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## OBITUARY.

With great regret we have to announce the death of Elias Howe, Jr., the inventor of the sewing machine. He died on the 3d of October in Brooklyn at the residence of his son-in-law. His personal appearance made him a marked man among those who did not know him by his intrinsic worth. His life is an instance of success under difficulties and a lesson for all who believe in the power of perseverance. He was born in 1819 at Spencer, Mass., the son of a farmer, who also carried on the business of a miller. His youth was spent on the farm, but when still a young man he learned the trade of a machinist. While working at this business in Boston he conceived the idea of a sewing machine. He succeeded in 1845 in producing a working machine, which would cost at least $300, even if manufactured in large quantities. So much opposition was made in this country to his invention that he was compelled to try to find a market in England. He succeeded in disposing of his right for two hundred and fifty pounds, reserving a royalty of three pounds on every machine sold. On his return to this country he found that machines were being made which infringed on his patent and he immediately took means to defend his rights and was driven into litigation to secure his patent from piracy. This occupied years and demanded large sums of money. In the meantime this invention began to pay, and from a few hundreds of dollars a year it rose to at least $175,000 annually. It was not until 1854 that Mr. Howe's claims were acknowledged. Having, ourselves, been employed and consulted by him from the date of his first patent until his final success, we understand thoroughly the painful and arduous labors which in Mr. Howe's case were necessary to his triumph. The merit of his invention and the persistence of his character combined, were the elements of his prosperity. In his death the world has lost a useful mechanic and society a valuable member. We give herewith an engraving of Mr. Howe, which will recall him to the recollection of many.

One trait in Mr. Howe's character should not be unnoticed; his useful patriotism. When the country was in need of soldiers he contributed money largely, and at a public meeting in Bridgeport he enlisted as a private soldier in the 17th Regiment, Conn. Vols., and the writer, then in the office of the Adjutant General, well remembers the stir of surprise among the clerks when Mr. Howe's enlistment papers came in to be filed. He went to the field and performed his duties as an enlisted man. More than this, when the government was pressed for funds to pay its soldiers he advanced the money necessary to pay the regiment of which he was a member.

ELIAS HOWE, JR.

## THE BRITISH ASSOCIATION.

### REAL IMAGE STEREOSCOPE.

Mr. Maxwell read a paper on a real image stereoscope, with illustrations of solid geometry. In ordinary stereoscopes the observer places his two eyes opposite two lenses, and sees the virtual images of two pictures apparently at the same time. In the real image stereoscope the observer stands about two feet from the instrument, and looks at a frame containing a single large lens. He then sees just in front of the lens, a real and inverted image of each of the two pictures, the union of which forms the appearance of a solid figure in the air between himself and the apparatus.

### THE ANEROID BAROMETER.

Dr. Stewart, Superintendent of Kew Observatory, read an interesting paper on the behavior of the aneroid barometer at different pressures. Experiments had lately been made with the view of ascertaining to what extent an aneroid may be considered a reliable instrument when exposed to considerable changes of pressure, such as occur in mountain districts. By means of an air pump the aneroids, when placed in the receiver, might be subjected to any pressure. A method of tapping the aneroids has also been devised, and by this means the experiments as to the deviation of the results given by these instruments were conducted with comparative ease, and with the greatest accuracy. The experiments were still going on.

Sir William Thomson said the aneroid had become so popular an instrument that many had satisfaction in learning that it was capable of giving results with scientific precision. Dr. Stewart had shown that in taking a barometer up a mountain of 12,000 feet the error would only be about 300 feet, and had also shown how to correct this error. By carefully using these instruments, therefore, they had a probability of determining, with much less probability of error, the height of a mountain of 12,000 feet. Among the very important matters which occupied the attention of the British Association, one which might with very great advantage, be followed up, would be the carrying out of experiments on the elasticity of metals, and all solids capable of being experimented upon. He remarked upon the elasticity of metals, and even of rocks, and referred to the time taken by the earth in consolidating—that this had taken place less than a thousand million of years ago. The earth was not, he considered, one-tenth as old as the popular geologists would make it.

### MAGNETISM.

Professor Swan read a paper on the phenomena which occur when magnetized steel is dissolved in acids. Dr. Phipson remarked that magnetism, like electricity, distributes itself upon the surface of bodies: and he possessed one or two striking experiments calculated to prove that the amount of surface alone influences the intensity of magnetism in a body.

Sir Wm. Thomson stated that the paper which had just been read contained a very interesting investigation, from the continuation of which they might look for some very important results, but that it was impossible to allow this paper to pass without a protest against the first sentence. Dr. Phipson commenced his paper by saying that it was generally admitted that electricity, like magnetism, generally distributes itself on the surface of bodies, and the only conclusion that could be drawn from this was that it pervades their entire mass. The president did not blame Dr. Phipson for supposing that magnetism resides on the surface, for he had quoted authors of repute. But the truth was that this was just another illustration of the fact that a very large portion of the statements made on natural philosophy were false. In many of the popular books there were statements not merely false in theory, but false as being in direct opposition to facts published many years ago. For example, the question of where magnetism resides was long ago tried, and on examination a false conclusion was arrived at, and which had been proved to be false by a celebrated mathematician. Harlow, long ago, when experimenting on bars of iron, found that the magnetic influence was not discoverable. His experiments were rough, as indeed were all his experiments, and with the rashness which characterized many investigators, he at once stepped to the conclusion that magnetism resides at the surface, and that statement of his had been the fruitful parent of many fallacies.

### LUMINOUS METEORS, COMETS, ETC.

Mr. Glaisher, in his report upon luminous meteors, said that the object of the committee was to ascertain more particularly the nature of meteoric flights. Last year there were a vast number of observations. One large meteor was observed at Cardiff, and the luminosity remained visible for about eighteen minutes. One was also seen above Dundee of extraordinary brilliancy, which was ascertained to be about 51 to 57 miles above the earth. A curious detonating fireball was then described. This body was seen in broad daylight in France in the month of June last, and was of a very extraordinary character. Another was seen at Glasgow, which passed nearly over St. Andrews, where it appeared to consist of three parts, each equal to Venus, and it was calculated that this meteor passed at a distance of about 50 miles above the earth. At Aberdeen, a brilliant fire ball was first seen last November, which, it was afterward found was seen also over the whole of Scotland, and as far as Nottingham. A remarkable fire ball, seen near Basle—of which there was a colored diagram on the wall—had been observed in the observatory at Basle and also in Paris.

Professor Alexander Herschel, Glasgow, said that the spectroscope showed a yellow light, but of what this light was composed it was impossible to say. As observers multiplied, however, with telescopes armed with spectroscopes, this difficulty would no doubt be resolved. The connection between comets and meteors had this year been established without doubt, and that connection gave wide scope for speculation as to the origin and character of meteoric bodies. Mr Huggins had made an observation of the light of a comet, and although that observation was not perfect, still it was sufficient to identify the light of the nucleus of the comet with that of the meteoric bodies. There were two theories as to these meteors. Leverrier had shown that their orbit extended from that of Uranus to that of the earth, while an Italian astronomer believed that they came from the utmost fields of space. Fifty-six showers were well established, and it was by the study of these showers that they hoped to continue, and possibly confirm and extend their researches by the assistance of those zealous observers who had hitherto been their supporters and constant assistants.

Professor Herschel said it was too bold to say that every shooting star was a comet. They were more likely the dissipated parts of comets—probably comets torn into shreds by the sun's attraction drawing them into space.

### ON THE COLORS OF SOAP BUBBLES.

Sir DAVID BREWSTER.—In repeating the beautiful experiments of Prof. Plateau "On the Equilibrium of a Liquid Mass Without Gravity," the colors of the soap bubble were presented to him upon soap films plane, convex, and concave; but the changes of form which they underwent, and their motions upon the film itself, were so incompatible with the common theory of their formation, that he was led by a few experiments to discover their origin and mode of production. The paper proceeded to give an account of experiments which, Sir David remarked, were sufficient to establish the almost incredible truth, that the colors of the soap bubbles are not produced by different thicknesses of the film itself, but by the secretion from it of a new substance flowing over the film expanding under the influence of gravity and molecular forces into colored groups of various shapes, and returning spontantaneously, when not returned forcibly, into the parent films.

Several inquiries were made as to the nature of the soap used, and whether glycerine might not be added with advantage. Sir David Brewster briefly replied to these questions, stating that the experiments could be made by any person in the course of a few minutes, and that all the phenomena described were emitted with ordinary soap bubbles. A mixture of glycerine made the films last much longer.

Sir Wm. Thomson pointed out that the mechanical questions involved in the seemingly simple operation of blowing soap bubbles were the greatest enigmas to scientific men. The extraordinary expansion and adhesion combined in the

vapor spheres were well worthy of the fullest investigation.

ACTION OF LIGHTNING.

In the summer of 1827, a hay stack in the parish of Dun, in this county, was struck with lightning. The stack was on fire, but before much of the hay was consumed the fire was extinguished by the farm servants. Upon examining the hay-stack, a circular passage was observed in the middle of it, as if it had been cut out with a sharp instrument. This circular passage extended to the bottom of the stack, and terminated in a hole in the ground. Captain Thomson, of Montrose, who had a farm in the neighborhood, examined the stack, and found in the hay stack, and in the hole, a substance which he described as resembling lava A portion of this substance was sent by Captain Thompson to Dr. Brewster, of Craig, who forwarded it to Sir D. Brewster with the preceding statement. The substance found in the hole was a mass of silex obviously formed by the fusion of the silex in the hay. It had a highly greenish tinge, and contained burnt portions of the hay. Sir D. Brewster presented the specimen to the museum of St. Andrews.

A NEW ELECTRIC MACHINE FOUNDED ON INDUCTION AND CONVECTION.

By Sir William Thomson.—The principle of the machine (a model of which was exhibited) was that of the "Successful Merchant" who commenced life with a capital of ½d., and after a month's persevering industry, realized the handsome sum of £1 and continued to goon increasing his capital at a compound rate of interest. The object of the instrument referred to was not to increase money but electricity, and that increase was at a compound rate. Precisely in conformity to the law which applied to compound interest and the increase of the successful merchant's capital was the increase of electricity by this machine. Given the smallest quantity of electricity, and the instrument increased it at the rate of compound interest, and this increase went on at a perfectly uniform rate. But just as the capitalist finds that he cannot always go on getting higher and higher interest for his money, but must ultimately, perhaps, be content with 4½ per .cent., instead of 5, so was it to some extent the case with this machine. When a very high charge was reached, the increase of the quantity of available electricity was not so great, owing to sparks passing in various parts of the machine, preventing the operator from retaining the full quantity of electricity which was got by it. There was great necessity for an easy-going electric machine, and that now shown fulfilled this condition.

NEW MAGNETIC AND ELECTRIC MACHINE.

By Wm. Ladd.—Two plates of iron, both ends of each plate fixed to a portion of a hollow cylinder; these plates are then placed a certain distance apart, and insulated from each other in such a manner that the cylindrical pieces will form the two hollow circular passages; into these spaces two armatures are placed. The plates are surrounded by a quantity of stout copper wire connected together, the two terminals of which are brought into connection with the commutator of the smaller armature, so that each change of polarity in the armature will augment the magnetism. If the armature in connection with the electro-magnet is made to rotate, there will be a very feeble current generated in it; but this passing round the electro-magnet will increase its power with every additional impulse. The only limit to the power of the machine is the rapidity with which the armature is made to rotate. The great improvement in this invention is the introduction of a second armature. The machine in the Paris Exhibition measures about 24 inches in length, 12 inches in width, and 7 inches high, and Mr. Ladd found that though not perfectly constructed, its power would keep 50 inches of platinum wire .01 in diameter incandescent, and when a small voltameter was placed in circuit with the second armature it would give off 250 cubic centimeters of gas per minute, and in connection with an electric regulator would give a light equal to about 35 Grove's or Bunsen's element, the driving power expended being less than one horse.

USE OF LICHENS AS DYE STUFFS.

Dr. Lindsay said it had been expected that the aniline dyes—a product from the distillation of coal tar—discovered a few years ago, would supersede the lichinous dye stuffs previously in use, in consequence of the breaking up of the Highlands by railways, and the improvement of the communication between Glasgow, Edinburgh, and the south. To him, however, it seemed that all such predictions were at least premature. He had come to conclusions favoring the belief that lichens would not be superseded, at least, for a long time to come. He then proceeded to give numerous details of the use of lichen dyes for commercial and domestic purposes.

Mr. R. Pullar said: It is very important to investigate the question of the value of lichen products, as many more districts might be found where the lichens are produced, and a certain market for them. Orchill or cudbear will not, I think, be replaced by coal tar or aniline colors for many purposes, and especially for rich crimson or claret shades on woollen goods. I think there is every likelihood of this material being used to a greater, instead of less extent, and the introuction of the coal tar colors has rather increased than dimdnished its use. I do not think the lichen products will ever compete with the coal tar colors for light shades. It is a well-known fact, which can be corroborated by the ladies present, that purples, violets, and other shades produced in former days by the orchill or cudbear, gave way very much sooner than those produced from coal tar. A violet dress or ribbon was formerly stained red so easily by exposure to the atmosphere or the slightest acid, that very few persons thought of having such colors; while, since the introduction of the coal tar shades, however, which, some say, are not so fast as the old colors, there is now an enormous sale, because they can be worn with impunity, and the colors, in most cases, stand well for a long time. This is an extraordinary fact, but can be corroborated by every person of experience.

INFLUENCE OF AIR ON VITAL ACTION.

In this paper Dr. Davy described a certain number of experiments, the result of which showed how much longer some animals are capable of resisting privation of air than others. In one instance an egg, an inchoate animal, so to speak, was hatched, producing a healthy chicken, after having been acted upon by an air pump twenty-six days; a young bird expired in about half a minute, a fish—the minnow—in about half an hour, the frog and toad in about the same time, the earth worm in about an hour and a-half; the insects, such as the dragonfly, butterfly, after the apparent death for more than an hour, recover on exposure to the air, and that repeatedly. By other experiments on birds by means of submersion in water, he showed that different species varied greatly in ability to bear exclusion of air; thus while all the snake birds of which he had made trial expired under water in about a minute or less, the buzzard lived about twenty minutes and a half, the common fowl about four minutes and half, the goose and duck about ten minutes. Reasoning on the results, he infers that each individual animal has something peculiar in its organism determining its peculiarities of function or action, peculiarities more readily described than accounted for. He holds the subject to be in a great measure mysterious, nor is he sanguine, referring to the new and ingenious views on the genesis of species, that they will tend, except partially, to enlighten the subject, considering that life itself is a mystery, and the origination of life, as regards natural science, an unsolved problem.

THE BORING OF LIMESTONE BY ANNELIDS.

By Mr. E. Ray Lankester.—The author stated that, in the discussions concerning the boring of molluscs, no reference had been made to the boring of annelids—indeed they seemed to be quite unknown—and brought forward two cases, one by a worm called Lencodore, the other by a Sabella. Lencodore is very abundant on some shores, where boulders and pebbles may be found wormeaten, and ridled by them. Only stones composed of carbonate of lime are bored by them. On coasts where such stones are rare they are selected, and all others left. The worms are quite soft and armed only with horny bristles. How, then, do they bore? Mr. Lankester maintained that it was by the crabonic acid and other acid excretions of their bodies aided by the mechanical action of the bristles. The selection of a material soluble in these acids is most noticeable, since the softest chalk and the hardest limestone are bored with the same facility. This can only be by chemical action. If, then, we have a case of chemical boring in these worms, is it not probable that many molluscs are similarly assisted in their excavations? Mr. Lankester did not deny the mechanical action in the pholas and other shells, but maintained that in many cases the co-operation of acid excreta was probable. The truth was to be found in a theory which combined the chemical and mechanical view.

## AMERICAN INSTITUTE FAIR.

The exhibition of the American Institute may now be fairly said to have reached its full glory. The confusion so characteristic of the earlier days of the Fair is no longer apparent. The sound of saw and hammer no longer blend with the dulcet tones of the orchestrion, and the musicians have now to contend only with untiring buzz saws, and machinery incessantly and loudly calling for lubrication. The articles have been classified in a catalogue, but implicit reliance placed upon the statements of this important document would be ap to lead the unsophisticated into some serious errors, or convey some ideas respecting their nature and construction entirely at variance with his previous conceptions. A revised edition which is promised before many days will, it is hoped, in some measure remedy this evil.

The most novel and attractive feature of the exhibition is by general consent conceded to be the Pneumatic Railway, erected by Mr. A. E. Beach, of the Scientific American, and every one visiting the Fair seems to consider himself specially called upon to visit, and, after actual experience, to pronounced his verdict upon this mode of traveling. Having accomplished this feat, descending from the mouth of the tube to the main floor, the visitor immediately enters the "Department of Intercommunication," a brief glance at the articles exhibited in which shall be the subject of this notice.

The group most naturally suggested by the title is the telegraph and its kindred applications, and under this grouping, the fine display made by the Bishop Gutta-percha Company first attracts attention. Prominently hung upon the eastern wall of the hall are samples of deep-sea cables, including pieces from cables which have been actually laid in different parts of the world. In a show case is to be seen a specimen of the first submarine cable ever made in which gutta-percha was used as an insulator, being a piece of the identical cable laid across the Hudson River for the Magnetic Telegraph Company in 1848. The conductor consists of a singie iron wire of No. 9 gage, insulated with two coatings of gutta-percha, the outer one much oxidized from contact with the air, but the inner coating still perfect. Insulated air-line cables, water pipes, photographic baths, acid pitchers, bottles and vessels in great variety, make up quite an interesting collection. Proceeding on our journey of observation, the telegraphic apparatus of Dr. L. Bradley next deserves attention. In addition to a creditable assortment of relays, keys, etc., the Doctor exhibits a rheostat of superior workmanship, a tangent galvanometer, and other instruments of like character.

A larger and more varied collection of telegraphic instruments fills the show-cases of Tillotson & Co. All the necessary equipments for a well-ordered office are here to be found. A Morse apparatus in full operation at this stand has undoubtedly given to many observers their first insight into the mysteries of telegraphy. On the same table is to be seen Gardiner's machine for lighting illuminating gas by frictional electricity. By its side the electro-medical apparatus of Dr. Jerome Kidder, forms always the center of a crowd of the curious, each anxious to experience the effects of the magneto-electrical shock.

Needham's pneumatic way for transporting packages and mail matter comes next in order. It is claimed that this arrangement possesses marked advantages over the ordinary tube designed for carrying passengers. In the latter the air acts on but one side of the car at once, consequently, it is said, the momentum of one half the air set in motion is lost, but in Needham's model the tube is made continuous, the inclosed column of air being then isolated from the atmosphere, and the whole force is utilized. Classed under the same group, though of a somewhat different character, is Hall's electric switch, so arranged that the continuous ringing of a bell gives evidence of the misplacement of the switch.

Having now introduced the subject of railroads, we pass next to a consideration of the group under which all articles relating to railways are classed.

A locomotive head light of handsome proportions, manufactured by Radley, McAlister & Co., of this city, is prominently posited. The burner of this lantern appears to combine many meritorious points. It is made wholly of brass, its parts being screwed or brazed together so as to be easily removed, repaired and replaced. By the employment of air chambers, the burner is kept perfectly cool, thereby giving a flame of uniform brilliancy and steadiness; a great saving in the evaporation of the oil, and furnishing a sure preventive against the almost universal liability of explosion. A head light manufactured by this firm, we are informed, graces the famous Grant Locomotive, now on exhibition at the Paris Exposition. A handsome head light is also exhibited by Peter Budenbach. The Metropolitan Transit Company show the model of their proposed plan for a three-tier railroad. A contrivance for removing obstructions from, and cleaning the tracks of, street railways, is the invention of John B. Read. The plan is undoubtedly feasible, but we fear that a legal enactment alone would induce the car companies to adopt any plan, however meritorious, for saving life and limbs of their passengers. The subject of bridge building, according to the classification, belongs to this group, but the sole exhibitor seems to be the Moseley Company, who exhibit a model four feet long, which they advertise will support the weight of thirty-five persons weighing one hundred and thirty-five pounds each. They propose to make good the truth of this assertion before the Fair closes. Persons of the proper weight anxious to distinguish themselves, will govern themselves accordingly.

In the group including vehicles and harnesses, the steam carriage for common roads, the invention of P. H. Rocker, of Boston, seems to be the chief attraction. The carriage is an ordinary buggy, with an upright boiler mounted on springs, behind. The cylinders are beneath the carriage body, in front, the pistons acting directly upon the crank serving as the rear axle and which turns the hind wheels. What success the vehicle has met with, we were not able to ascertain, no person seeming to have charge of it, and, as was the case in innumerable other instances, inventive imagination must supply, in great measure, the place of reliable information. Near the steam carriage, the arrangement of C. Ducreux, for instantaneously detaching horses from carriages, is illustrated by a working model. The object to be attained cannot be too highly commended, and providing some means for easily releasing running horses from vehicles, should be enforced by law, if in no other way it can be brought about. In this arrangement a lever under control of the driver loosens the trace and other connections, and instantly frees the horses. Colburn's method of effecting the same result is quite simple and equally valuable for the readiness with which the horse may be attached or detached from the carriage. A spring bolt on the harness saddle fits into a socket on the shafts; this is the only attachment, tugs, traces, whiffletrees, and breeching being entirely dispensed with. Should the horse run away with the carriage, or, slipping on a treacherous pavement, fall down, the driver pulls a cord connected with the spring bolt, when the animal is instantly detached. Mr. John Raddin, of Lynn, Mass., the exhibitor of this latter contrivance, presents to the public an elastic carriage wheel which is bound to make glad the heart of every member of the riding community who has ever occasion to ride over the cobble stone style of street pavement. The wheel is rendered elastic, so as to relieve the jar and rattle in striking against, or passing over, stones or inequalities, by applying to the end of the spokes a packing of india-rubber in a box or socket fitted to the felly. By this arrangement such riding, if we are to receive the assurances of the inventor, is rendered an absolute pleasure, the degree of the enjoyment being, we suppose, proportionate to the amount of jolting experienced. An elastic car wheel of the same inventor has between the hub and web, a ring of rubber pressed in by bolts and flange, to take the load and jar. The hub being separate from the web, it can be replaced when required with small expense. Turning again to carriage wheels, we willingly make a note of Stuart's metallic hub, whose peculiarity consists in dovetailing each spoke separately inside the hub, so that, while they can never get loose or work, they may be easily removed and new ones inserted without removing the tire.

In the group of which vessels are the characteristic type, we notice first an application by Mr. Montgomery of his corrugated iron to the construction of ships' ribs. Near by is a tank in which swims one of Golding's combined mattress

and life-saving raft. Each mattress has a buoyancy sufficient to support one person in case of necessity, and is provided with compartments for holding water and provisions. By means of hooks, any number can be fastened together so as to make a raft of any required size. Of that almost endless variety of devices for boat detaching, brought forward consequent upon an act of Congress in July, two years since, making it incumbent upon all vessels to carry such apparatus, we find but three on exhibition, of which the pioneer in this class, Brown & Level's, is manifestly the best. The bronze medal awarded for this tackle at the Paris Exposition is placed in a prominent position.

The Union power capstan claims for itself superiority over all others, working forward and backward as a simple capstan, and with a purchase of four and one-half to one, also forward and backward. It can be taken apart on shipboard with no other tool than its own parts supply. Spaulding & Coffin, of Boston, are the exhibitors.

The fifth group is devoted to implements and materials used in printing and engraving. Messrs. Hoe & Co. take the lead in this line, exhibiting sets of printers' materials, and a variety of forms of copying and embossing presses. The Novelty printing press is a Boston notion, and is designed to furnish a cheap, simple, job printing press for business men to amuse themselves with during leisure moments, and for a merely nominal sum furnishing the source for a rare combination of convenience, pleasure and profit. The bed of the press is stationary and nearly vertical, and against it the platen is brought by the power of a toggle joint with treadle attachment.

In group No. 6, is placed the differential pulley of T. A. Weston, of Buffalo, N. Y., and Doyle's Empire power tackle, the latter apparatus being the especial favorite of the youthful visitors, who, apparently, firmly believe that its sole purpose is the early development of the juvenile muscle. Without attempting to explain the course of reasoning of the committee in assigning burglar-proof safes to the "department of intercommunication" especially, as is the case with those now on exhibition, when said safes are securely locked, we would speak very favorably of the external appearance of the bankers' safes of Terwilliger & Co. We confess ourselves also unable to explain exactly in what way steel cannon fall under the same classification, unless considered as a means of intercommunication, in which case we would in conclusion draw attention to the model made by Thos. Prosser & Son, of an eight inch cast-steel breech-loading rifled cannon.

THE PNEUMATIC RAILWAY.

It is an interesting sight to stand at the mouth of the great tube and observe the arrival and departure of the car with its loads of passengers. The car fits the tube like a piston and travels both ways with the utmost regularity and steadiness. Nothing can be more gentle and pleasant than the start and stoppage; no jerking or wrenching of any kind is observable, and although the car is not provided with springs it rides along very easily. The tube is 107 feet in length, 6 feet in diameter, and is composed of fifteen layers of veneers, laid and cemented in alternate spirals, forming a total thickness of an inch and a quarter. This peculiar construction gives great strength and rigidity. The car carries twelve passengers, and its body is rounded on the same curve as the tube. Indeed, the body was made of a section of the tube cut in halves and the ends united forming a long open cradle without roof, with seats on each side, presenting the appearance of an omnibus sleigh. The wheels project three inches through the shell of the body, turn in boxes arranged under the seats, and run on a small track laid through the tube. One end of the car is provided with a disk or head which fits the tube and forms a traveling piston. There is a door in the disk, also ventilating valves; the lights and water gages are also arranged upon the disk. The disk presents a superficial area of 28 feet against which the atmospheric pressure acts to propel the car.

The Æolor or blowing wheel is made in the form of a screw propeller. It is 10 feet in diameter, made of wood, has eight blades, and revolves at the mouth of the tube opposite to that at which the car enters. When the screw turns in one direction it sucks the air through the tube and the car is drawn in. The car, as it passes along, moves a lever which gives a signal and by the time the car arrives near the screw the latter is reversed which forces a blast of air into the tube and drives the car back. The Æolor is capable of producing a far greater pressure than can be safely used upon the car in so short a length of tube.

There are two of the Æolors at the Exhibition. One of them works the Pneumatic Railway, the other, of smaller size, the Postal Pneumatic Dispatch. Both are driven by one of Root's little trunk engines, diminutive in size but exceedingly compact, runs beautifully, and gives out abundant power.

The visitors at the Exhibition manifest a lively interest in the Pneumatic Railway, and all seek for the ride. To be carried along by the air pressure is an entirely new sensation. More than twenty-five thousand persons have already been safely carried, much to their enjoyment and satisfaction. Mr. John D. Gilbert is the conductor and accompanies every train. It is probable that a Pneumatic Railway of considerable length for regular traffic will soon be laid down near New York under the auspices of the Pneumatic Dispatch Company of New Jersey, of which Mr. Beach has lately been elected President. Great credit is due to the Holske Machine Company who were the builders of the Pneumatic Railway and the Pneumatic Postal Dispatch as presented at the Exhibition. The whole work, tubes, cars, blowing screws and all, were constructed by them in the short space of six weeks. Considering that every thing was of a novel and experimental character, this was making good time. The work was conducted under the immediate personal superintendence of Mr. W. F. Holske, who is one of our most reliable, experienced and energetic mechanical constructors. It has been his business for many years to build experimental machinery. He is quick to appreciate a new idea, and prompt in putting it into bodily form. Many of the best patent models that come to our office are from the establishment of the Holske Machine Company, 528 Water street, New York city. We shall give a description of the Postal Pneumatic Dispatch in our next.

## Correspondence.

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

### Artesian Wells.

MESSRS. EDITORS:—The ascension of water in Artesian wells is not very satisfactorily accounted for, and the cases reported by your Chicago correspondent, on page 163, current volume, is an unique instance.

From a depth of more than 700 feet, and rising more than 80 feet above any surrounding source of production and higher than any land of that elevation within a hundred miles or more, as is the case, is an anomaly in hydro-dynamics

The prevailing *rationale* of the subject has generally been this: High sources in elevated land, with dipping stratified rocks, which being tapped by boring, forming the inverted syphon, the water must inevitably rise to the level of its source; but this contingency does not prevail at Chicago, nor in hundreds of other localities where water is always found, if the borings are continued deep enough in quite or entire horizontal rocks, the syndinal or antidinal pitch of the strata are never consulted or required. This theory is hardly a rational explanation of the results.

Another explanation is, that as all the sedimentary and even the primitive rocks are the result of crystalization or deposit from water, the hardening and shrinking of the strata leaves interstices and cavities filled with water which, when tapped, the superincumbent pressure forces it up and it follows the law governing fluids in like cases. But in this case it would be fair to presume that the source in time would become exhausted, like the oil wells of Pennsylvania.

Another, and to my mind the most rational one is, that as it is universally admitted that the center of the globe is in an incandescent or even fluid state, its great heat must produce from the lower portions of the 40,000 feet of the sedimentary rocks, steam, which penetrating the pores, fissures, and laminated portions, arrives at the condensing point under great pressure, which, on being relieved by boring, would in all cases produce a constant and unchangable flow.

Mr. Schufeldt's question in hydraulics is an abstruse and difficult subject for elucidation. Let us suppose that the source of supply is not a great basin or reservoir which the boring has penetrated, but a region of rock containing lamina and porosity, where the water by force has remained in a quiescent state for all time; on being relieved from its imprisonment by boring, it is produced from all quarters by flowing and segregation. On rising to nearly a balance of power, the antagonistic principles of weight and upward pressure are slowly adjusted and take time to assert their rights.

On turning the stop cock at the surface, there is no accumulation of water or head, there is no absolute space to contain it, and it is simply locked in a quiet state as it was before its release, and consequently when nearly on an equilibrium of forces, must necessarily rise very slowly.

I regret that Mr. S. did not report the temperature of the water, as well as that of the springs or wells, that we might compare the results with other locations, as to its increase according to depth. I should expect it to be about 70° Fah., well water being 55°. L.

Rochester, N. Y.

[Several other communications on the same subject account for the phenomenon on the principle of the inverted syphon, well understood by students of natural philosophy. One from the Pensylvania oil region gives an account of similar performances. The presence of carbonic acid gas in subterranean caverns communicating with the well hole, is suggested by one corresponfient as a possible explanation of the Chicago well performance; but we do not understand that theory as sufficient to satisfy all who make physics a study. The reason for the intermittent, almost capricious action of the Chicago well is probably yet to be ascertained. Its exhibition is by no means new. For years travelers have known of similar wells—natural—in the Tyrol, and in Sweden such phenomena in wells dug for domestic purposes are not rare.—EDS.

### The Comets Again.

MESSRS. EDITORS.—In No. 13, current volume of the SCIENTIFIC AMERICAN, Mr. P. G. Yendell has endeavored to refute the theory advanced by me in No. 10, current volume of your paper, namely, "that the tails of comets are refracted light." Mr. Yendell has evidently not seen Dr. Ramsay's article in No. 6, current volume of the SCIENTIFIC AMERICAN, in which that gentleman advances the theory that the tails of comets consist of reflected light. My communication is merely a modification of Dr. Ramsay's theory. If Mr. Yendell will read Dr. Ramsay's very interesting paper, he will get a very good explanation how it is that although light moves in straight lines the tails of comets appear curved. Mr. Yendell says "that he cannot resist the conviction that the tails of comets are composed of nebulous matter as evidently left behind by the motion of its head as the smoke of a locomotive by the progress of a train."

According to this theory the tail of a comet would follow precisely in the path or orbit of the same and would spread to the rear even when receding from the sun which your correspondent perhaps by experience knows it does not. If the appendage of a comet was nebulous matter left behind from the nucleus, like smoke, the nucleus would soon be dissolved and would disappear entirely unless it could be explained where it got the material from to feed and keep up the nebulous tail.

Before advancing a new theory it should have been proved that the old existing theory was not correct. The question to settle now is "is it possible and in harmony with the known laws that govern the universe that the tails of comets consist of nebulous, ponderable matter?" To me it appears impossible and entirely against the law of gravitation that a nebulous appendage could be formed many millions of miles in length, apparently much rarer than the body of the comet; it seems to me as impossible, as it is, that the atmosphere surrounding the earth could form an appendage and follow in the orbit of the same.

My supposition is that comets are worlds of a more recent formation than the other planets of the solar system; they are going through the process of development and are perhaps in a liquid and vaporous condition holding in solution all the elements to form a crust as on the planets. As long as this crust is not formed the body of the comet is not opaque, the rays of the sun can pass through it and are refracted, and in this way the tail is formed. AUGUST WILHELM.

Philadelphia, Pa.

### The Rotary Force Centrifugal.

MESSRS. EDITORS:—You have been coquetting for some time in your journal with the essence of matter, the centrifugal force, and with Helwolt'z's theory of vortex motion by calorical force.

This theory is opposed by an old discovery—neither heat nor electricity, when set free, are motive forces. They pass through bodies, disturbing the molecules, and leave them as before.

Your other questions, the essence of matter and the centrifugal force, are subjects of deep interest, and will be better understood if we state first what are the real discoveries that are made, and what is yet conjectural in the science of motion. At present there is no genius, no scholarship, no proofs that will satisfy the public mind, until it is guided out of the dark problem of Sir Isaac Newton's theory of attraction of gravitation. His great discoveries that have awed public opinion into submission to his views, were made from his observation of the phenomena of motion, and not on his problem of attraction. His problem itself is centripetal, and if it proves any thing clearly, it brings all bodies in motion to a state of rest.

It so completely ignored the centrifugal force, that for generations it has been unrecognized by science. Witness recent calculations of how long before the earth will fall down upon the sun. Now, if I at all understand the hidden power in the rotary force, which the attraction of gravitation fails to account for, it discloses more than is yet known of motion, by the aid of Sir Isaac Newton's discoveries. By comparing the phenomena of motion, which the attraction of gravitation fails to explain, with the phenomena of motion which it does account for, we shall gain the share which the rotary force controls in the movement of bodies in space.

And first, gravitation explains why the planets, comets, and sattelites, revolve in elliptical orbits, or curves, consisting of circles, ellipses, parabolas, etc. Secondly, it explains the unequal velocities of these bodies, in their orbital movements, together with the perturbations common in the movement of the planets.

