of the plate, C, in combination with the bottle or case, A so as to operate in the manner described.

2d, In combination with the above, I claim the arrangement of a spring so as to return the plate, substantially as herein set forth.

70,710.—MOLDS FOR CASTING STEEL INGOTS.—John E. Fry, Johnstown, Pa.

I claim the series of iron ingot molds, e e, in combination with the sand core, s, constructed substantially as hereinbefore described for the purpose set forth.

70,711.—BELT CUTTER.—Moses C. Goodale (assignor to himself and Louis Godder), Lowell, Mass.

I claim the arm, f, with its punch seat, b, when arranged to operate substantially as described and fully set forth.

Also the arrangement and construction of the knife, b, awl, n, and punch, e, in combination with the pliers, k and m, all for the purposes substantially as herein described.

70,712.—APPARATUS FOR BURNING HYDROCARBON OILS.—Mathew T. Gosnell, Baltimore, Md.

I claim the combination and arrangement of a tube or pipes B B, a perforated hearth, B, a valve or valves or inlets (for admission of atmospheric air), D D, with a boiler, A, and furnace, E, or their equivalents, in the manner and for the purposes set forth.

70,713.—DEVICE FOR THE ADJUSTMENT OF LOOKING GLASSES IN DRESSING CASES.—Alfred A. Gray and William C. Hyde, Detroit, Mich.

We claim the hinge and movable hinge plate, the thumb screw, or screw that secures the hinge plate, and the mode of adjustment, substantially as and for the purpose set forth.

70,714.—SASH FASTENER.—E. Herbster (assignor to himself, T. Tripp and E. F. Brown), Chicago, Ill.

I claim, 1st, The combination of wheel, D, having holes, b b etc., with pin, E, arranged to operate in sleeve, F, having slots, b' and a, for the purpose of locking sash, substantially as herein set forth.

2d, The combination of wheel, D, spring, C, pin, E, sleeve, F' and key, T arranged to wind said spring up and to fasten sash, substantially as and for the purpose set forth.

70,715.—PAPER-RULING MACHINE.—William O. Hickok, Harrisburg, Pa.

I claim the application thereto of a stationary table, G, so that it will operate in combination with the web, E, cords, F, and feed rolls, D D', substantially in the manner described and set forth for the purpose specified.

70,716.—WRAPPER FOR NEEDLES.—Jason Hill, Astwood, near Redditch, England.

I claim, in combination with a wrapper in or on which needles are placed or stuck, an incision or flap at or near the upper left hand corner for forming a cover for and for gaining access to the tops of the needles, substantially as and for the purpose described.

70,717.—CLUTCH FOR HAY ELEVATORS.—N. D. Hinman, Stepney Depot, Conn.

I claim, 1st, The arrangement described of the levers, L and N, with the yoke, R, and pulley, E, when constructed so as to operate in the manner and for the purpose substantially as set forth.

2d, The combination of the levers L M and N, when constructed so as to operate as and for the purpose specified.

70,718.—POCKET CUTLERY.—Peter S. Hoe, New York city.

I claim the combination, in a single instrument, of a knife, pincers and bodkin arranged to open and shut like a pocket knife, substantially as described and specified.

70,719.—SCRAPER.—William J. Horner, Cincinnati, Ohio.

I claim, in combination with the divided and hinged beam, A B C, shovel, D, and handles, E, the tongue, F, self-locking catch, G, and trigger, L, substantially as and for the purposes set forth.

70,720.—HAY OR COTTON PRESS.—Frank Horton (assignor to himself and Albert Horton), Silver Creek, N. Y.

I claim, 1st, Attaching the draft chains, C, to the follower, B, at points inside of the press frame, A' (the sides of the press box being slotted longitudinally for the passage of the chains) for the purpose described.

2d, Leading the draft chains, C, when placed within the press box over the sheaves, C', and obliquely to or nearly to the center of the windlass shaft, D, in the manner and for the purpose described.

3d, The locking device applied to the top covers, F and G, and side door, I, composed of the lever, H, hinged loop, h1, and staple or hook, h2, substantially as described.

70,721.—MODE OF PREVENTING THE EXPLOSION OF LAMPS.—Edward Howard, Redhill, England.

I claim the application of the long tube, A, before named and the substitution for the usual openings of a groove in the collar of the vase, C, so that by no opening can the flame of the lamp reach the gas in the vase.

70,722.—INVALID BEDSTEAD.—S. P. Johnson (assignor to himself and Charles B. Whittemore), Portland, Me.

I claim, 1st, The double-swinging lever, g, as and for the purposes set forth.

2d, The arrangement of the folding legs, 1 2 3, etc., having the pins on their inner sides, with the folding braces having the longitudinal and transverse slots, as and for the purposes described.

3d, The arrangement and combination of the rod, k, lever, J, ratchet, n, and pin, m, as and for the purposes set forth.

70,723.—CORN-POPPER.—Edward G. Kinsley, Stoughton, Mass.

I claim the corn-popper, as made with the perforated divisional partition, B, extended across its box, A, of woven wire, substantially as described, and for the purpose as specified.

70,724.—WATCH ESCAPEMENT.—William H. Lamb, San Francisco, Cal.

I claim, 1st, The construction of an escapement for timepieces, in such a manner as to pass the teeth upon opposite sides of the balance staff, thereby giving an impulse on both the right and left vibration, substantially as herein described.

2d, Unlocking pin, g, from the teeth, n, of the escape wheel, by the the liberating pin, on the balance staff coming in contact with the end of the detent lever, d, substantially as described; and,

3d, The combination of the wheels, D and E, operating on each, side of the balance staff by means of the notched rollers, b and c, or their equivalent, and the liberating pin, i, operating on the end of the detent lever, d, and the the pin, g, the whole operating as and for the purpose herein specified and described.

70,725.—CHURN.—C. H. Lee, Oskaloosa, Iowa.

I claim the churn, A, provided with a turret, in combination with a mouth piece, B, so constructed as to admit a free circulation of air in the churn, and at the same time prevent the cream from escaping, substantially as herein set forth and described.

70,726.—BLIND FASTENING.—Goodrich Lightfoot (assignor to himself and Joseph B. Lightfoot), Elgin, Ill.

I claim the jointed rod, L, in combination with hinges, e and e'', when constructed and operated substantially in the manner and for the purpose specified.

70,727.—INSULATOR FOR LIGHTNING-RODS.—Thomas J. Lockhart and Josiah Locke, Pittsburg, Pa.

We claim the application to lightning-rod insulators of the metallic shank, E, as herein described, or any other substantially the same, and which will produce the intended effect.

70,728.—SAW.—James K. Lockwood, Alpena, Mich.

I claim a circular saw, constructed with more or less slots, D, upon radial lines from the eye toward the periphery, and terminating in holes, C, in combination with the oblong holes or slots, E, for the purposes substantially as set forth.

70,729.—CAR COUPLING.—Samuel L. Loomis, Byron, N. Y.

I claim, in a draw-head or bumper of a railroad car, a spring so constructed and arranged as to serve the purposes of sustaining the pin until the link enters, and holding the link horizontal for the purpose of coupling, substantially as described.

And, in combination with a spring constructed and arranged as above claimed, I claim a coupling-pin with a shouldered end or point, as and for the purposes set forth.

And, in combination with a pin having a shoulder near the point, I claim a projection or plate, H, in the bumper or draw-head.

70,730.—HARVESTER.—Charles W. Marsh and William W. Marsh, Shabbona, Ill.

We claim, 1st, The arrangement of the several pulleys, C E, and G, with tightening or adjustable pulley, D, so that drive-belt, H, may give motion to both drums, K and L, of band of rakes, M, and revolving platform, N, substantially as and for the purpose described.

2d, We claim the adjustable pulley, D, on slide, d, working in groove in plate, f, as described.

3d, We claim the adjustable frame, A, when used in connection with the tightening or adjustable pulley, D, substantially as and for the purpose specified.

70,731.—RAILROAD TRACK.—Henry McCan, Hanover, Ohio.

I claim the construction and arrangement of the base and tread rails, A B, in combination with the chairs and ties, D E, and adjusting bolts, F, in the manner substantially as set forth.

70,732.—MODE OF OBTAINING MOTIVE POWER FROM PETROLEUM AND OTHER OILS.—Robert D. McCreary, Oil City, Pa.

I claim, 1st, The process herein described of producing motive power from oil without wholly destroying its lubricating or illuminating properties, or its value for refining or for other purposes.

2d, I further claim the combined process of partially evaporating oil to obtain motive power, without destroying its valuable properties, and using the resultant gases for fuel or illumination after their expansive force has been or partially so spent in driving the engine.

70,733.—PUMP.—John H. McGowan, and Theodore H. McGowan, Cincinnati, Ohio.

We claim a suction pipe coupling, E E', in connection with a pump cylinder or cylinders A, so constructed as that, when attached to the pump, it will form a reservoir, which will maintain a constant supply of water, and in which the pump cylinder is partly or wholly submerged, substantially as described, and for the purpose specified.

70,734.—COWL OR CHIMNEY CAP.—Charles G. Miller, Cincinnati, Ohio.

I claim the parts, B D E F H I, upon the top of a chimney, arranged substantially as described.

70,735.—DROPPER FOR HARVESTERS.—Lewis Miller, Akron, Ohio.

I claim, 1st, An apron for holding the falling grain, that is wound up and unwound by a traveling roller, and rack and pinion attachments, substantially as described.

2d, Also, in combination with a traveling roller, and an apron wound up and unwound by it, a holding-bar or board, that is thrown into and out of action by the roller, substantially as and for the purpose described.

70,736.—FAN-BLOWER.—Warren P. Miller, San Francisco, Cal.

I claim a blower, consisting of two or more wheels, constructed and operated in manner as described.

70,737.—PRESERVATIVE BLACKING FOR LEATHER.—William B. Moore, Winchester, Mo.

I claim a blacking and leather preservative, composed of the ingredients hereinbefore named, and compounded in the manner and in the proportions substantially as described.

70,738.—MACHINE FOR SETTING UP STAVES IN BARRELS.—James A. Morrell, Chicago, Ill.

I claim, 1st, The buttons, c, provided with the springs, e, substantially as and for the purposes specified.

2d, The adjustable truss-hoop supporter, D E, constructed and operating substantially as set forth.

3d, The hoop or band, C, for keeping in place and supporting the lower ends of the staves, substantially as specified.

4th, The lock or stop, s, for holding the truss hoop supporters in place, substantially as described.

5th, The standard or cylinder, A, base, B, and buttons, c, in combination with the truss supports, D E, and truss-hoop, F, substantially as and for the purposes specified.

70,739.—LAND ROLLER.—E. F. Olds, Lyon, Mich.

I claim, 1st, Hanging the rollers by means of their shafts or gudgeons to a central adjusting frame, so constructed and arranged that said rollers may be weighted more or less on either side by means of said frame, and the rollers rendered self-adjustable to the surface of the ground, as and for the purpose substantially as set forth.

2d, The central adjustable frame, E, constructed so as to be weighted, in combination with the rollers, B, substantially as and for the purpose set forth.

3d, The caster-wheels, L, and springs, M, in combination with the frame, C, and rollers, substantially as and for the purpose set forth.

70,740.—FLASK FOR CASTING TWEERS.—Beneville C. Painter, Mechanicsburg, Pa.

I claim, 1st, In combination with the sections, A B, of the flask, the partitions, I K, and false or removable bottom, D, arranged as and for the purpose described.

2d, Also, in combination with the previously made tube, G, the ferrule, e, and slide, F, in the section, B, for the purpose of molding in the tube, and removing the finished casting from the flask, substantially as described.

70,741.—LIGHTNING CONDUCTOR.—William G. Pike, Philadelphia, Pa.

I claim, 1st, A lightning conductor, consisting of a cylindrical or flattened tube or gasket of woven, braided, or plaited wire, terminated at its upper end by a solid point, substantially as shown and described.

2d, The angular rod, e, for connecting separate branches of the tubular conductor, constructed substantially as set forth.

3d, The combination of the wire tube, a, solid point, b, inserted rod, e, and insulators, d, arranged and constructed in the manner and for the purpose substantially as set forth.

70,742.—MIXING AND DRYING CYLINDER.—Leman B. Pitcher, Salina, N. Y.

I claim the crooked arm, A, the head, B, with the feeding hole, b, therein, each separately and in combination, with each other, and each also in combination with the cylinder, C, made and operated substantially as and for the purpose described.

70,743.—STEAM ENGINE CUT-OFF.—George W. Rawson, Cambridgeport, assignor to himself and Michael Hittinger, Somerville, Mass.

I claim the combination of the slide valve, the two gates, their openings and mechanisms, substantially as described, for operating such gates in manner as specified.