Sir Isaac Newton says all these phenomena are susceptible of explanation and computation by his theory of universal gravitation; and here the domain of the law stops.

It fails absolutely to account for the force which revolves the planets on their axes; it does not explain why the planets and sattelites revolve in orbits so nearly circular; it does not answer the significant question, why the planets revolve around the sun in the same direction. Gravitation would have accounted for this motion if the planets had circled around the sun in opposite directions.

All these questions therefore remain for the rotary force to explain. Moreover, gravitation gives no reply to the question why the planes of the planetary orbits are so nearly coincident, or why the planets all rotate on their axes, in the same direction in which they revolve in their orbits, or why the sattelites obey the same rule, and the sun itself in like manner rotates on its axis in the general direction of the motion of its attendant sattelites.

From what is conceded to Sir Isaac Newton's theory of the attraction of gravitation, and what it fails to account for, we may see how much is concealed from us in the hidden power of the centrifugal, and its resultant rotary force.

Rhinebeck, July 23, 1867. F. V. M. D.

### Pumping Hot Water for Boilers.

MESSRS. EDITORS.—My attention has been attracted to a paragraph in the SCIENTIFIC AMERICAN from your correspondent, on the subject of pumping hot water and your observations thereon, because it is one of much importance in regard to the safe working of steam engines, etc. It might be considered a matter of course, by many, that if a force-pump of given dimensions will inject a certain volume of cold water into a boiler within a stated period and continue to do so uniformly, that the same pump will inject a like quantity of hot water in the same length of time.

I am of opinion that somewhere about here lies the key to the solution of so many mishaps in the bursting of steam boilers, and that the explosions generally arise from the want of a sufficient supply of water by the force pump. My theory is that a force-pump for water of a high temperature ought to have twice the capacity of that used to pump cold water

when the volumes to be pumped are alike, because it is a fact that although water does not boil in an open vessel under 212 degrees, it is quite otherwise in a vacuum or a partial one. Hence, it does appear that in the case of hot water, the moment that the plunger forms the vacuum, just then, the hot water being relieved from pressure, forms into steam more or less and partially fills the pump chamber and thus prevents the regular passage of water through the valve. I therefore conclude that if the water to be injected is of a high and varying temperature its regular flow is not to be depended upon unless the pump be made sufficiently large to contain both water and steam in quantity at the same time, owing to its sudden transition from water, in the supply pipe, to steam, in the vacuum chamber of the pump.

Owen Redmond.

Rochester, N. Y.

### Volumetric Estimation of Barium.

Messrs. Editors:—All the metals of the third and fourth groups must first be removed by means of suitable reagents, either sulphide of ammonium or sulphureted hydrogen. Acetate of soda is then added in sufficient quantity to displace the acid present, by acetic acid. Heat about thirty-five grammes of bichromate of potassa in an oil bath until all the water of crystallization is thus expelled. As soon as cool weigh out 21.518 grammes of it, and dissolve in one liter of distilled water, then each cubic centimeter of this solution will precipitate .01 gramme of barium, as may be seen by the following proportion:—Ba; Ko, 2 C $O_3$:: 10 : x; or, 685 : 147.4 :: 10 : x .˙. x=21,518; .˙. since a liter precipitates 10 grammes, one cubic centimeter precipitates .01 gramme. A burette holding 100 cubic centimeters is then filled with the standard solution and placed in a burette stand over the barium solution. The standard solution is then allowed to run into the beaker until no precipitate is formed after the precipitate has subsided, in the supenvatant liquid on the addition of a drop of test solution. This point can be determined more exactly by putting a drop of nitrate of silver upon a glass plate and adding to it a drop of the solution; if a crimson precipitate is produced it is necessary to add more liquid from the burette; this is repeated very cautiously until there is no longer any reddish tinge produced in the nitrate of silver. The number of cubic centimeters is then read off, and the amount of barium in the original solution found a simple calculation; as for example, suppose that 78.9 cubic centimeters have been used, then the amount of barium present would equal 78.9÷1000×10=.789 grammes.

G. H. Mann.

Troy, N. Y.

### The Sun's Diameter.

Messrs. Editors:—I find in the Scientific American, page 179 of the present volume, that the sun's true distance is ascertained to be 92,340,,000 miles. If this be correct, the sun's mean horizontal parallax is 8.85″, and not 8.5776″, as was settled upon by the council at London some years ago. Now, taking 92,340,000 miles as the mean distance of the sun, either the apparent semi-diameter is more than 16′, as is generally given, or the real diameter is less than 886,000 miles, and which is it? A. J. Harris.

Wanseon, Ohio.

### Ammoniacal Gas as a Motive Power.

The idea of using ammoniacal gas as a motive power in place of steam has been entertained by many inventors, but has never before, we believe, been successfully carried out. A few years ago, MM. Tellier and Flandrin proposed to propel omnibuses through the streets of Paris by its means. They started, or proposed to start, with a vessel of the liquified gas, and supposed that when this was opened, by turning a tap, the gas would be discharged into a cylinder with sufficient force to drive forward a piston; and water being then admitted to the cylinder, the gas would be condensed, and a vacuum formed, and the piston driven back by atmospheric pressure. Our readers will thus see that the principle of an ammonia engine is pretty much the same as that of Newcomen's steam engine. The plan, if at all feasible, is obviously better suited for stationary than locomotive machinery, and the most reasonable application of ammonia has been made by M. Fromont, who proposes to work a pump by its agency. His engine differs somewhat from that of M. Tellier, inasmuch as he drives the piston in both directions with the gas.

A recent visit to the Paris Exposition has shown us an engine of his actually at work—or, rather, in action, for it was not usefully employed—and driven by a mixture of steam and ammoniacal gas. Strong liquid ammonia is used in the boiler, and the vapor generated is said to be a mixture of at least 80 parts of ammoniacal gas and 20 parts of steam, so it may be fairly called an ammoniacal engine. The principal recommendations of ammonia when applied as a motive power consist in the small amount of fuel required, and the short time it takes to get up the steam, so to speak. The economy in fuel is very considerable, being about one fourth of that required to generate steam alone. As regards the boiler, it may be of either of the ordinary forms, the only complete novelty being the apparatus for condensing the steam and ammonia. The gas disengaged (about six atmospheres at 110° Cent., with an ordinary solution of ammonia) does its work in the cylinder and then escapes into the tubes of a condenser, where the steam is condensed and the gas is cooled. The gas then meets with water from an injector which dissolves it, and the solution is carried on into a vessel called the "dissolver," from which it is pumped back into the boiler to do its work over again. The water for the injector is taken from the boiler, and is cooled before meeting with the ammoniacal gas by passing through a worm surrounded with cold water. These arrangements are necessarily a little complicated, and could not be fully understood without drawings. It is, however, satisfactory to see that an ammonia engine is a possibility, and thus power is obtainable where fuel and water are both scarce.—*Mechanics' Magazine.*

### Ober's Patent Toilet Glass.

Not ladies only, but gentlemen frequently feel the want of a convenient mirror by which a view of the back of the head can be obtained when dressing the hair, the common hand glass being inconvenient and requiring one hand to hold it. The device seen in the engraving is convenient and elegant. It is a box designed for holding brushes, combs, and the other paraphernalia of the toilet, having attached a mirror of convenient size and a hinged frame that, when elevated, sustains at its end a smaller glass, which, with the back of the head is reflected in the larger mirror. The jointed frame will permit the adjustment of the small mirror at any angle desired,

and will fold upon itself and on the box, making the whole contrivance, when not in use, portable and convenient. The jointed frame and small mirror may be attached to any ordinary mirror frame. In the form represented in the engraving it is especially adapted to the requirements of travelers, and in any form it is useful in all places.

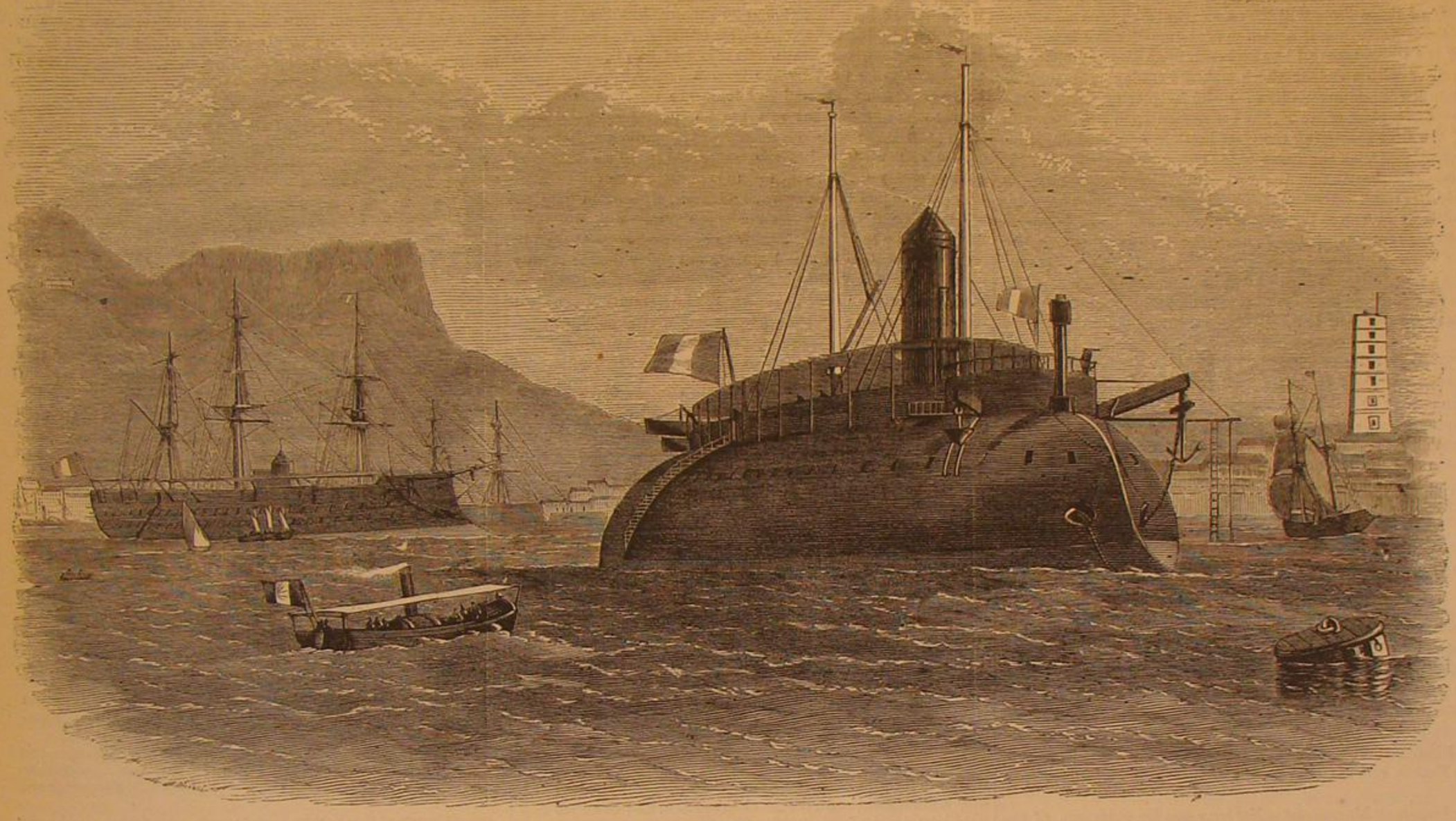
It was patented through the Scientific American Patent Agency June 25, 1867, by Albert Ober. Further information may be obtained by addressing Ober Brothers, Beverly, Mass.

### The Antiquity of Man.

The following paper by Mr. J. Crawford, F. R. S. was read in the Ethnological department of the British Association at the late meeting at Dundee:—Man, when he first appeared on earth, was without articulate speech, and, like the lower animals, must have expressed himself by what was little better than mere interjection. He had, therefore, to frame a language—a seemingly difficult achievement, yet one which every savage tribe had been able to achieve, and that not in one place only, but in several thousand separate and independent localities. It followed, then, that as every tongue was regularly constructed and perfect for its own purposes, many ages must have passed before language could have reached its present maturity. Even the languages of a people so low in the scale of humanity as the Australians, incapable of reckoning beyond duality, were found to be not only skillfully, but even completely constructed. It must be evident, then, what ages must have transpired from the first attempts to give names to a few visible objects to the completion even of such rude languages as those of the Australians, Feejeans, and Esquimaux, and how many more must have passed before the discovery of the art of writing. Like languages, the ordinary arts bore abundants proofs of man's antiquity. They were not the results of instinct; but, on the contrary, bore indications of man's brain and hands. The distaff and the loom were as much inventions as the steam engine and the telegraph. They had been invented in many independent localities, and at so early a time that in no instance had there been any record of the discovery. The discovery of metals, without a knowledge of which man must have ever remained a feeble savage, attested man's antiquity. The difficult art of making malleable iron seemed to have been immemorially known and practised even by the rudest people of the Old World, but it might be fairly conjectured that the first discovery must have been made by natives who had previously made considerable advances in civilization, and that from them the art came to be disseminated among ruder tribes. Were the languages of the negroes of Africa investigated—the rudest of which are known to practise the art of fabricating malleable iron—it would probably be found that it was acquired from the Mauritanians, Carthaginians, and Egyptians on the western, and from the Hindoos on the eastern side of the continent. Cultivated plants and domesticated animals also yielded proofs of the antiquity of man. The countries in which—through the auspicious character of the physical geography and the intellectual quality of the races inhabiting them—the earliest civilization sprang up, were Egypt, Syria, the valleys of the Tigris and Euphrates, India, and China; and, in a minor degree, Persia, the region lying between India and China, Japan, and one or two islands of the Malayan Archipelago. In all these writing had been early discovered and a calendar formed—arts indispensable to the rudest record of human events. But it was not necessary alone that the capacity for framing a record should exist, it was not less necessary that the monument containing it should be of durable materials, and be under conditions favorable to its preservation. In regions subject to violent alternations of heat and cold, drought and moisture, the most lasting materials were in time decomposed, while in tropical climates the same destruction was produced by a rank vegetation. Hume made true history begin with the first page of Thucydides, but man's story went back far beyond the time of either Thucydides or Herodotus. Egypt was, far beyond all other countries, that in which the chronicle of civilized man could be carried to the highest antiquity. After many dynasties of gods and demigods, the earliest date which, with any show of antiquity, could be ascribed to the history of Egypt began with the first dynasty of civil writers, and the learned made that correspond with the year before Christ 8986, which would make the first dawn of reliable history 10,833 years old, reckoning to our own time. The pyramids of the first dynasty were built, according to the same authority, Lesueur, B.C. 3460; the great Pyramid, B.C. 3280—respectively 5327 and 5127 years ago. At the earliest of these dates the Egyptians were already a civilized people, in possession of a high scale of numbers, of a calendar, and of the art of writing; while at the latest of them they were certainly a numerous people, skilled in architecture, and equal to the construction of gigantic monuments. This history of the Jews could pretend to no such antiquity as that of the Egyptians, or even as that of the Chinese. There was a general assent among critics in fixing the building of the temple to the year before Christ, 1015—a date which would make it 2446 years later than the construction of the oldest of the pyramids. Reckoning backwards, the exodus proceeded the building of the Temple by 480 years, and the bondage in Egypt was given as having lasted 430 years. There were other races of man which, from their conspicuous position, must have made a very early advancement, although probably not equaling that of the Egyptians. The valleys of the Tigris and Euphrates, from the climate, fertility of soil, and facility of investigation, with the genius of their inhabitants, were formed by nature to be the seat of a very early civilization, and we have abundant evidence of such a civilization having sprung up, rivalling that of Egypt in extent and greatly surpassing it in power. Its perishable monuments, however, do not furnish us with the same satisfactory evidence of antiquity as do the enduring monuments of Egypt. After a reference to the civilization of Assyria and India, the paper concluded as follows:—I may conclude this paper with a recapitulation of the conclusions which may, I think, be legitimately deduced from the facts stated in it. Man, although the latest creation of the class of beings to which he is most nearly allied, is yet of vast antiquity, although that portion of his history which has transpired since he acquired the art of making a durable and authentic record of his own existence, forms but a very small fraction of it. From the time in which he acquired the skill to frame this record, we have to trace him back over the many stages he had to pass through up to the discovery of his remains in caves, and those of his handiwork in the most recent geological formation, "the drift." We must, indeed, go beyond this, and up to his first appearance, when he was without speech, ignorant of every art, and, like the lower animals, chiefly guided by instinct. This is to be inferred from the fact that, where material evidence of man's presence exists, where in caves or "drifts," he is already found in possession of implements of stone, implying a considerable step in advance. But the localities in which the physical geography of the land and the genius of its people combined to effect such an early social advancement as was necessary to be attainment of the skill indispensable to the production of a reliable and enduring record of human events, however rude and imperfect, have been few in numbers, and confined to such as I have endeavored briefly to enumerate. Over the greater part of the earth's surface, auspicious locality and genius of race were not so combined as to have enabled mankind to reach that point. The red man of America, the shepherds of Tartary, the black races of Africa never even approached it. The most highly endowed and the most happily situated of the nations of Europe had reached it only in comparatively modern times, and might not, indeed, have reached it at all had they not borrowed largely from their more precocious neighbors of Asia. The physical geography of the wild region of Tartary, independent of the quality of race, has ever made it impossible that man should have advanced beyond the condition of migrating shepherds, who have now and then united in formidable hosts, and proved the scourges of civilized man. The peculiar privations, both as to locality and race, which characterize some regions of the earth have made all advance in arts beyond what was indispensable to a bare preservation of existence impossible, and of this we have examples in the land of the Esquimaux and of the Australians. In a few localities even this amount of skill had not been attained. Thus Spitzbergen, Nova Zembla, and even Iceland, when first seen by civilized man, were uninhabited; and when we see the Esquimaux living and multiplying and spreading in equally rigorous or even more rigorous climates, it is hard to believe but that they must once have had an aboriginal population, seeing that at least animal food is abundant in them. If they had they must have perished for want of skill to maintain existence. New Zealand would seem to have had no native inhabitants until it came to be colonized by savages and cannibals from the tropical islands of the Pacific. It is difficult in this case, too, to believe that prolific nature should have left so large a country without aboriginal inhabitants, yet it is more probable that the aborigines were either extirpated or absorbed by the more powerful invaders, than that they perished from want of skill in the arts.

### The First French Iron-clad.

Our engraving represents the appearance of the great ram constructed by order of the French Emperor, and which made such a nervous stir among the officials of the English navy some two years ago. At that time the performance of our initial *Monitor* and the accompanying efficiency of our other iron-clads had awakened a remarkable interest in the construction of war vessels among other nations. Impregnability and efficiency in assault were the two almost opposing qualities which it was desirable to combine in naval vessels. This was attempted in the *Taureau*, which is an iron-plated ram, defended by its plating and having its only means of offense in a single gun mounted near the bow in a turret. The principal advantage expected from the ship was its immense beak or prow, the ship itself being used as a projectile, to be hurled against those of an enemy. The sides



THE FRENCH IRON-CLAD RAM "TAUREAU."

of the vessel are protected by armor extending only about three feet above the water line amidships, and abaft and at the bow by five inches thickness of armor. The engines, two in number, are each of 250-horse power, and the vessel 197 feet long by 48 wide.

As a menace to hostile powers the *Taureau* may be valuable, but as a means of offence or defense it is doubtful if it would equal one of our unpretending monitors.

### How Guns are Fired.

The earliest means adopted for igniting the charges of big guns would seem to have been red-hot spikes or bars, which were introduced into the vent, and a pair of bellows for heating the irons formed a necessary part of the artillery equipment of the fourteenth and fifteenth centuries. The inconvenience and danger attending this plan became more conspicuous as the size and power of guns increased, and by the middle of the fifteenth century it had been almost entirely superseded by the system of priming with loose powder, a small train of which was laid up to and through the vent. But the red-hot priming irons were not at once got rid of, for until the adoption of a match made for the purpose, they were still used to ignite the priming powder; and of this match, or of the linstock used for holding it, we find no mention until some time in the sixteenth century. About the beginning of the seventeenth century the priming powder was in part superseded by a small piece of quickmatch, which, being introduced into the vent,acted like a weak tube. To this match the name *portefeu* was applied—a name which we still retain, although the modern "portfire," it need hardly be said, is a very different thing from the ancient *portefeu*. It is remarkable that, although the flint had been introduced about this time, or even earlier, as a means of firing small arms, no attempt seems to have been made for about 200 years to extend its employment to cannon. But the subject did not stand still, and a great improvement was effected in the first half of the eighteenth century, when the quickmatch or *portefeu* was no longer used by itself, but was placed inside a small tube, which could be dropped into the vent, the head of the tube being primed, and the train of loose powder which led up to the vent being done away with. It was not until the beginning of the present century that the simplification of reducing all tubes to one uniform length was effected, but by this time the peculiar action of a tube came to be understood. This action is due to the hole in the center of the composition, the effect of which is to expose a large surface of composition to immediate ignition, and the gas which is thus generated, being subjected to considerable pressure in the cavity, necessarily rushes in the only direction in which an escape is open to it—viz: through the tube—with accumulating force, causing an explosion, the effects of which are directed in the prolongation of the tube. The adoption of a safer and more rapid means of ignition is due to Sir Charles Douglas, father of Sir Howard Douglas, the well known writer on naval gunnery.

In 1778 he formally submitted various propositions "for improving, facilitating, and quickening the service of naval ordnance," including the introduction of flint locks and quill tubes. His propositions were not immediately entertained, and their employment on land never became very general, and tubes ignited by a match or portfire were generally used until 1845 for land-service guns. The next great improvement was the application of the percussion principle of ignition, an improvement of considerable importance at sea, since it made the firing of the gun more instantaneous, and and thus considerably increased the accuracy of the practice made from the ever-moving platform of shipboard. No tubes of this sort were made for actual service until about 1831. They were contrived by Mr. Marsh, of the Royal Arsenal Surgery, and improved upon in 1846 by Col. Dansey, R. A. They consisted of a quill tube, with a small cross-quill filled with a detonating composition, which was exploded by the blow of a hammer fixed to the gun. For land-service,percussion tubes do not seem to have been used until about the year 1845,when they may be considerdd to have been established for both services, although their application to land guns was only partial. Meanwhile attention had been directed to a tube which was brought to this country by a German officer, which depended not upon percussion but upon friction for its ignition. In 1851 Mr. Tozer, of the Royal Laboratory, succeeded in perfecting a copper friction tube of the pattern now in use, which was adopted for all land-service artillery in 1853. It was not recommended for naval service on the ground that any metal tube would be dangerous and highly objectionable between decks. But by 1856 a quill friction tube had been designed and adopted for naval service—the percussion tube being retained, however, in a certain proportion, until last year, when it was formally pronounced obsolete. The introduction of friction tubes was a great improvement for both land and sea service; in the field they superseded the common tubes and portfires, which had rendered the service of the guns slow and imperfect,and the use of which was attended with the risk of setting fire to ripe corn, dry grass, etc., from the ignited ends of portfire which were cut off and thrown down. For sea, garrison, and siege services they got rid of the hammer, making the firing of the gun even more instantaneous and convenient. These are the tubes now generally in use. There remains only to be noticed a system of firing guns by electric agency, which is largely used at proof and for experimental purposes, when it is desirable for the firing party to be under cover. The first employment of electricity for firing gunpowder dates as far back as 1751, and is due to Franklin; and in 1767 Priestley turned his attention successfully in the same direction. Our space will not permit us to detail the various contrivances which have been proposed. Suffice it to say that it was not until 1856 that Mr. McKinlay, the proof-master at Woolwich, submitted his galvanic tube, the principle of which consisted in causing the current of electricity to pass at one part of its circuit through a wire of inferior conducting power, which, becoming instantaneously heated to redness, ignited the priming in the head of the tube in which it was embedded. The last improvement in this direction has been the application of magneto-electricity, which was successfully accomplished in 1862, by Messrs. Abel and Wheatstone. The inductive apparatus used with these tubes is extremely simple, portable, and durable. The electric tubes are used also for firing "time guns" at Edinburgh, Glasgow, Sunderland, and other northern towns, the current being daily flashed at noon along ordinary telegraph wires from the Royal Observatory at Greenwich.—*Pall Mall Gazette.*

## Editorial Summary.

SEWING-MACHINE FACTS.—The following interesting statistics we gather from the quarterly returns, made, we believe, under oath, by the several manufacturers of sewing-machines throughout the United States. The figures which we present, and which we have been at some pains to collect, show at a glance the wonderful growth and great importance of this branch of American manufactures. It will be observed that one company alone has produced and sold within the year over *forty-three thousand sewing machines*. It is somewhat remarkable that, during the recent stagnation in trade, this business has been but slightly, if at all, affected. But below are the figures in detail:—

Sewing-machines manufactured and sold, as per quarterly returns, for the year ending June 10, 1867.

| | |
|---|---|
| *Double-Thread Machines:* | |
| The Singer Manufacturing Co. | 43,053 |
| The Wheeler & Wilson Mf. Co. | 38,055 |
| The Grover & Baker S. M. Co. | 32,999 |
| The Howe Machine Co. | 11,053 |
| The Florence S. M. Co. | 10,534 |
| The Weed S. M. Co. | 3,638 |
| The Elliptic S. M. Co. | 3,185 |
| The Ætna S. M. Co. | 2,958 |
| The Finkle & Lyon S. M. Co. | 2,488 |
| The Empire S. M. Co. | 2,121 |
| The Leavitt S. M. Co. | 1,051 |
| Total double-thread machines | 151,135 |
| *Single-Thread Machines:* | |
| The Wilcox & Gibbs S. M. Co. | 14,152 |
| The Shaw & Clark S. M. Co. | 2,692 |
| The Goodspeed & Wyman S. M. Co. | 2,126 |
| Total single-thread machines | 18,970 |

The foregoing facts and figures we find in the *Financial*

*Chronicle* of the seventh inst. About a year or so ago, as our readers will remember, we published a series of articles descriptive of some of the great manufacturing interests in this country. We then selected and described the immense establishment of the Singer Manufacturing Company, located in this city, as the representative and leading concern in the department of sewing machines, and we are now pleased to find that we did not in the least exaggerate or over-estimate the importance of the company in question. It is noteworthy and somewhat suggestive that the Singer Company, who did not, as we understand, take the trouble of visiting, or even of sending their machines to the Paris Exposition—who seemingly do not care in the least for either gold medals or red ribbons, and whose name is rarely seen in print—should, nevertheless, eclipse all other sewing machine concerns in the magnitude of their business. There is, of course, a reason for all this, but we leave our readers to find that out for themselves.—*Home Journal.*

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Prince Rupert's Drops.—The properties of unannealed glass are beautifully shown in the scientific toy bearing the above title, made by dropping melted glass into water, they take a long oval form tapering to a point at one end. While the body of these drops will bear a smart stroke from a hammer without fracturing, if a portion of the smaller end is snapped off the whole mass will be broken into an almost impalpable powder with a violent shock. Prof. Faraday used to illustrate the incompressibility of water by placing one of these drops in a phial of water, the concussion from the disruption of the drop shattering the glass bottle. Another interesting experiment with the same toy is now given by Reusch. In place of water he fills the vial with melted resin, and when this has solidified he nips off the end of the glass drop, the bottle is broken as before, and the mass of resin is deeply fissured throughout its length. The drop is found as a kernel, loosely aggregated together, but easily detached from the resin, entire. When broken to pieces the fragments will be seen to have the form of a cone on an hemispherical base, like some forms of hail.

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Tourist Indicators.—Mr. Bayalgette proposed at the late meeting of the British Association, a plan for providing for the wants of tourists for obtaining local information and supplying reliable topographical information after reaching the summits of eminences. A fixed circular stone or metallic table has radial lines pointing to objects of interest drawn upon it. Upon the line is to be engraved the name of the object, distance from point of view, and other information of interest. A form of this indicator would be found useful in open places in large cities, giving the directions and distances to public buildings, railway stations, etc.

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An International Workshop.—The French Emperor has been seriously considering a project for transforming the machine gallery at the Exposition into an international workshop. In estimating the whole of the steam engines employed at 2,000 horse-power, four million francs might be yearly realized by the rent, and, says the engineer Erissac, "a Cyclopean school would be stationed on the banks of the Seine, without rival in the world, and which would render to Paris, to France, and to industry, the greatest service."

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American Mastodons.—Not long ago Dr. Stimpson, of the Smithsonian Institute, heard of the discovery in Hunterdan, Ind.—a place about sixteen miles north of Fort Wayne—of bones of extraordinary size, evidently the remains of some monster. Proceeding to the spot, he unearthed one by one the bones of three mastodons, a male, female, and calf. The skull of the largest is four feet in length, the animal being at least fifteen feet in hight. The remains will form a part of the collection of curiosities in the Bureau of the Chicago Academy of Sciences.

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Steel Pens.—If a steel pen is hard and obstinate, refuses to yield when pressed, and annoys by its rigidity, hold it a half minute or less in the flame of a gas light or candle and stick it into water, oil, or tallow. In most instances it will cure the rigidity. In fact, it is a good practice to pass a steel pen through the flame of a lamp before using it. This burns off the oil used in the tempering and prevents that slipping of the ink, or the refusal to flow, generally noticed in all new steel pens.

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Preliminary Soundings for the proposed Franco-American cable are announced to be completed. The route decided upon is from Brest to the French island of St. Pierre off the south shore of Newfoundland, thence along the coast to this city. The cable is now making in London, the *Great Eastern* is chartered to lay it, and by next July telegraphic communication, it is hoped, will be opened.

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Military Aeronauts do not appear to have afforded any very useful results in the war in Paraguay. Although frequent balloon ascensions have been made, the ascent was but the signal for Marshal Lopez to order the kindling of great fires, the smoke from which covered his camp, and thus prevented the allies from discovering what was going on therein.

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## POPULAR ERRORS.

This heading is a somewhat favorite one among writers, but not seldom those who attempt to expose these "popular errors" fall into errors of their own, sometimes as egregious as those they condemn. A correspondent sends us a communication intended to notice some popular errors, and we give below the essential portions of his article. He says in effect, that although Lord Bacon knew seven men who attained the age of one hundred years by drinking cider, he does not mention the seven-score men who attained that age drinking only water. Luigi Cornaro reached the age of ninety-eight living from his fortieth year largely upon wine, and Red Jacket saw his hundredth year although he got drunk daily. The hydropathists believe in water and frequent ablutions of the body, as the remedy for almost all the ills flesh is heir to, yet plantation negroes and other people, who shun water as poison, are as healthy as the most rigid followers of Priessnitz. Tradition says that James, "the just," the brother of Jesus, neither took his daily bath, shaved his beard, nor cut his hair.

Our correspondent says further, that he has buried his brightest and most beautiful child—a martyr to science from daily ablution—while his younger born, puny and feeble, and knowing not what a bath is, lives and promises to grow to a healthy maturity. His mother, nearing her eightieth year, was by the carelessness of a nurse allowed to go without bathing and she is rarely ill; while all the rest of her mother's children, bathed regularly by the mother, died in youth (one accidentally drowned) of the same disease.

Our correspondent states that some years ago the theory was advanced in a book that grapes, used alone as food, would insure long life, free from disease, but that it would be difficult to find any grape eaters entirely free from disease and not in danger of death. So it is said salt is unhealthful and not fit to be used by the human family. Yet we know that our perspiration, and our tears are salt, and that the people who live without salt are no healthier, nor longer lived than those who use it habitually. Animals, both domestic and wild, thrive the better for it. Two thousand pounds of hay contain seven pounds of salt; a tun of turnips, four pounds, and bulbs, straw, and grain all contain this essential mineral largely. In the "blue grass" region of Kentucky writers say the girls grow to be more beautiful than in any other portion of the country; yet their food is mainly "hog and hominy" with potatoes and eggs, food that requires a large proportion of salt. Kentucky's stalwart sons, her old men and women, are healthy, hardy, and almost as indestructible as pine knots.

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### The Day Line.

Mr. Lyman Thayer, of Burlington, Vt., who appears not to be aware that the subject has been fully discussed in the Scientific American, sends us a very interesting and logical exposition of the question of the beginning of the day. He has gone, however, a little further than any of our correspondents, and has invented an admirable device for illustrating the subject to the senses. We quote that part of his paper which describes his invention:—

"I have addressed you on this subject, having learned there had been many remarks in your paper editorially and from correspondents, in regard to this vexed question, and no satisfactory answer given.

"I have just completed a diagram, in good form, representing the revolution of the globe with all the principal places on the globe shown on the face of it, set at their proper meridians as they are actually located on the globe, within the hours—the idea of representing the revolution of the globe with the hours shown, set at their proper places as they are actually located around the globe, is altogether a new and original contrivance or invention, and one that represents the revolution of the globe in a better and more distinct form, than any thing that has ever been invented and used for that purpose. It shows at once the relative position of all the principal places around the globe, and each and all the twenty-four hours as they are applied to each and every locality, at all times, at every revolution of the globe, or at all hours of the day—the hours being local or fixed principles, are attached to the sun, whilst the globe, with all its localities, continually revolving within the hours, is a fact that is not thought of or understood—it also constitutes a universal clock: every meridian is shown and numbered on the diagram, and by setting the meridian you are at, at the hour of the day, all other places stand at the hour or time it actually is at that place: shows where the days begin and end, and how they are applied to the revolution of the globe, and at all times, on how much of the globe it is Monday, for example, and how much it is Tuesday, or any other day, as the case may be: illustrates distinctly and plainly all questions that have been originated in regard to the day's changing, and shows a harmony of their application, and satisfies every intelligent mind on the subject. This diagram is set in a case, similar to the large parlor clocks, the diagram where the face of the clock would be; the revolution is made by a small crank at the side of the case, and the front of the lower part of the case contains an explanation of all its showing in plain form. They cost from five to ten dollars, according to the finish of the case, and would be useful in every family."

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### The Boiler Disaster at Newark.

On Monday the 30th ult., at Ehehalt & Seydel's Brewery, Rankin Street a boiler explosion took place which was a case of most unmistakable lack of water. The boiler was nearly new, 22 feet long 42 inch diameter with two 12-inch flues. The boiler must have been red hot for with the exception of about 6 inches of the bottom part of it all above is burned to blackness.