I also claim the said mechanism or combination, substantially as described, for operating the gates of the slide valve through the agency of a governor, and the mechanism for producing the longitudinal movements of the slide valve, such mechanism or combination first mentioned consisting of the tripper, p the notched slide bars, g g, the pawls or catches, m m, the springs, k k, the arms, f f, and the studs, r s, the whole being arranged and applied to the steam chest and the slide valve, substantially in manner and so as to operate as hereinbefore specified.

70,744.—HARVESTER.—George Riemer, Fayette, N. Y.

I claim the combination, with the sickle bar, H, and grooved wheel, G, provided with the rim, a, and made removable from its shaft, of the friction roller, I, arranged and operating in the manner and for the purpose herein set forth.

70,745.—BRIDLE BIT.—A. H. Rockwell, Harpersville, N. Y.

I claim, 1st, The mouthpiece, A, when composed of three links, d e, and e', and when combined with the sliding bars, f f', and with the rings, g g', or their equivalents, all made and operating substantially as herein shown and described.

2d, The bars, f and f', when made to slide on a flexible mouthpiece, when connected with the nose strap, B, and when made and operating substantially as and for the purpose herein shown and described.

70,746.—STEAM GENERATOR.—Robert E. Rogers, and James Black, Philadelphia, Pa.

We claim the boiler, A, having the enlargement, a, formed so as to project at or about a right angle with the body of the boiler, in combination with the circulating tubes, B, when the upper ends of said tubes are inserted straight into the enlargement, a, and the lower ends of said tubes are bent and inserted into the lower portion of the body of the boiler, A, substantially as set forth.

70,747.—HAND CORN PLANTER.—McCollum Russell and Alfred G. Burdick, Mill Rock, Iowa.

We claim, 1st, The plunger, E, provided with a pocket, e, regulating slide, J, and metallic end, K, in combination with the opening in the bottom, D, of the seed chamber, brush, d, and springs or scrapers, B B C C, substantially as and for the purpose set forth.

2d, The cell or pocket, e, in combination with the regulating slide, J, and brush, d, substantially as and for the purpose described.

3d, The combination and arrangement of the stop, I, strap, H, pin, h', button, L, and plunger, E, substantially as and for the purpose specified.

70,748.—CONSTRUCTION OF BUTT HINGES.—D. C. Sage, Middletown, Conn.

I claim 1st, The attachment of butt hinges to door casings and doors by means of hooks and plates, substantially as described.

2d, The construction of the leaves of hinges with hooks, a a, or their equivalents, upon them, for being received by perforated plates, B, substantially as described.

3d, The washers, d, of hardened metal, and detached from the pintle of the hinge, applied in recesses at the joints of the hinge, substantially in the manner and for the purpose described.

70,749.—COAT AND HAT HOOK.—J. B. Sargent, New Haven, Conn.

I claim a coat and hat hook, consisting of the plate, C, and hook or hooks, A or B, or both, on which the knob, D, is secured by a rivet or screw passing therethrough, in the manner described.

70,750.—SNAP HOOK.—J. B. Sargent, New Haven, Conn.

I claim, 1st, The double tongue, D, in combination with the hook, A, when constructed so as to operate substantially as described.

2d, The thumb-piece, E, in combination with the tongue, D, of a snap hook, so as to lock and secure the snap when closed.

70,751.—SAW SET.—Amos M. Shafer, Camden, Ohio.

I claim, 1st, The screw standard, H b, and hand nut, I, in combination with the spring, F, constructed and operating substantially as and for the purpose set forth.

2d, Preserving the parallelism of the sliding rest, P, with the anvil, and at the same time changing its relative hight with said anvil, by sliding the inclined edge of the said rest in brackets, M O Q M' O' Q', substantially as described.

70,752.—COG CHAIN.—Thos. Shaw, Philadelphia, Pa.

I claim the chain link, as constructed, for the purpose specified.

70,753.—CORN PLANTER.—William H. Shepherd, College Corner, Ohio.

I claim, 1st, The grain-dropping frame consisting of the cross beam, I, and grain slides, J J', arranged substantially as shown.

2d, The blocks, O, to indicate the position of the hills, as set forth.

3d, The provision of side beams, F F', pin, f, slot, f', and screw, e, for the purpose stated.

4th, The provision for liberating the hinged piece, L', allowing of the spouts M, to swing clear of the ground, as stated, and for the purpose set forth.

5th, The arrangement of the parts, h h' h'', for the purpose of disconnecting the seeding frame from the crank, G, as and for the purpose set forth.

70,754.—MODE OF SEPARATING VEGETABLE MATTER FROM ANIMAL FIBERS.—Henry Sherwood, London, Great Britain.

I claim, 1st, To disaggregate vegetable fibers or substances by means of their expo-ure to gaseous sulphuric anhyride, and to anhydrous chlorohydric gas, each used alone or together, or in mixture with other gases not being the elements of water; but I do not claim the use of vapors produced by evaporating the sulphuric or muriatic acids of commerce, except the oxygen caused to enter into chemical combination with some other element to form an oxide.

3d, I claim, in an instrument necessary for making use of gaseous agents, the combination of air-tight rollers, a and b, to receive substances into a cavity filled with an atmosphere of gases, and to deliver them from it, with any known mechanical arrangement applicable to receiving the substances from the ingress-rollers and delivering them to the egress rollers, (one of such arrangements being given as an example, c,) acting substantially, and capable of modification, as described.

3d, I claim to prepare vegetable fibers for paper making and other uses, by submitting them to the action of known agents in closed cisterns containing liquids at a low heat, (under 100° centigrade,) but under pressure of air or of liquids.

70,755.—MACHINE FOR TEMPERING FILES, SAW BLADES, AND OTHER ARTICLES.—John Small, St. Louis, Mo.

I claim, 1st, In a machine which is adapted for tempering files or plates and confining them between clamps during the tempering process, constructing the box containing said clamps wholly or partly of glass, substantially as described.

2d, The construction of the grated clamps, D D', with bracing ribs upon their backs, in combination with double-acting screw shafts for moving these clamps, substantially as described.

3d, The arrangement of the clamps, D D', in inclined planes within a bath or box, A, and upon double-acting screw shafts, E, operated and operating substantially as described.

4th, The hinged plate or apron, J, applied to the jaw, D, in combination with movable hooked rods, g, substantially as described.

5th, The standard, H, provided with pulleys, h h', upon its upper end, over which ropes or chains pass, which are attached to the hinged apron, J, and also to the cross head of hooked rods, g, substantially as described.

70,756.—SPRING ROCKINGCHAIR.—Edmund Smith, Jr., Worcester, assignor to Albert Goodspeed, Hubbardston, Mass.

I claim, in combination with the frame and seat of a chair, the springs, a a' a'', with their opposite ends fastened respectively towards the front and rear of the chair, all arranged and combined substantially in the manner and for the purposes above set forth and described.

70,757.—STEAM GENERATOR.—Jas. T. Smith and John Walter, Baltimore, Md.

We claim, 1st, The interior series of boilers, A, connected with tubes, n, and supplied with caps, s, at each end, the whole constructed and operating substantially as set forth.

2d, The mud-sills, E, pipes, H, in combination with the outside tier of boilers, A, operating as and for the purpose substantially as herein described.

3d, The goose neck branch pipes, L, in combination with the central tier of boilers, A, constructed as and for the purpose substantially as set forth.

70,758.—LOW-WATER INDICATOR.—L. Franklin Smith, Philadelphia, Pa.

I claim, 1st, The arrangement of the water gage, O, chambers, P and P', and three-way cocks, M and Q, in relation to the boiler, and with reference to the expanding tube, C, and fixed rod, G, substantially as described and for the purposes specified.

2d, The arrangement of the weight, N with the lever, H, and arm, h, for closing the valve, K, substantially as described.

70,759.—CASKET HANDLE.—William M. Smith (assignor to himself and the Meriden Britannia Company), West Meriden, Conn.

I claim the employment of attachments, D, or their equivalents, having tags, E, in combination with the depressions formed in the plates, B, substantially as and for the purpose described.

70,760.—SASH STOP.—Henry Soggs, Columbus, Pa.

I claim, 1st, The combination and arrangement of the pinion, E, and winch, F, applied to the jamb, with the rack bar, D', and friction rollers, f', applied to the sash in the manner and for the purpose set forth.

2d, The spring catch, G, in combination with the winch, and operating in the manner and for the purpose.

70,761.—PROCESS OF PREVENTING DECAY IN WOOD.—J. H. Taylor, New York city.

I claim, 1st, The chemical combinations of the above-named agents, in the manner described, for the purpose of preserving wood and other fibrous materials from decay.

2d, The combination of these potent antiseptics in the form of vapor, acting in accordance with known chemical laws, in the manner and for the purpose described.

70,762.—GATE.—G. L. Templeton, Pierceton, Ind.

I claim the cam, B, made of round wire, or similar material, and secured to the inner wing, E, in combination with the outer slotted wing, F, roller, I, gate, A, and frame, B, having a slot, J', arranged and operating substantially as and for the purposes set forth.

70,763.—CARRIAGE JACK.—Isaac Varney, Kenebunk, Me.

I claim the arrangement and combination of the arm, D, toothed slide, C, gear, b, casing, a, centrally-pivoted pawl, e, and spring pawl, t t, on the hollow cylinder, B, substantially as and for the purposes set forth.

70,764.—WELL TUBE.—Joseph Wagner, Newcastle, Pa.

I claim, 1st, The perforated stem, C, of the point, b, encased within the tube, A, in combination with the slot, a, and pin, b, substantially as and for the purpose described.

2d, The combination of the point, B, constructed as described, with the perforated stem, C, perforated tube, A, slot, a, and pin, b, substantially as and for the purposes described.

70,765.—FOUNTAIN PEN.—Michael Wagner (assignor to himself and Herman Witte), Cincinnati, O.

I claim the winged bristle socket, J K, sheath, C D F, scallops, E, slot, L, and stud, H, slot, G, combined, arranged, and operating as and for the purpose specified.

70,766.—MANGLE.—H. Wehdeking, Edgerton, O.

I claim, 1st, Tightening the lines bed and shortening the same, by the ar

rangement of the arms, A A A A, holes, a a, and pins, b b b b, in combination with the stationary arms, B B, substantially in the manner as herein described and shown.

2d, The construction and arrangement of the legs or lower part of the mangle, in combination with the rods, I I, substantially in the manner and for the purpose as herein described and shown.

3d, The arrangement of the wooden spring, J, rubber springs, I I, rods, I I, rollers, F and H, in combination with the arms, A A A A, and arms, B B, and the legs of the mangle, substantially in the manner and for the purpose as herein described and shown.

70,767.—COMPOSITION FOR INKING ROLLERS AND PADS.—J. M. Wilbur, Cleveland, O.

I claim the composition for ink rollers or pads consisting of the ingredients in about the proportions herein given, as and for the purpose specified.

70,768.—HORSE POWER.—Wm. H. Wiley, Fredonia, N. Y.

I claim, 1st, Extending the frame of the machine laterally across and beyond the circular track travelled by the horses, and providing the same with slides for the reception of a drag saw cross head and with bed pieces for the horizontal shaft pillow blocks, in the manner and for the purposes described.

2d, Securing the pinion spindles, D, to the tab'e, C, at varying distances from the center thereof, so that different sizes of pinions to gear with cog rim, F, and spur wheels to gear with pinion, b', may be used, as and for the purpose set forth.

70,769.—EGG STAND AND BOILER.—Edward P. Woods and Daniel Sherwood (assignor to Woods, Sherwood & Co.,) Lowell, Mass.

We claim, as a new article of manufacture, an egg stand and boiler, constructed substantially as described and for the purposes specified.

70,770.—MACHINE FOR MAKING WIRE DISH STANDS, ETC.—Edward P. Woods and Daniel Sherwood, (assignors to Woods, Sherwood & Co.,) Lowell, Mass.

We claim, 1st, The spiral grooved head or former, constructed substantially as described and specified.

2d, The combination of the spiral grooved head or former with the bar, G, substantially as described and specified.

3d, The combination, with the spiral grooved head or former, of the slots, c c c c, substantially as described and specified.

70,771.—MORTISING MACHINE.—Charles L. Zeidler, Cincinnati, Ohio.

I claim, 1st, The arrangement of continuously vibrated bell crank, D, having the arm, G, and wrist, g, connected on one side by pitman, H, to the chisel bar, and on the other side to a wrist, K, actuated by an obliquely slotted slide, L, under control of the operator, constructed and operating substantially as and for the purpose set forth.

2d, The arrangement of fast and loose sleeves, Q and R, upon the chisel-shaft or stem, engaging and releasing pawls or catches, S and T, cord, U, and pulley, V, in combination with the catch or trigger, H, and tappet, l", rack and pinion, v' l', and actuating and balancing springs, W and N, constructed and operating substantially as and for the purpose set forth.

70,772.—DITCHING MACHINE.—Isaac V. Adair (assignor to himself and Peter Wyckoff,) Varick, N. Y.

I claim, 1st, The arrangement of the wheels, A, axles, B, frame, C, pulley, B', band, A', endless chain of buckets, U, frame, S, adjustable brace bars, C' and D, and frame, F, with each other, substantially as herein shown and described and for the purpose set forth.

2d, The frames, F and C, when connected together by the adjustable bar, R, and draft chain, P, substantially as herein shown and described and for the purpose set forth.

3, The combination of the gage wheel, H, straps, I and J, lever, K, chain, L, and lever, M, with each other, and with the frames, C and F, substantially as herein shown and described and for the purpose set forth.

70,773.—PRINTING PRESS.—Edwin Allen, Norwich, Conn.

I claim the combination of the adjustable or sliding taper rollers, L, with inking roll shaft, k, hung and controlled essentially as described, and disks, K, for operation together, substantially as and for the purpose or purposes herein set forth.

70,774.—STEAM ENGINE.—Ernesto Ansaldi, Leghorn, Italy.

I claim the arrangement of the steam ports, passages, valves, and chests, as described, with the piston of two steam cylinders and their connections, to act in combination with each other, for the purpose of mutually assisting each other for overcoming the dead points of their strokes when accomplished by the means substantially as described and illustrated in the drawings.

70,775.—BELT LACING.—Holland C. Babcock, Cincinnati, O.

I claim the belt lacing provided with a pointed or stiffened tip, B or B', a slit, C, and secured for packing in a coiled form by tag, D, or its equivalent, substantially as and for the object stated.

70,776.—CAR COUPLING.—Peter Baker, Oakland, Md.

I claim, 1st, The coupling pin, B, provided with the flange, e, in combination with the hinge, E, and lever, C, when arranged to operate substantially as herein described and for the purpose set forth.

2d, The draw head, A, when arranged to be adjusted vertically in combination with the frame, G, substantially as herein described.

70,777.—ELEVATOR.—Jas. S. Baldwin, Newark, N. J.

I claim, 1st, The use of the apron, B, and the apron, C, or equivalent yielding edges, substantially as set forth.

2d, The secondary platform, F, and its apron, D.

3d, The balancing of said aprons in the manner set forth.

70,778.—ATTACHING BOLSTERS TO KNIVES.—Henry Barber, Greenfield, Mass.

I claim attaching the bolsters upon the tang by means of projections, a a' and b b', upon each side of the bolsters, the projections being clinched on the top and bottom sides of the tang, substantially as and for the purpose shown.

70,779.—CULTIVATOR.—Morgan Barnett and Eli Wood, Hardinsburg, Ind.

We claim, 1st, The plough frames formed by the combination of the beams, G, standards, E, and adjustable brace bars, I, with each other, substantially in the manner herein shown and described and for the purpose set forth.

2d, Pivoting the beams, G, upon the forward side of the axle, B, by means of the rods or bolts, J, and clips, K, substantially as herein shown and described and for the purphse set forth.

3d, The combination of the locking keys, P, with the forward ends of the beams, G, and with the rods or bolts, J, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the guide frames, M, with the beams, G, and rods or bolts, J and N, substantially as herein shown and described and for the purposes set forth.

5th, The combination of the levers, L, with the beams, G, and guide frames, M, substantially as herein shown and described and for the purpose set forth.

6th, The combination of the graduated stop-lever, O, with the beams, G, and guide frames, M, substantially as herein shown and described and for the purpose set forth.

70,780.—HAM-SLICING HOLDER.—John Baumgartner and Lawrence Angster, Newark N. J.

We claim the guard or arm, B, the brace, F G, the lever, and rack, E, operating together in manner substantially as and for the purposes described and set forth.

70,781.—SEEDING MACHINE.—R. Baxter, French Camp, Cal.

I claim, 1st, The seed box, constructed as described, and provided with a rod and prongs, so located that a part of the several prongs only is in the box, and that at the front side thereof, as and for the purpose described.

2d, The elbow lever, operated by a pin on the plow wheel, and operating the rod with its prongs, in combination with the said rod, in the manner and for the object set forth.

70,782.—BEEHIVE.—James M. Beebe, Casadaga, N. Y.

I claim the series of frames, C C, constructed and bound together, as described, when said frames are used within the casing, A B, formed, as herein set forth, with honey boxes, F F, space, e bottom board, I, and openings, e d, the whole constructed, arranged, and used in the manner and for the purposes set forth.

70,783.—HORSESHOE.—Jacob Behel and John Perrine, Rockford, and John M. Buell, Ogle county, Ill.

We claim, 1st, The movable clips, a1 and a2, when constructed and attached substantially as set forth.

2d, The combination of the movable clips, a1 a2, and shoe, A, having beveled recesses, x, to receive the same, substantially as described.

3d, The combination of the movable clips, a1 a2, and the shoe, A, constructed with corresponding recesses, x, and projections, c c, substantially as described.

4th, The combination of the movable clips, a1 a2, and shoe, A, constructed with stationary clips, y, and projections, c and k, substantially as described.

70,784.—STEAM ENGINE SLIDE-VALVE.—E. H. Bellows, Worcester, Mass.

I claim, 1st, A four post balanced valve, E, constructed and operating substantially as and for the purposes set forth.

2d, The combination with the steam chest, A, having a projection or flange, c, of the valve, E, substantially as set forth.

2d, The combination with valve, E, of cap, H, and projections or flanges, c d f f and ears, e e, substantially as and for the purposes set forth.

70,785.—CULTIVATORS.—Alfred C. Belt, Goresville, Va.

I claim, 1st, The reversed arrangement of the alternate teeth of the cultivator, as described.

2d, The cultivator teeth arranged in reversed positions, as described, in combination with the adjustable scolter.

3d, The grooved or recessed beam, in combination with the flanged teeth secured thereto, as described.

4th, The forward tooth, provided with the perforated sifter mold board, in combination with a following tooth having the reversed arrangement described, for the purpose set forth.

70,786.—POTATO PLANTERS.—John E. Bendix, New York city, and Morris Dietsch, Westchester, N. Y.

We claim, 1st, A carrier wheel, C, provided at its circumference with cups or buckets, d, in combination with a suitable hopper and tubular seeding stock, substantially as and for the purpose specified.

2d, The lever, J, and vertical holding post, K, arranged and operating in relation with each other, and with the sliding bar, G, of the covering blade, substantially as and for the purpose specified.

3d, The sliding bearing, f, arranged in relation with the shaft which carries the cupped or bucketed carrier wheel or wheels, C, and the gearing connecting the said shaft with the driving axle, whereby the movement of the carrier wheel or wheels, with reference to the hopper and seeding stocks, may be stopped without interfering with the progressive motion of the machine, substantially as herein set forth.

70,787.—ADJUSTABLE WATCH KEYS.—J. S. Birch, New York city.

I claim, 1st, Slitting the barrel, A, of a watch key, diagonally, substantially as herein shown and described, and for the purpose set forth.

2d, Forming the lower part of the barrel, A, cone or pyramid shaped, that is to say, decreasing in size towards the shank or stem, a, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the sleeve or slide, B, and nut, C, one or both, and whether made in one or two pieces, with the slit barrel, A, of the watch key, substantially as herein shown and described, and for the purpose set forth.

70,788.—GRINDING MACHINE FOR CIRCULAR SAWS.—Thos. Birch, Covington, Ky., and Adam Sowden, Cincinnati, Ohio, assignors to Ritter, Hogan and Sowden, Cincinnati, Ohio.

We claim, 1st, The provision, in a machine for grinding circular saws, of a pair of driving friction pulleys, adapted to grasp the saw at a shifting point diametrically opposite, or nearly so, to the point of impact of the grindstone, and having a corresponding approach toward and recession from the saw's center in the act of grinding, substantially as and for the purpose set forth.

2d, The arrangement of the saw carriage and driving pulley carriage, caused to automatically advance and recede with unequal velocities in paths parallel to the grindstone's axis, for the purpose explained.

3d, The arrangement of the paired friction driving pulleys, Z Z', made to grasp the saw on opposite sides thereof by means of pressing springs, b b', and set screws, c c', for the purpose set forth.

4th, In combination with the said friction driving pulleys and accessories, we claim the arrangement of travelling gearing and shaft, Y Y', e e e', and stationary gearing, e", as represented.

70,789.—BARREL COVER.—Calvin Bird, Dorchester, Mass.

I claim the combination of the flush handle with the strengthening cleat and guard plate, substantially as described.

70,790.—SETTING STEAM BOILERS.—C. T. Boardman, Pawtucket, R. I.

I claim in combination with the cylindrical boilers, B B, tubular boiler, G, and walls, A, of a setting, the pier, H, and horizontal partitions, J J, arranged substantially as specified.

70,791.—GALVANIC BATTERIES.—Charles Boulay (assignor to Jean David Schneiter), Paris, France.

I claim putting each of the electro motive metals of each element in direct contact with any suitable exciting matters or mixtures of them in the dry or slightly moistened and more or less coarsely pulverized state, which exciting matters or mixtures of them are to act on their respective electro motive metals, or other electro motive bodies embedded in them, by attracting moisture from any suitable exciting liquid or solution, from which they are kept separate by a suitable porous partition or a diaphragm, substantially in the manner and for the purposes described, and illustrated in the annexed drawings.

70,792.—HOUSE VENTILATORS.—Robert Boyd, Evansville, Ind.

I claim, 1st, A ventilator so constructed that pure air may pass into the room, and foul or impure air may be passed therefrom, substantially in the manner herein shown and described.

2d, The outer cylinder, B, with the openings, G, H and J, and the frame, A, combined and arranged substantially as described.

3d, The inner cylinder, C, or its equivalent, arranged and operating substantially as and for the purpose set forth.

70,793.—RAILWAY-AXLE BOX.—C.B. Boynton, St. Paul, Minn.

I claim the arrangement and combination of the rubber, A, under the washer of bolt, B, the inside construction of cover, C, also the flange, E, fitting on to the shoulder at the top of box, D, as herein described and for the purpose set forth.

70,794.—GATE LATCH.—Mark J. Briar, Oxford, Ind.

I claim a latch for gates, etc., composed of latch lever, I, link piece, K, lever handle, L, arranged together substantially as and for the purpose described.

70,795.—SASH FASTENER.—Geo. Brosius, Ranch's Gap, Pa.

I claim the combination of the cam lever, D, spring, E, or its equivalent lever, F, arm, K, bolt, L, and cord, G, in the manner and for the purposes substantially as above set forth and described.

70,796.—APPARATUS FOR DRAWING TIRES FROM ENGINE-DRIVING WHEELS.—Wm. H. Bryant, Chicago, Ill.

I claim the apparatus for drawing tire from wheels, herein described, constructed and operating substantially as her in set forth.

70,797.—CARRIAGE-TOP BUTTON HOLES.—S. A. Budd, Cleveland, O.

I claim the combination of the spring, a, washers, A D, and disk or cap, C, with the curtain, substantially as and for the purpose set forth.

70,798.—HARVESTER.—John Burke, Sycamore, Ill.

I claim, 1st, The combination of slotted plates, F F', provided with notches attached to the front end of gear frame, A, with standard, D, provided with corresponding notches at back end of said gear frame, so that said gear frame may be thus raised or lowered equally at both ends, and parallel with main frame, substantially as set forth.

2d, I claim the combination of slotted plates with rachet, consisting of plates F F', and dogs, G G', substantially as described and for the purpose specified.

3d, I claim the dogs, G G', for the purpose specified.

70,799.—CAR AXLE.—Samuel S. Burt, Marquette, Mich.

I claim the yoke, D, in combination with the axle boxes, C C, axle, B B, and car wheels, A A, substantially as and for the purpose described.

70,800.—AIR ENGINES.—John R. Cameron, Pittsburg, Pa.

I claim, 1st, The combination of the vacuum chamber, A, and the hot air chamber, C, when constructed and arranged as described.

2d, The fire box, B, with its blast pipe, d, and the water cistern, E, in combination with the vacuum chamber, A, constructed and operating substantially as herein set forth.

3d, The inner lining, b', for the purpose of forming more rapidly a vacuum in A, and also the bellows, D, in combination with the vacuum chamber, A, substantially as herein described for the purposes specified.

70,801.—CREEPING ROBES FOR INFANTS.—M. M. Cashman, Boston, Mass.

I claim forming a creeper, by uniting a skirt, A Ai Aii, with a wrapper, Aiv Aiii Aii, substantially as shown and for the purpose set forth.

70,802.—ROTARY ENGINES.—Edwin Chapman, Rochester, Minn.