Had there been a sufficient quantity of water in it and it had ruptured as it did, the consequences would have been terrible, as it pointed directly in its flight toward dwellings on the opposite side of the street. The end of the boiler, with some three feet of the shell and eight feet of the flues, would have passed through them. The boiler was to all appearance a good and safe one.

### ANOTHER LEVEE PLAN.

W. A. J. of Louisiana proposes a novel method of constructing levees on the Mississippi. He would erect on the banks, at a distance of 150 feet apart, a series of abutments of brick, having wings or projections on two sides in a direction parallel with the river banks. Between these abutments he would build the earth levees, not however in a right line, but curved toward the river, the ends of the arch or curve resting on the wings and body of the abutment. Perhaps his idea will be better understood by supposing arches of 150 feet span laid on a horizontal instead of a vertical plane, the top of the arch presented to the water. The banks of the river would then present a succession of curves instead of one straight line or a line following only the sinuosities of the river. He considers that if the earth between two piers was washed away, making a crevasse, it would not so easily extend further as with the present style of embankments. As this subject is one of great importance we will make a single remark on this proposed plan. The arches themselves are only earth, unprotected by piling or any other means. Of course, a portion of the arch, that presented to the force of the current, must to a certain extent, offer resistance—at least sufficient to deflect the current toward the center of the stream. How long this unprotected curve of earth would resist the continual wear of the current is for engineers or our correspondent to estimate, or experiment to determine.

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## MANUFACTURING, MINING, AND RAILROAD ITEMS.

Rock crystal, sufficiently clear to be used for lenses, has lately been discovered in Arkansas, while digging around a breastwork thrown up during the war.

The total product of the Lake Superior iron mines last year was 306,252 tuns of ore. The reasons for the exceedingly rapid development of these mines since the year 1855 when the shipments of ore were 1,445 tuns—are many and obvious. The deposits are immense, easily worked, and nearly free from those noxious elements which render the flux of most iron or ores difficu and expensive. None of the mines, moreover, are over thirty-five miles from cheap water transportation, while most of them are only fifteen or sixteen miles distant.

Between Oil City and Meadville, says a recent visitor to the Pennsylvania oil regions, there is not one well in operation. It is only a long line of rotting derricks and rusted boilers and engines.

The survey of the proposed railroad from Schenectady to Ogdensburg on the St. Lawrence river, is about completed. The survey was provided for by the Legislature, and has been accomplished under the supervision of the State Engineer. From the St. Lawrence to the Hudson, this road in connection with the Athens and Schenectady "cut-off" will be direct and vastly shorter than any other. The route is pronounced by the superintending engineer a practicable and highly favorable one.

The extensive cultivation of flax in Australia will probably result from the success of late experiments in raising this plant at Portarlington on Port Phillip Bay. A factory for its manufacture has just been started in the suburbs of Melbourne.

The boot and shoe manufactories at Lynn, a town of twenty-three thousand inhabitants, employ seventeen thousand persons, or more than two thirds o its population.

The American company formed for the purpose of constructing a system of local telegraphs on the coast of China, has purchased from the Western Union Telegraph company some 525 miles of telegraph cable originally intended to be laid across the Behring's Straits, but now destined to be laid on such portions of the coast between Hongkong and Shanghai as may be considered advisable.

An immense deposit of toccoline has been discovered near Pescara, in Italy. It is combustible like asphalt and answers for pavements. About 60 per cent. of refined oil, which affords a far more brilliant light than petroleum, may be obtained from it.

Francis Morris, of New York has recently concluded at London, an arrangement with Capt. Pim, of the Royal Navy, looking to the establishment of a new interoceanic line across Nicaragua, by railroad, connecting with steamers on the lake.

The Air line railroad has been surveyed from New Haven to Middletown during the past few weeks. The line is twenty-one miles long, and can be built for $600,000 not including the right of way and the portion already built.

The Reis mine, near Downieville, Cal., has proved itself a most wonderful investment. For sixteen years ninety thousand tuns have been taken from it, and it now has forty-five thousand tuns of pay ore in sight, enough to keep two mills running for two years. The total production last year was $224,000. The mine is 5,100 feet above sea level.

The Belgians claim to have been the first to discover the uses of coal, and this discovery, they say, was made by one Hullos, a blacksmith, of the village of Plenevaux, near Liege, in the year 1049, from whose name they derive the word "houille." Coal was first used as fuel in London in the latter part of the thirteenth century; but the smoke was considered so injurious to the public health that Parliament petitioned King Edward I. to prohibit its burning, as an intolerable nuisance. He complied, and issued his proclamation against it. The most severe measures were then employed to abolish its use—fines, imprisonment, and the destruction of furnaces and workshops where it was used.

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## Recent American and Foreign Patents.

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

Oil Can.—Martin Robbins, Cincinnati, Ohio.—This invention consists in providing a can or vessel which is to contain oil, sirups or other liquids, with a vacuum handle and with an adjustable nozzle, so that the nozzle may be adjusted to any desired angle, with the can, for the purpose of allowing a greater or less quantity of the liquid to be ejected or forced out, as may be desired.

Coal Elevator and Distributor.—Henry C. Clark and Robert B. Little, Providence, R. I.—This invention relates to a new device whereby coal or other articles can be conveyed from a vessel or other receptacle to any particular one of a number of compartments, where they can be dumped into carts or cars if desired.

Three Wheel Carriage.—John Gehr, Mercersburgh, Pa.—In this invention the journals of the forward axle work in boxes attached to a horizontal fixed wheel, which supports a revolving ring to which are attached the couplings that connect the forward and rear axles.

Lifting Jack.—Wm. Green, Holly, Mich.—This invention is a neat, cheap and convenient lifting jack, designed for the special purpose of removing hop poles from the ground.

Attachment for Sewing Machine.—John W. Neill, New York City.—The object of this invention is to provide an attachment for sewing machines for making the plaits or tucks in shirt bosoms, ladies skirts, dresses or garments of any description, whereby the material is creased and folded to any sized plait and sewed through the three folds or thickness of the plait to finish it completely at the same time.

Ague Medicine.—T. M. Daniel, Athens, Ga.—This invention relates to a new composition, or rather application, of certain ingredients which when applied in the manner hereinafter specified, form a cure and preventive for ague, fever, etc.

Loom.—Daniel K. Fretz, Buckeye, Iowa.—This invention has for its object to simplify and cheapen, and otherwise improve the ordinary hand power loom, wherein the various parts are put in motion by the vibration of the batten.

Hold Back.—James C. Covert, Townsendville, N. Y.—This invention relates to an iron hold back to be attached to the hames, and to be connected by a ring to the neck yoke, for the purpose of doing away with the breast strap, and to facilitate the easy adjustment of the harness and the management of the vehicle.

Lamp.—Peter Hoffmann, Constableville, N. Y.—This invention relates to a lamp which consists of two oil chambers, the upper chamber, from which the wick draws its supply, being arranged in such a manner above the lower one into which the oil is poured, that whenever it becomes empty it may be pressed down, its lower end having a plunger fitting close in a tube projecting from the lower chamber, whereby the oil is pumped into the upper chamber. The lamp is not liable to explode, and may be filled while burning without danger.

Machine for Making Bullets or Shot.—C. H. Remington, Dubuque, Iowa.—This invention relates to a new and useful improvement in machinery for making bullets or shot by compression or swaging.

Leather Rolling Machine.—Johnson Lombard, Springfield, Me.—This invention relates to an improved machine for rolling or folding sole leather in bundles and consists in a set of rollers and straps in combination with a table and main rolling shaft by which the leather is rolled tightly for packing and transportation.

King Bolt.—Enos A. Keasey, Ligonier, Ind.—This invention relates to an improved construction of king bolts for carriages and other vehicles, and consists in attaching the bolt with a swivel joint to the axel clip which supports the bolt by a shoulder, so that the cam bolt and head block shall turn together.

Gate.—Hans J. Johnson, St. Peter, Minn.—This inventfon has for its object to furnish a durable and convenient gate, which may be used as a single or double gate, and which may be easily adjusted so as to swing over snow or other obstructions.

Rein Holder.—Buel D. Pease, Madison, Pa.—This invention has for its object to furnish an improved rein holder for attachment to the dash board of a wagon or carriage, which shall be so constructed as to hold the reins securely and at the same time allow them to be instantaneously detached.

School Desk and Seat.—D. C. Wilson, Beaufort, S. C.—This invention has for its object to furnish a strong, simple and convenient manner of making school desks and seats, and it consists in the construction of their frames and in the manner in which they are secured to the floor.

Cultivator.—J. Madison Morse, Sandwich, Ill.—This invention has for its object to furnish on improved attachment for corn cultivators, by means of which the driver may be enabled to ride, which at the same time shall have a tendency to prevent the cultivator from "jumping" or "bounding" and which may be easily and quickly attached and detached.

Driving Propellers.—Wm. Lawton, Greenpoint, N. Y.—This invention has for its object to furnish an improved device by means of which the screw may be made to revolve more rapidly than the driving shaft operated by the engine, so as to drive the boat at speed by a slow movement of the engine.

Shoe Knife.—Henry Sauerbier, Newark, N. J.—The inventor has received two patents for a knife for cutting or trimming the edges of the soles of boots and shoes. His invention consists in the application of a sliding guard or gage to the blade of the knife whereby the desired work may be accomplished without the liability of cutting the upper of the boot or shoe.

Test Pump and Gage.—Henry Getty, Brooklyn, N. Y.—This invention relates to a combined pump and gage, more especially intended for the testing of gas or other piping or tubing.

Machine for Cutting Miters.—R. F. Tompkins, New York City.—This machine consists of two cutter blades, arranged to be moved up and down in a vertical plane, and so as to be adjusted with regard to each other at a greater or lesser angle, in combination with rests or blocks for the material or stuff to be cut, correspondingly susceptible of adjustment, and to be brought into the proper relative positions with regard to the cutter or knife blades.

Water Wheel.—Wm. Cooper, Hancock, Md.—This invention relates to an improvement in that class of water wheels which are placed on a vertical shaft and are commonly termed horizontal wheels. It consists, first, in an improved application of gates to the wheel, whereby the former may be opened or closed simultaneously with the greatest facility, and retained at any point without interfering in the least with the proper action of the water upon the buckets; second, in a peculiar arrangement of the buckets, the manner of placing them in the wheel, whereby power is obtained both by the impact and gravity of the water.

Corn Planter.—Joseph Krebs and August Johns, Massillon, Ohio.—This invention has for its object to furnish an improved machine by means of which the ground may be furrowed, the corn dropped and covered, and the hill marked by the same operation, and which shall at the same time be simple in construction and easily operated.

Chair Seat.—George Heesen, Tecumseh, Mich.—This invention relates to a new and improved seat for chairs, settees, etc., and consists in substituting paper twine for flags hitherto used for such purposes. The seat is constructed in precisely the same way as the flag seat.

Saw-Set.—James C. Woodard, Franklin, Conn.—In this saw-set are combined and obtained many important advantages and features.

Couplings.—E. and H. Butler, Croton Falls, N. Y.—The object of this invention is to prevent the rattling noise and wear of the center bolt or pin by which the shafts or thill are hung or pivoted to the couplings, and for this purpose the invention consists in a novel application to the said center pin or bolt, of an elastic cushion or cushions whereby the desired end is effected.

Combined Eraser and Letter Opener.—George C. Barney, Philadelphia, Pa.—This invention consists in a blade of steel or other suitable material having two edges made of a curvilinear shape intersecting each other at one end of the blade where the blade is sharp pointed; the outer or convex edge of the blade being made suitable for use as an eraser, with the inner or concave suitably sharpened for cutting paper more particularly.

Watches—J. A. Harmann, New York City.—This invention consists in so constructing the pendant of a watch as to receive and hold the key adapted to such watch whereby the key is always at hand when to be used for winding the watch movement or setting or adjusting its hands, and furthermore the socket of the key, cannot becomed clogged or stopped up with dirt, etc.

Hens Nest.—C. W. Blackman, Bridgeport, Conn.—This invention relates to a new and improved nest for hens and has for its object the prevention of more than one hen occupying the nest at the same time.

Window Screens.—James McFeeley, North Woburn, Mass.—This invention consists in so constructing the frame to a window or door screen in such manner that water can be made or allowed to flow over the surface of the screen from top to bottom whereby while the dust etc., is more perfectly excluded, the atmosphere of the room is rendered cooler and more pleasant.

Center Boards for Vessels.—John G. Saunders, Narragansett, R. I.—This invention relates to a new and improved mode of laying center boards in vessels, whereby the center board may be raised and lowered with its lower edge parallel with the keel of the vessel and center board, in case of meeting with any obstruction when the vessel is sailing, allowed to rise and pass over the obstruction without sustaining anp injury whatever, and also admit of being readily detached from its trunk at any time when necessary for repairs.

Moustache Guard.—A novel contrivance was patented on the 23d of July last by Chas. E. Mitchell, who is now residing at the Astor House, New York, in the shape of a mustache guard. It is made of thin metal and by means of springs ingeneously placed can be instantaneously attached to or removed from a cup or tumbler and carried in the vest pocket when not in use. By its use coffee or other liquids can be drank without wetting the moustache. Mr. M. will be happy to show his invention to persons taking an interest in novelties of the kind or, to dispose of rights to manufacture.

Loom Picker.—Bradford Nichols, Phenix Village, R. I.—This invention relates to a new and useful improvement in the picker of a loom, and consists in making the shell or casing and binder of the picker of rawhide, and securing it to the staff by flanges on each side in such manner that it cannot slip out, nor break, nor allow the filling to come out.

Clothespin.—R. G. Britton, Springfield, Vt.—This invention relates to an improvement in clothespins, and consists in uniting two wooden pieces by an iron pin or rivet, and inserting a spiral spring between the ends, on one side, to close the other ends upon a clothes line to keep the clothes fast when hung out to dry.

Horse Collar.—James G. Haymaker, Salem Cross Roads, Pa.—This invention relates to an improvement in horse collars, and consists in a novel construction and arrangement of the lock upon the hame plates and pads whereby the collar can be placed on the horse without passing it over his head.

Dresser Coppers and Warper Plates.—Ambrose J. Nichols, North Providence, R. I.—This invention relates to machinery for the manufacture of textile fabrics, and it consists in an improvement in dresser plates or coppers, as they are usually called by manufacturers, and which improvement is also applicable to warper plates, as both the dressers and warpers are used for similar purposes.

Thill Coupling.—E. M. Naramore, North Underhill, Vt.—The object of this invention is to provide a wagon thill and pole coupling that may be readily coupled and uncoupled, and firmly and securely held in place.

Telescope.—W. Kuebler and F. Seelhorst, Philadelphia, Pa.—This invention relates to a new and improved method for adjusting the eye-pieces and object-glasses of telescopes.

Safety Valve.—John N. Wrigley and George Smith, Newark, N. J.—This invention consists in so arranging a valve or a valve seat in the coating or shell that it is nearly balanced by the steam, thereby rendering it much more sensitive than the ordinary safety valve now in use and consequently much more safe.

Steam Valve and Valve Movement.—John N. Wrigley and Geo. Smith, Newark, N. J.—This invention relates to a new and improved method of admitting steam to the cylinder of a steam engine.

Stovepipe and Smoke Stack Joints.—Wm. Stine, Elmore, Ohio.—The object of this invention is to improve the manner in which stovepipe, smoke stacks, etc., are usually joined together and to facilitate the operation of putting them up and taking them down.

Carriage Wheels.—John G. Buzzelle, Lynn, Mass.—This invention has for its object to furnish an improved carriage wheel, light, simple, strong, and elastic, and which can be readily tightened or strained whenever desired.

Attachment for School Desk.—D. J. Stagg, New York city.—This invention relates to a new and useful attachment for school desks, for the purpose of holding or supporting drawings, maps, or any papers, while being copied. The invention consists in having a frame or a drawing board fitted in a slot or opening in the desk, and arranged in such a manner that the frame or board, when desired for use, may be raised up and adjusted in proper position relatively with the occupant of the desk, to receive the drawing or other article to be copied, and, when not desired for use, capable of being lowered or let down within the opening of the desk, so as to be entirely out of the way.

Horse Hay Fork.—A. J. Purviance, Keosauqua, Iowa.—This invention relates to a new and useful improvement in operating horse hay forks, so that the same may not only be elevated as usual, but also drawn over the spot or stack where the hay is to be dropped or discharged. The object of the invention is to facilitate the stacking and storing away of hay with the horse hay fork.

Seeding Machine.—Edwin Ritson, Maltaville, N. Y.—This invention relates to a new and improved seeding machine, of that class designed for sowing seed in circles.

Plow.—Mason Prentiss, Cambridge, N. Y.—This invention relates to a new and improved plow of that class which is provided with a double mold board, and is more especially designed for cultivating crops. The invention consists in the application of an adjustable shoe at the rear of the share or mold board, the share being arranged in such a manner that it may, with the greatest facility, be adjusted higher or lower to graduate the depth of the furrow, as may be required.

Machine for Kneading Dough.—W. B. Morrison, Muskegon, Mich.—This invention relates to a new and improved machine for kneading dough, and it consists in piercing the bottom of a box or dough receiver, with a concave surface in or over which a series of plungers work.

Ventilating Attachment for Mill-Stones.—Hezekiah Mc Eldowney, Dixon, Ill.—This invention relates to a new and improved means for causing a circulation of air to pass down between the exterior of the upper mill stone and the curb thereof, whereby the stone is kept in a cool state, and the flour prevented from "sweating," as it is technically termed.

Shifting Step for Vehicles.—Edward Miller, Milwaukee, Wis.—This invention has for its object to furnish an improved shifting or detachable step for attachment to vehicles to enable persons, and especially ladies, to get in and out conveniently.

Churn.—W. C. Peck, Bridgeport, Ohio.—This invention has for its object to furnish an improved rocking churn, simple in construction, convenient to be used, and which will do its work quickly and thoroughly.

Elliptic Spring Brace.—M. Barker, Great Valley, N. Y.—This invention has for its object to furnish an improved means by the use of which elliptic springs may be strongly and securely braced, and which at the same time will allow either of said springs to act without a strain upon the other.

Gate.—A. Tandy, Columbia, Mo.—This invention has for its object to furnish an improved gate, simple in construction, and durable, and which can be opened and closed over obstructions, or up or down hill, as may be desired or necessary.

## 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.*

W. B., of Ohio, thinks it would be a good thing to silence an enemy's guns by firing, point foremost, into the mouth of the guns a number of square tapered files with the teeth cut the reverse way, which would plug or lodge the enemy's shot and burst their guns when fired. So it would; but will W. B. please inform us about his plan for getting so direct an aim as to shoot into the mouth of those cannon he intends to burst.

J. O. B., of Mass., has two stoves in his shop in which he burns wood, one of which with a funnel of 40 feet in length drips a great deal of liquid matter every day, and the pipe has to be frequently taken down and cleaned of a deposit resembling coal tar. The other, on the contrary, gives no such trouble. He wishes to know "what's the matter?" Wood when subjected to slow combustion is more or less distilled and one of the products of such distillation is pyroligneous acid which when heated still more becomes a dark, glutinous substance. It may be seen exuding from the ends of logs when heating on the andirons of an old-fashioned fireplace. The remedy is to put his stove and funnel in order to produce a draft and insure combustion.

J. T., of N. Y., asks what will remove the stain of claret from a table cloth, salt not always being efficient. Try oxalic acid.

N. D. F., of Conn., asks how ale and cider barrels can be thoroughly cleaned. We think a strong solution of sal. soda followed by hot water will do it.

W. M., of N. Y., wishes to be informed if hydrogen gas can be made available for heating or cooking purposes. It certainly can, but its expense is a serious objection, except where hydrogen can be had for next to nothing.

L. W. S., of Mass. "Can you give me information how to burn up the smoke from a planing mill, the furnace fires of which are from shavings and the waste of the mill?" Refer to the article on "Boiler Setting" first page of No. 9, current volume.

T. H. B., of Texas.—"What is the best way to keep a tubular steam boiler free from mud and scale, the latter of which accumulates rapidly from the use of hard water?" Blow off frequently, which will remove the mud and a part, at least, of the scale. One great fault of those who run boilers of any kind is their disinclination to perform this necessary work often enough.

R. B., of Pa., says there is in use in Philadelphia a check valve to steam boilers intended to prevent the pump from thumping. It is placed about two feet from the pump on the suction pipe and is supposed to admit about one fifth of air at every stroke of the pump, forming a cushion for the plunger and then passing into the boiler. It is used on the Harrison cast-iron boiler advantageously, and the question is whether this air endangers the boiler and whether such a pump could injure a wrought-iron boiler. In reply we would say that the air pumped into the boiler cannot injure it whether of cast or wrought iron; neither can we see how the injection of air with the water could benefit a boiler or assist in generating steam.

J. M. W., of N. Y., says: "Believing myself to have discovered a substance which I call liquid phosphorus or oil of phosphorus—the result of an experiment in match making last spring. Allow me, if you please, to ask information." Certainly; but it would, perhaps, be more satisfactory to you and us if you had described your liquid phosphorus and denoted the sort of information required.

F. K., of Mo.—"Could you give a simple and cheap recipe for softening hard water for washing purposes; the wells are in limestone rock?" We knew of nothing simpler and cheaper than sal. soda or wood ashes.

L. M. T., of Mo., desires to know the process of preparing birds and other specimens of animal life by retaining the bones and flesh. Probably D. Van Nostrand, 192 Broadway, can furnish a treatise on the art of the taxidermist.

G. McD., of N. Y., cannot succeed in depositing a film of pure silver upon silver. The battery fails him entirely. Certainly the battery may be made to give an even deposit of pure silver. Probably your failure is due to lack of skill or imperfection in the materials employed.

## Business and Personal.

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

Parties having a Paper Mill for sale or lease will please address, with particulars, Wm. H. Gandey, Lambertville, N. J.

Tin-Ware Manufacturers and Manufacturing Companies send address to Jno. I. D. Bristol, Detroit, Mich.

Wanted, address of manufacturers of Try-Squares. John Burgum, Concord, N. H.

Wanted, manufacturers for the best double-shovel (iron) plow in the market. Address Ray & Shalters, Alliance, Ohio.

Send prices and descriptions of wood-turning lathes to I. J W. Adams, Salisbury, Md.

Manufacturers of Pumps for raising water from deep wells, please send circulars to D. Arthur Brown & Co., Fisherville, N. H.

Manufacturers of Paper-bag machinery, and paper manufacturers send circular and price list to J. Walter, Baden, Mo.

Capitalists, seeking investments, are invited to investigate the merits of "Cotton Tie," illustrated in present number.

Oak Belting.—Large Lot for sale very cheap, in lots to suit. Address S. T. Wellman, Nashua, N. H.

## EXTENSION NOTICES.

William H. Sweet, administrator of the estate of Henry L. Sweet, deceased, of Foxborough, Mass., having petitioned for the extension of a patent granted to the said Henry L. Sweet, the 20th day of December, 1853, for an improvement in guides for sewing on binding, for seven years from the expiration of said patent, which takes place on the 20th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December, 1867.

Joseph Nason, of New York city, having petitioned for the extension of a patent granted to him the 2d day of January, 1854, for an improvement in arrangement for cutting screws in lathes, for seven years from the expiration of said patent, which takes place on the 2d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December next.

Hezekiah B. Smith, of Smithville, N. J., having petitioned for the extension of a patent granted to him the 10th day of January, 1854, for an improvement in mortising machines, for seven years from the expiraton of said patent, which takes place on the 10th day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 23d day of December next.

## Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,261.—Manufacture of Wheeled Vehicles, etc.—John S. Campbell, Newton, N. J. Aug. 5, 1867.

2,405.—Apparatus for Raising Water, etc., by Steam Power.—Wm. L. Horne, Batavia, Ill. Aug. 22, 1867.

2,475.—Carpet Stretcher and Tack Driver.—Wm. Brown, New York City, Aug. 31, 1867.

2,433.—Manufacture of Iron and Steel.—Alexander L. Holley, New York City. Aug. 27, 1867.

2,466.—Apparatus for Submarine Exploration.—George Wrightson, New York City. Aug. 29, 1867.

2,506.—Paddle Wheels for Water Craft.—Wm. R. Manley, New York City. Sept. 4, 1867.

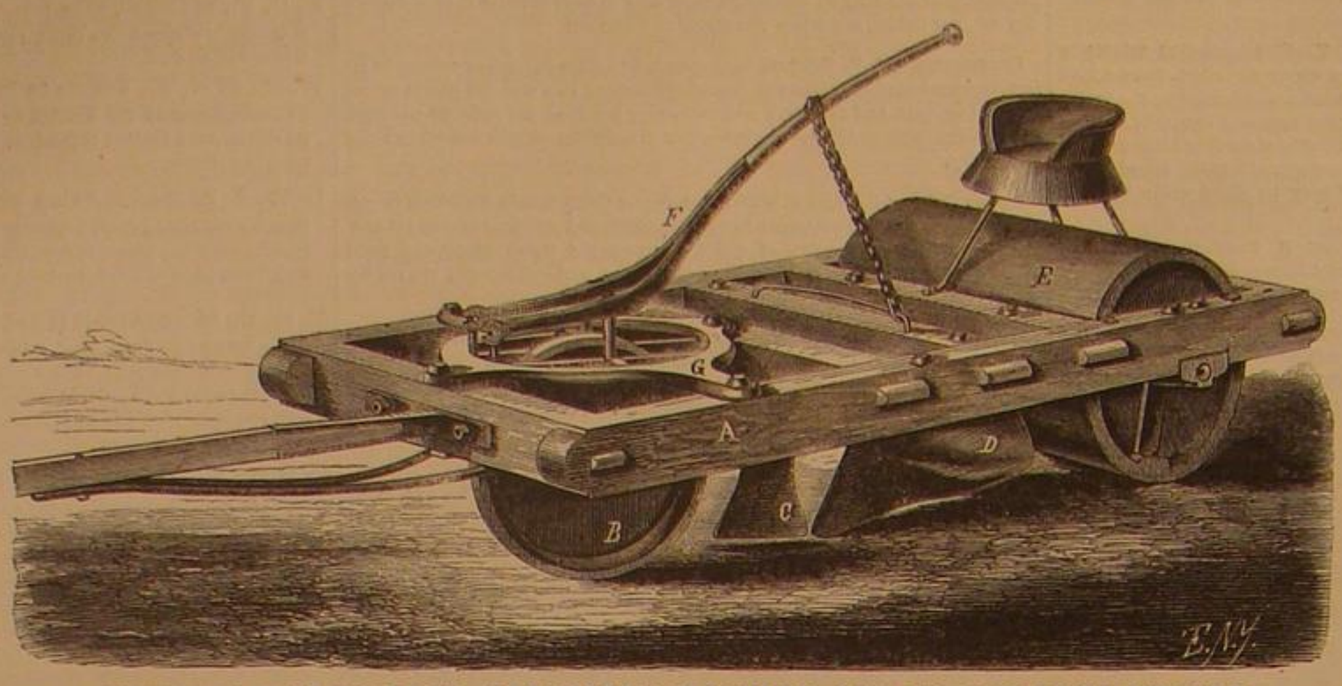
2,551.—Wire Heddles for Loom Harness.—Darius C. Brown, Mass Sept. 9, 1867.

### Implement for Repairing Roads.

The machine seen in the engraving is intended primarily for filling in the ruts, leveling the surface, and compacting the material of roads. It is a plow, scraper, and roller combined, and appears to be a very useful implement for agriculturists. A strongly braced rectangular frame, A, of wood, supports all the working parts, which consist of a guiding wheel, B, colter, C, plow share, D, and roller, E, with their appurtenances. The wheel, B, is mounted in a circular metallic frame by means of arms passing through the frame on each side of the wheel and extending up to a forked lever, F, by which the forward end of the whole machine may be raised. The circular frame on which the wheel is mounted partially rotates in another, denoted by G, and bolted to the frame, A. It will be seen that the driver may guide the machine or regulate the hight of the forward part, and thus the depth of the plowing, by means of the lever, which is easily accessible from his seat.

The machine may be drawn by a yoke of oxen or span of horses. When in use for repairing roads the guiding wheel runs in the rut to be filled, and the plow shares, D—of which there are two, one on each side, converging at their rear ends—lift the earth or gravel from each side of the rut and deposit it in the depression. The colter, C, which is simply a double plow share, is used only when there are very hard and compacted ridges in the road to be broken up. Whether in filling ruts or leveling ridges the heavy roller, E, over which is the driver's seat, compresses and solidifies the work. The machine works over one half of the road at a time and then returns on the other side. The patentees confidently claim that one man with the team can finish five or six miles per day and do it better than fifty men with picks, shovels, etc.

By the removal of the roller and the substitution of a shaft carrying a pair of wheels, the shares being taken out, the machine is adapted to ridge land in parallel rows with a channel on the top of the ridge for the seed, as for cotton and some other crops. Patented through the Scientific American Patent Agency Sept. 17, 1867, by Minor and Ward, who may be addressed at New Bedford, Mass. Models are now on exhibition at the Fair of the American Institute, New York city.



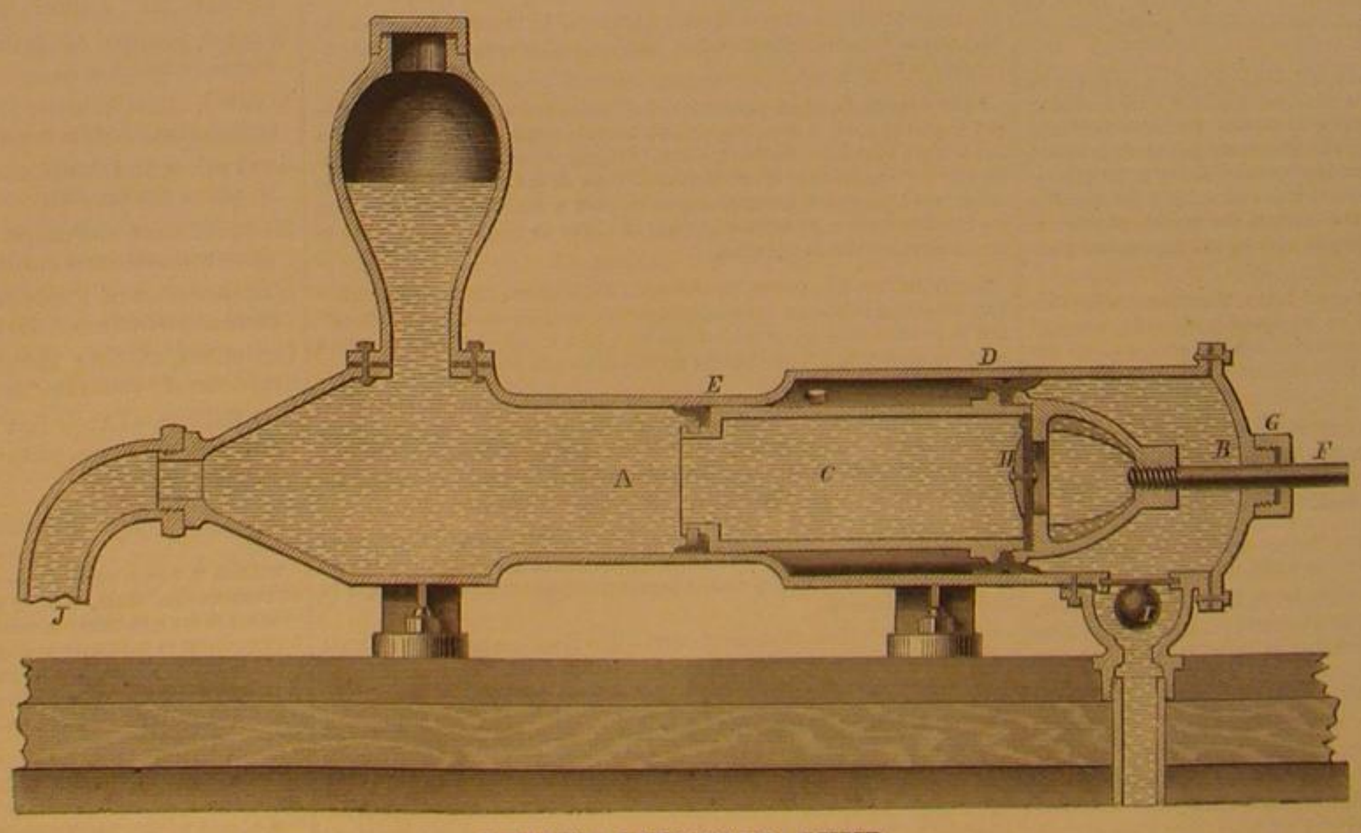

MINOR & WARD'S ROAD REPAIRING MACHINE AND COTTON LAND RIDGER.

### Improved Double Acting Pump.

Few mechanical contrivances have been the subject of so many improvements, or attempted improvements, as the pump, whether the ordinary lifting pump or the combined lifting and forcing pump. In those of the last mentioned character the principal difficulty has been that the upward flow of the water has been checked and turned in a new direction before any proper results could be obtained. This entails an immense loss of power which ought to be employed in raising the water. The prevention of this loss of power is the object of the inventor of this pump; he constructs it on the principle of the incompressibility of water, using the water itself as a ram or solid piston at each alternate stroke.

The engraving is a sectional view of the pump when used in a horizontal position. The cylinder of the pump is of unequal diameter, the portion, A, being much less than the chamber, B. Inside the cylinder is the hollow piston, C, packed at the ends, D and E, and worked by the piston rod, F, through the stuffing box, G. This hollow plunger is open at the forward end and closed at the rear end by the flap valve, H, of the inlet pipe, and J, is the discharge pipe, which may be carried in any direction. In the engraving the pump plunger is seen as making a forward stroke, the water contained within it and held by the valve, H, acting as a solid ram to force the water in the cylinder, A, out of the discharge pipe, J. The return stroke opens the valve, H, by the back pressure of the water in B, which rushes through the cylindrical plunger, C, to be in turn discharged. It will be noticed that the chamber, B, is of much greater diameter than the plunger, C, so that they bear the relative proportions of two to one. This insures always a full cylinder and makes a continuous stream, without check or interruption. One of these pumps in the fair of the American Institute delivers a continuous, full, round stream by the working of a vertical lever moved by one hand, requiring no greater expenditure of power than that which could be exerted by a child of eight or nine years. When used for very deep wells the pump is vertical and the hole or holes seen in the side of the chamber, B, are stopped and the down or backward stroke of the plunger creates a vacuum in the annular space between the chamber and the hollow plunger, which, on the forward or upward stroke assists in raising the weightof the connecting rods and the water column. Valves for opening and closing these holes can be readily attached which may be operated automatically. An air chamber may be connected to the pump if desired,but it is not necessary. It is understood that this pump may be arranged to work either horizontally or vertically.