I claim, 1st, The arrangement of the steam chamber, e, aperture, g, and packing, r, with reference to the piston, D, and shaft, E, as herein described for the purpose specified.

2d, The construction of the piston, D, provided with the opening for discharging steam into the cylinder, and opening, f, for exhausting the steam through the shatt, substantially as herein shown and described.

70,803.—MOTOR FOR OPERATING SEWING MACHINES.—Wm. Z. W. Chapman, New York city, H. C. Goodspeed, Plainfield, N. J., and Edwin Reed, Bath, Me.

We claim a sewing machine motor, in which is a barrel enclosing the coiled spring, the equalizing fly wheel, the train of gears, regulating cone pulleys, c c', connected by a band which is operated by a sliding rack and pinion, all constructed and combined as described, and for the purpose set forth.

In combination with the above we claim the brake apparatus, constructed as described and for the purposes set forth.

In like combination we claim the arrangement of the cover of the table, provided with an aperture, which while shut will expose the arm and plate, and when open will neither disturb the machine nor carry any part thereof with it.

70,804.—LEVELING ATTACHMENTS TO AGRICULTURAL IMPLEMENTS MOUNTED ON WHEELS.—Benj. F. Cook, Olema, Cal.

I claim the application of a wheel, F, provided with a rim, a, bevelled so as to form inclined planes, and interposed between the rear axle and bolster of the machine, substantially as and for the purpose set forth.

I also claim the combination of the wheel, F, and the capstan or winch, H, substantially as and for the purpose specified.

I further claim the brake, e, arranged in relation with the drum, dx, of the capstan or winch, H, and connected to the lever, Gx, when said parts are used in combination with the wheel, F, for the purpose set forth.

70,805.—ROOFING.—Geo. Cook, Paris, Ill.

I claim, 1st, A tile, B, of earthenware, stoneware, or other suitable material, having the parts, D E F G H, substantially as shown and described.

2d, In combination with the tile, B, I claim the cap, G, having a groove, g, as and for the purpose set forth.

3d, In combination with the tile, B, I claim the hasp, C c c', as and for the purpose stated.

4th, In combination with the elements, D E F H, I claim the bead, I, and grooved comb, J, for the different sides of the roof peak, as and for the purpose set forth.

70,806.—SILENT BOLT FEEDER.—Jacob Cornwell, Kalamazoo, Mich.

I claim, 1st, The revolving platform, m, provided with a scraper, f, in combination with the revolving platform, n, substantially in the manner set forth.

2d, In combination with the subject matter of the above, I claim lever, L, and band, s, substantially as described.

70,807.—LOW WATER DETECTOR.—Clemoire F. Cosfeldt, Jr., Philadelphia, Pa.

I claim, 1st, The arrangement within the boiler of the valve seat, B, support, E, and the independent slotted valve, C D, having shank, b, and rod, d, as and for the purpose described.

2d, The regulating screw, d, one end protruding through the slot, c, and the other end resting on the support, E, substantially as and for the purpose described.

70,808.—CLOTHES WRINGER.—E. Hall Covel, New York city.

I claim, 1st, The double slotted standards, A A, in combination with the conical box, N, and levers, H H, substantially as and for the purpose herein recited.

2d, The double bail or semi-circular levers, H H, jointed together, and forming thereby a fulcrum for each other, with the boxes, N, attached thereto, or cast theron, and having the springs and adjustable nut on the ends, as and for the purpose described.

70,809.—APPARATUS FOR CARBURETING AIR.—William F. Cozzens and J. H. Jones (assignors to themselves and Leopold Bouvier), St. Louis, Mo.

We claim, 1st, The combination of the condensing or forcing apparatus, A, with the carbureter, B substantially as set forth.

2d, The combination of the trays, B2 and B3, and the injection pipes, b5 and apertures b4, when arranged as and for the purposes set forth.

70,810.—CHEESE PRESS.—E. J. Crane, Laporte, Ind.

I claim the platform, A, the studs, B B' and C, the connecting bar, E, the levers, D D', the pressing stud, F, and the table, G, arranged, combined and operating substantially as shown and described for the purposes herein set forth.

70,811.—CONSTRUCTION OF SHEET METAL BOXES.—Martin H. Crane (assignor to Crane, Breed & Co.), Cincinnati, O.

I claim the mode of stiffening and ornamenting vessels made of sheet metal by the use of composite ribs or mouldings of wood and metal, soldered to the exterior or interior surface of the vessel, substantially as set forth.

70,812.—VENTILATING DEVICE FOR RAILROAD CARS.—Wm. G. Creamer, Brooklyn, N. Y.

I claim the construction and attachment of ventilating plates to the sides of railroad cars, to admit air and exclude rain and cinders, and present a flush surface, substantially as specified.

70,813.—BOAT HOISTING APPARATUS.—A. F. Crosman, Steamer Ossipee, U. S. N.

I claim, 1st, The drums, D D, upon the shaft, E, secured to the side of the vessel between the davits, and provided with a rope, G, passing through the side of the vessel, all arranged as described, whereby the manipulations of the rope, G, operate the tackle ropes, a a, simultaneously, as herein shown and described.

2d, The arrangement of the links, J K, hooks, L, metallic mousings, M, hooks, N, and vertically sliding bar, f, for detaching the boat from the tackle blocks, as herein shown and described.

70,814.—METHOD OF STARTING AND STOPPING CARS.—Alonzo G. Crossman, Huntington, N. Y.

I claim, 1st, The cylinder, L, and piston, K, in combination with the wheels, D, E and F, and suitable connections, the whole operating in conjunction with the axle, G, substantially as set forth.

2d, The combination with the cylinder, L, piston, K, and wheels, D, E and F, of the clutches, a and b, substantially as and for the purpose specified.

3d, The combination, with the piston, K, and cylinder, L, of the rack, R spur wheel, S, and crank, T, substantially as and for the purpose set forth.

70,815.—FAUCET FOR STOVE RESERVOIRS.—John B. Crowley (assignor to himself and Chamberlain & Co.), Cincinnati, O.

I claim, 1st, The provision, in a stove reservoir, or boiler, of the spout, B, having within the reservoir a plug or valve, D, whose stem extends and is operated above the top of the reservoir, substantially as and for the purpose set forth.

2d, The arrangement in a stove reservoir of the spout, B, having within the reservoir the upturned seat or inlet, C, and self-closing valve or plug, D, whose stem or handle extends through an orifice, e, in the reservoir lid, and is confined in lugs or guides, G H, substantially as set forth.

70,816.—CORN HARVESTER.—John P. Culp, Quincy, Ill.

I claim, 1st, The wheels, D E F H I I', the shipper, G, cutter, K, and reel, L, arranged as described, in combination with the sustaining wheels, B, and shaft, a, of a corn cutting machine, as set forth.

2d, The jointed arms, c c, in combination with the cutter, K, and reel, L, arranged and operating substantially as and for the purpose set forth.

3d, The combination of the latch, O, and the trap-fails, N N N', in the bed of a corn cutting machine, when arranged and operating substantially in the manner and for the purpose described.

4th, The roller, P, with its arm, l', and the latch, m, when combined with the frame and bed of a corn cutting machine, and arranged and operated substantially as and for the purpose set forth.

70,817.—ASH SIFTER.—J. Warren Custer, Trappe, Pa.

I claim the arrangement of the wire sieve, D, having a wire around its circumference, when secured within a circular box, A, by means of the jaws, E E, formed in said box, and the spring, G, in the manner and for the purposes set forth.

70,818.—SASH SUPPORTER AND FASTENER.—Amos Cutter, East Boston, Mass.

I claim the combination of the arms carrying the rollers or wheels holder, F, and thumb screw, G, or its equivalent, substantially as and for the purpose described.

70,819.—GATES.—Orlean Doud (assignor to himself and Isaiah Rowe), Dansville, New York.

I claim, 1st, The combination of the rail, A', with the pin, b, and post, B', with cap, a, and metal plate, C, with the gate, A, having a segmental bar, D, all constructed, arranged and operating in the manner and for the purposes set forth.

2d, The latches, d d, rod, i, lever, e, spring, g, used in connection with the gate, A, and post, B, with its pins, x x, for the purposes set forth.

70,820.—CAPSTANS.—Jacob Edson, Boston, Mass.

I claim, 1st, Constructing the base of two cone-shaped disks, or shells, one of which is reversed so as to give double bearings, B B, and B' B', for the standard or spindle, H.

2d, The unguent receptacle at the top of the base, and surrounding the standard or spindle, H, made substantially as and for the purpose set forth.

3d, The extending of the fleeting cleats above the joint which separates the head from the body of the capstan, substantially as described and for the purpose set forth.

4th, Combining with the body of the capstan the head and cap, N, made in one piece, substantially as and for the purpose set forth.

5th, In placing the upper bearing of the capstan in the top of the cap or head, N, substantially as and for the purpose set forth.

6th, The combination of the draining pipes, L L, with the receptacles, K K, substantially as described and for the purpose set forth.

70,821.—WHEEL BARROW.—David B. Ellis, Ypsilanti, Mich.

I claim the diagonal brace, bracing and strengthening both the body and legs of the barrow against lateral and perpendicular strain and pressure, substantially as described.

70,822.—MARBLE SHOOTER.—Wm. F. Falls, Boston, assignor to Ira Steward, Milford, Mass.

I claim a marble shooter having its parts constructed and arranged to operate and adapted to the projection of marbles of varying size, substantially as set forth.

70,823.—DOOR HOLDER.—C. J. Fisher, Waukon, Iowa.

I claim the combination of the cam lever, E, frames or plates, B and C, and bumper, F, with each other, substantially as herein shown and described and for the purposes set forth.

70,824.—CROOK FOR MUSICAL INSTRUMENTS.—Isaac Fiske, Worcester, Mass.

I claim a crook for musical instruments made of one piece of metal and formed into shape substantially as set forth.

70,825.—WORK BOX.—James S. Fletcher, South Bend, Ind.

I claim a revolving or turning work box with aparments within it for containing sewing articles accessible as set forth, and constructed as described and represented, out of solid rings, C c, as set forth and explained.

70,826.—COMPOSITION FOR COATING SHIPS' BOTTOMS.—Geo. A. F. Fowke, Westminster, Great Britain.

I claim the composition, in its forms, I, II, annd III, and in its application and use, as hereinbefore in this specification described, for the purpose of coating the bottoms of iron and wooden ships, floating docks, and other similar structures and submarine works, and thereby preventing them from fouling and the ravages of the worm.

70,827.—SLEIGH BRAKE.—C. Gardiner, Esperance, N. Y.

I claim, 1st, The pawls, G, their upper ends wedge shaped and pivoted in the corresponding wedge-shaped mortice in the bent lever, E, whereby the pawl is permitted to yield to the backward movement of the sleigh, all arranged and constructed as herein set forth for the purpose specified.

2d, The connecting rod, e, embracing the bar, A', and the tongue, A", connected by the pin working in the slot in the tongue, its lower part extending to the neck yoke, all constructed and arranged as described, in such a manner that the length of the stroke of the pawl, G, shall be governed by the length of the slot in the tongue, as herein set forth for the purpose specified.

70,828.—RAILROAD GATE.—E. K. Gardner, Orville, Ohio.

I claim the gates, D D, levers, m m and n n, arms, l l, and movable rails, C C, all combined substantially in the manner and for the purpose set forth.

70,829.—CAR COUPLING.—Samuel Gissinger, Lawrenceville, Pa.

I claim the pivoted buffer, A, provided with link opening, O, pin opening, 2, plate, R, and locking pin, f, when used in combination with lever, g and r, chain, m, and springs, n and s, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

70,830.—TOOL REST.—Wm. Gleason, Rochester, N. Y.

I claim, 1st, The employment of the triple screw system, substantially as herein set forth, for the purpose of adjusting vertically the cutting tool of engine lathes without loosening it.

2d, The arrangement of the eccentric clamping shaft, Y, in connection with the clamping screw, S, and rest, D, substantially in the manner herein shown and described and for the purpose set forth.

70,831.—METAMORPHOSCOPE.—E. A. Goodes (assignor to himself, E. L. Miller, and W. H. Morford), Philadelphia, Pa.

I claim, 1st, The combination of two or more endless belts of different lengths, furnished with sections of figures or pictures, substantially as and for the purpose specified.

2d, The combination of the endless belts furnished with sections of figures or pictures, the rollers, A" a b c, and the top plate or cover, e, formed with an opening, f, substantially as and for the purpose specified.

70,832.—TRAVELING BAGS AND VALISES.—Nicholas Groel, Newark, N. J.

I claim as an article of manufacture the struck-up metallic corner pieces, D, when constructed and applied in the manner described to valises and traveling bags, for the purpose specified.

70,833.—DRYING ATTACHMENT FOR PAPER RULING MACHINES.—R. J. Groshans, Buffalo, N. Y.

I claim, 1st, The application of a revolving fan to paper ruling machines for the purpose of drying the paper, and causing the same to be discharged smoothly into the box prepared to receive it, substantially as set forth.

2d, The manner of constructing the fan, substantially as shown and described, to wit, having the fan composed of pasteborrd, tar-board, or an equivalent material fitted on pins, c, in the shaft, and retained in position by springs, B, substantially as shown and described.

70,834.—TAG HOLDER.—A. Grushus, St. Paul, Minn.

I claim the tag holder made substantially as herein described.

70,835.—TREADLE FOR SEWING MACHINES.—Thomas J. Halligan, New York city.

I claim, 1st, The construction and arrangement, substantially as herein described, of the treadle shafts, C D, with their treadles, A B, for operation in unison and whereby said shafts are made the one to support and protect the other, essentially as herein set forth.

2d, The combination of the treadle shafts, C D, arranged as described, with their treadles, A B, driving arms or levers, E F, pitmen, G H, and double-throw crank, I, of or to the revolving shaft, K, substantially as shown and described.

70,836.—STOVEPIPE DAMPER.—Griffen B. Halsted, N. Y. city.

I claim, 1st, The notched friction ring, in combination with the spurred shaft of the damper, substantially as and for the purpose specified.

2d, The friction ring constructed with a cam-like surface, whereby the compression of the pipe may be increased by turning the friction ring with reference to the damper shaft, substantially as and for the purpose specified.

3d, The damper, B, constructed with the angular groove, c, and the lips, f, arranged in relation with each other substantially as described, whereby the damper may be readily attached to its spurred shaft, as set forth.

70,837.—LOOM.—Marion McDonald Hankins, Vandalia, Ill.

I claim, 1st, The combination of the straps, C C, and rollers, D E, for operation substantially as specified, to work the pickers by the action of the lay.

2d, The arrangement of the picker levers, B B, constructed as described, springs, F, or their equivalents, and the lay, substantially as herein set forth.

3d, In combination with the levers, B B, the connecting straps, G G, rollers b pickers, H H, and check straps, I I, for operation with each other and the lay, as shown and described.

4th, The means, substantially as herein described, for operating the treadle roller, T, consisting of rods, J J, lever, K, shaft, L, spring, N, rod, O, and clutch and lever, Q P, essentially as specified.

70,838.—MEDICAL COMPOUND.—John Harrigan, East Boston, Mass.

I claim the above described medicine, compounded as described and for the purpose set forth.

70,839.—AMALGAMATOR.—F. G. Hesse, San Francisco, Cal.

I claim, 1st, The narrow annular amalgamating chamber, A, formed by a revolving cylinder, D, and an inner cylinder, either stationary or revolving with D, constructed for very high speed, and in combination with a hydraulic device to cause a current of air to pass through said chamber, for the purpose substantially as described.

2d, The use of an extra current within the chamber, A, for the purpose of discharging pulp without interfering with the amalgamating current, substantially as described.

3d, The manner of producing this current by means of a centrifugal head and guide blades, substantially as described.

70,840.—PENCIL HOLDER FOR COMPASSES.—Wm. G. Hillegass, Philadelphia, Pa.

I claim the removable pencil holding attachment for carpenters compasses the same consisting of the clamp, B, made adjustable by a set screw, c, substantially as and for the purpose herein shown and described.

70,841.—STEAM ENGINE.—John M. Hirlinger, Red Rock, Pa.

I claim slide, H, as constructed, in combination with the slotted cylinder, the bolt or shaft, G, and the piston, B, for operating the valve, D, by means of its pin, E, extending into a recess in said piston, in the manner substantially as and for the purposes specified.

70,842.—PUMP.—John M. Hirlinger, Red Rock, Pa.

I claim the slide valves, a and d, constructed as described, in combination with the stock and piston, arranged as and for the purpose specified.

70,843.—MENSTRUAL RECEIVER.—S. L. Hockert, Chicago, Ill., assignor to himself and Jared Thompson, Sr., Milwaukee, Wis.

I claim the construction and combination of ring, a, sack, b, and arm, c, for the purposes and in the manner substantially as hereinbefore shown.

I also claim the combination of ring, a, sack, b, arm, c, and cord, for the purposes and in the manner as hereinbefore set forth, or their equivalent.

I also claim a combination of ring, a, sack, b, arm, c, cord, l, pad, e, projection, a, set screw, d, belt, l f, and buckle, g, for the purpose and in the manner hereinbefore set forth.

70,844.—TUBE WELLS.—D. Cyrus Holdridge, Lodi, Wis.

I claim the tubular point, B, and screw, f, in combination with the pipe, A, when arranged to operate as described and for the purpose set forth.

70,845.—MACHINE FOR MAKING THE LINKS FOR CABLES AND OTHER CHAINS.—Alfred Homfray, Witley Lodge, England.

I claim, 1st, The sliding shaft or ram, and mandrel which it carries, in combination with the anvil and the jaws for holding the link, and tappets for closing said jaws, substantially as and for the purposes herein shown and described.

2d, The combination with the sliding shaft or ram and its mandrel, of the welding ram or hammer and die, arranged and mounted in the frame of the machine, substantially as and for the purposes set forth.

3d, The combination of the mandrel, its shaft, and the welding hammer and die, with the anvil, link-holding jaws, and tappets by which said jaws are closed, substantially as herein shown and specified.

70,846.—DOOR FASTENING.—Nelson Hornaday, West Elkton, Ohio.

I claim the combination of hooks, A A C, bar, B, with the catches, D E O, when the several parts are constructed, arranged, and operating conjointly in the manner and for the purpose specified.

70,847.—MOLDING-FACING MACHINE.—Robert Howdon (assignor to Crane, Breed & Co.), Cincinnati, Ohio.

I claim, 1st, The construction of the dies of a molding facing machine in two or more adjustable parts, for the purpose set forth.

2d, The arrangement of frame, A, movable dies, C C' C'', and set screws, D, or their equivalents, for the purpose set forth.

3d, The auxiliary die, I i, in the described combination with the rear die C, of a two or more part molding-facing apparatus, for the purpose explained.

70,848.—SELF-ADJUSTING THILLS.—Arah H. Howe, Brookfield, Vt.

I claim, 1st, The independent shafts, B B, connected together by the strap, C, and to axle, A, by means of the rod, a, whereby one or said shafts may be used independent of the other, as specified.

2d, The arrangement of the shafts, B B, low-draft whiffle, D, rods, a a, and connecting straps, in the manner substantially as and for the purposes set forth.

70,849.—MACHINE FOR FILLING MARSHES.—George Howell, Philadelphia, Pa.

I claim, 1st, An excavating boat constructed for partial and varied submergence, having the chamber, B, pipe, G, side plate, a, and with or without the inner plates, J, substantially as described and for the purpose set forth.

2d, In combination with such a boat, I claim the air-tight reservoirs and pipes connected therewith, substantially as and for the purpose set forth.

3d, I claim in combination with such a boat, the stirrers, e, on the shafts, F, substantially in the manner described and for the purpose specified.

70,850.—AUTOMATIC TIGHT-ROPE DANCER.—Wm. Humans (assignor to himself and Charles Williams, Jr.), Boston, Mass.

I claim, 1st, A jointed figure, balanced as shown, in combination with a pulley wheel, c, provided with cranks or arms, d, through which motion is imparted to the legs of the figure as the pulley passes over a cord, on which it is supported, substantially as described.

2d, I claim the combination of the hinged arm or detent, e, and cord, g, or its equivalent, attached to the arm of the figure, substantially as and for the purpose set forth.

70,851.—PADDLE WHEEL.—Wm. Hunter, Detroit, Mich.

I claim a paddle wheel constructed with radial arms, B, and floats, D, which are rigidly attached to the end of one arm, and, extending in front thereof, are secured on the opposite edge of the next preceding arm, or to the rim, C, in such manner as to form an acute angle at its upper edge, and form a diagonal bracing for the arms, substantially as described.

70,852.—PAPER FLOUR SACK.—John M. Hurd, Auburn, N.Y.

I claim, 1st, Crimping or softening a strip or band around near the top of the paper flour sack, as and for the purpose specified.

2d, The combination of the plain rolls, G H, or their equivalents, with two or more sets of crimping rolls, when all are used for the purpose above specified.

70,853.—REEL AND SWIFT.—Ezra Hutson, Brockport, N. Y.

I claim, 1st, The sleeve, C, in combination with the pivoted arm, B, substantially as and for the purpose specified.

2d The combination of plates, k k', arms, D D, sleeve, C, and arm, B, as and for the purpose set forth.

3d, Spring, f, wheel, d, sleeve, C, and arm, B, all combined substantially in the manner and for the purpose described.

70,854.—SHRINKING TIRE.—J. B. Jackson and M. R. Jackson, Rochester, Iowa.

We claim the stationary jaw, C, and movable jaw, D, in combination with the screw, F, gripes, G, and keys, H, constructed and arranged to operate substantially as and for the purpose set forth.

70,855.—YOKE FOR GRAIN ELEVATORS.—Eliza Jane Jewell, Brooklyn, N. Y., administratrix of the estate of T. E. Jewell, deceased.

I claim, 1st, Making the yokes of grain elevators of cast iron, constructed substantially as and for the purpose herein shown and described.

2d, The adjustable guide arrangement at the ends of a metal yoke, when consisting of the flanges, c, plates, e, gibs or guides, f, and set screws, g, all made and operating substantially as described, in combination with the tenons, b, on the uprights of the stationary frame, A, arranged as described.

70,856.—LAMP.—Melvin Jincks, Dansville, N. Y.

I claim the employment of a gas tube which shall extend from the mouth of the wick tube to the first floor of the shell, for the purpose of retaining and consuming the gas generated in the lamp, when arranged in combination with non-conductor, B, shell, A, and extinguisher, E, as herein set forth and described.

70,857.—COMPOUND TOOL FOR PUNCHING AND SHEARING.—J. C. Jordan, Watertown, Wis.

I claim the combination of the frame, A, lever, C, cogged segment, D, pinion, E, handle, F, shears, B G, cam, H, box, L, mandrel, I, punch, M, and die, f, all arranged and operating substantially as herein described and represented.

70,858.—FIREPLACE.—Israel Kepler, Corry, Pa.

I claim in connection with the common corrugated grate back, the corrugated extension plate or back, H, projecting over the fire and continuing up to the throat of the flue, as and for the purpose herein described and represented.

70,859.—SHEEP TROUGH.—Frank Ketcham, Monongahela City, Pa.

I claim the sheep trough of the form and configuration substantially as and for the purposes herein shown and described.

70,860.—DOOR LATCH.—Edward King, Taunton, Mass.

I claim the combination of the hub, F, to knob spindle, having extension arm, H, in combination with a latch bolt carrying pawl, I, when all arranged together for operation substantially as and for the purpose described.

70,861.—SHEEP SHEARS.—Brainerd Kingsley, Sharon, Mich.

I claim 1st, The bands, G G, and handle, I, arranged to hold and operate cutters, J, substantially as set forth.

2d, The combination of cutters, J J, and m m m, with levers, B C, bar, A, bands, G, and handle, I, as set forth.

3d, The plate, E', bar, a, posts D and E, arranged to support bands, G G, and lever, C, substantially as described.

70,862.—NUT-TAPPING MACHING.—Jas. Kirkley, Chicago, Ill.

I claim 1st, The arrangement of a gang of die boxes, a gang of taps, a gang of rotating and vertically sliding spindles, in the relation shown to gears, and a shaft, O, the parts above named being constructed and operated substantially as herein described.

2d, The arrangements of the oil receiver, G, oil-supply reservoir, F, pipes, d e, and forcing-pump, a, in combination with the die bed and vertically sliding and rotating spindle carrying taps, substantially in the manner and for the purpose herein described.

3d, The combination, with the nut tapping machine, constructed and operating substantially as herein described, of an automatic lubricating and oil-elevating apparatus, constructed and operating substantially as herein described.

4th, The arrangement of the levers, R, weight, W, links, R', treadles, S, and vertically-sliding and horizontally-rotating spindles, carrying taps, H, in relation to one another and to the die-bed, D, substantially in the manner and for the purpose described.

70,863.—MACHINE FOR CUTTING PAPER STOCK.—Abijah L. Knight, Baltimore, Md.

I claim 1st, The combination of the crank shaft, G, pitman, F F, knife-block H, guide-frame, I, and knives, i and C, substantially as and for the purpose specified.

2d, The combination of the crank shaft, G, pitman, F, having the pin, e, lever, L, pawl, p, ratchet, r, idle-wheels, O and P, feed-rollers, M, M', N N', and feed-table, I, all constructed and arranged substantially as and for the purpose set forth.