It was patented July 23, 1867, by Henry Getty, of Brooklyn, N. Y., who may be addressed for further particulars or the sale of rights, etc., at McNabb and Harlin's, 86 John street, New York city.




GETTY'S IMPROVED PUMP.

### Crushing Coal for Burning in Boiler Furnaces.

A few days since we inspected an apparatus erected in the fireroom of the steamer *Warrior* at the Delamater Iron Works—Mulford & Ripley—for pulverizing the coal and forcing it into the furnaces, over the fire, by means of a blowing apparatus.

Circumstances prevented us from examining the internal structure of the crusher and blower as critically as we should have been pleased to do, but the former was apparently a pair of cast iron rollers, over which was erected a hopper for the purpose of supplying them with coal; from the under side of these rollers the pulverized fuel is emptied into a blower with tight fitting, revolving pistons, which force it through about five inches diameter pipes and sprinkle it over the fires.

The crushers and blowers, of which there are two each, are driven by a 15-inch by 15-inch cylinder engine erected on the deck. It transmits its motion to the crushers and blowers through an intermediate shaft driven by gearing and from which belts are led to them. Altogether it looks like a rather complicated fix.

With regard to the efficiency of this contrivance we cannot speak from observation, but we are free to confess that for use on board of steam vessels it impressed us very unfavorably. Indeed we were unable to discover what was the object of the engineer who contrived it, except perhaps to save the trouble of opening the furnace doors to "fire up," but this seeming advantage is attended, it seems to us, with several serious drawbacks, among which is the fact that if the draft is good a considerable portion of the "powdered coal" will be carried into the flues and up the chimney.

There are only four furnaces in the *Warrior's* fire room, and this fact, taken in connection with the machinery necessary for this small number of furnaces, will enable one to form an idea of the complication such an apparatus would render necessary in the fire room of a first-class ocean steamer.

### Artificial Stone for Building---Ransome's Process in America.

We have from time to time called the attention of our readers to Mr. Ransome's process of making artificial stone for building, and especially in our issue of 25th July, we copied an article from *Engineering* which explained the process of its manufacture, and gave the results of such experiments as had then been tried to test its value as a building material.

Recently, through the kindness of Hon. David Naar, President of the "Ransome Patent Stone Co., of New Jersey," we have had an opportunity of witnessing the process ourselves. We confess ourselves to have been unexpectedly pleased not only with the simplicity of the process, but with the facilities which the company have for the manufacture of the stone, and the beautiful results which they accomplish.

The article above referred to went so fully into the *modus operandi* that we do not deem a long explanation of the chemical process necessary. It is a successful imitation of nature's own methods. Grains of sand are agglutinated by cement. The sand is washed from all impurities, thoroughly dried, and intimately mixed with the silicate of soda of commerce. It is then molded into the form desired and subjected to a bath of the solution of chloride of calcium. A double decomposition takes place and induration commences. In a few moments the plastic mass begins to ring under a slight blow of the trowel. The results of the decomposition are the insoluble silicate of lime and chloride of sodium (common salt), which is easily soluble in water. As soon as the mass has hardened throughout, or when the chloride of calcium has been brought in contact with every particle of the sand so mixed with the silicate of soda, it is boiled in a solution of chloride of calcium, which drives the salt to the surface, from which it is washed by a shower bath of water. The stone is then dried and is ready for use.

The stone, as compared with the sandstones in use, is considerably cheaper, and when capitals or ornamental moldings are required, the cost is not more than one eighth. Its weight is about 140 pounds to the cubic foot. The color is about the same as the Portland stone, depending of course upon the color of the sand used. It is easily colored, however, to any tint required. It has been subjected to the severest tests as to its durability, and so far shows greater resisting and durable qualities than the sandstones in use.

It is being made not only in Europe but in several parts of this country, and is beginning to be used for building purposes, and the true test, that of time and the weather, is being applied to it.

We cannot predict that it will endure as long as the Pyramids, but its composition is such, and it so well stands the tests to which it has been subjected, as to give us good reason to hope and believe that it is equal if not superior in durable qualities to most of the building stone in use.

Those who have been foremost in undertaking the manufacture of the stone in this country deserve success, and we believe the article will fill a want long experienced by builders, and we hope they will not let prejudice deter them from giving it a fair trial.

It is not remarkable that such a discovery has been made; the wonder is that it has not been made before. Our exchanges from England mention the Ransome process as a practical success for nearly every purpose for which stone is used, even to the manufacture of grindstones. What Great Britain can do in this line can be equally well done by us, and we predict for the New Jersey company financial success.

### New Use of a Device.

A new use of a thing without being claimed in combination with some other and new element, or as part of a new combination, in the device where such thing is introduced, is not patentable, it being considered simply the application of an old thing to a new use. Toward such a view would appear to be the leaning of the courts. The point was touched upon in the case of West *vs.* Silver Wire and Skirt Manufacturing Company lately decided in the Southern District of New York.

Color of Sunlight.—M. Brucke has observed that diffused solar light, instead of being perfectly white, is tinged with red. The light of burning magnesium, which appears to be so like sunlight, has a tinge of violet.

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## THE LESSON OF THE SHOEYBURYNESS EXPERIMENTS. HOW LITTLE ENGLAND HAS PROFITED BY IT.

That England has profited less than her maritime rivals from the millions of pounds she has so liberally expended in experimenting with artillery, rifling, projectiles, and armored targets of almost every possible description, is a very remarkable fact. This fact—as curious as it is true—does not speak very highly with respect to the engineering talent and judgment which have directed the fabrication of her heavy ordnance and her iron-clad navy.

After the experiment with the 13-inch smooth bore at Shoeyburyness, Sept. 13th, 1862—five years ago—against the *Warrior's* section of 4½-inch plates, 18 inches of teak, and an inner skin of iron, to suppose that a target similar to that one with the exception that it had 3½ inches more iron, could resist the 15-inch gun, seems to us to betray a remarkable misapprehension of the important national problem committed to the English naval constructors and gunmakers for solution.

The complete penetration of the 8-inch "*Warrior* target," backing, and inner skin, by the 15-inch gun on Sept. 26th, as stated by the Atlantic cable, points out to every one who can read, that the iron-clad fleet of England is as vulnerable to the guns likely to be brought against it as the old wooden vessels were to the guns cast to attack them with. That the plans on which the English artillery have been built will not give to large calibers the strength necessary to attack first-class iron-clads, appears to be established by a retrospective view of the experiments of the past five or six years. Commencing in 1862 with 10½-inch wrought iron rifles, increasing shortly afterward to 13½-inch, we now see (and 1868 is close at hand) a puny weapon, the 9-inch rifle, the best gun in the English artillery parks, while on the other hand the maritime nations in the north of Europe—Russia and Sweden—knowing from the publicity of the English experiments, what not to make, are casting, as fast as they can melt the iron, duplicates of the very gun John Bull has just proved to the world can send its big round shot through any iron-clad he has built or is building.

Thus England, by the foolishness of her gunsmiths and constructors, has been materially assisted into such a position that her influence in European politics is nearly if not quite, wiped out.

With respect to the last exploit of the Shoeyburyness artillerists and "select committee men" in bursting their target and their reputation at the same time with the 15-inch gun, we do not believe they would have imported that weapon if they had any idea of its capabilities. Already had the highest authority on ordnance in England, Captain Noble, demonstrated, in an elaborate official report, that the maximum force of the 15-inch shot was only 8,658,760 foot-pounds (while he has himself proved by late experiments that it is 17,000,000 foot-pounds!) Again, neither is it likely that this officer and the "select committee" would have permitted the big smooth bore to demonstrate its power by the use of full charges against the target had it not been for the criticisms on his calculations and trials, by an American engineer, which were republished in several of the English journals. As it is, the extraordinary tests to which Noble has put the gun, failing, as was no doubt the desire, to burst it, exhibit its power in a stronger light than would otherwise have been the case. On the first trial against the target on July 26th, it will be remembered that after the first two rounds with cast iron shot, a steel shot weighing 498 pounds and no less than 14·945 inches in diameter (see *London Times*) was used, or in other words the windage was only $\frac{55}{1000}$ of an inch; in fact, this shot fitted as tight as a steam engine piston—it was as close a fit as could be got in the bore. The gun was not injured, and the next step was to raise it to an elevation of 32°, imbed it in timber, so that proper recoil was prevented, and blaze away with 100-pound charges, or 40 pounds more than they had used against the target. The gun also stood this trial without injury, and as several of the prominent British journals wanted to know why 100 pounds was not used against the target, there was nothing left but to accede to this very proper request. The trial was made (we believe with cast iron shot), and the target, nearly twice as strong as any British iron-clad afloat, was penetrated (according to the American system of penetration), and smashed. A comparison between the hole made by the 15-inch and the sort of gimlet penetration effected by the 9-inch, will show the difference between the British "awl hole" system and the American penetrating system. But a pretty correct idea of the appearance of the hole made by the 15-inch can be had by a photograph in our possession of the 4½-inch *Warrior* target after it had been penetrated by the 13-inch smooth bore in 1862. We trust, however, that Brother Bull will not omit to have a photograph taken of this last hole.

It is not unlikely that the 15-inch gun or the big smooth system is too plain a subject for the highly scientific writers on artillery and armor in English journals. They seem to be completely bewildered by the "hifalutin" talk (as the *London Army and Navy Gazette* has it) of their gun makers and ordnance officers. Our readers are no doubt aware that it is the habit of English officers, both of the army and navy, as well as scientific men in civil life, when a new idea strikes them, to rush into the amphitheater of one of their "Institutions," and either deliver a "lecture," read a "paper," or have a "conversation." These efforts are published with proper ceremony, and are called the "proceedings" of "Institution" so and so.

We remember very well the "papers" of such men as Armstrong, Coles, Halstead, Tyler, and many others, read and published during the progress of our rebellion; they often proved very entertaining to their audiences, as in many cases they proved, beyond the shadow of a doubt, that things which we Americans had already accomplished could not be. For example, that monitors could not possibly go to sea! By the use of a hydrostatic press, it might be possible to squeeze the "papers," "lectures," "conversations," and "pamphlets" of the naval, military, and civil *savans* of John Bull's land, on the subjects of guns and iron-clads alone, into the office—which is not very small—in which we are writing.

No antiquarian library on mechanical subjects can be complete without a set of these valuable documents.

These persons have been in the habit, as soon as an innovation in the naval or engineering line is broached, to grab it at once, shuttle-cock it about, until it is so befogged that the originator of the project himself would not recognize what they are talking about. So many irrelevant side issues are started by these ingenious investigators, that both writers, readers, lecturers, and listeners, were very often so confused and entangled, that they forget what it was that "light" was to be thrown on. The chief of artillery of the London *Times*, the scientific reporter of the Pall Mall *Gazette*, and the ordnance officer of the *Engineer*, appear to have wallowed in "papers," "reports" (Noble's in particular), and "discussions," until their minds are in quite a mixed up state. Here are some extracts from their last disquisitions on the big smooth bore. The chief of artillery of the *Times*, after stating that on the trial "for range," (*i. e.*, the trial to see if they could burst the gun,) the 15-inch, at 32° elevation, with 100 lbs. "American" powder—we call it "mammoth grain"—projected its shot with an initial velocity of 1,538 feet per second, and to a distance of 7,680 yards, 4¼ miles, says: "The gun is probably too short to burn all the powder before the shot leaves the muzzle, and a further increase of charge could not give proportionate velocity." As they proved on their trials, "60 lbs. give 1,170 feet per second (to a 453 lb. ball), and 100 lbs. *only* increase it to 1,538 feet."

Now, if a pound of powder in a given gun always performed the same amount of work, irrespective of the weight of charge, the *vis viva* would vary directly as the weight of the charge; and, consequently, the velocity of the shot as the square roots of the charges. Hence, as 60 lbs. give 1,170 feet to a 453 lbs. ball, a 100 lbs—if each lb. was of same efficacy as first charge—would give 1,511 feet per second: but this charge actually gave "1,538 feet" to the same weight of ball. The remarkable fact is thus shown that the work done per pound (notwithstanding the magnitude of the charge) increased with a charge nearly double the first one. Yet, in the face of this demonstration, which took place right under his nose, the chief of artillery of the *Times* says, "the gun is too short to burn all the powder," and "a farther increase of charge would not give proportionate velocity."

And in order to exhibit still further the strange ignorance of the first principles of gunnery which characterize the writings of this artillery *savant*, it will only be necessary to say that the proportionate space occupied by even a 50 lbs. charge in the bore of their 9-inch pop-gun, is so much *more* than 100 lbs. taken up in the 15-inch, that it shows he has no accurate knowledge of the subject on which he discourses to the whole of Europe through the columns of its "leading journal."

The change in the tone of his last article in the *Times* of September 10, from the gorilla-like shriek of his former one in *Times* of July 27, to use a comparison started by himself, is as different as the terrible roar of the 15-inch is from the tiny tinkle of the 7-pounder rifle fired on the same occasion. We are, by the by, quite anxious to read his account of the penetration of the target on September 26.

There is another point which it may be well for both the chief of artillery of the *Times*, the scientific reporter of the Pall Mall *Gazette*, and the ordnance officer of the *Engineer*, to make note of, and that is that the *vis viva* of their 9-inch "punching" bolt, compared with the atmospheric resistance it encounters, is only about 7 per cent. more than that of the 15-inch sphere.

The scientific reporter of the *Gazette*, in his issue of the 10th inst. says: "The rifled gun (9-inch) can be used in broadside. the smooth bore (15-inch) only in turrets." Is it possible that he does not know that we have a carriage which can handle a 15 or 20-inch whenever a platform can be found strong enough to carry it, broadside or any where else.

It is true we prefer to put them in monitor turrets, where they can be protected by say from 15 to 20-inches of wrought iron, instead of the English system of mounting their 7 and 9-inch guns behind a thin veneering of the same metal.

The ordnance officer of the *Engineer* has made the brilliant discovery that 34° is "the angle at which projectiles are thrown to the greatest distance." The same officer, in order to conceal his chagrin that the 15-inch did not burst after being fired two rounds with 100 lbs. charges at that angle, goes off on a long rigmarole about powder in his issue of 13th inst., leaving the *vis viva* of the shot out of the question! To restate what we have already partially alluded to, we will briefly observe that the big monitor smooth bore, the identical gun installed in our turrets over five years ago, at the commencement of the rebellion, has shown that it can put its shot through any iron-clad in the British navy.

Even if in future trials the Shoeyburyness artillerists succeed in bursting the American gun, it will not materially help their case, as the important fact of the great power of large round shot against armor plates has been fairly established, and there is no difficulty in building a smooth bore gun of 15 inches caliber, to use, say, 150 lbs. charges.

## AN IMPORTANT QUESTION.

Is marking patented things with the patent stamp of nearly identical but inferior articles actionable under the act of 1842?

Frequently patentees suppose in cases where their inventions are infringed under color of right by reason of the infringer making use of the date of another and somewhat similar invention, that they have a remedy for the mischief under the 5th sections of the Patent act of 1842. The first clause of that section provides that a person shall not (under a certain penalty) affix upon an article not patented by him, the name of another who has obtained a patent upon such article, without the consent of such patentee; the second clause, that a person shall not affix the word "patent," or "letters patent," or "patentee," or any word or words of like import, with intent of imitating a patentee's device on any unpatented article, or in other words, on an article not covered by any patent whatever, for the purpose of deceiving the public. The first clause is the one enacted for the protection of a patentee under certain circumstances; the second for the protection of the public generally.

The case referred to above does not come within either of these clauses without it can be shown in an action brought that the infringer is wrongfully using the date of the second or similar patented article, as it may be made to appear that he has a license from the second patentee; or is using such mark upon an article unpatented by any person whatever, for the purpose of imposing upon the public, or in other words, deceiving the public by making it think it is getting a patented article when such is not the fact.

The case would be different and clearly within the statute, were the infringer using the name of the patentee who prosecutes in the action, or date of his patent, without his consent, or using his date of patent upon an article not patented by any person, with intent to deceive the public, as before explained. The only way of reaching such fraud so far given by our legislators is by proceeding as in cases of common infringement.

## INDUSTRIAL EDUCATION—WHAT A LIBERAL MANAGER HAS ACCOMPLISHED.

The education of the families of skilled artizans is a subject which philanthropists and political economists never tire of writing about—in fact, we know of no subject in the educational line about which more has been said and less accomplished than this. This is almost, if not wholly due to the narrow-mindedness, illiberality, and, we may add, not a little to the stinginess of employers. What can be accomplished in this direction, by the energy and liberal-mindedness of a single individual, is very strikingly shown by the success which has attended the efforts of M. Schneider, manager, and we believe, the proprietor, also, of the immense iron works at Creusot (department of Saone et Loire), France.

These works are of great magnitude, as will be seen by the following description, taken from the Pall Mall *Gazette*:

Creusot may be said to form a kind of model manufacturing community, all placed under the direction of a single individual or firm, and consisting of 24,000 inhabitants.

The number of workmen employed is 9,950; the steam power is equal to that of 9,750 horses. There are coal mines, which produce 250,000 tuns annually. There are iron mines, which produce 250,000 tuns of minerals per annum; and the annual production of cast iron is 130,000 tuns. But it is not in the mere production of raw material that this company expends its skill. It converts its cast iron into all the forms of wrought iron employed in the manufacture of machinery, or in the construction of large engineering works. In the course of the year it turns out 100 locomotives, or about two a week. Although situated far inland, with no direct temptation to undertake naval engineering, it exhibits numerous examples of marine steam engines (one of 950 horse power nominal—upward of 5,000 actual) for the iron-clad ships of the French navy.

It seems, that, from their earliest childhood, the children,

boys and girls, of the workmen at this immense establishment, are educated and trained in schools organized by M. Schneider. So far from the education which they receive putting the workman above his work, the contrary is the case; it enables him to do it more to the satisfaction of his employer, and to his own honor, and better for his own personal advancement.

The system of the instruction given at the Creusot schools is fully detailed in tables hanging on the walls of the Great Exhibition; drawings of the habitations of the workmen, their churches, their hospitals, and their schools, are also exhibited.

"Statistical tables illustrate the progress and changes of the population; these are divided into two parts—the one shewing the progress of their material welfare, their accumulation of property, and their consumption of food and luxuries; the other showing the amount of attendance at schools, the relative statistics of individual success in these schools, and the subsequent rank attained by each pupil in the manufactories. From these we gather that the progress of education has always been followed by improved moral character and advanced social being; that the pupils who have most successfully availed themselves of the technical schools are those who have afterward risen to the highest ranks as foremen, clerks, superintendents, overseers and engineers, in the works themselves."

These tables also show "the organization of the schools, the programme of subjects taught, distribution of pupils' time, samples of their mechanical and mathematical drawings, samples of their hand and eye sketches, examples of writing and French composition, lists of their studies in religion, sacred history, French history and geography; studies in arithmetic, algebra, elementary geometry, and descriptive geometry; specimens of ornamental writing and map drawing. These are for the boys. But the girls also are well educated, with the difference that for plain drawing and geometry are substituted needle-work and dress-making. They are also taught book-keeping." It was remarked this education—fully equal to that taught in most of our high schools—does not put the workman above his work; and the magnificent display in almost any branch of heavy iron and steel manufacture placed by the Creusot works in the Exhibition, is as finely finished, both as regards accuracy and beauty of finish, as it is possible to make iron and steel. Fully equal to that of the most ignorant and dextrous of the English workmen.

It has been intimated on more than one occasion, by a prominent political economist of this country, that it would not harmonize with the "American idea" for employers to manifest any interest in the welfare and advancement of their employés. We believe this to be ridiculous fallacy.

No doubt American mechanics will strongly object to be ostentatiously *patronized* by that spirit of vanity which is so often illustrated in founding educational and theological establishments, so as to afford a prominent place to display the name of the founder. But an employer who cannot manifest an interest in the welfare of those employed by him, and those depending on them, without offending that proper pride which belongs to any man who is good for anything, by ostentatiously patting them on the back, and doing good with a loud blowing of horns, shows at once that he is a mean fellow—even more stingy, in reality, than one who makes no pretensions.

The moment a man becomes an employer he assumes duties which it is wicked to shrink from; duties scarcely less sacred than those due from parents to children. It is quite unnecessary to enlarge on these obligations, any one who cannot hide behind a three cent piece will appreciate them just as thoroughly as though they were placed before him in the largest type.

Where you find a man with a keen scent for gratitude, it is a pretty safe rule to set him down as "small potatoes, and few in a hill." To do good, to advance the welfare of others, to add to their happiness, is all the reward a noble nature cares for; and this seems to be the spirit which moves the manager of the Creusot Works.

If one cannot attempt to add to the means of enjoyment of others, without the accompanyment of a brass band, he had better, a good deal, not make the attempt at all.

## THE TWENTY-EIGHTH STREET BOILER EXPLOSION.

This catastrophe which occurred Sept. 9th was so remarkable that it has attracted the attention of engineers and practical men throughout the country. The public, generally, have also read the details with great interest. The statements, however, which have appeared in some of the news journals have been so inaccurate and confused that we deem it well to publish the facts as they could be ascertained by personal inspection. This boiler, which was eight feet diameter at the bottom, six feet at the top, and fourteen feet and six inches high, and weighing five tuns, exploded about 4 P. M. on the 9th of September, at 258 West 28th street, ascending into the air nearly vertically, with a slight westerly inclination, described by those who saw it as appearing about the size of a nail keg, and falling into the rear part of the dwelling house 308 West 28th street, a distance horizontally of about 450 feet. Two persons were killed where the explosion occurred—the engineer and fireman; and two children of Mr Houseman, by its descent through his dwelling, and several others were injured.

This boiler was new, having been in use less than two months and a half, was built by Densmore & Black, of this city, and was of the style known as the Densmore boiler, which has an excellent reputation in different parts of the country. It was illustrated and described on the first page of No. 23, Vol. XVI. Scientific American. It was tested by hydrostatic pressure to 115 pounds to the square inch. The iron is pronounced of good quality by all practical iron men. The man who has since bought it and cut it up, says it is the best iron he ever found in a boiler. All agree that the boiler was well made. These boilers, of the same size as this, have been tested both by the Metropolitan police inspectors and the steamboat inspectors, to 120 pounds to the square inch, and received their certificate to carry 80 pounds pressure of steam, and have carried that pressure for years. Many of them are now running, carrying 90 and 100 pounds to the square inch.

It was intended to carry 60 pounds pressure to the square inch on this boiler, and the safety valve was supposed to be set to blow off freely at that pressure. It had two steam gages—one in the fire room and one in the engine room. It did its work very easily, running all the time with the damper nearly closed and much of the time with the fire door open. On the afternoon of the explosion it was not doing more than about half its ordinary work. The engine was running at the time of the explosion and had not been stopped. The boiler had never been known to foam any after the first two days, and it was working to the delight and admiration of the owner and scores of practical steam men who visited it.

The lower portion of the boiler stood in a vault, the arch over the vault coming up a little below midway of the boiler, there being about two inches space between the boiler and arch all around. The fire room was below the arch, and the engine room was above and at one end of it, and the gage cocks and water glass gage were above the arch on the back side of the boiler where the fireman could not see them when at his duties, it being intended that the engineer should have sole charge of the water. This was an arrangement of the engineer himself. It should be borne in mind that the same engineer and fireman had run there, for about four years, three horizontal boilers placed in this vault—the fireman having charge of the fire and water, and the engineer charge of the engine and the machinery generally through the establishment. The boiler stood upon cast-iron legs that raised the bottom of it sixteen inches from the fire-room floor, which space was open on the front side half way around the boiler and stopped up on the rear side with a four inch brick wall laid up under the edge of the boiler. The fire grates were about 20 inches above the floor of the fire room, and the fire-box in the boiler was about 7 feet 4 inches high above the grate and contained about 180 square feet of heating surface of the most effective kind, the heat acting with nearly equal force upon every part of it. From the top of the fire-box the heat was conducted down to the bottom of the boiler through 135 tubes, 6 feet long and 2½ inches outside diameter, and was conducted directly from the bottom of the boiler to the chimney, and the outside of the boiler was covered with hair felt all over to the very bottom.

The cylinder containing the tubes was 4 feet diameter and 6 feet long, hence would contain, without any tubes, 90 cubic feet of water,. The tubes would displace 27½ cubic feet, leaving the water contents of the tube cylinder 62½ cubic feet, or more than two thirds as much as it would be if it had no tubes in it. The water spaces between the tubes and the shell would average about six inches thick. The water spaces around the fire-box were nowhere less than four inches thick, and would average full six inches and a half thick. The gage cocks were set to carry from fifteen to twenty inches depth of water on the crown sheet. In regular working order it carried over 1,300 gallons of water, or about 21 hogsheads, about one cubic foot to every four feet and a half of heating surface. The ordinary run of stationary tubular boilers carry one cubic foot of water to from five and a half to seven square feet of heating surface; railroad locomotive boilers, a cubic foot of water to from eight to eleven feet of heating surface; and steam fire engines a cubic foot of water to from thirty to thirty-two feet of heating surface.

The evaporating power of this boiler, as near as we can arrive at it, was about 470 gallons per hour. The quantity of water on the crown sheet about 315 gallons, as designed to be worked, hence it would take forty minutes to uncover the crown sheet, and about twenty minutes more to get the water down to the upper tube head, which would have to occur before the tubes could heat.

The upper ends of the tubes and all the upper portion of the fire box showed unmistakable evidence of having been over-heated. The lower tube head blew out taking the tubes with it, the head and most of the tubes remaining where the boiler stood, the tubes first coming out of the upper head. There were 135 two-and-a-half-inch tubes equally distributed over a fifty-two-inch head well expanded with good projections on each end outside of the heads, and if not over-heated would not have yielded at three times the pressure that other portions of the boiler was able to withstand.

## THE MACHINIST'S APPRENTICE.

Several communications asking information in regard to the trade of the machinist have been received. If we reply to one the answer will comprehend the inquiries of the others.

A correspondent from Iowa wishes to enter as an apprentice, a shop where locomotive and other engines, and machinist's tools are manufactured, or, at least, where engines are built, and desires replies to the following questions: "Can you recommend some such establishment where I could get in or you think I could? What is the period and what the terms of an apprenticeship? I wish a situation where the best of work is done and an opportunity is afforded the apprentice of becoming a thorough workman."

The time was—twenty-five or thirty years ago—when the position of apprentice to the machinist trade was easily obtainable and the remuneration was sufficient to support the apprentice. It is not so now. To enter a good shop as an apprentice requires in most cases influence and the position is granted as a favor. The amount paid is rarely more than enough to liquidate board bills, if it is even so much, and the time required from three to five years. There are adequate reasons for this change. The apprentice must be furnished with good and valuable tools and his work is of as high a character as his increasing capabilities will warrant, not only for the purpose of advancing his interests but for the benefit of his employer. It is not surprising, therefore, that the first year or so of his apprenticeship proves, from breaking of tools and spoiling of jobs, unprofitable to the proprietor.

Again, there is no adequate means to compel an apprentice to fulfill his contract with his employer. He may, soon as he deems himself competent to do work which brings higher pay, leave his shop and go elsewhere. Consequently, master machinists prefer to employ ordinary laborers for their rougher work and journeymen for the better quality. Under these circumstances we do not know how to advise you.

# OFFICIAL REPORT OF PATENTS AND CLAIMS

### Issued by the United States Patent Office,

FOR THE WEEK ENDING OCTOBER 1, 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.*

69,298.—Foot Rest.—Calvin Adams, Pittsburgh, Pa.

I claim constructing a foot rest with the base, A, of suitable diameter for its support, and the rest, B, of convenient shape to form a rest for the foot, connected by one or more columns, C C, substantially as shown and described.

69,299.—Fence.—G. W. Adams, Rochester, N. Y.

I claim the arrangement of the metallic stakes, P, double bracing wire, f, in connection with the bed plate, C, and the rails, R, of the fence, substantially in the manner herein shown and described and for the purposes set forth.

69,300.—Broom Head.—E. A. Alexander and H. C. Kellogg, Independence, Iowa.

I claim the employment of slotted bar, b, when arranged in combination with hooks, d d, loop, c, and handle or screw rod, a, in the manner and for the purpose set forth.

69,301.—Corn Planter.—Thomas Allen, Arrow Rock, Mo., assignor to himself, Joseph Nicholson, Arrow Rock, and A. B. Garrison, St. Louis, Mo.

I claim the arrangement of the furrow plow, B, coverers, k k1, side boards, O O1, rolling wheel, D, slide valve, d, worked with a lever, E, or automatically, the adjustable cams or pins, p, on the rolling wheel, all in combination, when constructed and arranged substantially as shown and specified.

69,302.—Clothes Dryer.—Israel B. Arnold (assignor to C. P. Dunham), Providence, R. I.

I claim the improved folding clotheshorse, as composed of a central post, A, the series of posts, B B B B, their several connection bars, C C C, the catch plates, D, and screws, e, arranged and applied together substantially in manner and so as to operate as set forth.

69,303.—Machine for Making Socketed Reed Plates.—Chas. Austin, Concord, N. H.

I claim the combination as well as the arrangement of the guides, D1 D1, the endless carrier, B, the presser, I, the rotary cutter, F, the vibratory frame G, and the adjustable cam, H, as described, the said cutter, F, carrier, B, and cam, H, being provided with mechanism for operating them, substantially as described.

I also claim the combination as well as the arrangement of the hopper, E, the guides, D1 D1, the endless carrier, B, the presser, I, the rotary cutter, F, the vibratory frame, G, and the adjustable cam, H, as described, they being provided with mechanism for operating the carrier, the cutter, and the cam, as explained.

I also claim the adjustable cam, H, made substantially as described.

I also claim the combination as well as the arrangement of two or any other suitable number of edge cutters, L L, and one or more pressers, I K, with the endless carrier, B, the guides, D1 D1, the rotary cutter, F, the vibratory frame, G, and the adjustable cam, H, or the same and the hopper, E, the whole being to operate together, and provided with mechanism for actuating the carrier, the cutter, and the cam, substantially as herein before explained.

I also claim the combination as well as the arrangement of the two endless carriers, B M, one or more side trimmers or plane irons, U, the guides, D1 D1 R R, the reverser, S, the cutter, F, the vibratory frame, G, and the adjustable cam, H, the carriers, cutter, and cam being provided with operative mechanism, substantially as described.

I also claim the combination as well as the arrangement of one or more smoothers, V, one or more finishers, W, the plane iron, U, the reverser, S, the endless carriers, B M, the guides, D1 D1, R R, the cutter, F, the vibratory frame, G, and the adjustable cam, H, the whole being provided with mechanism for operating the carriers, the cutter, and cam, substantially as described.

I also claim the combination as well as the arrangement of the hopper, E, the guides, D1 D1, the carrier, B, one or more pressers, I K, the rotary cutter F, the vibratory frame, G, the edge cutters, L L, the reverser, S, the guides, R R, the carrier, M, the face cutter, U, or the latter and the presser, T, also, their combination as well as their arrangement with one or more smoothers, V, or one or more finishers, W, the camers and cam and rotary cutter being provided with mechanism for operating them, substantially as hereinbefore specified.

69,304. — Wardrobe Bedstead. — William R. Bagnall, Chelsea, Mass.

I claim a hinged oblong bed-frame arranged to swing laterally from a case, as and for the purpose described.

I claim a swinging bed frame, combined with a surmounted wardrobe or bureau, or both, substantially as described.

I claim a wardrobe or bureau, or both combined with a swinging bed frame having head and foot pieces swinging inwards, as and for the purpose described.

69,305. — Carriage-shaft Coupling. — Jesse P. Barrick, Massillon, Ohio.

I claim the pivoted or hinged stop, J, and spring, I, arranged in relation to the coupling, in the manner and for the purpose substantially as set forth.

69,306.—Carriage Button.—W. P. Bateman (assignor to himself and N. F. Mathewson), Barrington, R. I.

I claim a carriage button, as constructed, with the head eccentric to the body, and with a journal to project from the head, and with a screw and a prismatic base to its body, as described.

I also claim the carriage button, as not only made with the head eccentric to the body, and applied thereto by means of a journal so as to be capable of being revolved relatively to it as specified, but as having a prismatic base, and a screw to project therefrom, as explained.

69,307.—Machine for Making Wagon Wheels.—Alonzo Beswick, Paris Richardson, Jr., and John W. Brown, Kelley, Ill.

We claim the combination and arrangement of the cross bar, C, and movable bar, E, with the guide bars, H H, operating in the manner and for the purposes set forth.

We also claim the auger frame, W, in combination with the screw, M, and guide bar, H, operating substantially as described and for the purposes stated.

69,308.—Brick Machine.—Peter E. Bland, St. Louis, Mo.

1st, I claim the combination of movable plattens or followers, b, in a mold-bearing cylinder, B, revolving about a fixed central shaft, H, with one or more fixed cams, k, upon said shaft, all substantially in the manner and for the purpose herein set forth.

2d, The combination of compressing plates, or plungers, G, with a revolving mold-bearing cylinder, B, when said compressing plungers have the within-described reciprocating movements, and operate in unison with an intermittent movement of said cylinder, substantially as and for the purpose herein set forth.

3d, The combination of pistons, g, or their equivalents, with a revolving mold-bearing cylinder, B, and radial cam-actuated followers, b, in the molds thereof, when said pistons, g, have substantially the within-described reciprocating movements, for the purpose herein specified.

4th, The combination of a ratchet wheel, W, or other equivalent device, with the hollow shaft of a mold-bearing cylinder, encircling a fixed central shaft, H, all substantially in the manner and for the purpose herein set forth.