3d, The paper-stock cutting machine above described, consisting of the parts specified in clauses one and two of this claim, combined and arranged together substantially as described, for the purpose of cutting and preparing paper stock.

70,864.—MACHINE FOR MOLDING PULLEYS.—Thos. Knowles, Robert Knowles, and Samuel Knowles, Jersey city, N. J.

We claim a machine or apparatus for molding wheels or other work of curvilinear character, having for its elements a pillar or post, A, horizontally swinging and radially adjustable ram, D, carrying a vertically adjustible ram or pattern-holder, I, and dividing gear for adjusting the swing of the horizontal ram, substantially as specified.

70,865.—COMPOSITOR'S COPY HOLDER.—P. A. La France, Elmira, N. Y., assignor to himself and H. R. Kendall, New York city.

I claim 1st, The board, A, when provided with the extension, b, and roller, c, or their equivalents, and with the spring finger-bar, C, for holding the manuscript, substantially as and for the purpose herein shown and described.

2d, The board, A, when provided with the extension, c, or its equivalent, and with the indicating sliding bar, D, substantially as and for the purpose herein shown and described.

3d, The board, A, when provided with grooves, h h, or their equivalents, and with slotted plate or plates, E, or their equivalents, substantially as herein shown and described.

4th, The board, A, when arranged as described, so that it can be moved laterally on the type-case, B, and when provided with the spring finger-bar, C, sliding indicator-bar, D, and extension bars, E, or equivalents, all made and operating substantially as and for the purpose herein shown and described.

70,866.—BOLT FASTENING.—V. Lapham, El Paso, Ill.

I claim the bolt fastening, D, formed by the combination of the hinged parts, d1 and d2, pivoted catch, d3, and rubber spring, d4, or equivalent, with each other and with the bolt, C, substantially as herein shown and described and for the purpose set forth.

70,867.—LAMP.—James Lee, New York city.

I claim 1st, The combination of the wooden case, B, with the oil reservoir, A, substantially as herein shown and described and for the purpose set forth.

2d, The interposition of a wooden connection, b2, between the neck, a', of the oil reservoir, A, and the cap, C, substantially as herein shown and described and for the purpose set forth.

3d, Forming air passages, D, in the neck of the lamp, leading beneath the cap, C, from the external air to the interior of the oil reservoir, A, substantially as herein shown and described and for the purpose set forth.

4th, The adjustable extension pedestal, formed by the combination of the parts F and G, springs, f', and stop, g', with each other, and with the case, B, substantially in the manner herein shown and described, and for the purpose set forth.

70,868.—FISHHOOK.—A. I. Lenhart, New Brunswick N. J.

I claim the hook, B, pivoted to the bar, A, provided with the shoulder, b, and having the spring, d, bearing against it, in connection with the slide, c, having the spring, D, attached, and the hook or hooks, C, all arranged substantially as and for the purpose set forth.

70,869.—SHAFT COUPLING.—W. E. London, (assignor to J. A. Fay & Co.), Cincinnati, Ohio.

I claim a shaft coupling, constructed as herein specified, to wit: one half keyed on firmly in the usual manner, the other half provided with an adjustable clamping device, as herein specified and for the purposes described.

70,870.—HORSE RAKE AND HAY SPREADER COMBINED.—J. M. Low, Portlandville, N. Y.

I claim 1st, The arrangement of the revolving toothed shaft, M, and its supporting frame, K, the axle, A, and frame, C, of the rake substantially as herein shown and described and for the purpose set forth.

2d, The combination of the gear wheels, N and O, shaft, P, gear wheels, Q, and R, one or more shafts, S, and the gear wheels, T and U, with each other, and with the drive wheels, B, frame, K, and tedder-shaft, M, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the toothed reciprocating clearer shaft, B', with the revolving toothed tedder-shaft, M, and with the frame, K, substantially as herein shown and described and for the purpose set forth.

4th, Operating the reciprocating clearer shaft, B', from the shaft, P, by means of the eccentric wheel, E', or its equivalent, and the pitman, D', substantially as herein shown and described and for the purpose set forth.

70,871.—QUILTING FRAME AND CLOTHES DRYER.—Geo. A. Mallory, and J. J. Fish, Oxford, New York.

We claim the adjustable slotted standards, A A, cross-rail, B, arms, C C, and cross-rods, g g, constructed and arranged to serve as a quilting frame and clothes horse combined, substantially as described.

70,782.—PREPARING WOOD TO BE USED IN THE MANUFACTURE OF PAPER AND FOR OTHER PURPOSES.—C. K. Marshall, New Orleans, La.

I claim 1st, As a new article of manufacture and commerce, wood chips and saw-dust, reduced to a fine flour or powder, substantially as described.

2d, The use of the flour, obtained as above described, as an ingredient in the manufacture of paper.

70,873.—FURNACE FOR DESULPHURIZING AND REDUCING ORES.—Jabez Maunton, (assignor to himself and Wright Duryea, Wm. Ennis, J. H. Van Riper, A. P. Cummings, and J. Wendell Cole), New York city.

I claim 1st, The combination with a reversible draft in or through them, essentially as specified, of the fuel chambers, E E, and intermediate reducing chamber, F, said chambers being chargeable from above, and communicating with each other at or near the base, substantially as and for the purpose or purposes specified.

2d, The combination with a reversible draft, operating as described of regenerators, D D, fuel chambers, E E, and intermediate reducing chamber, F, said fuel and reducing chambers connecting with each other at or near the base, and chargeable form above, essentially as herein set forth.

3d, The vertical regenerators, D D, with their draft inlets or outlets, e, arranged below, in combination with the fuel chambers, E E, and intermediate reducing chamber, F, for action as described.

4th, In combination with the vertical regenerators, the spray water pipes, K, essentially as and for the purpose specified.

70,784.—FURNACE FOR HEATING PURPOSES.—Jabez Maunton, (assignor to himself, Wright Duryea, Wm. Ennis, J. H. Van Riper, A. P. Cummings, and J. Wendell Cole, New York city.

I claim the combination of the fuel chamber, C C', arranged to connect for combustion at the base, and regenerators, F F', in connection with said chambers at or near their tops, for operation with a reversible draft substantially as specified.

70,875.—RAILWAY SUPERSTRUCTURE.—J. Audley Maxwell, Savannah, Ga.

I claim in the construction and arrangement of the superstructure of railroads, the combination of the ties, A A and B, string pieces, C, chair, H, and knees, K, in the manner and for the purpose herein described.

77,876.—MACHINE FOR PLANING METALS.—Wm. McPherson, New York city.

I claim 1st, The cross-traversing screw, G, or its equivalent, and driving gear, as herein specified, so arranged to the cross-cutting tool in a planing machine as to operate relatively to the cutting tool, A, and table, W, substantially in the manner and for the purpose herein specified.

2d, I claim in combination with the longitudinal and transeverse feeding mechanism of the planer, the adjustable uprights, E E, arranged to operate substantially as and for the purposes herein set forth.

3d, The hinged braces, 2 and 4, in line with the axis of and in combination with the adjustable inclined uprights, E, and bed of the planer, substantially as and for the purposes herein specified.

70,877.—HAND LOOM.—S. C. Mendenhall, Richmond, Ind.

I claim 1st, The application to hand looms of the endless metal-eyed belt or metallic chain, B b, in combination with the spurred pulleys, C, D, the whole being arranged and combind for the purpose of driving the cam shaft, A.

2d, The described arrangement of endless metal-eyed belt or metallic chain, B b, spurred pulleys, C and D, pitmen, P P, and batten, Q.

3d, The described arrangement of the endless metal-eyed belt or metallic chains, B b, spurred pulleys, C and D, pitman, P P, and batten, Q, and the crank, D', when said crank has such a position on its pulley as to give and time the motions of the batten, and the cam shaft, a and for the purposes set forth.

4th, I claim the reversible plate, S, with its slot, n, or its equivalent, for the purposes set forth and described.

70,878.—BLEACHING STOCK FOR PAPER.—S. T. Merrill, Beloit, Wis.

I claim the introduction into a close-covered rag engine or other close vessel, provided with an agitator, of chlorine gas, or the disengaging of the latter from a chlorine solution contained within the box of the engine or other vessel, for the purpose of bleaching paper stock, substantially as set forth.

70,879.—SLIDE FOR EXTENSION TABLE.—Elisha Mets, (assignor to himself and A. Cram), Rochester, N. Y.

I claim in combination with the oblique grooves, substantially as herein shown and described, the bent coupling or locking irons, h, for the purposes set forth.

70,880.—AWNING.—S. Miller, and J. S. McClellan, Champaign County, Ohio.

We claim 1st, The two rollers, B B, in combination with roller, F, canvas, H, arms, G, boards, K K, and cord, I, constructed and operating as described, and for the purposes set forth.

2d, The arranging boards, K K, so as to form a shelter to roller, F, in combination with roller, F, canvas, H, arms, G, boards, K K, and cord, I, constructed and operating as described, and for the purposes set forth.

70,881.—MACHINE FOR TEMPERING SKIRT WIRE.—J. H. Monk Brooklyn, N. Y.

I claim a pair of grooved rollers, adjusted substantially as specified, in combination with the pot or bath for melted metal for tempering wire for skirts, etc., in the manner set forth.

70,882.—WASHING MACHING.—Allan Neilson, Allegheny City, Pa.

I claim, 1st, The corrugated conical rollers, E, when arranged with level lower surfaces and when secured to a swinging frame, C, the axes of which rollers cross each other, substantially as and for the purpose herein shown and described.

2d, The flexible washboard, G, consisting of laths that are secured together by strings or wires, a a, operated by a treadle, F, substantially as set forth.

3d, The combination of the treadle, F, cords, a, box, H, and flexible board, G, with each other and with the rollers, E, all made and operating substantially as herein shown and described.

70,883.—DISH WASHER.—Edwin Norton and J. S. B. Norton, Boston, Mass.

We claim the combination as well as the arrangement of the revolving frame, E E', with the crib, K K, made substantially as described and for the purpose set forth.

70,884.—HOOK FOR TRAVELLERS.—William R. Oatley, Rochester, N. Y.

I claim the two hooks, A B, connected by a swivel joint, and constructed and arranged substantially in the manner as and for the purpose set forth.

70,885.—FANNING MILL, GRAIN AND SEED SEPARATOR.—Harrison Ogborn, Richmond, Ind.

I claim, 1st, The trough, 13, situated under and at the lower end of the upper grain board with a removable side, 15, substantially as and for the purposes described.

2d, The combination of the adjustable trough, 13, with the upper grain board, 11, forming the bottom of the front part of the shoe, I, and the adjustable screen, J, substantially as and for the purposes described.

3d, The combination of the upper grain board, 11, with the adjustable side, 13, of the trough, 13, substantially as and for the purposes described.

4th, A hopper consisting of the side boards, E, with converging grooves, e, the sliding board, F, and adjustable swinging board, H, substantially as and for the purposes described.

5th, The combination of the swinging board, H, lever, E, provided with a spur or tooth, e1, and the rack, e2, substantially as and for the purposes described.

6th, The vertical circular rim, R, secured to the fannings, Q, substantially as and for the purposes described.

7th, The rod, p, with its bent part, p', and the lever, n, substantially as and for the purposes described.

8th, The rod, p, in combination with the linked rods, m and m', wrist, r and wheel, V substantially as and for the purposes described.

9th, The belt wheel, W, pivoted loosely on the pin, w, and provided with three sets of holes, K K1 and K2, for the purpose of giving either circular, side or end motion to the shoes, substantially as and for the purposes described.

10th, The arm, l, rigidly attached to the shoe by means of which motion is transmitted to the shoe, substantially as and for the purposes described.

11th, The combination of the arm, l, rigidly attached to the shoe, pulleys, V W, and belt to give circular motion to the shoe, substantially as and for the purposes described.

12th, The combination of the arm, l, pulleys, V W, and rod, v', to give either side or end motion to the shoe, substantially as and for the purposes described.

13th, The pins, g2, on the cleats of the sliding doors, G', substantially as and for the purposes described.

70,886.—RAILWAY CHAIR.—Nathaniel F. Page (assignor to himself and Elijah Whitney), Rutland, Vt.

I claim as my invention the combination as well as the arrangement of the cap, C, with the part, A, made with the two lips, a b, to receive the rail and the cap, substantially as specified.

I also claim the arrangement of the recess of the lip, b, at an obtuse angle with the rail-supporting surface of the chair, such chair being provided with two lips, a b, and a cap, C, as set forth.

70,887.—CARD HOLDER FOR TRUNKS.—William L. Paine, Boston, Mass.

I claim the within-described card holder for trunks consisting of the strips or plates, B C, in combination with points or projections, or their equivalent, for holding the card securely in place, substantially as set forth.

70,888.—FRICTION CLUTCH PULLEY.—C. D. Palmiter (assignor to S. A. Webb), Oswego, N. Y.

I claim, 1st, The device herein shown and described of connecting the pulley, B, with the shaft, A, consisting of a movable wedge, l, and an eccentric pivoted friction pad, j, which are made and operated substantially in the manner herein shown and described.

2d, The hinged lever, C, spring, h, stationary arm, C, and sliding wedge, I, in combination with each other and with the shaft, A, and pulley B, all made and operating substantially as herein shown and described.

3d, The combination and arrangement of the arm, C, having arm, d, elbow-shaped bar, D, pivoted thereto, and having the arms, f g, and pad, j, spring, h, set screw, i, wedge, l, sliding sleeve, E, pulley, B, and shaft, A, as herein described for the purpose specified.

4th, The pad, j, when attached to the arm, D, at the point of connection of the arm, f g, and out of line with the axis, A e, whereby the revolutions of the pulley, B, in one direction clamps the edge of the pad in line with the axis, A e, and increases its bite, and the revolutions of the pulley in the opposite direction turn the pad out of the line of said axis and releases its bite, as herein described for the purpose specified.

70,889.—BLACKING BRUSH.—Charles A. Paret, Nashville, Tenn.

I claim the arrangement of the staples, D D, loop, F, elastic band, E, scraper, B, spring, C, and groove brush stock, A, as herein described for the purpose specified.

70,890.—ASH SIFTER.—Daniel E. Paris, Troy, N. Y. city.

I claim, 1st, A bail to an ash sifter used separately from an ash pan or constructed with hooks or lugs at either end of the bail so as to engage with an ash pan surrounding or inclosing the sifter and so that both sifter and pan can be moved by the bail or the sifter separately.

2d, A double self-acting lifter to an ash pan or ash sifter so constructed with hooks or other means of moving the pan or sifter but not attached or attachable to them except while in actual use or in vertical position, as herein described and explained.

70,891.—STRAW CUTTER.—Hiram Parks, Athens, N. Y.

I claim the notched feed bar, K, when provided at its front with teeth in combination with the pin, b, on the oscillating lever, I, all made and operating substantially as herein shown and described.

70,892.—BLACKING BOX HOLDER.—Thomas King Payson, New York city.

I claim the box holder, A, with its lid carrier, B, provided with set screws, f, or other equivalent means for securing the box and its lid and setting the same relatively to each other, also facilitating the accommodation of different sized boxes in the one holder, substantially as shown and described.

70,893.—INKSTAND.—Stephen Perry and Joseph John Perry, London, England.

We claim, 1st, The employment of a hollow stopper formed of vulcanized india-rubber, or other suitable elastic material, in combination with the reservoir, A, tube, D, and cup, D1, for the purpose and substantially in the manner set forth.

2d, The tube, D, formed with the protuberance, D2, and fitted into the stopper, C, for the purpose and substantially in the manner set forth.

3d, Forming a stopper, cup and tube, in one piece of hard and soft rubber combined, substantially as described.

70,894.—EDGE PLANE.—J. E. Plummer, Binghamton, N. Y.

I claim the construction and use of a "reversible edge plane," substantially as described and represented for the purpose set forth.

70,895.—BOLT FOR DOOR.—George A. Pridham, Newark, N J.

I claim the plate, A, as constructed and used in combination with the bolt E, provided with screws, G and F, as and for the purpose set forth.

70,896.—GRAIN DRILL.—Hiram Pulse, St. Paul, Ind.

I claim, 1st, The upper box or hopper, F, having the two doors, g g', and throats, H G', for optional discharge of the grain either through the screen or otherwise, as set forth.

2d, The slides, O and Q, adjusting lever, P, clamp, p, and slotted bar, p' combined and arranged substantially as and for the purposes set forth.

3d, The cross bolt, B, and nuts, 1 2 3 4 5 6, in the described combination with the beams, A A', sheaths, C C' C'', and draft rod, Y, for the purpose specified.

4th, The slotted brackets, r, and slotted segmental arcs, r', in combination with the rear wheel, R, and driving belt or chain, S, as and for the purpose specified.

5th, The notched spouts, D, in combination with the valves, n, and winged shares, N n', for the purpose decribed.

6th, In the described combination with the screen, I, and screen chamber, F', of my grain drill, I claim the removable drawer, J, for the purpose specified.

7th, The notched rod, W w, and spring, f, for the purpose specified.

8th, The caster wheel, T, slotted bracket, U, and bolt, V, for supporting the front end of the implement in combination with the adjustable rear wheel, R, as and for the purpose set forth.

70,897.—DISCONNECTING HORSES FROM VEHICLES.—John Rancevan, Carthage, Ohio.

I claim, 1st, The socket, C, provided with the spring backing, e, in combination with the bolt, c, stay strap eye, d, and cords, l and G, arranged and constructed substantially as described and for the purpose specified.

2d, The pivoted hammer, f, guard, f '', revolving lever, F, spring double tree strap, E, and double tree, D, arranged as described upon the tongue or other desirable part of the vehicle, and operated substantially as described and for the purpose set forth.

70,898.—COMBINED HARROW AND SEEDER.—Benjamin Randall, Adams, N. Y.

I claim, 1st, The shaft, J, in the seed box, I, provided with the radial arms b, and rotated by means of suitable gears from one of the wheels, B, when the same is in combination with the scattering board or plate, M, and all arranged substantially as described and for the purpose set forth.

2d, The slide, K, perforated with the V-shaped holes, e, and fitting in the seed box, I, in combination with the perforated bottom, L, of the seed box which is perforated with circular holes, f, and the scattering board or plate M, the whole being constructed, arranged and operating substantially as and for the purpose specified.

3d, The combination of the harrow connected with the truck or mounted frame and the distributing apparatus applied to said frame, all arranged substantially in the manner as and for the purpose set forth.

70,899.—APPARATUS FOR TETHERING ANIMALS.—David W Rawson, Croydon, N. H.

I claim the band, m, with the hook or hooks, b, and the flange, d, on the cap, c, to be applied to any tether in which a cap or socket turning on an upright stake or bar is used.

70,900.—TOBACCO PRESS.—Thomas N. Read, Danville, Va.

I claim, 1st, The shrouding box, A, provided with false sides, A A, substantially as and for the purpose described.

2d, The hinged cross head, C, when combined with the screw, E, as and for the purposes and operating in manner substantially as specified.

3d, The truncated conical body, G G, in combination with socket, f, toe, e, and band, H, substantially as and for the purposes above set forth and described.

70,901.—CARPENTERS' SQUARE.—C. H. P. Robinson (assignor to himself and John B Robinson) Bellport, N. Y.

I claim a carpenters' square provided with a slot, a, in the manner and for the purpose described.

70,902.—COMPOUND TOOL FOR CUTTING, PUNCHING, AND UPSETTING IRON.—John J. Rose, Elmwood, Ill.

I claim, 1st, The curved lever, F, pivoted in the frame, A, in combination with the slide, E, and lever, B, whereby the latter in its downward movement presses upon the inner end of the lever, F, whose outer end forces the slide inward to upset the iron held by the clamps, C D.

2d, The combination of the eccentric, L, upon the eccentric lever head, H, yoke, K, and slotted side piece, a1, with the plunger, J, and punch, I, as herein described, for the purpose specified.

3d, The construction and arrangement of the main lever, B, pivoted between side plates, a1 a2, at their rear ends, lever, F, slide, E, clamps, C D, and hand lever, H, with flange, k', as herein shown, for the purpose specified.

70,903.—DOOR SPRING.—Cyrus W. Saladee, Newark, Ohio.

I claim the combination of the box, A, mandrel, C, spring, E, and plates D and K, with an arm, B, and stirrup, F, constructed and operating substantially as described, and for the purposes set forth.

70,904.—SCHOOL DESK AND SEAT.—J. P. Scott, Lewisburg, Pa.

I claim, 1st, The arrangement of the school desk, B, supported on the sliding standards, A A, and the seat, C, hinged to the slide pieces, b b, and supported by the segment arms, c c, constructed, combined, and operating, as and for the purposes herein described.

2d, The lid, f, hinged to the desk, B, in combination with the folding brackets, g g, in such manner as to fold on the top or close the hollow receptacle for books in the desk, arranged as herein set forth.

70,905.—APPARATUS FOR PUNCHING SHEET METAL.—Morris Selferth, Morristown, N. J.

I claim, 1st, Securing the punch, C, in the bed plate, B, by means of the holder, G, and screw, e, and making it adjustable up and down by means the screw, b, substantially as herein shown and described.

2d, The application to the punching machine herein described of the auto-

matic lifter, i, by which the plate is raised off the punch, substantially as and for the purpose herein shown and described.

2d, The bar, h, lever, l, and spring, k, in combination with the cam, g, on the shaft, D, and with the stationary punch, C, all made and operating substantially as herein shown and described.

70,906.—SKATE.—G. W. Shearer, Crown Point Center, N. Y.

I claim the combination of the levers and springs between the blade and foot rest of a skate, when arranged and applied thereto, substantially as and for the purpose described.

70,907.—MAIL BAG.—Luther M. Sims, Lincoln, Ill.

I claim the case, C, constructed and used with the bag and its flap, s, substantially in the manner and for the purpose set forth.

70,908.—CARRIAGE JACK.—Joshiah B. Small, Boston, Mass.

I claim my improved carriage jack, as constructed with its notched lifter or slider, arranged with guide posts in manner as described, and as having two toggles and a forked lever, and a stop, h, thereof, arranged and combined together, and with one of the posts, in manner as specified.

70,909.—COOLING AIR AND OTHER SUBSTANCES.—Daniel E. Somes, Washington, D. C.

I claim, 1st, Atomizing liquids, by means of a fan-blower, substantially as described.

2d, Cooling air or liquids, substantially as set forth.

3d, The devices or their equivalents, substantially as set forth, for cooling air and liquids.

70,910.—ELASTIC PACKING FOR THE JOINTS OF DOORS, LIDS, AND THE LIKE.—Daniel E. Somes, Washington, D. C.

I claim, 1st, An elastic tube, having a flange, lug, or plate, or more than one of either, or their equivalents, substantially as herein described, and for the purpose set forth.

2d, An elastic tube, prepared by splitting, as in fig. 9, or by making holes, f, as in fig. 12, or in any equivalent manner, for the purpose set forth.

70,911.—CAR BRAKE.—Charles Spofford (assignor to Charles Spofford, Walter E. Hawes, Charles Hersey, and Francis C. Hersey), Boston, Mass.

I claim the eccentric-gear, M N, when used with mechanism for operating the brakes of railroad cars, etc., substantially as described.

I also claim the friction wheel, T, in combination with a slotted bar, w, and shipper, 7, for taking the power from the periphery of a car wheel, C, to wind up the brake, substantially as set forth.

70,912.—MACHINE FOR PRESSING BONNETS.—Solomon Squier, and Horace Squier, Monson, Mass.

We claim, 1st, The combination of the jointed presser, F f, pressure-bars, L, pressing-frame, A C D E, block, B, heater, b', suspension rod, G, lip plates' m n, and supplementry heaters, h h, as herein described, for the purpose specified.

2d, The block, B, when attached to the frame, A, by a slide hinge, b, so that different sized blocks may be used to press hoods of varying proportions, by the same machine, without changing the jointed presser, as herein set forth.

70,913.—FISH HOOK.—Elisha Sterling, Cleveland, Ohio.

I claim the combination with the hook, A B, sliding extension hook, a, and the counter extension hook, b, constructed substantially in the manner and for the purpose set forth.

70,914.—GOLD SEPARATOR.—William C. Stiles, Nevada City, Cal.

I claim, 1st, The arrangement of the openings, o o, protected by screens, s s, and ledges, l l, upon an inclined vibrating table, T, having a series of transverse ledges, l l, for the purpose of separating the gold dust from dirt, substantially in the manner described.

2d, The combination and arrangement of a series of foraminated water troughs, w w, with an inclined vibrating table, T, having openings, o o, and ledges, l l, substantially as and for the purpose set forth.

70,915.—VENTILATING DEVICE FOR BOOTS AND SHOES.—Amos Stocker, Watertown, N. Y.

I claim, 1st, The instrument seen in figs. 5 and 6, letter, C, in combination with a boot or shoe.

2d, I also claim the extra insole, with its spring or springs, in combination with the valve, as seen in fig. 6, letter, C, substantially as described, and for the purposes set forth in the specification.

70,916.—GRINDING MILL.—Giles M. Stone, St. Louis, Mo.

I claim the adjustable roller, B, operating in connection with the front edge of the chute, T, for the purpose of grinding the lumps which pass between the upper rollers before reaching the second rollers, as herein shown and described.

70,917.—MACHINE FOR FLANGING AND WIRING METALLIC PLATES.—Orson W. Stow, Plantsville, Conn.