5th, The combination of a rocking shaft, J, and pawl levers, w w, with pins or catches, i i, on the revolving mold-bearing cylinder of a brick machine and with ratchet bars, l l, on a receiving car running beneath said cylinder for the purpose of imparting an intermitting forward movement to the car in unison with the intermittent revolution of the cylinder, all substantially in the manner and for the purpose herein set forth.

6th, The combination of inclined bars, r, with the frame of my improved brick machine, and with the coupling hooks or catches, o, of the cars running through the same, for the purpose of automatically disconnecting the cars in their forward movement, substantially as herein set forth.

7th, The combination of a stationary transver e sweep bar, n, with a revolving mold-bearing cylinder, B, and movable followers, b, therein, to effect a detachment of the molded material from the face of said followers after its discharge from the mold, substantially in the manner herein specified.

8th, The combination of detachable mold frames, F, with a grooved or suitably framed revolving mold-bearing cylinder, B, substantially in the manner and for the purpose herein set forth.

9th, The combination of any suitable packing material with the re-adjusting pins or pistons, g1, of a rotary cylinder brick machine for the purpose of lubricating or dampening the sides of the mold therein, substantially as herein set forth.

10th, The combination of an adjusting plate, J, with the end of a fixed central cam shaft, H, passing centrally through the mold-bearing cylinder, B, of a revolving cylinder brick machine, substantially in the manner and for the purpose herein set forth.

### 69,309.—Machine for Weaving Baskets.—F. H. Brown

(assignor to himself, E. F. Peugeot, and H. Fiersheim), Chicago, Ill.

1st, I claim a skeleton basket form, as and for the purpose set forth.

2d, The packing and forming device, F, or its equivalent, as and for the purposes specified.

3d, The guide-piece, M, constructed and operating as and for the purposes specified.

4th, Cam, Z, in combination with the band, X, as and for the purposes specified.

5th, The flexible teeth, T, of the controlling band, as and for the purposes set forth.

6th, The holder, 3, in combination with rod, I, and cam, Z, as and for the purposes set forth.

7th, The cam, G, in combination with the screw, C, as shown, and for the purposes specified.

8th, The slide, etc., in combination with the packing and forming device, F, as and for the purposes set forth.

9th, In a basket machine, the oscillating standard, 4, in combination with the weaving device, as and for the purposes specified.

### 69,310.—Cane Stripper.—J. C. Brown, Crawfordsville, Ind.

I claim the cane stripper and cane cutter, herein described, when the same is considered as a whole device, and constructed in its said several, parts as aforesaid, and used for the purpose and in the manner substantially as set forth.

### 69,311.—Hat and Coat Rack.—T. W. Brown, N. Y. City.

I claim the arrangement of the lower curved or coat prong so as to stand obliquely with the larger, upper, or hat prong, and the fastening plate, substantially in manner as described.

I also claim the tri-pronged hook as made with the hat prong and the two coat prongs, and with these latter arranged obliquely with respect to the fastening plate and such hat prong, and to project in opposite directions relatively to the latter, the whole being substantially as described and represented.

### 69,312.—Mode of Embalming or Preserving Animal Substances.—L. Brunetti, Rovigno, Italy.

I claim the method of and means for embalming or preserving animal substances from decay, substantially as herein set forth and described.

### 69,313.—Wood-bending Machine.—D. Catchpole, Geneva, and J. Havens, Auburn, N. Y.

1st, We claim the arrangement of the sliding bed, D1, lever, J, rod, r, presser head, e, former block, B, and its clamps, and the wheel, W, substantially in the manner and for the purposes shown and described.

2d, The levers, G, former, rotating head, Q, and former, F, arranged and operating substantially in the manner shown and described, for the purpose of giving the vertical and lateral bends at the same time, as set forth.

3d, The arrangement of the levers, G, pivoted to the sliding bed, D, in combination with the rollers, R, attached to the bed, D, as and for the purposes specified.

### 69,314.—Cultivator.—Nathan A. Cates, Thorndike, Me.

1st, I claim the combination of the central beam, carrying the adjustable roller, the colter and the scraper, with the laterally adjustable beams, carrying the ridging and smoothing plows, the combination being and operating substantially as described for the purposes set forth

2d, The combination with the scrapers of the laterally adjustable plows, all constructed and arranged for joint operation, as described.

3d, The laterally adjustable furrow-turning and ridge-smoothing plows, constructed and operating as described.

4th, The combination with the central beam and colter, of the clevis bracket and adjustable yoke carrying the leading roller, all constructed, arranged and operating as described.

### 69,315.—Architectural Porcelain.—W. J. Cheyney, Wallingford, and E. F. Dieterichs, Philadelphia, Pa. Antedated September 20, 1867.

We claim, as a new article of manufacture, architectural porcelain, composed of cryolite, or its chemical equivalents, in combination with silicia and a metallic oxide, or an alkali, or both, pressed and cast in molds, and pressed or rolled as above set forth.

### 69,316.—Plate Porcelain.—Waldron J. Cheyney, Wallingford, and E. F. Dieterichs, Philadelphia, Pa. Antedated Sept. 20, 1867.

We claim, as a new article of manufacture, plate porcelain, composed of cryolite or its chemical equivalents, and silica alone, or cryolite, or its chemical equivalents, in combination with silica and a metallic oxide, or an alkali, or both, fused and cast on a table, and rolled or blown into cylinders, and cut and flattened, as above described.

### 69,317.—Manufacture of Dress Trimmings.—Waldron J. Cheyney, Wallingford, and E. F. Dieterichs, Philadelphia, Pa.

We claim, as a new manufacture, bugles, beads, or buttons, made of cryolite, or its chemical equivalents, fused with silica, worked substantially in the manner and for the purpose described.

### 69,318.—Enamel to be Applied to Metals, Earthenware, Artificial Stone, etc.—W. J. Cheyney, Wallingford, and E. F. Dieterichs, Philadelphia, Pa. Antedated Sept. 19, 1867.

We claim, as a new manufacture, an enamel composed of cryolite, or its chemical equivalents, and silica fused together, substantially as above set forth.

### 69,319.—Picker Stave for Looms.—Richard Collins, Chicopee, Mass. Antedated Sept. 14, 1867.

I claim the combination of the cam, c, with the lever, a, and plate, d, substantially as and for the purpose described.

### 69,320.—Loom.—Jessie D. Cottrell, and George Draper, Milford, Mass.

1st, We claim the combination of the "let off" mechanism, two yarn beams, and a friction and equalizing apparatus, substantially as described.

2d, The "let off" mechanism, made and arranged with the friction equalizing apparatus, substantially as described.

3d, Our improved arrangement of the two yarn beams, and the equalizing and friction apparatus substantially as described, the two beams under such an arrangement being placed close together, and the equalizing and friction apparatus being arranged outside of, rather than between them, as explained.

4th, We also claim our improved friction and equalizing apparatus, or mechanism, substantially as described.

5th, We also claim the arrangement of the gears, o r r m, and l, constituting the "compound motion."

### 69,321.—Step and Extension Ladder.—H. W. Covert, Rochester, N. Y.

I claim, as a new article of manufacture, the combined step and extension ladder, A B, having combined and arranged therewith, both lateral and rear braces, D C, in such a manner as to expand and brace when used as a step ladder, but fold compactly when used as an extension ladder, as herein set forth.

### 69,322.—Harvester Rake.—M. Crossman, Marengo, and P. A. Spicer, Marshall, Mich.

1st, We claim the mode of suspending and tripping a series of revolving rakes or reels, and attached vibrating arms, by the use of an inclined trackway, H, in combination with the traversing roller, R, abutting pins, P, hinged abutments, J, and tripping cam, K, connected, arranged, and operated substantially as herein described.

2d, Changing the hight of the plane of rotation, in rakes or reels, when so suspended by the employment of stepped faces, I, on the hinged abutment, J, in combination with the guide lever, L, as set forth.

3d, Preserving the parallelism of the rake with the vibrating arm, and with the platform of the machine, by overbalancing and stopping said rake, and connecting it with its revolving central cap by the combined arrangement of the bracket arm, M, rod, N, link, O, and stop cars, S, substantially in the manner herein specified.

### 69,323.—Coupling Plows to Wheeled Carriages.—Marshall S. Curtiss, Bradford, Ill.

1st, I claim the curved and slotted arm, C, its form and manner of adjustment between the ears, I, combined with the plow beam, B, substantially as and for the purpose set forth.

2d, The forward guide, Q, combined with arm sockets, N, arranged to allow the forward end of the plow beam, B, to have a lateral and vertical motion, substantially as set forth.

3d, The arrangement of the seat, F, in front of the crank axle, E, combined with lever, D, the whole being arranged to set plow, B, in the ground, or lift it out of the ground, as described and set forth.

### 69,324.—Churn.—William Davis, Arrow Rock, Mo.

I claim the disks, D, shaft, a, diamond-shaped beaters, D' gears, a' b', and spring, B, in combination with the case, A A1, and the parts being constructed, combined, and arranged, as and for the purpose specified.

### 69,325.—Glass Ware Press.—H. Dillaway, Sandwich, Mass.

I claim the combination of the driving segment gear and pinion, with the respective pinion and segment gear with which each alternately connects when arranged to operate to produce the descent of the plunger or piston, substantially as shown and described.

Also, Combining the follower with mechanism, which not only effects its descent, but holds it stationary upon the mold during the continued descent of the plunger, substantially as described.

### 69,326.—Clutch for Suspending Hay Forks.—Wm. Dixon, and L. Heath (assignors to themselves and T. P. Saunders), Adams, N. Y.

We claim, 1st, The combination of the arms, A A1, spurs, J J, stock or frame, D d, pulleys, B b, cord or flexible connection, C, and springs, L L, substantially as and for the purpose specified.

2d, The combination with the above of the clasp, I, staff, h, latch or ratchet bar, F, catch, M, and spring, G, arranged and operating in the manner and for the purpose set forth.

3d, The combination of the arms, A A1, pulleys, B b K, stock, D d, cord, C, ring, E, latch, F, spring, G, staff, h, and clasp, I, the whole constructed and operating in the manner and for the purpose explained.

### 69,327.—Adjustable Frame for Stretching Hides.—William Dunn, Newark, N. J.

I claim the application of movable planks to a stationary frame, in the manner set forth, and worked by levers, as shown, the planks divided in the middle, and connected by a hinge, or each plank in one continuous piece, and working independently of each other, thus adjusting itself to the formation of the hide, and stretching each part to its fullest capacity.

### 69,328.—Centrifugal Apparatus for Washing Sugar.—George E. Evans, Boston, Mass.

I claim, 1st, The movable inner circular cylinder, or partition, B, in centrifugal sugar machines, either with or without foraminations, the same being capable of being attached without alteration of the centrifugal tub by means of a conical or cylindrical socket, fitting upon a central conical or cylindrical shaft, substantially as described.

2d, Constructing the inner cylindrical partition, B, in centrifugal sugar machines of sheet metal, or any equivalent material, without foraminations or interstices, substantially as described.

3d, Operating the inner cylindrical partition, B, when made without foraminations, to make a wall of sugar by lifting the same after the rotation of the centrifugal has commenced.

### 69,329.—Self-adjusting Lid Support for Pianos, Desks, etc.—Charles T. Faber, New York city.

I claim the adjuster for bridging the notch or stop which holds the prop or support for the lids of pianos, desks, and other similar articles of furniture, made automatic in its action by means substantially as described.

### 69,330.—Railway Truck.—H. B. Fernald, Dedham, Mass.

I claim, 1st, The circular truck, T, constructed as described, with hangers cast or fitted upon it, and extending above and below, substantially as set forth.

2d, In combination with the above, the guides, I I, the convex wheel, E, and the drive wheel, D, constructed and arranged as set forth.

3d, The truck, V, with the hangers extending above and below, and provided with slotted openings for the wheels, O O, a traverse opening to admit the axle, and a central circular opening in combination with the guides, L L, substantially as described and set forth.

### 69,331.—Composition of Matter for Filling Safes, and for Other Purposes.—Samuel T. Fowler, Brooklyn, N. Y.

I claim the use of saw dust, or its substitute, for this purpose, in combination with any one or more of the plastic materials herein described, for the purpose specified.

### 69,332.—Horse Rake.—Samuel Freet, Upper Strasburg, Pa.

I claim the combination of the double acting lever, A, and the roller, B, with hooks, c c, the lever being attached to the roller, B, which is attached or fixed on the ends of the shafts, B, having in it two hooks, c c, to hold down the teeth when raking heavy hay, or heaping the same.

### 69,333.—Making Carriage Bolts.—Samuel Frisbie and Andrew S. Upson, Farmington, Ct.

We claim the method substantially as herein described of making bolts with heads and square necks, such method consisting in enlarging or swelling that part of the rod which is to form the neck, and at the same operation forming a rudimentary or preliminary head thereon, and subsequently forming the square neck by squeezing, and the finished head by compression, the whole mode of manufacture being substantially as described.

### 69,334.—Shoemaker's Bench.—Benedict Gantner (assignor to himself and John Sporre), Tell city, Ind.

I claim, 1st, The combination of the treadle, C, strap, D, drum, a, and straps, e h, substantially as and for the purpose described.

2d, The combination of the treadle, C', strap, D', pawl, b, and ratchet, a', or their equivalents, substantially as and for the purpose specified.

3d, In combination with the elements of the above claims, I claim the clamp E, constructed as described, for the purpose set forth.

4th, The spring, c, in combination with the bar, d, cross head, f, and straps, e h, substantially as and for the purpose specified.

5th, The friction device, k k l, in combination with the groove, j, arranged and operating substantially as described.

6th, The dovetailed key, f, in combination with the groove, g1, and shoulder, B2, substantially as and for the purpose set forth.

7th, The rollers, m, in combination with the shoulder, B2, for the purpose specified.

8th, The removable cushion, G, and anvil, F, adapted to be applied substantially as described, for the purpose specified.

### 69,335.—Three Wheel Carriage.—John Gehr, Mercersburg, Pa.

I claim, 1st, The ring, B, working in the groove, a1, of the wheel, A, and having the projections, b1 b1, substantially as and for the purpose specified.

2d, The spring, D, bent in the form shown, attached to the wheel, A, by the bolts, d d, and baring the carriage at d1, substantially as and for the purpose described.

3d, The metallic guard, substantially as and for the purpose specified.

### 69,336.—Gate.—Riley James Gilbert, Hanover, Wis.

I claim, 1st, The inclined ways, G and H, when constructed with ascending and descending inclines, and used to guide and support separately the ends of a gate, substantially as described.

2d, Operating a gate, having its ends separately supported on two parallel double inclined ways by means of the handles, E, and cord, D, the latter being provided with a stop, f, in such a manner that the gate is operated by the cord, together with its own momentum and gravity, substantially as described.

### 69,337.—Farm Gate.—Newton J. Glover, Waveland, Ind.

I claim the double flanged roller, B, the pieces, A E H I P, and the brace N, in combination, substantially as described and set forth.

### 69,338.—Machine for Cutting Ice into Blocks for Storing.—George B. Gruman, Ridgefield, Ct.

I claim the arrangement of the revolving circular saw, C, adjusting frame, B, lever, D, in combination with the other attachments, in the manner herein described, and for the purpose set forth.

### 69,339.—Potato Digger and Weeder.—George W. Hall, Triangle, N. Y.

I claim, 1st, A spade or spading fork, having a pivoted fulcrum or rest provided with a swivel joint, substantially as and for the purpose set forth.

2d, A spade or spading fork, having a pivoted fulcrum or rest where the said fulcrum is adjustable on the handle of the spade or fork, and of adjustable length, substantially as described.

3d, A spade or spading fork, constructed as described, viz., with an adjustable, pivoted swiveling fulcrum, as and for the purposes set forth.

### 69,340.—Double Rotary Harrow.—George W. Hall, New Haven, Mich.

I claim the combination of the bent rim, a, having teeth therein, sleeves, s s, and x x, center pin, c, and cross bar, l, all constructed and arranged as and for the purposes described.

### 69,341.—Device for Preventing Horses from Cribbing.—G. G. Hickman (assignor to himself, Francis H. Wright, and John Criswell), Coatesville, Pa.

I claim the combination of the rubber part, or shield, A, with the prong, B, substantially as and for the purpose specified.

### 69,342.—Harvester.—Anthony Hilts, Jr., Springdale, O.

I claim the quadrantal plate, C, when provided with stop, s, and perforations, i i, in combination with bar, E, and tongue, A, operating in the manner and for the purpose described.

### 69,343.—Musketo Frame for Windows.—Augustine E. Horton, North Leominster, Mass.

I claim the musketo shade as composed of the main and auxiliary rectangular musekto netting covered frames, A C, and the cross bar, B, arranged and hinged together as specified.

### 69,344.—Sadiron.—Arthur Y. Hubbell, Elmira, N. Y.

I claim the employment of a non-conducting substance, in combination with the parts, A B, constructed and arranged substantially in the manner and for the purpose set forth.

### 69,345.—Puddling and other Furnace.—William Jeffries, West Bromwich, Eng. Patented in England, January 26, 1866.

1st, I claim the improvements in pudding furnaces and heating furnaces, and other reverberating furnaces used in the manufacture of iron and steel hereinbefore described, and illustrated in the accompanying drawing, that is to say, constructing the beds of the said furnaces, substantially in the manner hereinbefore described and illustrated, whereby the whole or nearly the whole of the plates used in ordinary furnaces are dispensed with, and great economy, both in the cost of keeping the furnaces in repair and in the saving of time consequent upon the furnaces working a long time without requiring repair, is obtained.

2d, Manufacturing a fettling for lining fettling, or repairing reveberatory furnaces, by tapping or running liquid mill or other cinder into molds, so as thereby to form bricks or blocks, which bricks or blocks are used to line fettle, or repair the bottoms of reveberatory furnaces, instead of fettling the said furnaces with red ore, pottery mine, and tap cinder, calcined and ground as is usual.

### 69,346.—Strawberry Ripener.—C. Jillson, Worcester, Mass.

1st, I claim a strawberry ripener made of glass, to be used substantially as and for the purpose set forth.

2d, A strawberry ripener for supporting the fruit, and preventing the runners taking root about the stem of the plant, substantially as set forth.

### 69,347.—Sadiron Heater.—James J. Johnston, Alleghany city, Pa.

I claim the grated heater, f, when the bottom of same is corrugated, and used in combination with the box or body, A, of a box iron, whose inner face is corrugated, substantially as herein described, and for the purpose set forth.

### 69,348.—Mode of Treating Slags and Cinders for the Manufacture of Iron.—Rudolph Keck, Clintonville, N. Y.

I claim the within described process of reducing slags and cinders directly into wrought iron by subjecting them after they have been pulverized to the action of a separating apparatus and reducing the residuum in a puddling furnace or blooming fire, as set forth.

### 69,349.—Clothes Dryer.—Henry N. King and Austin G. Mason, Adrian, Mich.

We claim the construction and use of the four bents, a e, b f, c g, and d h, the four slats, S S S S, and the brace, B, the whole constructed and operating substantially in the manner and for the purpose set forth.

### 69,350.—Axle.—S. D. Littlefield (assignor to himself and Horatio D. Knight), Burlington, Wis.

1st, I claim the beveled flanges, e e1, for covering the collar, E, and the nut, D, and protecting them from grit and sand, substantially as specified.

2d, The projections or lugs, x x1, for stationing the collars, d d, temporarily upon the skein, substantially as set forth.

### 69,351.—Poultry Drinking Fountain.—George H. Lomay, Somerville, assignor to himself and Richard D. Blinn, Lexington, Mass.

I claim the combination and arrangement of the filling opening, e, and the recess, d, with the reservoir, B, and the trough, A, such reservoir being provided with a discharge opening, b, arranged as specified.

I also claim the construction of the poultry drinking fountain with flat top to the reservoir, in combination with the filling orifice, e, or the same and the recess, d, arranged in its bottom, as set forth.

### 69,352.—Clod Fender.—John Lowe, Lebanon, Ind.

I claim the device herein described, when the same is constructed in its said several parts in manner and form as aforesaid and used for the purpose and in the manner and form substantially as set forth.

### 69,353.—Horse Hay Fork.—Joshua M. Mansfield, Watertown, N. Y.

1st, I claim the separately-pivoted curved links, C, in combination with the sliding bar, D, and hinged tines, B B, arranged and operating substantially as and for the purpose described.

2d, The eccentrically pivoted cam lever, F, in combination with the spring catch, E e, and rope, G, arranged and operating as and for the purpose specified.

3d, The arrangement of the arm, A' a, rope, G, and cam lever, F, substantially as set forth.

### 69,354.—Wagon Spring.—James McDuffie, Heller's Corners, Ind.

I claim the spring, A, in combination with the gibs and keys, B, and the bar, C, said springs and bar being constructed in the manner and for the purposes herein described and set forth.

### 69,355.—Cooking Stove.—Matthias Mead, Lowell, Mass.

I claim the arrangement of the ducts, f f, for conveying heated air through the bottom of the oven and distributing it through the discharge pipes, g g, substantially for the purpose described and set forth.

### 69,356.—Carriage Pole.—Christain K. Mellinger, Millersville, Pa.

I claim the plate, A, with its slots, b, and eye, a, forming the adjustable shackle for carriage poles, when arranged, constructed, and applied in the manner and for the purpose specified.

### 69,357.—Ventilator for Railroad Car.—Jos. H. Moore, Chicago, Ill.

1st, I claim the shaft, C, when provided with rods or dashers, a a, attached spirally as described, in combination with wind fans, D, located inside of the casing, substantially as and for the purposes described.

2d, The shaft, C, provided with the rods, a a, and fans, D, located and operating as described, in combination with the doors, G, and bath, B, substantially as specified.

3d, The perforated diaphragm or partition, E, in combination with the shaft, C, provided with rods or dashers, a a, and water bath, B, the whole constructed and operating substantially as specified.

### 69,358.—Machine for Pressing Hats.—Monroe and Chas. H. Morse, Franklin, Mass.

We claim a series of dies or molds combined with a movable or revolving steam chest to heat the same, so that by the movement of the steam chest either of said molds may be brought to the proper place to cooperate with the other parts of the machine without disconnecting the molds from the steam chest, substantially as described.

### 69,359.—Cut-off for Water Spouts.—Henry W. Mosher (assignor to himself and Edward C. Dudley), Aurora, Ill.

I claim, 1st, The shifting pipe, B, and the flange or collar, c, of the horizontal pivoted plate, C, arranged in relation to the conducting spout, A, in such manner that the lower end of the shifting pipe may be moved horizontally in the arc of a circle, substantially as described.

2d, The combination of the fixed base plate, D, having two openings, with the horizontal pivoted plate, C, which carries the shifting pipe, when constructed and arranged so that the surfaces of these two plates shall remain in contact while changing the pivoted plate from the cistern pipe to the escape opening, and vice versa, substantially as described.

3d, The shifting pipe, B, sustained so that it will maintain its proper connection with the conducting spout, A, and the pivoted flanged plate, C, by means of an annular seat, b, on the lower end thereof, and the fixed ears or projections, a a, on the fixed conducting spout, as herein described.

4th, The pivoted flanged plate, C, provided with an annular groove, s, in the bottom thereof, in such manner as to maintain the relation with the influx opening of the base plate, as herein described and for the purpose set forth.

5th, The filter, G, seated in the influx opening of the base plate, D, the shifting pipe, B, and the pivoted plate, C, all arranged substantially as herein described.

### 69,360.—Water Wheel.—John Mumma, Middletown, Ohio.

Antedated Sept. 23, 1867.

1st, I claim the elongated concave buckets, S, terminating at their upper ends with the cap, V, constructed, arranged, and operating in the manner and for the purpose described.

2d, The floating cylindrical gate, C, in combination with the floats, m, lever, B, and rods, D, arranged and operating substantially as described.

3d, The cylindrical rack or screen, H, in combination with chutes, d, and gate, C, arranged as described for the purpose specified.

4th, The combination of the ball gates, a, with chutes, d, operating substantially as specified for the purpose set forth.

5th, The rings, h h, arms, l, chains, b, guide rods, f, and roller, E, arranged in relation to the ball gates, a, substantially as and for the purpose specified.

6th, The chute disk, I, with its packing ring, r, in combination with chutes, d, and annular diaphragm, K, arranged above the wheel and its curb, J, all constructed and operating substantially as and for the purposes described.

### 69,361.—Vise.—J. Howard Murray, Trenton, N. J., assignor to himself and T. S. Murray and A. Jameson.

I claim the stationary jaw of the vise with its shoulders, s s', in combination with the screw, D, and nut, E, the whole being constructed as and for the purpose described.

### 69,362.—Axle.—Webster Nevins, Falmouth, Me.

1st, I claim the combination of the part, d, ears, e e', joints, f, and metallic rocker plate, b, as and for the purposes hereinbefore described.

2d, The combination of the metallic rocker plate, b, with its bolt, c, worked into and forming a part of said rocker plate, with the forward axle, substantially as and for the purposes described.

### 69,363.—Churn Dasher.—Maria A. Ober, Chazy, N. Y.

I claim a churn dasher constructed as shown and described.

### 69,364.—Carriage Step.—Charles Parker and Wm. Vogler, Canterbury, N. H.

1st, I claim a vibrating carriage step operated by mechanism connected with the forward axle, substantially as described.

2d, The vibrating step, a, in combination with the fan shaped arm, d, levers, b b', and cross bar, c, substantially as described.

3d, The step a, provided with fan shaped arm, d, substantially as described.

### 69,365.—Loose Joint Butt Hinge.—Marshall Perry, New York City, assignor to himself and Geo. W. Gregory, Watertown, N. Y.

I claim a right or left hand hinge composed of two plates, one having a single pintle carrying knuckle, and the other having two socketed pintle receiving knuckles, one projecting from the top and the other from the bottom of said plate, but at opposite edges, substantially as and for the purpose set forth.

### 69,366.—Bed Bottom.—Thomas Raser, Geneseo, Ill.

I claim the boxing or castings, C, and polls, B B, in combination with the rubber bands and slats, D and E, as described.

### 69,367.—Device for Heating Tires.—Charles H. Reno, Barrington, N. Y.

I claim the chamber, A, pipes, C and D, and branch pipe, E, when made and used as and for the purpose herein specified.

### 69,368.—Mop Head.—Geo. W. Sanders, Springfield, Vt.

I claim the screw cam, c, and slide, d, or its equivalent, in combination with the jaw, c, constructed and operating substantially in the manner described and for the purpose specified.

### 69,369.—Hitching Device for Whiffletrees.—Henry and James M. Saunders, Oxford, Ohio.

We claim the application to the whiffletree, A, of the arms or stops, B, the cases, D, with the spring bolts, C, incased therein with the cords, c, and pulleys, d, when the same are arranged to operate as herein shown and described.

### 69,370.—Machine for Preparing Peat for Fuel.—A. M Sawyer, Athol, Mass.

1st, I claim the combination of an apparatus for grinding or disintegrating the peat, the endless apron, b, and the squeezing rollers, C and C', arranged substantially as described.

2d, The combination of the endless apron, b, the squeezing rollers, C and C', and the scraper, F, substantially as described.

3d, The scrapers, h h, within the hopper, R, in combination with the series of molds, substantially as described.

4th, Arranging the cams that work the pistons in and out, so as to be adjustable, as described, so that the movement of the pistons in the direction of the diameter of the mold wheel may be varied and thereby the compressing capacity of the mold be increased or diminished, substantially as described.

### 69,371.—Hat Blocking Machine.—Julius Sheldon, New York City.

I claim in combination with a hat stretching or blocking machine, the continuous rubber cap, a, applied substantially as and for the purpose set forth.

### 69,372.—Flask for Casting.—G. P. Sisson, Florence, Mass.

I claim the bands, G and H, or either of them, in combination with a snap flask, and arranged to operate therewith substantially in the manner and for the purpose herein specified.

### 69,373.—Journal Box.—Le Roy M. Taylor and W. D. Fowler, Washington, D. C.

We claim the manner herein described of constructing the box, A B, in two halves, with the hinge, a e, and the turning pin, d, and locking devices, g h, the said construction admitting of a ready removal of the shaft, as well as giving ready access thereto, all as set forth.

### 69,374.—Wind Mill.—John S. Thornton, Port Gibson, N. Y.

1st, I claim the fan wheels, E E, fans, C C, and arms, D D, constructed and combined substantially as and for the purpose set forth.

2d, The fan, G, in combination with fans, C C, arranged in relation to each other substantially in the manner and for the purpose specified.

3d, The shaft, B, combined and arranged with wheels, F F and E E, substantially as and for the purpose described.

### 69,375.—Hay Derrick.—Isaac Van Voorhis, Hillsboro, Pa.

I claim a portable self-balancing derrick consisting of one or more upright posts, with arms hinged on opposite sides, such arms connected with each other in the manner described and the whole operating substantially as and for the purposes above set forth.

### 69,376.—Mattress.—B. F. Walton, Philadelphia, Pa.

I claim a mattress or cushion containing curled hair or other equivalent elastic stuffing material, combined with shavings or chips of cedar, for the purpose specified.

### 69,377.—Car Brake Shoes.—I. P. Wendell, Philadelphia, Pa.

1st, I claim the combination with a cast iron brake shoe for railroad cars, of pieces of wood, india rubber, or other suitable material, softer than the iron, substantially in the manner hereinbefore described and for the purpose above specified.

2d, The combination of the shoe A, and stock D, by means of the groove, e, tongue, f, and cross key, E, substantially in the manner described and for the purpose set forth.

3d, The combination of the lug, i, and arm, k, with the keys, E and E', substantially as described and for the purpose specified.

### 69,378.—Excavating Machine.—E. H. Williams, Grand Meadow, Iowa, and D. R. W. Williams, Werner, Wis.

We claim the construction and arrangement in an excavator, of the pressure belt, V, when the same is driven by friction caused by the ascending furrow slice, in the manner and for the purpose herein described.

3d, The construction and arrangement of the two shafts, S S, with their pulleys, in combination with the pressure belt, V, as herein described.
3d, The combination of the tightening pulley, L', frame, L, and pressure belt, V, in the manner and for the purpose herein set forth.

69,379.—Pill Machine.—A. H. Wirz, Philadelphia, Pa.

I claim so constructing the metallic or inclosing frame of pill machines that the central wooden part thereof shall be attached or fixed to only the end pieces of such frame, so that the sides thereof which form the bearings or ways of the movable part of the machine will be disconnected from such central part and will not be deflected or changed in parallelism by the shrinking of the central wooden part, for the purpose set forth.

69,380.—Picker for Looms.—Edward Wright, Worcester, Mass.

I claim the combination of the metal shell, C, filling, D, and spring, E, or its equivalent, with the top of the picker staff, A, substantially as and for the purposes set forth.

69,381.—Watch Regulator.—Henry L. and Edward J. Zahm, Lancaster, Pa.

We claim the regulator, A, having an angular base resting on the operating screw, D, substantially as described.

69,382.—Treadle for Propelling Machinery.—William C. Abbott, Niles, N. Y.

I claim the combination of the treadles, L M, the straps, O P, the roller, Q, and crank, R, when said parts are constructed and arranged in relation to one another, substantially as set forth.

69,383.—Rotary Engine.—Moses L. Andrew, Cincinnati, O.

1st, I claim the combination and arrangement of the lipped and chambered wings, D D', grooved segmental pistons, E, and springs, F, for the purpose set forth.
2d, The combination of the set screws, H, and springs, I, whereby to hold the follower, G, to the end of the piston, C, with a variable and elastic pressure.
3d, The arrangement of the conical boxes, M, bearings, N, and pinch nuts, O, for the purpose set forth

69,384.—Hoisting Apparatus.—W. D. Andrews, N. Y. City.

I claim the use of two plain or grooved friction wheels of different diameters upon one shaft when the same are operated and driven by two similar friction wheels of different diameters on one driving shaft placed nearly parallel thereto, and so arranged that the speed and power may be varied by bringing into contact the larger wheel and smaller pinion or the smaller wheel and larger pinion, by means of the eccentric bearing as shown and described, or other equivalent device, for the purpose and object as stated.

69,385.—Letter File.—Frederick Ashley, New York City.

Antedated June 1, 1867.
I claim securing the upper portion, C' of the hook or thumb plate, b, to which it is attached by a pivot, c, to the frame, A, for operation in combination with a spring, e, to admit of the lateral play of said portion, C, relatively to the lower portion, B, of the hook through a slot or opening, f, in the former, substantially as specified.

69,386.—Elliptic Spring Brace.—M. Barker, Humphrey, N.Y.

I claim the arrangement of the brace rods, C D, their outer ends secured to the center of the lower part of the springs, A B, their inner ends pivoted to the vertical wheel, E, pivoted to the bottom of the wagon box, as herein described for the purpose specified.

69,387.—Hand Spinning Machine.—Turner Barns, Greensburg, Ind.

1st, I claim the arrangement of spindle, J, maintained in a given direction or bearing within the movable arm, H, by means of sliding rod, I, and pitman, 23, and stem, I.
2d, In combination with elements of claim 1st, I claim the arm, H, adapted for being advanced and retracted by weight, X, and treadle, Y, and their described or equivalent accessories, substantially as set forth.

69,388.—Eraser and Letter Opener.—G. C. Barney, Philadelphia, Pa.

I claim the blade, B, having convex and concave sharpened or cutting edges intersecting in a sharpened point, substantially as described, forming a combined eraser and letter opener.

69,389.—Apparatus for Recording Votes.—J. E. Beardsley, A. F. Boyle, E. M. Lewis, and M. A. Clancy, Washington, D. C.