I claim the combination, as well as the arrangement, of the adjusting screw bearing, L, with the rocker-shaft, K, and the roller-shaft, C, its shoulder, h, and clamp-nut, M, or their equivalents.

I also claim the combination and arrangement of the set nut, T, the rocker shaft, K, and the adjusting bearing, L, applied to the shaft and the case or frame of the machine, substantially as specified.

I also claim the application of the front box, of the shaft, C, to such shaft and the case or frame, I, so as to be capable of being moved in one arc with the shaft, and endwise with such shaft, as described.

I also claim the case or frame, I, as made and applied to the rocker shaft journals and the bearings of the two shafts, and so as to encase the gears, substantially as described and represented.

70,918.—HARVESTER.—A. W. Tucker, Waxahachie, Texas.

I claim suspending the finger bar and its appendages from a curved beam, D, pivoted to the rear of the frame of the machine, and adjustable in any desired position, as set forth, so as to set the finger bar at any desired hight, in combination with the pivoted extension, E', of the finger bar, and the chain and lever, h, all being constructed, arranged, and operated in the manner and for the purpose set forth.

70,919.—FAUCET.—John E. Tucker, Boston, Mass.

I claim a faucet, composed of pipe, B, with stem, C, and plug, D, with its grooves, e, pipes, G and A, and packing-ring, E, all constructed, arranged, and operating in the manner as and for the purposes set forth.

70,920.—MODE OF PREPARING CLOTH FOR RECEIVING LITHOGRAPHIC AND OTHER IMPRESSIONS.—Charles Volkmar, Jr., New York city, assignor to himself, Wm. P. Myers and Thomas Hedlem, Baltimore, Md.

I claim the process for preparing cloth for receiving lithographic, photographic, or other impressions, substantially as described.

70,921.—SELF-CLOSING HINGE.—Caspar Vetter (assignor to himself and Peter Schneider), Cincinnati, Ohio.

I claim, 1st, The combination, with a self-closing door, or shutter hinge, operating by gravitation and by a spring, substantially as shown, of the angular or non-circular top or head, B, and socket, K, permitting the door, when mounted, to gravitate to any desired position, as described.

2d, In combination with the spring, J, I claim the inclined edges upon collar, C, and socket, G, having depressions, g g', and prominences, c c', substantially as shown and described.

79,922.—GUIDES OR CLAMPS FOR HARNESS FRAMES.—Adolph S. Villee, Lancaster, Pa.

I claim the protecting guides, formed of strips, A B, with blocks or ends, C, arranged substantially as shown and described, for the purpose specified.

70,923.—SCREW DRIVERS.—T. D. Voorhees, Easton, Pa.

I claim the rotating thimble, C, with the flange, D, when applied to a screw driver, substantially as and for the purpose set forth.

70,924.—GRATE COMBINATION.—John Wallace, Louisville, Ky.

I claim the semi-circular tile, B, and grate, A, when the same are constructed and combined substantially as described and for the purpose set forth.

70,925.—PAPER RULING MACHINE.—Edmond A. Warren, Brooklyn, N. Y.

I claim, 1st, The rotating cylinder, C, provided with shafts, D D, having fingers, E, to grasp the sheets of paper to be ruled in connection with the pen-beam, O, provided with pens, Q, and all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The adjustable cams, N, at one end of the cylinder, C, in connection with the arm, M, on the shaft, J, provided with fingers, K K, for presenting the sheets to the cylinder, C, substantially as shown and described.

3d, The adjustable cams, T, at one end of the cylinder, C, in connection with the arm, S, on shaft, P, having the pen-beam, O, attached, substantially as and for the purpose specified.

4th, The cords, U U', arranged in relation with the cylinder, C, and working respectively over the rollers, Z Z' W Y Y' V, to operate substantially in the manner as and for the purpose set forth.

70,926.—WAGES INDICATOR.—Windsor N. White, Winchendon, Mass.

I claim the said wages indicator, or combination and arrangement of the cylinder, divided and marked substantially as described, with the slotted case or its equivalent, and the scale applied to such case, as set forth.

70,927.—CHIMNEYS.—A. S. Whittemore, Willimantic, Conn.

I claim the combination of a tile chimney, or flue, A, with an air pipe, C, the latter encompassing the former, and communicating with the external air and the compartments within the building, substantially as and for the purpose specified.

I further claim the elastic bands, B, fitted in the annular recesses, f, in the flanges at the ends of the tiles, substantially as and for the purpose set forth.

70,928.—AXLES AND AXLE BOXES.—David Wigger, New York city.

I claim, 1st, The rings, c d, fitted within the journal box, in combination with the collars, e, f, on the journal, Ax, substantially as and for the purpose specified.

2d, The arrangement of the packing ring, n, within the annular nut, C, and in relation with the journal, Ax, packing rings, h, and flange, g, substantially as and for the purpose specified.

70,929.—SELF-SETTING GAME TRAP.—Alfred Wilkin, McConnellsville, Ohio.

I claim, 1st, The combination of the shaft, B, operated by a spring or weight, arms, D, short lever, E, and lever, G, with each other, for the purpose of setting and tripping the trap, substantially as herein shown and described.

2d, The combination of the quadrant, I, and spear, K, with the arms, D, of the shaft, B, substantially as herein shown and described, for the purpose of killing the animal.

3d, The combination of the curved pivoted piece, L, connecting rods, N, elbow levers, O, and hinged platform, R, with each other and with the arms, D, of the shaft, B, substantially as herein shown and described, for the purpose of throwing the dead animal out of the way.

4th, The combination of the lever, T, and hooks, U and V, with the elbow levers, O, and quadrant, I, substantially as herein shown and described and for the purpose set forth.

70,930.—BELT FASTENER.—David Wigger, New York city.

I claim, 1st, The plates, B B', when firmly secured to the ends of the belt, and when shaped as described, so that they can only be disengaged by moving the ends of the belt aside, substantially as herein set forth.

2d, The plates, B and B', when made as set forth, in combination with the bolt, a, the same being made and operated substantially as and for the purpose herein shown and described.

70,931.—LANTERN.—Moses B. Wright, Meriden, Conn.

I claim the perforated metal cap, D, top, a, chimney, C, shell, B, and perforated metal band, d, all combined in the manner substantially as set forth.

70,932.—DICE BOX.—Justus E. Zender, New York city.

I claim, 1st, As a new article of manufacture, a hand dice box made of metal, substantially as and for the purpose described.

2d, I also claim a hand dice-box, lined with cloth, or any equivalent material therefor, whether such dice-box be made of metal or any other suitable material, substantially as and for the purpose specified.

REISSUES.

2,797.—MACHINE FOR BOLTING AND CLEANING CLOVER-SEED.—John C. Birdsell, South Bend, Ind.

I claim, 1st, The combination in a machine for threshing and hulling clover seed, of the bolts, A A', with the cranks, D E E, guide rods, F F, arms, G G H H, and connecting rods, B B', or their equivalents, in the manner and for the purpose set forth.

2d, I claim the combination, in the machine above described, for threshing and hulling clover seed, the trough, I, with the endless conveyer, J, in the manner and for the purposes specified.

2,798.—PITMAN CONNECTION FOR HARVESTERS.—Hiram L. Wanzer, New York city.

I claim, 1st, Connecting the pitman, B, to the pitman wheel, A, of a harvester, by means of a round or polygonal pin, a, having an eccentric projection, d, and made substantially as and for the purpose herein shown and described.

2d, The tapering pin, a, when arranged in combination with the pin, d, the washer, e, and nut, b, all made and operating substantially as and for the purpose herein shown and described.

3d, I claim the pin, i, in combination with the packing, k, all made and operating substantially as and for the purpose herein shown and described.

[NOTE.—FIFTY-ONE patents in the above list were obtained through the Home Office of the SCIENTIFIC AMERICAN.—EDS.]

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

66,352.—CLOTHES WRINGER.—C. H. Knox, Mount Pleasant, Iowa. Dated July 2, 1867. Application for reissue received and filed Oct. 21, 1867.

1st, I claim the double cog wheel, P, and double pinion, S, substantially as set forth.

2d, The combination of Cog wheel, P, and pinion, S, with rollers, D D, substantially as and for the purpose set forth.

3d, The arrangement and combination of lever, M, hinged to box, A, roller, L, rods, K, levers, I, and plate, G, arranged to operate upper roller, D, as set forth.

26,327.—NURSING BOTTLE.—Milo S. Burr (assignee by mesne assignments of Francis J. La Forme), Boston, Mass. Dated Nov. 29, 1859. Application for reissue received and filed Oct. 10, 1867.

I claim my said improved nursing bottle, having its body, A, composed of glass or other suitable material, and provided with an elastic nipple or mouth piece, f, and a flexible or pendulous tube, C, applied thereto substantially in manner and so as to operate as and for the purpose set forth.

I also claim in a nursing bottle otherwise properly organized, the use or employment of a flexible or pendulous tube, substantially as and for the purpose set forth.

I also claim the application of a gravitating tip or tube, c, to the lower end of the flexible tube, C, substantially as and for the purpose set forth.

68,298.—OVERSHOT.—Henry C. Tyer, Andover, Mass. Dated Sept. 3, 1867. Application for reissue received and filed Oct. 30, 1867.

1 claim a boot or shoe constructed with an elastic gore or gores of vulcanizable material, when the said gore is inserted into the shoe before vulcanization and during the process of construction, and the whole completed by vulcanization substantially as set forth.

63,770.—CENTRIFUGAL MACHINE FOR DRAINING SUGAR AND OTHER SUBSTANCES.—David M. Weston, Boston, Mass. Dated April 9, 1867. Application for reissue received and filed Nov. 2, 1867.

1st, In the construction of centrifugal machines for separating liquids from other substances, I claim suspending such machines at the top by flexible connections operating substantially as described.

2d, The combination of the spindle, D, and its accessories, with the socket, B, and its india-rubber bushing, C, or other equivalent spring connection, to form a flexible and elastic bearing for the shaft, E, by which the cylinder may be suspended substantially as described.

3d, The employment in a centrifugal machine of a hollow shaft, and a spindle or axle on which it runs, to support the cylinder or basket, substantially as described.

4th, So forming and arranging the driving pulley, F, upon the shaft, E, that it shall surround the spring bearing, substantially in the manner and for the purpose described.

5th, The construction of the openings, I, in the bottom of the cylinder, in such machines and the valve, J, for the purpose of closing the same, substantially as described.

6th, The combination of the cylinder, G, the hollow shaft, E, the driving pulley, F, the spindle, D, its elastic bushing, C, and socket, B, to form the operative part of a centrifugal machine, substantially as described.

57,006.—GAS MAINS.—I. N. Stanley, Brooklyn, N. Y. Dated Aug. 7, 1866. Application for reissue received and filed Nov. 2, 1867.

I claim as an improvement in hydraulic mains for gas works, the combination with the main C, of the external supply tubes D, cast with or made separately from and attached to the main, and communicating with the same below the water or fluid therein, substantially as and for the purpose herein set forth.

34,088.—BASKET.—Lansing Marble and Townsend North, Vassar, Mich., assignees of Lansing Marble aforesaid. Dated Jan. 7, 1862. Application for reissue received and filed Nov. 2, 1867.

1st, I claim a basket formed of two series of overlapping splints, A A', substantially as described, and fastened in any suitable manner.

2d, Fastening hoops, a a D and C C, in combination substantially as and for the purpose described.

2,847, whole No. 33,851.—GANG PLOW.—Wm. B. Ready, Sacramento, Cal. Dated Dec. 3, 1861. Application for reissue received and filed Nov. 1867.

1st, I claim the curved beams, A, when used in connection with a gang plow, or a series of plows connected together by cross bars, B B B, constructed and operating as and for the purposes herein set forth.

2d, The arrangement of the arms, G, wheels, I, and lever, J, when attached to the right hand arms, G, and connected to the central beam, A, as and for the purposes set forth.

3d, The arrangement and application of the draft at any point or place below the top of the standard of the plow, as specified and described and for the purposes set forth.

56,189.—HORSE RAKE.—George Deal, Wilmot, Ohio. Dated July 10, 1866. Application for reissue received and filed Nov. 6, 1867.

I claim the combination and arrangement of the hinged arms, I I, adjusting screws, H H, or their equivalent, tooth roller, D, and rake teeth, L L, substantially as and for the purpose herein specified.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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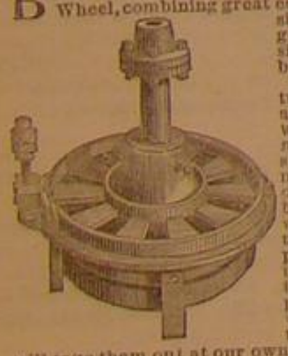
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