1st, We claim the arrangement of the bars, P, with jacket and type, z, bars, O, with indicators, X, connected to bars, P, by the short bar, s3, rods, b', and springs with angular bars, o, when used with the disks, C and D, and lever, N, in the manner and for the purposes herein specified.
2d, The dial plate, A, with its flange, A', and hands, 12, when arranged in combination with the drum, E, as constructed in the manner and for the purposes herein set forth.
3d, The metallic disk, C, with its springs, W W, and slots and provided with the radiating flat springs, R, on its back, in the manner and for the purposes specified.
4th, The disk, B, provided with its narrow paired slots, y y, for guiding the U-shaped bars, O, and plate, F, as constructed and arranged as set forth.
5th, The circular disk, G, with point, ', pin, m, and spring, j, on its rear face and with bar, h, spring, h', pin, r2, and pin, g, on the front face in combination with the hollow shaft, f2, and ratchet, k, as and for the purposes herein fully described.
6th, The arrangement of the clutch, K, with cones, q, and pawls, o o, in combination with the ratchets, p p', spring shaft, and spring, H, plates, m1 m2, and cogs, s s', in the manner substantially as and for the purposes herein specified.
7th, The drum, E, with its rollers, f f, band, g, and double catch, d2, when arranged and used in the manner and for the purposes herein specified.
8th, The disks, A B C D and G, with the drum, E, when constructed as specified with the voting devices and gearing for taking, counting, and printing the voters' names, in the manner and by the operation substantially as herein fully set forth.

69,390.—Apparatus for Filtering and Purifying Spirits.—William F. Bearns, Mount Pleasant, N. Y.

1st, I claim the rectifying vessel, h, provided with the oven flow pipe, p, supply pipe, e', perforated false bottom, m, and perforated head, n, between which the filtering material is retained, as and for the purposes set forth.
2d, I claim the perforated head, n, formed with the movable sections, 1 and 2, held in place by the cross bar, l, fitted in the manner and for the purposes set forth.

69,391.—Churn.—E. O. Bennett, Mt. Pleasant, Iowa.

I claim the combination of the floats, G G, the inclined shaft, F, the perforated diaphragm, H, with the driving machinery of a rotary churn dasher, substantially as described.

69,392.—Hen's Nest.—C. W. Blackman, Bridgeport, Conn.

I claim a nest for hens composed of a box, A, provided with two doors, B B, hung on pivots, c c, and constructed each of two parts, b b', at right angles with each other and connected by cross rods, C C, all arranged to operate in the manner substantially as shown and described.

69,393.—Tooth Powder Lozenge.—C. E. Blake, San Francisco, Cal.

I claim the making of tooth powder in the form of lozenges.

69,394.—Attaching Thills to Carriages.—S. S. Bliss, New Bedford, Mass.

I claim, 1st, Securing the side irons, B B, when the same are constructed with solid conical bearings or centers, F F, to the thill, A, by means of clamp bolts, D D, or in any equivalent manner, substantially as described.
2d, The combination of the thill, A, side irons, B B, having solid conical bearings, F F, and clip iron, C, with its conical socket or seats, E E, when the same are constructed, arranged and operated substantially as described and for the purposes set forth.

69,395.—Lasting Awl.—C. K. Bradford, Lynnfield, Mass.

I claim combining with the stock or handle, a, an eye-pointed awl, b, substantially as shown and described.
Also, in combination with such stock and eye-pointed awl, the spool chamber within the handle, substantially as set forth.

69,396.—Respirator.—Robert Brayton and Samuel Curtis, Fremont, Ohio.

1st, We claim the nostril tubes, b b, chamber, F, and mouth piece, c, in combination with the tubes, a a, and valves, d d', substantially as and for the purpose set forth.
2d, The box, A, and tube, E, in combination with the air chamber, F, substantially as set forth.
3d, We claim a respirator so constructed that it may be connected to either the mouth or nose and so provided with inhaling and exhaling pipes and valves that in breathing the valves will alternately open and close, when used in the manner and for the purposes substantially as set forth.

69,397.—Folding Seat for Carriage Bodies.—Richard F. Briggs, Amesbury, Mass.

I claim the combination and arrangement of the support, b, slotted friction plate, d, and slotted upright support, c, substantially as described for the purpose herein set forth.

69,398.—Clothes Pin.—R. G. Britton, Springfield, Vt.

I claim a clothes pin formed of the two wooden pieces, A B, united by the pin, b, through the grooved circular projection, a, and the tongue, c, and provided with a spiral spring, h, between the ends, c' c', to close the ends, c c, arranged and operating as described.

69,399.—Ratchet Brace.—William Brown, Hoboken, N. J.

I claim the spherical ratchet, A, in combination with the socket, c, and pawl, g, substantially as described.

69,400.—Lifting Jack.—William Green, Holly, Mich.

1st, The combination of the lever, L, upright post, A, grooves, e e, lip, e', and guides, v v, with the dogs, b b', each having the short projecting tooth, l, and arranged and operating substantially as and for the purpose described.
2d, The lifting jack above described consisting of the post, A, having the series of teeth, a a', the grooves, e e, lip, e', and guides, v v, in combination with the lever, L, having the dogs, b b', held in place by the springs, s s', and provided with the teeth, l l, all the parts being constructed, arranged and combined substantially in the manner and for the purpose specified.

69,401.—Bellows.—George Bushnell, Schodack, N. Y. Antedated Sept. 26, 1867.

I claim, 1st, The combination of the several smaller bellows with the rod, L, operating substantially in the manner hereinbefore described.
2d, The combination of the bellows, E, with the chamber, F, valve, O, and lever, P, as hereinbefore set forth and described.

69,402.—Attaching Thills to Vehicles.—Edward M. Butler, Croton Falls, N. Y.

I claim the rubber cushion, I, or its equivalent, applied to the center pin of shaft couplings, substantially as and for the purpose described.

69,403.—Carriage Wheel.—J. G. Buzzell, Lynn, Mass.

I claim, 1st, The swivelled spokes, B', when crimped to give them elasticity with the coils, b', substantially as herein shown and described.
2d, The single spokes, B, their outer ends swivelled to the rim, C, and their ends screwing into the hub and adapted to be turned to regulate the strain of the wheel, as herein set forth for the purpose specified.
3d, The single spokes, B or B', their inner ends secured to the hub, A, out of the same horizontal lines with the coils, b', as herein set forth for the purpose specified.
4th, The combination and arrangement of the removable ring, D, coiled swivelled spokes, B B', whereby the strain and elasticity of the wheel are adjusted, as herein set forth for the purpose specified.

69,404.—Wagon.—Vasco M. Chafee, Xenia, Ill.

I claim, 1st, Hinging the tongue or shafts of a wagon or other vehicle to the front axle so as to obtain a direct center draft, substantially as set forth.
2d, The combination of the tongue, C, with a center hinge at G, and the side braces, H, attached substantially as and for the purpose set forth.
3d, The plate, F, forming the sand board axle plate and reach receiver combined in one piece, substantially as described.
4th, The combination of the bolster, A, plates, E and F, reach, D, brace, I, and king bolt, K, substantially as set forth.

69,405.—Tag or Label.—Charles H. Chapman, Sherley, Mass.

I claim the spangle, B, in combination with the string, C C', and card, A, made substantially as described and for the purpose set forth.

69,406.—Ringing Hogs.—G. W. Clark, Frankfort, Ohio.

I claim, 1st, The within-described apparatus consisting of the awl or piercing instrument, A B C, and the key or twisting instrument, E F G, constructed and operated substantially as and for the purpose set forth.
2d, The awl, A B C, when provided with a groove, b, and socket, b', substantially as and for the purpose explained.
3d, The key or twisting instrument, E F G g, and hook, H, combined and operating in the manner and for the purpose explained.

69,407.—Coal Elevator and Distributor.—H. C. Clark and Robert B. Little, Providence, R. I.

I claim, 1st, A coal elevator which is arranged substantially as herein shown and described so that coal or other material can be raised from the hold of a vessel and discharged into any desired one of a number of temporary compartments or pockets and be discharged from the latter into cars or carts, ready for delivery to families all without requiring any manual labor except what is required for raising or lowering the necessary doors or traps, as set forth.
2d, The extension rails, G, when hinged to the ends of the rails, F, so that they can be folded out of the way, substantially as set forth.
3d, The adjustable bolsters, o o, when arranged as set forth for the purpose specified.
4th, The revolving trough, J, when arranged in combination with the rails, F F, of an elevator and with the chambers, B B, substantially as herein shown and described.
5th, The revolving trough, J, when provided with trap doors, p, substantially as and for the purpose herein shown and described.
6th, The device for regulating the discharge of the coal or other material from the pockets or chambers, B, consisting of the screen or board, a, in combination with the hinged plate, d, and with the cord, e, all made and operating substantially as and for the purpose herein shown and described
7th, The folding extension, G, when made as set forth arranged in relation with the adjustable bolsters, o, stationary track, F, and flexible revolving trough, J, all made and operating substantially as and for the purpose herein shown and described.

69,408.—Terrestrial Globe.—G. P. Clarke, N. Y. City.

1st, I claim the division of a sphere or globe into sections or zones, substantially as described and for the purposes set forth.
2d, I claim the construction and application of the spring, I, in combination with the spindle, E E, the trunnions, F F, and the center zone, D, substantially as and for the purposes set forth,

69,409.—Hand Reaper and Mower.—J. P. Cook (assignor to himself and John T. Campbell), Rockville, Ind.

I claim a hand reaper or one designed for manual operation composed of a framing, A, having two reciprocating sickles, F F, attached and operated by eccentrics, or their equivalents and suitable gearing simultaneously in opposite directions, substantially as shown and described.
I further claim the adjustable yoke, B, in the framing, A, for the purpose specified.

69,410.—Water Wheel.—William Cooper, Hancock, Md.

1st, I claim the gates, G, operated through the medium of the circular plate, I, pivoted arms, H, and springs, J, all arranged substantially as and for the purpose specified.
2d, The combination and the arrangement of the slotted arms, H, springs, J, plate, I, as and for the purpose specified.

69,411.—Steam Superheater.—L. R. Cornell, Flatbush, N. Y.

I claim the superheater as described consisting of the parallel cylinders, A, divided into chambers, B2, by heads, B, and supported by means of the uprights, A2, said chambers connected alternately by means of the curved pipes, C, and connecting with the parallel condensing pipes, E, beneath each cylinder by means of the short pipes, D, as herein shown and set forth for the purpose specified.

69,412.—Holdback.—J. C. Covert, Townsendville, N. Y.

I claim the metallic holdback constructed as described consisting of the V-shaped strap, B, attached at its angle by a ring, c, to the neck yoke and at its ends by the snap hooks, b, to the rings, a, of the harness, as herein shown and described.

69,413.—Metallic Hame Tug.—J. M. Curran and J. C. Baxter, Washington, D C.

We claim a hame tug having its body, A, formed of a single strap of metal with the eye, B, having the hinged or detachable piece, b, and its rear end formed for attaching the buckle, F, substantially as shown and described.

69,414.—Ague Medicine.—F. M. Daniel, Athens, Ga.

I claim a composition or medicine composed of the ingredients in about the proportions herein set forth and for the purpose specified.

69,415.—Mucilage Pot.—Otis Dean (assignor to Robert W. Young), Richmond, Va.

I claim, 1st, The provision, in combination with the reservoir, A, for mucilage, varnish, or other material of a brush receptacle, D, to contain a suitable material to keep the brush moist, as explained
2d, In combination with a pot for mucilage or other material I claim the bar, F, for the purpose specified.
3d, The bar, F, applied to the lid, in the manner and for the purpose set forth.

69,416.—Dykes and Levees to Rivers.—S. B. Driggs, New York City.

I claim, 1st, The metallic wall or core, when arranged in a curved, corrugated, or zig-zag form, substantially as and for the purpose set forth.
2d, The metallic wall or core constructed with lap joints at the junction of the plates to compensate for expansion and contraction, and arranged at an angle to the horizon in combination with the braces, D, substantially as specified.

69,417.—Cast Steel.—Francis Ellershausen, Ottawa, Canada.

Patented in Canada, Sept. 14, 1867.
1st, I claim the furnace above described consisting of the retort, B, hearth plate, D, and lower fire chamber, A, when the parts are constructed combined and arranged in the manner above set forth and for the purpose specified.
2d, The hearth plate, D, in a furnace containing the retort, B, and fire chamber, A, substantially as and for the purpose set forth.
3d, The process of obtaining cast steel directly from iron, or from iron ore in connection with wrought iron, substantially as above described.

69,418.—Index Gage and Caliper.—D. F. Elmer, Springfield, Mass.

1st, I claim the cylinder, g, slotted and graduated as specified in combination with the jaws, a a', dial plate, B, hand, c, and bolt, H, substantially as described.
2d, The combination of the graduated dial plate, B, with the cylinder, g, in the manner and for the purpose set forth.
3d, The jaws, a a', in combination with the slotted and graduated cylinder g, and bolt, H.
4th, The combination of the bolt, H, with the graduated cylinder, g, as and for the purpose specified.

69,419.—Coffins.—T. B. Estep, Cincinnati, Ohio.

1st, I claim a coffin, whose joints are hermetically closed by means of cemented rubber strips, D, and sheet metal strips, E, the same being applied and secured substantially as herein described and set forth.
2d, In combination with the rubber strips, D, and metal strips, E, I claim the angle iron, D d d' as and for the purpose explained.

69,420.—Coffins.—T. B. Estep and W. C. Hofferman, Cincinnati, Ohio. Assignors to Thomas B. Estep.

We claim a coffin whose upper edges of the body, A, are provided with corrugations, a, when used in connection with grooved lid, B b, cleat, C, and india-rubber gasket, E, the whole being arranged and operating substantially as herein described and set forth.

69,421.—Machine for Coiling Springs.—J. W. Evans, N.Y.

1st, I claim the revolving mandrel, I, made capable of a sliding motion in direction of its length in combination with the spirally grooved roll, K, and serving to detach the spring when formed essentially as herein set forth.
2d, In combination with the sliding and revolving mandrel, I, the griping dog, b, and spiral guiding collar, d, for operation on the wire of which the spring is formed substantially as specified.
3d, The sliding and revolving mandrel, I, with its locking dog, b, and hand wheel or its equivalent, H, in combination with the spirally grooved rotating roll, K, having formed in it a recess or notch, s, essentially as herein set forth.

69,422.—Looms.—Danl. K. Fretz, Cono, Iowa.

I claim the combination and arrangement of the spring, P, and hinge, Z, with the lay and picker staff, substantially as described.

69,423.—Air Pump.—Henry Getty, Brooklyn, N. Y.

I claim the gage, K L M, cup, O P, coupling, I, having recess, Q, all arranged to operate in connection with an air pump, as herein shown and described.

69,424.—Telegraph Apparatus.—Elisha Gray, Oberlin, Ohio

1st, I claim the commutator or pole changer relay, and key arranged to operate conjointly with the main and local circuits so that the operator at any point on the line can reverse the current over the same, from the main battery in the manner substantially as set forth.
2d, The peculiar construction of the commutator when arranged with the line and local circuits for the purpose of obtaining the attraction and repulsion of the direct and reverse currents by means substantially as specified.
3d, The commutator with an electro magnet or vibrating core armature so arranged that its poles are between the poles of the electro-magnets and so connected with the line and local circuits, that when both are closed one magnet is attracting the armature and the other is repelling, in the manner substantially as described.
4th, The arrangement of the magnet, J, electro-magnets, C D, lever, H, and spring, K, combined and operating conjointly in the manner and for the purpose substantially as set forth.

69,425.—Weighing Attachment to Faucets.—L. C. Fisher and A. D. Holliday, El Paso, Ill.

We claim the bar, L, with clutch, D, plate, E, bars, H and F, rods, c c, with springs, G G, and plate, A, the various parts constructed and operating in the manner substantially as and for the purposes set forth.

69,426.—Glass Ware Presses.—Jonathan Haley, Cambridge, Mass.

I claim a press organized substantially as described so that the bed and plunger have simultaneous movements relative to each other in approaching and receeding.
Also the combination as arranged of the cranks, connecting rods, movable bed and plunger-carrying crosshead for the purpose specified.

69,427.—Watches.—J. A. Harmann, New York City.

1st, I claim the key, C, constructed as described and adapted to screw into the pendant, E, substantially as described for the purpose specified.
2d, The construction and arrangement of the pendant, B, spindle, F, and hollow screw key, C, as herein set forth for the purpose specified.

69,428.—Beehive.—Edward Harrison, Springfield, Ohio.

1st, I claim the open bottomed cup, A in combination with a removable strainer, D, substantially as and for the purpose set forth.
2d, In combination with the open bottomed cup, A, the ring, B, for the purpose of readily applying or removing the strainer, D, substantially as and for the purpose set forth and described.
3d, A bee feeding apparatus which can be filled through the top, and from which the feed can only be obtained through the bottom, so that it may be placed to cover an orifice in the top of the hive and the bees enabled to feed while observing their natural inclination to cluster together, and so that it may be replenished with feed without removal or disturbance of the bees as set forth.

69,429.—Horse Collar.—J. G. Haymaker, Salem Cross Roads, Pa.

1st, The catch, B, secured to plate, D, on one end of the collar and spring, b', in the opposite end with or without the pin or entering piece, C, and hole, C', applied to the lower portions of a divided horse collar and locking them together substantially as described.
2d, The pin or entering piece, C, and hole, C', with or without the catch, B, and spring, b', applied in like manner and for like purpose substantially as described.

69,430.—Chair Seat.—Geo. Heesen, Tecumseh, Mich.

I claim as an improved article of manufacture a chair seat formed or constructed of paper twine substantially as set forth.

69,431.—Beehive.—J. H. Hendrick, Clinton, Ill.

1st, I claim the comb-frames, E E', with their cross bars, f f', perforated as and for the purpose described, in combination with the lower division, A, of the hive, and the door, C, and its adjuncts, substantially as set forth.
2d, The surplus honey boxes or drawers, H, constructed substantially as and for the purpose set forth.
3d, The combination of the surplus honey boxes, H, when constructed and arranged substantially as described, with the upper division, F.

69,432.—Hay Raker and Loader.—J. W. Henry, Pecatonica, Ill.

The upper and lower frames, composed of the uprights, E E and D D, with their endless aprons and shafts and drums, arranged with the rake, L, and rods, M M, in such a manner that hay is carried up and emptied forward of the machine as and for the purpose set forth.

69,433.—Filter.—Foster Henshaw, Washington, D. C.

1st, I claim the alternate sand and cone chambers either with or without the removable coal chambers, g g, when arranged and combined with the head pieces and the perforated plates, e e and f f, one or both substantially as described and for the purposes set forth.
2d, The said filter when provided with the extension pipe, h, as a syphon in connection with the water holder or tank when arranged and combined as set forth.

69,434.—Suspension Hook for Horse Hay Forks.—Edward Hicks, North Hempstead, N. Y.

1st, The hook constructed with its prong, e, situated at an angle to its shank, A, substantially as and for the purpose specified.
2d, The eye, A*, of the hook constructed with the angles or corners, a* b* c*, substantially as and for the purpose set forth.

69,435.—Chair.—G. H. Hoagland, Port Jervis, N. Y.

I claim the seat frame and back, or either, secured to the side frames of the chair by means of metallic fastenings, c d, forming mortise and tenon locks, substantially as specified.

69,436.—Lamp.—Peter Hoffmann, Constableville, N. Y.

I claim the reservoir, B, provided with the tube, C, adapted to slide in or over the tube, a, for the purpose of pumping the oil from the reservoir, A, as herein set forth for the purpose specified.
2d, The combination of the reservoir, A, sliding reservoir, B, tube, a, sliding tube, C, carrying the tubes, e o, spring, l, and valves, l and k, substantially as and for the purpose specified.

69,437.—Steam Car Brake.—Thomas and Hatfield Hopper, Newark, N. J.

1st, We claim the combination of the sliding rods, A and D, with the pulleys, C1 and C2, chains, B, and rope, G, when arranged to operate the brake levers, F, in the manner and for the purpose herein described.
2d, The sliding rods, D, and adjustable pulleys, C', when constructed and arranged in the manner and for the purpose herein set forth.

69,438.—Cam for Looms.—F. E. Howe, and Leonard Washburn, Stafford, Conn.

We claim the combination of the cam wheel, B, having the guide, b, guide, c, guide, e, and guide, f, with the lever, A, having the projections, a d and g, the parts and the whole being arranged and operating substantially as and for the purpose described.

69,439.—Lamp Chimney Cleaner.—J. P. Howell, N. Y. City.

I claim the lamp chimney cleaner with a flexible jointed handle that will yield to the curves of the glass, and covered with cloth or other suitable material in such manner that such cloth may be readily applied or detached substantially as shown and described for the purpose set forth.

69,440.—Washing Machine.—Richard Hubbard, Cadiz, Ind.

1st, I claim in combination with a revolving rubbing cylinder, E, the adjustable washboard, C, and bands of elastic webbing, D, arranged to operate substantially as set forth.
2d, The revolving cylinder, E, when constructed with buckets, E1, and rubbing surfaces, E2, substantially as set forth.

69,441.—Bed Bottom.—H. L. Ashan, Plattsburg, N. Y.

I claim the combination of the slats, C C, with the narrow slots at each end for securing the bands, a a, that connect the slats to the cross pieces, B, and additionally connecting the slats, one with the other, by the bolts, D D, whereby the slats are prevented from turning as herein specified.

69,442.—Cultivator.—C. M. Jenne, Young America, Ill.

1st, I claim the arrangement with reference to the seat, u, of the beam, i, working upon universal joints and provided with suitable shares and handles, substantially as and for the purpose specified.
2d, The share-stocks, n, pivoted to the beams, i, and furnished with stems, x, extending through the slotted guides, c, substantially as and for the purpose specified.
3d, The wedges, g, in combination with the inclined bars, f, rods, h, and beams, i, whereby the said beams with the shares attached thereto may be raised or lowered substantially as herein set forth.
4th, The wedges, d, in combination with the oblique bars, c, in such manner that the position of the said bars may be changed to adjust the position of the beams, substantially as herein set forth.

69,443.—Gate.—Hans. J. Johnson, St. Peter, Minn.

1st, I claim the combination of the spring, G, toothed plate, F, bent lever, H, plate, E, rod, D, and loops or eyes, B and C, with each other and with the post, A, and rear end of the part, I, of the gate, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the double jointed hinges, K, toothed segments, L, and spring, M, with each other and with the adjacent edges of the parts, I, and J, of the gate, substantially as herein shown and described and for the purpose set forth.
3d, The combination of the adjustable catch, V, with the lower edge of the part, I, of the gate, substantially as herein shown and described, and for the purpose set forth.
4th, The combination of the catch plates, P, lever plates, S, spring, T, and and lever, U, with each other and with the post, R, and plate or bar, O, attached to the forward edge of the part, J, of the gate substantially as herein shown and described and for the purpose set forth.

69,444.—Fence.—Nelson Johnson, Jasper, N. Y.

1st, I claim the skeleton metallic sockets having either hollow or solid gudgeons and otherwise constructed and operating substantially as described for the purpose set forth.
2d, The boards, C C1 C2, having bevelled upper edges, c', substantially as and for the purpose specified.
3d, The combination of the battens, A2 A3, strips, a3, post or stake, A4, pin a4, and brace, D, substantially as and for the purpose described.
4th, The combination of the socket, B, wedges, c c, and board, C, substantially as and for the purpose specified.
5th, The slots, a a5, gudgeons, b, and pins, a' a5, combined and arranged substantially as described.

69,445.—Fence.—Nelson Johnson, Jasper, N. Y.

1st, I claim the pins, a, in combination with the fence panels, B, the said pins constituting the supporting pivots of the panels and part or all of them being removable to facilitate the withdrawal of the panels substantially as set forth.
2d, In combination with the parts, A A1 A2 A3, and panels, B, I claim the buttons, C, constructed and applied substantially as and for the purpose specified.

69,446.—King Bolt.—Enos A. Keasey, Ligonier, Ind.

I claim a king bolt made with a shoulder piece, b, and a projection, c, at the lower end forming a swivel joint with the clip, B, constructed and operating as herein described.

69,447.—Stretcher for Painters' Canvas.—Miner K. Kellogg, Baltimore, Md.

I claim the application of a knee and screw to stretchers by which canvas can be readily kept tight upon its surface, substantially as herein described and represented.

69,448.—Ladder and Chair.—E. Kohn and J. L. Natcher, Sidney, Ohio

I claim the combined step ladder and chair, consisting of the upright, A, and string or diagonal piece, B, composed of the hinged sections, C D E, together with the brace, F, all combined and arranged as shown and described.

69,449.—Corn Planter.—Joseph Krebs and August Johns, Masillon, Ohio,

I claim an improved corn planter formed by the combination of the marking plow, Y, adjustable covering plow, A1, roller, E1, lever, D1, and dropping wheel, T, with each other, said parts being constructed, arranged and operated substantially as herein shown and described and for the purpose set forth.

69,450.—Telescope.—William Kuebler and F. Seelhorst, Philadelphia, Pa.

I claim the adjusting ring, C, when applied to telescopes and to all optical instruments of a similar nature substantially as and for the purposes herein shown and described.

69,451.—Propeller.—William Lawton, Green Point, N. Y.

I claim the combination of the arms, F, pivoted gear wheels, C, stationary internally toothed gear wheel, H, and gear wheel, D, with each other and with the driving shaft, E, and working shaft, C, substantially as herein shown and described and for the purpose set forth.

69,452.—Dirt Scraper.—Cyrus Little and Joel L. Little, Van Wert County, Ohio, and Reuben M. Dalbey, Springfield, Ohio, assignors to themselves and Doty & Rawlins.

1st, We claim the plates, G G, constructed as described in combination with the springs, e e, on the bar, C, in the manner and for the purposes set forth.
2d, The rod, D, bar, C, and springs, e e, arranged in combination with the scraper, A, as constructed and for the purposes specified.

69,453.—Sewing Needle.—G. A. Lloyd and S. Fetlow, San Francisco, Cal.

We claim making the eye so far from the rear end of the shaft that it will

carry the bight of the thread or twine through the cloth sewed when the needle is pushed through the cloth by the thimble or palm, substantially as described.

2d, We also claim diminishing the shaft of the needle from a little behind the eye gradually to the rear end, both in width and thickness, substantially as described.

69,454.—MACHINE FOR FOLDING LEATHER.—Johnson Lombard, Springfield, Me.

1st, I claim the table, B, hinged to the horizontal frame, A, as and for the purpose described.

2d, The combination of rollers, c c', hung in the hinged side pieces, D D, the rollers, c2 c3, hung in the double standard, E, the roller, c4, hung in the slide, g, on the table, B, the main shaft, F, hung in the posts, C C1, and the belt, n, passing over all the rollers, the whole being arranged and operating substantially as and for the purpose herein described.

3d, The slide, g, and the brake, m, in combination with the roller, c5, arranged and operating as described.

69,455.—GATE.—Christian Mack, Leipsic, Ohio.

I claim the combination of part, B, latch and lever, H I, gate, a, triangular swinging and supporting frame, E F D, and post, C, constructed, arranged and operating in the manner as shown and described and for the purpose set forth.

69,456.—SASH LOCK AND STOP.—Donald D. Mackay, Whitestone, N. Y.

1st, I claim the spring catch, c, pivoted at its lower end, sliding rod, f, and knob, c*, arranged in relation with the spring rollers, a a', and the sash, A, for operation substantially as set forth, the whole forming a combined sash stop and lock as described.

2d, The sliding bars b, furnished with rollers, a, and operated by spiral springs, c', as arranged and operating in relation with the sash, A, substantially as and for the purpose specified.

69,457.—FOLDING BEDSTEAD.—S. H. Mapes, Almond, N. Y.

1st, I claim attaching the slats, b, of each section to the rubber or elastic bands, c, which will be more or less stretched when the sections of the slats are to be connected together in the center, that being done by suitable hooks, i, substantially in the manner and for the purposes set forth.

2d, The arrangement of the folding bedstead, with the enclosing case composed of the hinged or swinging sections, s' and D, and the hinged top, E, substantially as described.

69,458.—GOVERNOR.—T. B. McConaughey, Newark, Del.

1st, I claim the combination of notched levers, g g, with spiral spring, h, constructed as and for the purpose set forth.

2d, The looped lever, L, when combined with brake, S, in the manner and for the purpose described.

3d, The governor, B, in combination with arms, e e, notched levers, g g, the spring, h, and lever, L, the whole constructed and operating in the manner and for the purpose substantially as herein set forth.

69,459.—MODE OF VENTILATING MILL STONES.—H. McEldowney, Dixon, Ill.

I claim the spiral flange, C, at the inner side of the curb, B, in combination with the openings, D E, at the upper and lever parts of the curb, all arranged substantially as and for the purpose set forth.

69,460.—WINDOW SCREEN.—James McFeely, North Woburn, Mass.

I claim the perforated or slotted tank, D, reservoir, E, and spout, G, in combination with the frame, A, and screen, B, substantially as described for the purpose specified.

69,461.—TUCKING ATTACHMENT FOR SEWING MACHINES.—John McNeill, New York City.

1st, I claim the combination of the creasing device, I, the pressure plate, E, the folding plate, F, the guide plate, G, and the forming plate, H, constructed as described, that by its mode of operation the plaits or tucks of shirt bosoms or other garments shall be creased, folded and finished by sewing when attached to a sewing machine.

2d, In combination with the above the following plate, K, having the end, m, doubled and turned in upon itself for forming the first or outside one of a set of plaits or tucks constructed and operating substantially as described.

69,462.—FENCE.—M. D. Messler, New Lebanon, Ohio.

1st, I claim the rods, E, having spirally shaped lower ends, their upper ends bent and secured to the upright of a fence, substantially as described.

2d, The wires, d, forming the connection between the panels of a fence, constructed and arranged substantially as described.

3d, In combination with the above the pivoted cleats, a a', secured and arranged substantially as described.

69,463.—NEEDLE SETTER FOR SEWING MACHINES.—Thomas C. Michener, St. Louis, Mo.

I claim the combination of the spring arms, B B', with the adjustable arm, A A', and the pointed needle guide, c, all arranged in the manner and for the purpose described.

69,464.—CAR COUPLING.—Daniel W. Miller and Michael Brestle, Jr., Middletown, Pa.

1st, We claim the sliding block, C, provided with pin or bolt, c, and constructed with recesses, o, (one or more) when said recesses are arranged at an angle to the horizontal plane, substantially as and for the purposes set forth.

2d, The sliding block, C, and its pin, d, combined with the link, G, and sheath, A, all constructed arranged and operating substantially as herein set forth.

69,465.—SHIFTING STEP FOR VEHICLES.—Edward Miller, Milwaukee, Wis.

1st, I claim an improved shifting step, A, formed with a hook or flange, a', upon its upper end, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the hinged handle or top piece, B, with the step, A, substantially as herein shown and described, and for the purpose set forth.

69,466.—MACHINE FOR MILLING TWIST DRILLS.—L. B. Miller, Jersey City, N. J.

1st, I claim the spindles, D and E, one within the other revolving in a common head and locked together by the spring bolt, b, in combination with a longitudinal feeding device having a diagonal adjustment, to a rotary milling tool or cutter substantially as specified.

2d, The arrangement and combination of the vertical slide, I, adjustable slide, T, intermediate sliding bar, V, and slotted eccentric, R, for regulating the depth of cut, substantially as set forth.

3d, In combination with said vertically adjustable sliding carriage the adjustable cam or eccentric, V, elbow lever, W, and clutch, A', operated by the screw, b', for giving an irregular depth of cut throughout the line or length thereof, substantially as specified.

4th, The reversing carrier or spring borne clutch, D', in combination with the clutches, g' A', nuts, e' c' and screws, d' b', for operation together as herein set forth.

5th, The arrangement of the driving shaft, J, the work holding carriage having a longitudinal and swiveling motion as described and the burr or milling tool, A, substantially as specified.

69,467.—DOUGH KNEADER.—W. B. Morrison, Muskegon, Mich.

I claim the box, A, provided with a concave surface, B, in its bottom, in combination with the arms or rods, E, having shoes, G, attached and operated from a crank shaft, D, substantially as and for the purpose specified.

69,468.—CULTIVATOR.—J. Madison Morse, Sandwich, Ill.

I claim the combination of the cart and frame, B C D E F G H, constructed and arranged substantially as described, with an ordinary corn cultivator, as and for the purpose herein set forth.

69,469.—THILL COUPLING.—E. M. Naramore (assignor to himself and W. M. Naramore), North Underhill, Vt.

1st, I claim the bed piece, A, constructed substantially as described, for the purposes set forth.

2d, The knuckle, B, formed of the parts, a b c, in combination with the bed piece, substantially as described.

3d, In combination with the bed, A, and knuckle, B, I claim the spring catch, C, with its link, f, and spring, J, substantially as and for the purposes herein set forth.

69,470.—COMPOSITION FOR IMITATION RUBBER.—J. B. Newbrough and E. Fagan, New York City.

We claim as a new composition stearine or margarine, and sulphur, gum copal, or other suitable material, so combined and in such proportions as to form a compound of the nature herein described.

69,471.—WARPER AND DRESSER PLATE.—Ambrose J. Nichols, North Providence, R. I.

I claim the eyelets, B, when placed in the holes in the copper, A, in such a manner as to turn loosely therein and allow the thread to wear equally upon all sides and prevent the formation of channels, as herein shown and described.

69,472.—PICKER FOR LOOMS.—Bradford W. Nichols, Phœnix Village, R. I.

I claim the combination of the picker of the picker staff and binder, b, with a raw hide case, a, the case having laps, b, projecting over the sides of the staff, and a shoulder, i, in the hide, to hold the filling, g, in place, substantially as described.

69,473.—PIPE AND BOLT CUTTER.—C. C. Parsons, Boston, Mass. Antedated Sept. 18, 1867.

I claim a pipe or bolt cutter having two rotary disk cutters arranged to operate substantially as set forth.

69,474.—REIN HOLDER.—Buel D. Pease, Madison, Pa.

I claim an improved rein holder formed by the combination of the frame, A, cam, B, and spring, D, with each other, substantially as herein shown and described and for the purpose set forth.

69,475.—CHURN.—W. C. Peck, Wheeling, West Va.

I claim the detachable cream box, D, dashers, G, bar, B, cross bar, I, and uprights, H, all constructed and arranged as herein shown and described.

69,476.—HARVESTER RAKE.—G. M. Peters, Granville, Ohio.

1st, I claim the reciprocating rake carriage, I I', in combination with the reciprocating slide, K, and chain, M, substantially as described.

2d, The rake head, J, pivoted to the reciprocating carriage, I I', in combination with the reciprocating slide, K, operating as described.

3d, The arrangement of the ways or guides, H L, in relation to the platform and in combination with the rake carriage and lifting slide, substantially as described.

4th, The combination of the reciprocating and lifting rake, J, and carriage I, ways or guides, H L, and endless chain, M, with the platform, G, substantially as described.

69,477.—APPARATUS FOR HEATING WATER AND CONDENSING STEAM.—Henry J. Phalen, Plantersville, Texas.

I claim the arrangement of the pipes, D G, for the passage of the steam and of the water or other liquor, whereby the water or liquor is forced in the same direction as the current of steam, by which it is overtaken and with which it mingles in a spray-like or other divided condition, substantially as and for the purpose herein specified.

69,478.—PLOW.—Mason Prentiss, Cambridge, N. Y.

I claim the adjustable shoe, D, applied to the curved rear part of the plow beam, A, substantially in the manner as and for the purpose set forth.

69,479.—MODE OF OPERATING HORSE HAY FORKS.—A. J. Purviance, Keosauqua, Iowa.

1st, I claim the conveyor, D, provided with the horizontal ribs, C C, having circular holes, d, roller, a g, cam, F, and crank, G, constructed as described, for the purpose specified.

2d, The projection, J, in combination with the crank, G, and cam, F, substantially as described for the purpose specified.

3d, The fork head, E, provided with the shoulders, e, whereby it is held in position by means of the cam, F, as it enters the conveyor, D, substantially as described for the purpose specified.

4th, The combination of the fork head, E, conveyor, D, cam, F, crank, G, and projection, J, substantially as described.

69,480.—POTATO BAKER.—Adam Reid, Buffalo, N. Y.

I claim a potato baker made to sit upon or in the pothole of a cooking stove, having an inner shelf, D, for the support of the articles to be baked, and a double wall, forming an annular hot air chamber, A, with apertures, C, made through the inner wall, substantially as described.

69,481.—BULLET MACHINE.—C. H. Remington, Dubuque, Iowa.

1st, I claim the combination of the slides, b b', actuated by the cams, a a', the moving die, c, and the stationary die c', the punch, d, and the feeding slide, g, arranged and operating substantially as and for the purposes herein described.

2d, The head block, k, the clamping jaw, k1, the sliding arm, k2, and slide piece, k3, actuated by the side cam, m, combined and operating substantially as and for the purpose herein described.

69,482.—LOGOTROPE.—Charles Richardson and J. Graeme, Jr., New York City.

I claim the supporting rods, b, sleeve, c, and nut b*, arranged in relation with each other and with the disks, furnished with suitable words at their peripheries, substantially as and for the purpose specified.

69,483.—GENERATING GAS FROM HYDROCARBON LIQUIDS.—M. S. Richardson and E. A. Pond, Rutland, Vt.

1st, We claim in the manufacture of gas from hydrocarbon fluids, the method herein indicated of discharging air in a divided state into the body of the carbureting fluid, in such manner that the discharge of the said air may at all times take place at the same depth below the surface of the fluid, for the purposes set forth.

2d, The combination with the carbureter or tank for containing the hydrocarbon, of a float provided with concentric compartments under the arrangement described, so that the air in passing from one compartment to another, shall be forced in a divided state into and through the body of the carbureting fluid, as set forth.

3d, The float herein described, the same consisting of a series of open bottomed concentric chambers, communicating one with the other by means of tubes or pipes, and connected with the air supplying apparatus, substantially as set forth.

69,484.—SEEDING MACHINE.—Edwin Ritson (assignor to W. H. Burtis), Maltaville, N. Y.

1st, I claim the combination of the rotary furrow openers, E, and coverers, L, attached respectively to the frames, C D, the former being connected by hinges or joints, a, to the front end of the frame, A, and the latter connected by hinges or joints, b, to the rear of the frames, C, substantially as and for the purpose set forth.

2d, The vibrating shoes, L, arranged and operated as shown, in connection with the seed box, K, provided with one or more compartments, and all arranged substantially as and for the purpose specified.

3d, The attachment of the coverers, L, to the rear bars, d, of the supplemental frames, D, to admit of the adjustment of the coverers, substantially in the manner as and for the purpose set forth.

4th, The combination of the furrow openers, E, coverers, L, and the seed-distributing device composed of the vibrating shoes, L, and perforated bottom of the seed box, provided with slides, o, all arranged substantially as and for the purpose specified.

69,485.—OIL CAN.—Martin Robbins, Cincinnati, Ohio.

1st, I claim a can or vessel for containing oil sirups or other liquid, provided with a vacuum handle, and an adjustable nozzle, substantially as herein shown and described.

2d, The nozzle, E, adjustably attached to the stopper, D, the latter being continued into the can to form the conducting tube as herein set forth, for the purpose specified.

3d, I also claim the combination of an adjustable nozzle, with the can or vessel substantially as herein shown and described.

69,486.—COMBINED CORN PLANTER AND PLASTER DROPPER.—Henry Rodes, Clarence Center, N. Y.

1st, I claim the combination with a planter, C, and plaster dropper, D, of a dropping arrangement that by a single movement shall open the one and close the other, substantially, and *vice versa*, as herein set forth.

2d, The special combination and arrangement of the dropping apparatus, consisting of slides, E G, connected with the single arm, J, and operating in the manner and for the purpose herein specified.

3d, The combination of the sliding gage plug, n, with the slide plates, I I', arranged as described, and operating in the manner and for the purpose specified.

4th, The construction, combination, and arrangement of the draw bars, I I', stirrup, r, and connection, w, with the drill tooth, t, and coverer, v, as herein set forth.

5th, The combination and arrangement of the elastic connection, a1, and the adjusting gage, b1, with the pivoted plaster tube, m, operating in the manner and for the purpose set forth.

6th, The arrangement of hoppers, C D, with dropping slides, E G, the rock shafts, E H, with connection, G, the cam and roller, c a1, and the draw bolts, I I1, with stirrup, r, and connection, w, the whole operating in the manner herein set forth.

69,487.—COMBINED HORSE RAKE AND HAY SPREADER.—Charles Rogers, Barker, N. Y.

I claim the frame, C, arranged in rear of the axle, A, and supported by the castor wheel, c, in combination with the bearings, g h, and the head of a rake or tedder, substantially as and for the purpose specified.

69,488.—TRUNK.—Alfred V. Ryder, New York city.

1st, I claim in a trunk, the body of which is composed of three main portions or compartments, A B C, the front upper, or upper front one, A, of which is hinged as at a, and made to open and close as described, constructing the front of the rear portion, B, of a shelving or receding character relatively, to the dividing cut or cuts, b, substantially as and for the purpose or purposes herein set forth.

2d Hinging the front upper, or upper front portion, when the same is arranged to open as described, relatively to the remaining portion or portions of the trunk, at a point or in a line which is in advance of a vertical center, through the width of the trunk, essentially as specified.

69,489.—GRAIN AND SEED CLEANER.—Jacob Sattison (assignor to himself and Ambrose Frayer), Ripley, Ohio.

I claim the bolt, B, in combination with the shake sieves, M, conductors, N and O, when arranged and operated conjointly with a fan or blower, in the manner and for the purpose substantially as set forth.

69,490.—SHOE KNIFE.—Henry Sauerbier, Newark, N. J.

I claim the sliding or adjustable guard or gage, C, provided with a lip, b, and turned up edge, in combination with the blade of the knife, substantially as and for the purpose herein set forth.

69,491.—SHOE KNIFE.—Henry Sauerbier, Newark, N. J.

I claim the guard, C, having the lip, b, at its outer end, when provided with the beveled recess, c, resting against the blade, A, as and for the purpose set forth.

69,492.—CENTER BOARD.—John G. Saunders, Narragansett, R. I.

1st, I claim the raising and lowering of the center board, in an oblique direction, by means of an oblique slot or groove, and a fixed bolt, or their equivalents, arranged substantially as and for the purpose set forth.

2d, The rack bars, C, in combination with the pawls, c, and the center board, B, all arranged substantially as and for the purpose specified.

69,493.—WASHING MACHINE.—John Schermerhorn, Spring Creek, Pa.

1st, I claim the construction of the boxes, D, of the square part, g, and the arm, d, with hooked end, e, for receiving the spring, f, in combination therewith, and with the rubber, B C, substantially as and for the purpose described.

2d, The combination of the spring, f, adjustable boxes, D g d e, and corrugated rollers, C, meshing with the corrugation of the rounded bottom of case, A, substantially as described, for the purpose specified.

69,494.—GATE.—William Serviss, Sidney, Ohio.

I claim the arrangement of the post, C, of the partial inclosure, relatively to the posts, a b, when provided with a hinged stop, F, whereby the gate is retained between the points, C a, of the inclosure, or may be opened at pleasure, substantially as set forth.

69,495.—WATER WHEEL.—Samuel Shive, Forks, Pa.

1st, I claim the wheel, A, mounted on the sliding frame, B, secured to the hinged pulley frame, D, and operating substantially as described, for the purpose specified.

2d, The hinged pulley frame, D, in combination with the wheel, A, constructed and operating substantially as described.

69,496.—RAILWAY SWITCH.—Daniel Simmons, N. Y. city.

1st, I claim the horizontal operating bars, G, upright bars, I, steams, h, and springs, i, arranged to operate in relation with each other, and with the platform, fulcrum, r, and the laterally projecting pins or studs, b*, of the lever heads, A*, substantially as and for the purpose herein set forth.

2d, The combination of the locking pawls, d, and rods, d', with the switch rails, C, and levers, D, substantially as and for the purpose herein set forth.

69,497.—BOB SLEIGH.—L. F. Skinner, Springvale, Wis.

I claim the hubs, a a a a, spokes, d d d d, forming the segment of a wheel when attached to runners, A A A A, in combination with axles, B B, constructed as described, and operating as set forth.

69,498.—BUTTER TRYER.—Wm. H. Sloan, St. Louis, Mo.

I claim the scraper, B, when provided with a handle, b, and a convex scraper piece, b2, as described and set forth.

69,499.—STEAM GOVERNOR.—H. D. Snow, Bennington, Vt.

I claim the arrangement of the revolving head, m, segment arms, p, and governor balls, in combination with the valve rod and adjustments, u v, as and for the purposes set forth.

69,500.—TOY PISTOL.—Fisher A. Spofford, and Matthew G. Rallington, Columbus, Ohio.

We claim the toy pistol, consisting of a barrel open at both ends, with the aperture, E, opening directly into the barrel, near the breech, and having the spring, h, located therein, as shown, with the piston, B, operated by the spring, C, and the trigger, D, arranged to release the piston by elevating its front end, all as herein shown and described.

69,501.—ATTACHMENT FOR SCHOOL DESKS.—David J. Stagg, New York city.

I claim the sliding frame, B, constructed as described, having the extended top-supporting rail, c, and attached to the desk by means of the spring catch, C, said frame adapted to fit in the slot, a, of the desk, substantially as described for the purpose specified.

69,502.—COMBINED CORN PLANTER AND CULTIVATOR.—J. F. Sterett and C. M. J. Reynolds, Ottumwa, Iowa.

I claim the arrangement of the hopper, D, upon the beam, with the pipe, J, slides, H and a, bar, F, and the round of the handles, with its lever, G, and arm, E, the several parts being used and operating as and for the purposes set forth.

69,503.—FIRE-ALARM TELEGRAPH.—J. H. Stevens, Boston, Mass.

1st, I claim the rheotrope, D, and reversing magnets, I, in combination with each other, when connected with and operated by signal box, K, substantially as described.

2d, The arrangement and combination of the wires, M M, switches, B, and knobs, C, so as to include in or exclude from the circuit the rheotrope, D, substantially as and for the purpose described.

3d, The described combination and arrangement of signal box, K, start magnet, E, rheotrope, D, with its springs, L, and wires, M, with switches, B, and reversing magnet, J, substantially as and for the purpose described.

69,504.—ODOMETER.—M. W. Stevens and E. H. Drake, Stoughton, Mass.

We claim the application of the odometer with the hub, B, and its journal, D, in manner as specified, in connection with the formation of such journal with a notch, x, and the application thereto, and to the odometer train, of a pitman, y, and a spring, z, to operate the said train, substantially in manner and by the revolution of the wheel hub on the axle journal, as specified.

We also claim the combination and arrangement of the cap or guard, v, with the train, the dial plate, and the case, B, and its hollow shank, C.

We also claim the arrangement and combination of the spring, z, and the cranked shaft, t, and its pawl, r, with the train of gears and screws for operating the index arbor, g, as specified.

69,505.—FURNACE.—Wm. Stevens, Bloomington, Ill.

1st, I claim the tube, E, and pipes, I I I, arranged in the manner as specified, and used for the purpose set forth.

2d, The arrangement of the chamber, D, perforated plate, G, in combination with the tube, E, and pipes, I I I, in the manner and for the purposes specified.

69,506.—STOVEPIPE JOINT.—Wm. Stine, Elmore, Ohio.

I claim the perforated metallic ring for securing the joints of stovepipes and smoke stacks, provided with the central flange, a, around its periphery, when constructed as described, with the ends upon both sides of the flange, a, of equal or of unequal diameters, substantially as herein shown and described.

69,507.—WASHING MACHINE.—T. B. Stout, Keyport, N. J.

I claim the rubber, B, having a vibrating or self-rocking movement, and arranged and operating substantially as and for the purpose herein specified.

I also claim the wash-board, C, rocking, or self-adjusting sidewise, in combination with the rocking movement of the rubber, B, at right angles thereto, substantially as and for the purpose herein set forth.

I also claim the adjustment of the washboard so as to bring its flutings or corrugations either parallel with or oblique to those of the rubber, substantially as and for the purpose herein specified.

69,508.—SLEIGH RUNNER.—W. H. Stroup, Philadelphia, Pa.

I claim the runners, A A1, hinge, C, and keeper, B, arranged in the manner and for the purposes specified.

69,509.—GATE.—A. Tandy, Columbia, Mo.

I claim forming the upper hinge of a slot in the upper end of of the bar, C, and guide, E, substantially in the manner herein shown and described and for the purpose set forth.

69,510.—WOOD MITERING MACHINE.—Robert F. Tomkins, New York city.

I claim the adjustable sector-shaped rest blocks, B, having guide pieces, U, in combination with the guide wing, M, adjusted by means of the set screws, P, in the slotted plate, K, and bearing the inclined cutter blades, N, and with the adjustable guide strips, R, substantially as described for the purpose specified.

2d, The adjustable grooved post, V, in combinaton with the cutter blades N, and rest blocks, B, as and for the purpose specified.

69,511.—CAR COUPLING.—Joseph Trent, Millerton, N. Y.

I claim the combination and arrangement of the revolving buffers, B B1, buffer bars, D D1, blocks, G G1, springs, K K1, and rods, H H1, substantially as described for the purpose specified.

69,512.—MOP HEAD.—John Troxel, Reedsburg, Ohio.

I claim the arrangement of the heads, A A, arms, B B, levers, C and D, and link, E, the several parts being constructed and operating in the manner and for the purpose set forth.

69,513.—SHEEP SHEARS.—Francis Van Doren, Adrian, Mich.

1st, I claim having two or more stationary guards or cutters, E E, and one movable cutter, A, on sheep shears, substantially as and for the purpose herein shown and described.

2d, The movable cutter, A, in combination with two or more stationary guards or cutters, E E, and gages, a b, all made and operating substantially as herein shown and described.

69,514.—SPRING BED.—Charles Van Dyeck, Nashville, Tenn.

I claim the combination of the three frames, C a b, mattresses, A B, diaphragm, H1, springs, D D1 and H, arranged substantially as described.

69,515.—LOOM.—A. O. Very, Andover, N. Y.

1st, I claim operating the treadle shaft of looms by means of a direct action of the lay on a cam formed on a loose jacket on the treadle shaft, substantially as described.

2d, The spiral cam, G, on the loose jacket, F, on the treadle shaft, C, substantially as and for the purpose set forth.

3d, The roller pins, g g, on the under side of the shuttle race, H, operating the cam, G, on the loose jacket, F, substantially as and for the purposes set forth.

4th, Making the straps operating the picker staffs adjustable, substantially as described.

5th, The tripper arms, c d, on the treadle shaft, C, substantially as and for the purpose described.

69,516.—LOOM.—W. B. Walker, Salem, Iowa.

1st, I claim the construction and arrangement of the downward projecting arms, b b, slotted longitudinally in which the pickers, t f, are pivoted and supporting the picker blocks, g g, which are mortised to receive and inclose the upper ends of said pickers, as herein shown and described for the purpose specified.

2d, I claim the pickers, f f, one in the end of each arm or exterior of the lay with the projections or arms, d d, having a convex point and being concave from that to the main body of the picker, substantially as described and for the purposes set forth.

3d, The main springs, c c, with the outer end convex or bent up to work on the convex point of the projection, d d, of the arms of the pickers, substantially as described and for the purpose set forth.

4th, The arrangement and combination of the platforms, I I, fastened on the top of the sides of the loom with and for the purpose of holding the guide springs, i i j j and k k, also the set springs or catches, r r, and elbows, s s, to which the set springs are attached, substantially as described and for the purpose set forth.

5th, The cloth beam, 7, with the ratchets, 2 and 3, attached and the surface covered by cards or filled with pins, the spring, s'', and pawls, 4 and 6, substantially as described and for the purpose set forth.

6th, The extra cloth beam or receiving beam on which the web will be received by the action of the take-up beam in the combination with the take-up beams, constructed and operated as described.

69,517.—WOODEN PAVEMENT.—C. G. Waterbury, N. Y. City.

1st, I claim the blocks, A, with their projections, B and E, constructed and arranged substantially as and for the purpose set forth.

2d, In combination with the blocks, A, having projections, B and E, I claim the movable strips, C, and bolts, D, substantially as and for the purpose set forth.

3d, In combination with the blocks, A, having projections, B and E, I claim the bolts, D, with or without the strips, C, substantially as and for the purpose described.

69,518.—DROP HAMMER.—W. H. Waters, Springfield, Mass

1st, I claim a pair of rollers, F F, each of which is seperately rotated by power applied to the pulleys, H H, in combination with the board or strap and drop substantially as set forth so that lifting power is applied to each surface of the strap or belt in the manner and for the purposes set forth.

2d, In combination with the rod, S, and drop I claim the mechanism substantially as set forth, for sustaining the rod at any point to which it may be raised as specified.

69,519.—BREECH LOADING ORDNANCE.—Asa Weeks, Minneapolis, Minn.

1st, I claim the arrangement of the pins, w v, with coil springs, when used in combination with breech blocks, C, as constructed in the manner set forth.

2d, The combination of the sliding bar, k, and hammer, E, with the block, c, and cannon, A, for the purposes herein specified.

69,520.—HORSE COLLAR FASTENING.—D. C. Westfall, Mifflin, Pa.

I claim the horse collar fastening consisting of grooved hollow caps for receiving and concealing the ends of the collar, forming a bearing for the hames, and concealing in one part the spring sliding bar, f, which catches over the bevel hooked projections of the other part when constructed and operating as herein represented and described.

69,521.—SPIKE.—James A. Whitney, Jersey City, N. J. Antedated, Sept. 26, 1867.

I claim a notched, toothed, or serrated spike constructed with a spiral or twisted portion, substantially as herein set forth.

69,522.—SKATE.—Fridrek Wichehaus and Charles Rothe, Newark, N. J.

We claim the elliptic heel button, f, firmly secured to the spring lever, E, which plays in the recess, d, between the rear standard, D, and the sole plate B, and whose forward end drops into the rear end of the foot plate, A, in the manner and for the purpose herein described.

69,523.—SCHOOL DESK AND SEAT.—D. C. Wilson, Beaufort, S. C.

I claim the school desk and seat constructed as described consisting of the end frame, A B, framed into each other and held in position by means of the top board and shelf, the seat being formed upon the timbers, B, secured to the front part of the frame, A, as herein shown and described.

69,524.—WATCHMAN'S REGISTER.—Adolph Witt, Cincinnati, Ohio.

1st, I claim in combination of the tubular center shaft, C c c', minute hand and stem, D D' d d', axial rod, E e, spring hour hand, K k, perforated dial plate, N n, shutters, O, and closing follower, R, the whole being arranged and operating substantially as herein described and for the purpose specified.

2d, I also claim the combination of the hour wheel, F f, intermittent wheel, H h, and spring, J, as and for the purpose set forth.

3d, In combination with the seven described elements of the first clause, I further claim the spring belt crank, T t t', and rod, U u, for the objects explained.

4th, I claim the combination of lever, W, cam, X, shaft, Y, spring, Z, and operating knob or handle, Y', or their equivalents for the purpose described and set forth.

69,525.—SAW SET.—James C. Woodward, Franklin, Conn.

I claim the hammer-head, C, constructed as described provided with the stem, K, fitting longitudinally into the outer or swinging end of the shank, B, and adjusted by means of the thumb screw, M, as herein set forth for the purpose specified.

2d, I also claim the set screw, Z, substantially as and for the purpose described.

69,526.—CUT OFF VALVE GEAR.—J. N. Wrigley and George Smith, (assignors to John N. Wrigley,) Newark, N. J.

We claim the cams, d d, on the wheel, H, the adjustable bar, K, the bell crank, J, and the rod, m, arranged and operating substantially as described for the purpose set forth.

69,527.—STEAM SAFETY VALVE.—J. N. Wrigley and George Smith (assignors to John N. Wrigley), Newark, N. J.

1st, I claim the construction and arrangement in the shell, A, of the stationary valve, B, movable valve seat, C, substantially as herein set forth for the purpose specified.

2d, The construction and arrangement of the shell, A, stationary valve, B, movable valve seat, C, stem, E, and lever, F, substantially as described for the purpose specified.

69,528.—BOOTS AND SHOES.—B. C. Young, Boston, Mass.

I claim a boot having buttons or knobs securely fastened to and projecting from the opposite outer surfaces of the leg near the top thereof, or in such position that by applying a fore finger under each button or knob, and a thumb to the inner surface opposite said button or knob, the boot may be securely grasped to pull it on the foot, substantially as set forth.

69,529.—HARVESTER.—Elijah Young, Fayetteville, Mo.

I claim the adjustable disk, e4, in combination with the spring pawl and the ratchet, substantially as described and set forth.

## REISSUES.

2,767.—RAILROAD CHAIR.—John McMurtry, Lexington, Ky., assignee of J. A. Roebling and J. McMurtry. Patented Oct. 31, 1865.

1st, I claim a solid block of cast iron or steel of sufficient length to rest on two or more sleepers and constructed as described, in combination with a plate of iron or steel of like length, fitted on the opposite side of the rails and secured to said block and rails in the manner and for the purpose specified.

2d, I claim further a plate of iron or steel of such length that it will rest on two or more sleepers, in combination with a like plate fitted on the opposite side of the rails, both being constructed and connected as and for the purpose set forth.

3d, I also claim the vertical flanges pendant from the inner edge of the bases of the two plates, in combination with said plates, substantially as and for the purpose described.

2,768.—BREECH-LOADING FIRE-ARM.—Wm. H. Miller and Geo. W. Miller, West Meriden, Conn. Patented Dec. 26, 1865.

We claim, 1st, The latch, E, arranged and operating in combination with the face plate, b, oscillating breech piece, B, and catch, I, substantially as described.

2d, We also claim the combination of the swinging breech piece, striker, and detent, operating together as and for the purpose described.

3d, We also claim the plate ejector, F, with its shoulders, stop, and finger, when hung loosely upon and constructed in its movements solely by the pivot pin of the swinging breech and moving around the same center with it and operated by the inserting of the cartridge and the swinging of the breech, in the manner substantially as described.

2,769.—PUTTING UP POWDERS, ETC.—Henry Sawyer, Roxbury, Mass. Patented Jan. 5, 1864.

I claim a package or case which when made with distributing holes and filled, is cemented by the wax or wafer, e, as set forth.

## DESIGNS.

2,792.—TRADE MARK.—Thomes Bakewell, Pittsburgh, Pa.
2,793.—STATUETTE.—Hammatt Billings, Boston, Mass.
2,794.—SPOON HANDLE.—Luther Boardman and Norman S. Boardman, East Haddam, Conn.
2,795.—WATCH PLATE.—Alfred Gerard, Somerset county, N. Y.
2,796.—RANGE.—S. W. Gibbs, Albany, N. Y.
2,797.—TRADE MARK.—Stuart Guywn, New York City.
2,798.—SEWING MACHINE.—T. C. Page, Chicopee, Mass.
2,799.—WOVEN FABRICS.—William B. Weeden, Providence, R. I.

## 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.*

54,432.—HEAD BLOCK FOR SAW MILLS.—Simon F. Stanton (assignee of J. M. and S. F. Stanton), Manchester, N. H. Dated May 1, 1866. Application for reissue received and filed Sept. 19, 1867.

I claim the combination of the graduated notched guide, R, and vibratory lever, Q, with its pawl and ratchet wheel, P and O, or the equivalent thereof, for moving the uprights different and determinate distances by the simple movement of the lever, substantially as and for the purpose herein specified.

I also claim the combination and arrangement of the pinions, D D D, and double setts of racks, b b b and c c c, for moving the uprights by the turning of the shaft, E, substantially as herein set forth.

I also claim the construction and arrangement of the shaft, E, sections, coupled by clutches, F F, which may be connected or disconnected at pleasure, substantially as and for the purpose herein specified.

I also claim the screws, J J J, arranged upon the upright and operating substantially as and for the purpose herein set forth.

I also claim the dog apertures in the uprights for the reception of horizontal dogs, substantially as described.

I also claim the clamp hooks or dogs, M M M, arranged and operated substantially as and for the purpose herein set forth.

60,342.—TAP BORER.—W. A. Ives & Co., New Haven, Conn., assignees by mesne assignments of Silas S. Crocker, Maquoketa, Iowa. Dated Dec. 11, 1866. Application for reissue received and filed Sept. 25, 1867.

I claim, 1st, A borer constructed from a plate curved so as to form a conical shaped instrument, one edge projecting slightly above the other, the salient edge sharpened while the other forms a guide and the space between the two edges of the throat of the instrument combined with a gimlet point, whether the edge be spiral or straight.

2d, The volute-shaped tool with a sharpened salient spiral edge with or without the gimlet point, 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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16,616 Do. Slings.
21,397 Hatchets.
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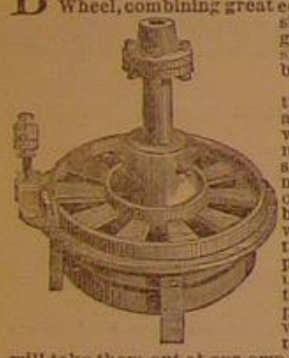

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# PATENTS

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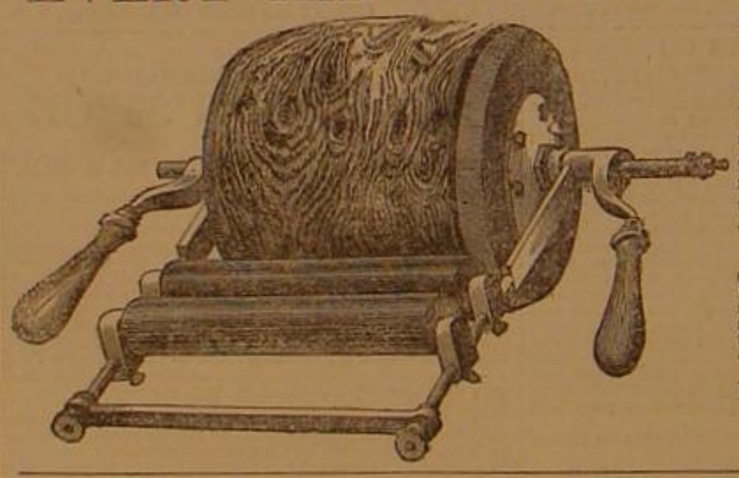

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## Improved Cut-off in Engines.

Most of the features of modern steam engineering originated in the fertile brain of James Watt. He found the steam engine in a very crude state and left it in quite as perfect a condition (excepting only mechanical construction) as that of the ordinary engines at the present time. He invented separate condensation, expansion, steam jacketing, superheating, and the governor. The combination of the governor with a cut-off valve gear was reserved to a later period, having first been published in the "Repertory of Patent Inventions" for 1826, as the invention of James Whitelaw. Since then the steam engine has advanced by improvement in details and construction rather than by the development of new principles.

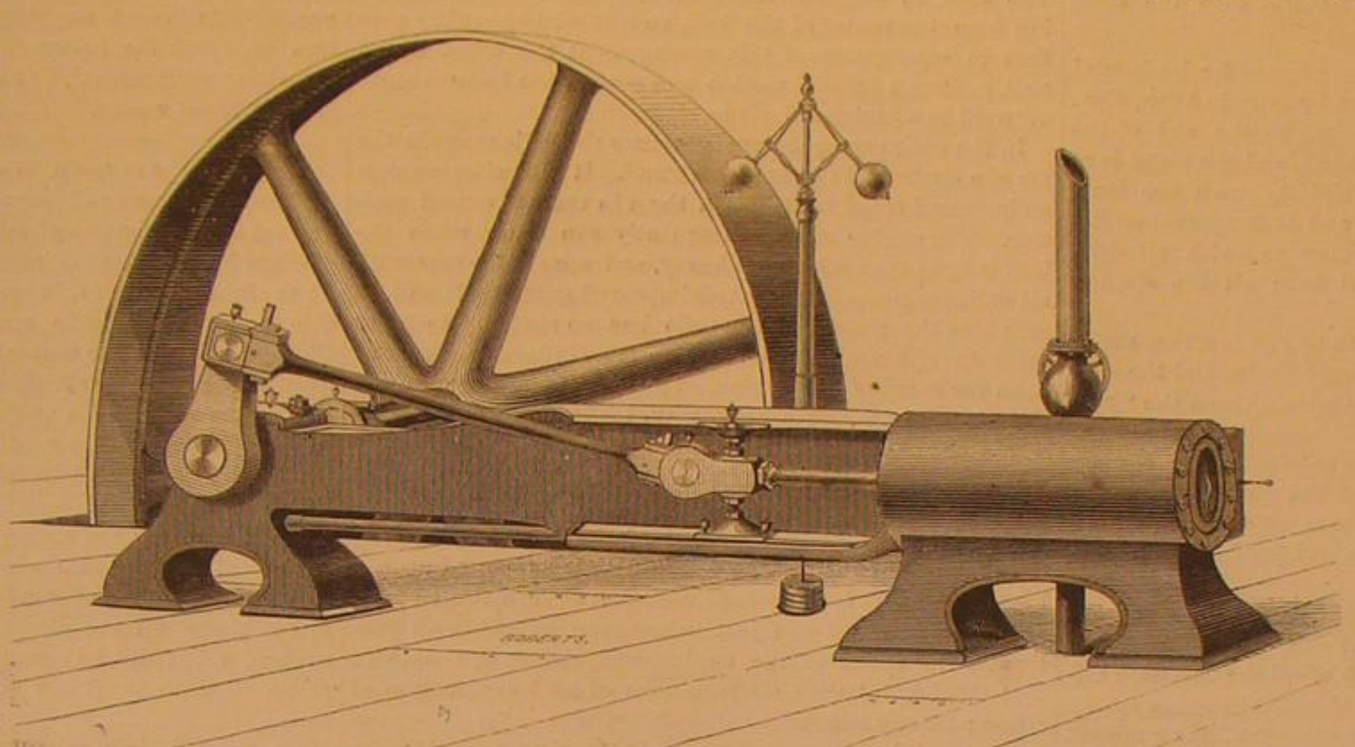
The inventors of the engine herewith presented to the public make no pretension to the introduction of radical improvements in the principle of using steam expansively, but they have devised and perfected a new and simple method of operating and controlling the action of the valves for admitting and cutting off the steam, by means of which better results are obtained than by the devices heretofore in use.

There is no necessity at the present day to argue the superiority of an engine regulated by the cut-off to one regulated by the throttle, so far as economy of fuel or regularity of speed are concerned. Practical business men have settled that question for themselves by experience, and no shrewd business man will purchase a throttle valve engine when he can procure one which automatically adjusts the supply of steam to the exact amount required for the work in hand. There are occasional situations, where the load is constant and the engine and pressure of steam are exactly adapted to the circumstances, when a fixed cut-off will give nearly or quite as good results as an automatic cut-off, but a change in the load or pressure of steam will disturb the conditions so as to destroy the equality. With a perfect automatic valve gear and regulator the variation of load or pressure within reasonable limits will not materially affect the economy; while there is no other possible means of regulating the speed and power of an engine with the perfection which is attained by a governor attached directly to a sensitive cut-off valve gear.

This engine has a novel construction of the governor, by which the variation due to the pendulum action of the ordinary governor is overcome, and a regulator produced which will give the same speed whether the engine be light or heavily loaded, or the pressure of steam in the boiler be greater or less. The governor as invented by Watt, and adopted by modern engineers with rare exceptions, gives only an approximation to equal speed, requiring a variation of from five to thirty per cent between the extremes of motion.

In designing this engine it has been the object of the inventors not only to introduce their own peculiar ideas and improvements, but to combine therewith all those features which long practice has proved to be most conducive to economy of fuel, and the durability of all the working parts. The steam jacket has been much neglected in this country, though in almost universal use by the best engine makers of Europe; and so little is its theory and advantages understood here, that in most cases where it has been introduced in this country it is filled with the exhaust steam, thus defeating the very object for which it was designed. This engine is jacketed with live steam from the boiler in both heads as well as around the cylinders, thereby keeping the metal of the cylinders, as hot as the hottest steam which enters it.

The valves which effect the distribution of the steam in the steam engine are the most important part of the machine, as upon their properly performing their functions depends the efficiency of the working mediums. They must not only admit, exhaust, shut off, and close, at the proper periods, but they must be perfectly tight when closed, and when open admit the steam with the least possible resistance. They should also permit of such a relation to the cylinder as to give the least practicable lost space or clearance. There are four distinct varieties of valves used for this purpose, viz.: the plug or cock, the piston, the seat valve or poppet, and the slide. The first variety is never used now by competent engineers, having but one good quality, viz.: the equal pressure of steam on its sides, to balance its many bad features, such as leakages, sticking from expansion, and unequal wear. The piston valve is also nearly out of use owing to the excessive lost space inherent in its construction. The same objection applies to the poppet valve with the additional ones of great liability to leakage, and inability to open and close quickly from the fact that it opens immediately on starting, and is not closed until brought to rest. It is impossible to start or stop the valve instantaneously, therefore the opening and closing must be correspondingly so slow as to be objectionable except on slowly moving engines.



THE BABCOCK & WILCOX STEAM ENGINE.

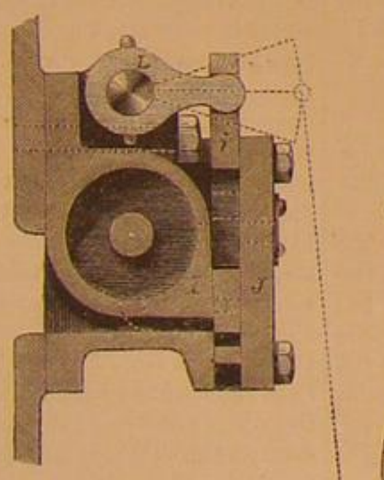


Fig. 2

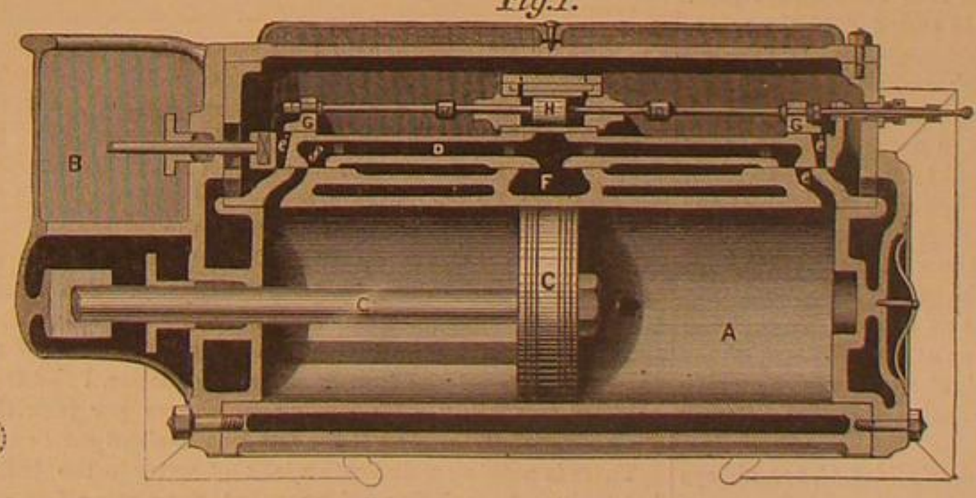


Fig. 1.

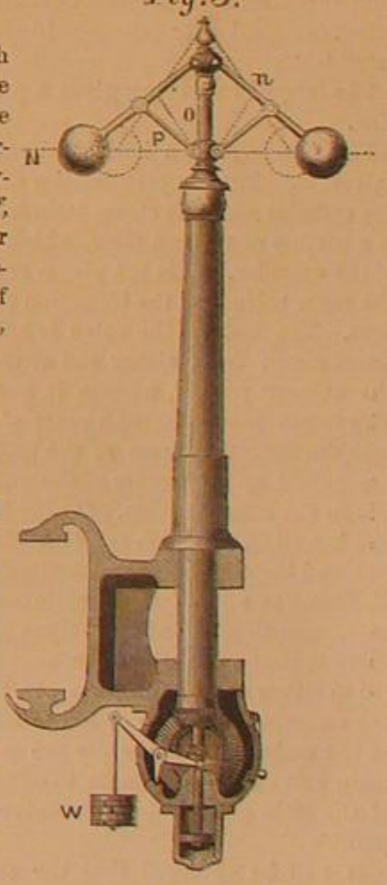
The universal experience in this country and Europe is in favor of the slide valve for opening and closing the ports of all quick moving engines. It is simple and easily fitted, admits of the least lost space, opens and closes the ports with the quickest possible motion, and is the least liable to become leaky from use of any form of valve. Of the two forms of slide valve the flat is much preferable to the curved, from the greater facility of accurate fitting, and the more equal wear of two planes as compared to inner and outer cylindrical surfaces.

An important condition of equal wear in a slide valve, however, is a constant travel. Where the induction valve is made also to act as a cut-off valve, as in a link motion, and in detachable valve gear, this condition cannot obtain, and as a consequence we find that such valves are always wearing leaky.

The adaptation of a cut-off mechanism to act in conjunction with a plain slide valve, the latter to admit and exhaust the steam, and the former to close the port at any desired point in the stroke, has been a favorite pursuit of engineers for the past half century, but in all arrangements previous to the invention of Babcock & Wilcox, the motion of the main valve had more or less effect upon the action of the cut-off, and the latter would not work with the desired rapidity at all points, nor would it admit of a range of motion throughout the stroke of the piston. Nine-tenths of all the expansion engines now built in Europe have some modification of this form of valve gear, and the engine of Messrs. Farcot & Sons, which received the Grand Prize at the late Paris Exposition, was of this class.

One of the points in which the Babcock & Wilcox engine differs from the best engines which have preceded it is the manner in which the cut-off valves are operated, viz.: by the action of the steam itself, independent entirely of the action of the main valve; thus insuring an instantaneous, positive, and easily controlled cut off, at any desired point in the stroke of the piston. The distribution of the steam to the alternate sides of the piston, and its release from the cylinder when the stroke is completed, are performed in the manner most approved by experienced engineers, by means of a plane slide valve operated by the ordinary eccentric. But from the fact that the induction valve has in no case to effect the suppression of the stream—or, in American phrase, act as a cut-off valve—and from the further fact that the cut-off is actuated independently of the motion of the main valve, the functions of "lead" and "cushion" can be adjusted to any desired degree, without in any manner affecting the action of the cut-off valve. This is an important distinction between the operation of the main valve of this engine and those which have preceded it. In the ordinary three-ported slide valve, or in any other arrangement where the several functions of *lead*, *out-off*, *release*, and *compression*, or closing the exhaust, are dependent on the motion of one eccentric, the "exhaust", functions—*i. e.*, the release and compression— must always be subservient to the "steam" functions—*i. e.*, the lead and suppression, or cut-off.

Fig. 3.



In the Babcock & Wilcox engine, however, the cut-off being actuated by a separate and entirely independent mechanism, a single valve is capable of giving any degree of lead and compression which may be desired, as perfectly as with the most complicated valve gear.

Another important difference between this engine and all previous adjustable slide or rolling valve cut-offs, lies in the fact that the valves have a constant travel under all circumstances, thereby insuring an equal wear. A valve which varies its throw to effect the cut-off, as in all detachable valve gear, cannot wear equally, and has a continual tendency to grow leaky. Again, this constant throw insures a wide, open port, and the least loss through throttling the steam by the action of the valve—or, in other words, enables us to obtain a pressure in the cylinder more nearly approaching that in the boiler, than can be realized with other valve motions.

Another peculiarity of this engine is its extreme simplicity and the fewness of parts exposed to wear. At first sight, it has the appearance of one of the simplest styles of non-expansive engines, having none of the catches, cams, dash-pots, springs, tappets, etc., which are common to other expansion engines. With the exception of the cut off gear, the

engine is a simple slide-valve engine, and can be used as such, should any accident occur to the cut-off. The cut-off mechanism itself is also of the simplest possible description, having the least possible number of parts, consistent with a proper performance of its functions. It consists of two cut-off slides, a miniature steam cylinder, and a valve for controlling the admission of steam to the same. This small cylinder, being enveloped in the steam, requiring no packing, and having only the weight of its piston to produce wear, is, for all practical purposes, indestructible. The cut-off slides are always balanced when they move, consequently they are not exposed to injurious wear.

Another advantage of the Babcock & Wilcox engine is that it is easily comprehended by ordinary mechanics. The motions and adjustments are similar to those familiar to any one who understands a plain slide-valve engine; and any man who can adjust such an engine properly, can readily adjust this.

The cut-off valve of this engine presents a convenient means of stopping at any desired point, simply by opening or closing the cut-off valve by hand, as the case may require. The engine may be warmed up, also, without danger of starting, by closing the cut-off valve by hand. In cases where it is desirable to back the engine, a starting bar may be readily shipped and the engine handled with the same ease as the plain slide.

The bed or framing which has been adopted for horizontal engines is of the form first introduced by Horatio Allen, Esq., of the Novelty Iron Works. It is bolted to the end of the cylinder, and extends to the pillow-block, and the metal is so disposed as to give the greatest rigidity with the least weight. The cross-head is upright, and is supported on flat slides, a drip cut cast on the bed serving to catch all drippings, not only from the slides, but from all the stuffing boxes.

The regulator or governor is driven by gearing, thus avoiding all danger of breakage or slipping of belts, and the consequent damage to the engine and machinery from the "running away" of the engine.

In addition to the steam jacket for preserving the temperature of the cylinder, a covering of felt is employed around all the exposed parts, and this in turn is covered by a casing of polished metal. The latter is the best possible protection against loss by radiation.

In the construction of these engines, no pains or expense is spared to procure the best material and workmanship, and the proportions and relative strength of all the parts are calculated with the utmost care, from formulas based on long experience, as well as a thorough knowledge of the qualities and peculiarities of the materials. Great attention is also paid to giving artistic forms to the various parts, every piece being designed with reference to rigid simplicity and a cultivated taste.

The largest engraving gives a perspective view of the engine.

Fig. 1 represents a horizontal section of the cylinder and valves, showing the peculiarities of the cut-off motion. A, is the cylinder which is steam jacketed as are also the heads. B, is a portion of the bed piece, which forms also the front head of the cylinder. C is the piston and C' the piston rod. D, is the main valve, e e' the induction ports, and F, is the exhaust port. The body of the valve is hollow and conveys the exhaust steam from either end of the cylinder alternately to the exhaust port, F, whence it goes into the exhaust pipe. The steam passes through ports e' in each end of the valve, into the induction ports of the cylinder, alternately as they are opened by the motion of the valve derived from an eccentric in the usual manner. On the back of the valve at either end is a slide, G, which can be made to cover the port at that end, and these slides are each attached to one end of a piston, H, fitting in a small steam cylinder bolted to the back of the valve, and so adjusted that when the port in one end of the valve is closed the other is open. Upon steam being admitted to either end of the piston, H, the piston is shot over and the corresponding side closed to cut off steam from that end of the main cylinder; while the port at the other end of the main valve is opened ready to admit steam to the other side of the main piston when the valve shall arrive at the proper position.

It will be observed that the cut-off slides, G, are always balanced when moved. The one about to close having steam of equal pressure upon each side, while the other one has been balanced by the main valve riding past the end of the valve face on the cylinder, thus admitting steam behind the slide, G. This condition obtains during the whole stroke of the piston until the steam is cut off, after which the cut-off slides, G, remain stationary relatively to the main valve until ready to cut off steam on the return stroke, previously to which time they have been balanced by the over-riding of the valve at the other end. These slides, have, therefore, literally no wear, and once fitted tight, they will remain so indefinitely. The piston, H, in the small cylinder, is turned to fit, and has no packing, neither have the rods stuffing boxes, as the pressure is equal on both sides except during the inappreciable time which intervenes between the exhausting of the cylinder, I, and the movement of the piston. The only tendency to wear in these parts is due to the weight of the piston and rods, which is supported on large surfaces. In fact, after twenty months constant use, none of these parts have worn sufficiently to obliterate the tool marks upon the surfaces.

Steam is admitted alternately to each end of the piston, H, at every revolution of the engine, causing the cut-off slides to move at every stroke, cutting off the steam at the point determined by the governor.

Fig. 2 shows a cross section of the cylinder, I, and its valve. This valve is balanced by the plate, J, upon its back and is operated by a toe upon the rock shaft, L, carried upon the main valve, and extending through the end of the steam chest where it receives motion from a crank, M, which is adjusted in its position by the governor. The exhaust ports of the cylinder, I, are made upon the bottom and are at a little distance from the end, while the steam ports are upon the side and at the extreme end of the cylinder. By this arrangement the piston closes its own exhaust port and cushions on the remaining distance, thus dispensing with all dash pots or air cushions, and causing the valve to work without any noise.

The valve, i, being balanced, and the rod, L, carried through its stuffing box by the main valve, there is the least possible power required by the regulator to adjust the crank, m, thereby ensuring a more sensitive action than can be attained where the governor has labor to perform.

The governor is peculiar and is shown at Fig. 3. The balls, N, are hung upon arms in the usual manner, which arms are jointed at their upper ends to a head attached to the rod, o, which slides within the hollow shaft that drives the balls, the motion being communicated through the radius rods, p, which are jointed at their lower ends to the gearing shaft, and at their upper ends to the center of the arms, n. The rods, p, are half the length of the arms, n, measuring from the center of the ball, and it will be readily seen that in consequence of this arrangement the arms, n, and rods, p, form a parallel motion and compel the balls to move outward in a horizontal plane.

In the ordinary pendulum governor the balls move in the arc of a circle and rise as they extend. It therefore requires an increased speed to maintain them in their advanced position. The engine must consequently run faster when the load is light than when it is heavy, and such is the case with all ordinary governors. In this improved governor it will be seen that the gravity of the balls has no tendency to move them in either direction, and exerts no influence whatever upon the speed of the engine. The centrifugal force causes them to diverge, and a weight, W, tends to bring them towards the shaft. When therefore these two forces are in equilibrium the balls will remain in the same position, but as either preponderates they are moved in a corresponding manner, thus affecting the speed of the engine by varying the amount of cut-off. The weight, W, is supported upon a bent lever which is so proportioned, that the centrifugal force at any given speed will just balance the weight in all positions. The speed of the engine, will, therefore, remain at that fixed point with all variations of load or pressure of steam; for any increase or diminution will cause either the balls or weight to preponderate and the point of cut-off to be changed until the speed is again brought to the standard where the two forces are in equllibrium.

Any desired speed can be obtained by altering the weight, W, and the action of the governor will be as perfect in one case as in any other. A spiral on the rod, o, serves to advance or retire the crank, m, relatively to the main crank, so as to cause the cut-off to occur earlier or later in the stroke, as the balls diverge or converge; and the amount of this adjustment is such that the cut-off may be varied from nothing to seven-eighth stroke. [See Advertisements on page 270.]

## Correspondence.

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

### The Late Explosion in New York City.

Messrs. Editors:—After a careful and reflective examination, I have come to the conclusion that the steam boiler disaster in Twenty-eighth street was not an explosion, but that the boiler gave out and was carried to the place where we found it by the ordinary pressure of steam. I find the rupture was in the strongest part of the boiler—the tube cylinder—which was 52 inches in diameter and 7 feet long, made of 5-16 iron, which was of good quality. The outside shell was 96 inches in diameter and but 4-16 thick. Now, taking the diameters of the two into consideration, and the extra thickness of the iron of the tube cylinder, I find it capable of sustaining fully double the pressure per inch that the outside shell could; yet the outside remained entire.

There is nothing to indicate a lack of water in the boiler, but the most conclusive evidence that there was a full supply. Had there been a lack of water, the boiler would undoubtedly have been destroyed, but its subsequent flight, the destruction of two lives and a dwelling house 150 yards distant would in all probability not have been the result.

This seems perhaps paradoxical, but. if we examine the construction of the boiler which our readers will see illustrated on the first page of this journal dated July 9th, 1867, we will see that it is of that type of boilers having a large fire surface with a very small water space, particularly in the tube cylinder, which is on one side exposed to intense heat outwardly, while the heat returns through the tubes internally. In the upper half of this cylinder, probably, the major part of the steam was generated, which of course must find its way to the steam reservoir in the top—the water spaces being small around the tubes—the water was necessarily forced out by the steam, the iron heated—the water returns on the heated iron—thus alternately expanding and contracting the plate of the cylinder most exposed to the intense heat of the furnace, while its attachment to the main part of the boiler being less exposed to heat, was expanded less. This alternating continually weakens, disintegrates, finally destroys the strength of the iron, and it gives out in the strongest part!

I have said that there was no evidence of a lack of water. This is proved by the fact that the crown is one foot or more above the top flue sheet of the inner tube cylinder, showing no marks of overheating. This crown sheet is flat, sustained by suspension stays from the top. It was intact—no depression in any part, nor any marks of overheating, while the tube sheet of the cylinder showed most unmistakable evidence that when the rupture took place, that and one half the length of the tubes and one half of the shell of this cylinder were *red hot!*

With regard to the elevation and flight of the boiler, if we assume the boiler had 60 pounds of steam to the square inch, this multiplied by the area of 96 inches (the diameter of the outer shell of the boiler), gives us an ascensive power of nearly 218 tuns, while the parts of the boiler that ascended weighed but about four tuns.

Now there is ample evidence that the water and steam (and the water contained in the boiler would become steam when liberated) was still being discharged from the lower end of the boiler until it landed, acting precisely like the force of gunpowder being discharged by a rocket in its ascent.

Now taking this view of it, the escaping steam had to impinge on the atmosphere, which we will assume as 15 pounds per square inch, this multiplied by the area of 96 inches, gives us a propelling power of more than 54 tuns, against 4 tuns to propel.

Need we look after a *gas theory* to give these results? Is it necessary to invent any "mysterious" causes? I found the iron of which the boiler was constructed good, the workmanship unexceptional, but the principle on which the boiler is constructed wrong. F. W. B.

### Artesian Wells in Illinois.

Messrs. Editors:—I crave a short space in your scientific journal for the purpose of asking a few questions that would perhaps interest some of your 100,000 readers, and may benefit the inhabitants of this section. Onargo, the point whence this comes, is located in central Illinois, 85 miles south of Chicago. It is in the center of what is known as the Artesian Well region. These overflowing wells can be produced within a radius of 20 miles at the depth of 70 feet, variations in surface allowed. Water is procured by boring with a six-inch auger through about 5 feet of soil, 10 to 20 feet of sand, 15 to 20 feet of blue clay, 20 to 30 feet of hard pan, a composition of blue clay and coarse sand or gravel, and as hard as baked pottery, and into a bed of white sand called "water vein." In this bed of sand the water is found, it will in many places fill the discharge pipe several feet above the surface, which may be conducted to any part of the farm by pipes. Onargo is 92 feet above Lake Michigan and higher than the surrounding country, and these wells are found on every farm, flowing a constant stream at an even temperature. The question is, where does this water come from? Some of these wells throw 20 gallons per minute, others 120. A gentleman well acquainted with this country and the numerous wells, estimates the amount of water brought to the surface in this district at 53,400,000 gallons per day; this is allowing but 50 gallons to a well per minute. Where does this water come from? It cannot come from the lake, as we are so much higher than that body of water. It cannot collect in reservoirs from the surface, because it is impossible for water to penetrate the stratum known as hardpan, that overlays the sand or water vein. In this vein, where the water is found, there are no vacuums, or lakes, or veins of water, or currents, but a hard and compact bed of sand, almost pure white. Now if this water does not come from the lake or surface in this vicinity, but its source is a body of water some distance away, would it not be necessary for it to be at a great hight to overcome the resistance it meets in traveling through this bed of sand? Say this old theory is correct, say that the source is 200 miles away and 200 feet higher than the discharge, would not the resistance it meets in traveling through this compact bed of sand so overcome the power it receives from the fountain head that it would fail to reach the surface? Or do you consider that this water is conducted through this sand on the capillary principle? and if this is true why is it that beyond a certain radius they bore to the bed rock and fail to procure water?

A great many other things I would like to ask, but I know I must be brief. We find peculiarities in every section of this great artesian well country, most of them worthy of note, which if collected would fill your paper a dozen times. If you want a map of this section, with number of wells and location, size of streams, etc, I will forward the same.

Ed. Rumley.

[We would be glad to receive from our correspondent any further information he may deem interesting.—Eds.

### Turbines and Water Power.

Messrs. Editors.—For some time I have watched with peculiar interest for items relating to Hydraulics, especially in reference to the most economical use of water power, as I am about fitting up a mill where I have a fair water power. In your issue dated October 5th, I notice two statements purporting to be made by parties using the "Leffell wheel," which seem to me to be extremely improbable, viz., in one case where a turbine wheel of only 6 inches diameter had replaced two 20 feet overshot wheels and was doing more work on less water than they had been able to, and the other where a 10-inch wheel was running 3 pairs of large flouring burrs. Now I am pretty well acquainted with the amount of power required to do the work therein stated and that acquaintance leads me to believe that this is impossible, that it is impracticable for any such wheels to accomplish these results, especially with the small amount of water said to have been used.

Now if the Leffell or any other wheel can do what is there claimed, it is certainly important for all millers and manufac-

turers to know it, but if as we think, it cannot be done, it is doing much injury to allow such statements to pass unchallenged, as they may mislead many, who, like myself, contemplate improvements, but who have neither the means or inclination to experiment on uncertainties or to take risks on the assertions of manufacturers of this or that article.

Allow me accordingly to ask your opinion or that of some of your multitude of readers, who are experts in the theory and practice of Hydraulics as to the possibility of a 6-inch turbine doing more work than two 20-feet overshots and as to the best way of applying water power generally. A discussion of this subject cannot fail to be of great advantage and may save much trouble and expense to many, as all through our country new water powers are being developed and brought into use, and even more attention would be given and capital invested in them, were there a more general knowledge of the subject. F. WILBER.

Philadelphia, Pa.

Our correspondent refers to an advertisement. Probably the parties whose names are appended to the document can furnish him with the information.—EDS.

### End of the Comet Discussion.

MESSRS. EDITORS:—The kindly manner in which Prof. Wilhelm, of Philadelphia, has taken exception to some features of my explanation of the philosophy of comets' tails, commands admiration; and yet I think he errs.

Comets, when in a fit condition for the production of a tail by aid of the sun's rays, are opaque and self-luminous, and are not "transparent gas," as generally supposed; hence all those rays from the sun, that strike the comet within the circumference of the opaque substance, are absorbed. Only those rays that impinge upon the luminous margin become reflected. Or, possibly, as the rays pass through the luminous envelope, they become surcharged with cometary light, and are thus made luminous and visible. Once the rays have passed the luminous margin, they again become obedient to the same law and power of transmission by which the same rays were originally conveyed from the sun to the comet.

That part of the professor's diagram marked "shadow," is shadow within the comet's tail. It is well known to astronomers that the tail is a hollow cone, with the apex at the head, and that the surface of the cone only is luminous. Now, I do know, that the tail expands as it lengthens, in obedience to the law of reflected or transmitted light; whereas a transparent sphere would refract rays like a double convex lens to a focus in opposition to the sun. Hence the tail can hardly be refracted light.

To Dr. Fullerton I beg to say that I fully believe in the "all-pervading ether theory;" but the "secular acceleration of Encke's comet" is owing to an entirely different cause.

New York. GEO. M. RAMSAY.

### Gravitation.

MESSRS. EDITORS:—In reply to the inquiries of your correspondent, J. D. Caton, on page 194, current volume, I wish to say that Bassnett was not the first to propose a "mechanical explanation" of gravitation, while my hypothesis is anything but a mechanical one, in the sense of a transference of force from body to body by actual contact.

Newton himself did not believe in the inherent power of matter to attract other matter, and put forth the suggestion that an elastic medium pervades all space, increasing in density as we proceed from dense bodies outward; that this "causes the gravity of such dense bodies to each other; every body endeavoring to go from the denser parts of the medium to the rarer." The objections to this hypothesis are well stated by Whewell in his Bridgewater treatise; first, that we cannot find traces in any other phenomena of a medium possessing these properties; second, we have to suppose an inherent *repulsive* power in the particles of the medium for each other, and for dense matter. This supposition requires accounting for quite as much or more than that of simple inherent attraction, and is, beside, more complex. A subsequent theory, which excited much attention at the time, was proposed by Le Sage, in a memoir entitled, "Lucrece Newtonian," and further illustrated by M. Prevost, according to which all space is occupied by currents of matter, moving perpetually in straight lines, in all directions, with a vast velocity, and penetrating all bodies. These currents would be intercepted by gross bodies, which would thus be driven toward each other.

Mossotti more recently advanced a theory in which he attributed gravitation, as well as the attraction of cohesion and other molecular forces to a resultant force produced by a repulsion between the particles of matter; an attraction between matter and the etherial medium, and a repulsion between the particles of the latter. When the material molecules of a body are inappreciably near to one another, they mutually repel each other with a force which diminishes rapidly as the minute distance augments, and at last vanishes. When the molecules are still farther apart, the force becomes attractive. The limits of distance, at which the nature of the force changes, vary according to the temperature and nature of the molecules, by which is determined whether the body they form be solid, liquid or aëriform. This hypothesis, with some modification, is the one which is most generally received among physicists at the present time; and a nearly similar one has been recently discussed at some length by Professor W. A. Norton, in Silliman's journal.

The view which I have taken is, it seems to me, more simple than either of these, in the respect that it involves but one assumption instead of three or four to account for the same results. It is simply that force exists as a distinct separate entity, possessing quantity and direction, and only becoming cognizant to us when associated with matter, and producing motion. We arrive at the knowledge of its *independent* existence by reasoning upon these witnessed effects when so associated.

My plenum is of force and not of matter. Matter is merely a vehicle for force, and its inertia or weight is measured by its carrying capacity.

To sum up, in a few words, the substance of the paper which I read before the American Institute, which will be published in full in their next volume of proceedings, matter has no properties except that of motion, when associated with force. Impenetrability, elasticity, &c., are the manifestations of *force*, and not the properties of matter. Attractions are the results of interceptions of force; repulsions those of the excess of momentum over attractions.

A recent writer in the *London, Edinburgh and Dublin Philosophical Journal*, under the head, "Conic Theory of Heat," advances a similar idea to one of those contained in my paper, and proposed by me two years ago, viz., that the three conditions of matter are due to elliptic, parabolic, or hyperbolic character of the molecular orbits, the first corresponding with the solid, the second with the liquid, and third with the gaseous form of matter. I have attempted to trace the forms of crystals to the elliptic (including the circular) character of their orbits, and to show that in the liquid condition the relations of the forces are such that the orbits would be parabolic in single pairs, and hyperbolic in the gaseous condition. Also, to show, that the "Clash of Atoms," so much talked about of late, is a physical impossibility, impenetrability not being one of the properties of atoms.

New York, Oct. 9, 1867. HENRY F. WALLING.

### The Number "108."

MESSRS. EDITORS:—I beg leave of presenting herewith a few words in addition to the article, "Extraordinary Coincidences," which I saw on page 227, current volume.

The number 108 itself is very remarkable. It is composed of the prime factors 2 and 3, thus: $2\times2\times3\times3\times3$. It is the product of the second power of 2 and of the third power of 3, and can be expressed thus: $1^1\times2^2\times3^3$.

Such a remarkable coincidence cannot be merely accidental; it must have some deeper foundation in the mysteries of astronomy, such as Kepler's law in relation to the radius of the orbits and the velocity of planets. I belong to the creed of those who believe that our planetary system has been formed of one great sphere of gaseous matter in such manner known as the hypothesis of La Place. The above remarkable number may have its foundation in the proportions in which the gaseous matter separated by centrifugal force into fragments, of which the earth, the moon, and other bodies of our planetary system have been formed.

At some future time I hope to publish something more interesting upon this subject, in connection with my hypothesis about comets mentioned on page 114, current volume.

J. G. KONVALINKA.

Astoria, L. I.

### How to Procure Information.

MESSRS. MUNN & CO., GENTS:—To show the value of the SCIENTIFIC AMERICAN as an advertising medium, I give these facts: A gentleman from the interior came into my office recently and said he was anxious to possess a certain machine. He had spent a great deal of time fruitlessly in search of it and now desired my advice. I told him two lines in the "Business and Personal" column of your paper would bring him the needed information in a short time, if such a thing existed in the country. He wanted to return home in a day or two and if not successful by that time he would get me to attend to the matter for him. I drew up a statement of the facts, put it in your paper, and, sure enough, by the time your journal got to your readers and a return could reach me I had several letters giving all the information desired. My friend spent time and money in a fruitless search; a one dollar notice in the SCIENTIFIC AMERICAN brought it out at once.

A. W. M.

New York City.

### Quick-Setting Cement.

MESSRS. EDITORS:—I see that N. U. A., of Mass., enquires for a quick setting and durable cement. I can recommend Scott's Cement for that purpose, it is made into a paste with boiled oil and used in the same way as red lead, the joints are then warmed by putting on steam at a low pressure, which causes it to become quite hard in about three hours. It does not rust the faces of the joints like rust cement, and is much cheaper than red lead. It is much used in ocean-going steamers, and has been known on the other side of the Atlantic for twenty or thirty years. Yours truly, M.

Cincinnati, O.

### Plaster of Paris on Millstones.

MESSRS. EDITORS:—Your correspondent, S. J. T., of Ga., asks how to make his plaster of Paris stick hard to his mill stones. The following I have used with success on other articles. First boil the plaster till the bubbling ceases or till quite dry; then mix in a little powdered alum, then mix with water; apply quickly, as it sets rapidly, becoming very hard. PENROSE CHAPMAN.

Brunswick, Me.

### Recipe for Welding and Restoring Steel.

MESSRS. EDITORS:—For welding cast steel that has been repeatedly overheated, and restoring the same to its former nature, such as machinist's tools, chisels and all other articles, take of nice fine sand, 5 lbs., salt, 3 oz., copperas, 2 oz., as much blue vitriol as will stand on a quarter of a dollar, the same quantity of rosin as vitriol. Use as borax.

Portland, Me. GEORGE JONES.

### The Science of Ballooning.

A French writer, M. F. Marion, has just issued a work on balloons and aerial voyages, giving a popular history of ballooning from the earliest times to the present day. M. Marion has taken the experiments in aerostatics in chronological order, and bestowed a good deal of pains in presenting his readers with an intelligible view of the improvements which have been made since the first voyage of M. Pilâtre des Roziers, who in 1783 ascended with the Marquis d'Arlandes in a Montgolfier balloon inflated by hot air produced by the burning of straw. An authentic account of the voyage was drawn up on the safe descent of the balloon in the environs of Paris, and was signed by Benjamin Franklin among other persons of distinction. When questioned as to his opinion concerning the utility of the invention, which many there present thought to be already in a state of perfection, Franklin replied, "'Tis the child that has just been born."

Although a great deal has been done, as far as the construction of balloons is concerned, and the method of inflation, we are very much in the same condition now as were our forefathers in everything that relates to steering them. Indeed, it is acknowledged that, with the exception of the possibility which accurate observations may afford of calculating upon and taking advantage of currents of air, there is no hope of our ever being able to control the direction of a balloon in the air; and it remains to discover some method of aerial navigation without balloons.

The services rendered by balloons to science are, however, by no means inconsiderable, and we at least in America know how valuable has been their aid in warfare. It was in 1794 that the French republic first established a corps of military aeronauts. The Committee of Public Safety had accepted a proposition of Guyton's to avail themselves of the services of a young doctor named Coutelle, who had offered to take observations in a balloon. Coutelle experienced much difficulty in carrying out his project. Sulphur being much wanted for powder, the government prohibited the production of gas by sulphuric acid, and Coutelle was obliged to have resort to Lavoisier's process for making hydrogen by the decomposition of water. Ordered to report his invention to General Jordan at Maubeuge, he was at first unable to make himself understood by that officer, who ordered him to be shot as a suspicious character. He managed to explain at length the real purport of his visit. Subsequently he made several ascents with two or three assistants in his balloon, the cords of which were held by the corps under his command. The Austrians repeatedly fired at the balloon, which escaped unhurt, and was subsequently successfully employed at the battle of Fleurus, and for taking observations at the siege of Mayence.

Napoleon does not appear to have favored the use of balloons in military affairs to any great extent, a fact which M. Marion is inclined to impute to the ominous circumstances attending the descent of a balloon which, under the direction of Garnerin, the Emperor's aeronaut, was sent up in Paris on the day of his coronation by Pope Pius VII., in 1804.

At dawn on the second day it was hovering over Rome, and the inhabitants viewed with consternation the strange body which they saw sailing between the cupolas of the Vatican and St. Peter's. Suddenly it fell and touched the earth twice, and then impelled by the wind rose again, and was finally submerged in Lake Braciano. The place it had touched was the tomb of Nero, and before it had succeeded in regaining its free flight a portion of its crown had been torn from it and left on the tomb.

On the eve of the battle of Solferino an ascent was made by one Godard; but ballooning, as applied to warfare, first began to receive real attention in the war in the United States, where Mr. Allan, of Rhode Island, conceived the idea of communicating with the earth by means of a telegraphic wire. Shortly afterward Professor Lowe sent the first message by this means from the balloon "Enterprise," above Washington, to the President, and an ascent which furnished valuable information to the army of the Potomac was made in September, 1861, under the direction of Mr. Allan. Ballooning is at the present time extensively practised in Paraguay with a great deal of success, and has afforded great aid to the Brazilian commanders in overcoming the difficulties attending the manœuvres of an army in that flat and densely wooded country.

The plates in this volume are by M. P. Sellier, and are as well executed as they are curious and appropriate. The simple unsightly machine of the present day, which we know as a balloon, is a very different thing to the gorgeously decorated and magnificently colored globe in which the Marquis d'Arlandes and Pilâtre des Roziers made their first voyage.—*Evening Post.*

### A Musical Prayer Book.

In Philadelphia, one pleasant Sunday evening, an old lady whose failing eyes demanded an unusually large prayer book, started for church a little early. Stopping on the way to call on a friend she laid her prayer book on the center table. When the bells began to chime she snatched what she supposed to be her prayer book and started for church. Her seat was at the chancel end of the gallery. The organ ceased playing. The minister said: "The Lord is in his holy temple, let all the earth keep silence before him." In the effort to open her supposed prayer book, she started the spring of the music box which she had taken instead. It began to play—in her consternation she put it on the floor—it would not stop—she put it on the seat, it sounded louder than ever. Finally she carried it out, while it played the "Washing Day," an Irish jig tune.

THE dollar weighs 412½ grains; of these 41¼ grains are copper. The copper is one ninth of the silver.

### The Profession.

The true engineer is so imbued with the faith in the greatness and abstract goodness of his profession, that he can hardly believe there can be too many engineers. The essence of all engineering is thought, and that of the most valuable kind, not only when regarded in its material aspect, but valuable also when considered in relation to its beneficent and Christianising tendencies. Half the world, possibly nine-tenths, still believe, and will always believe, in mental apprenticeship, and in the routine of mental impartation; in other words, that a youngster of average dullness can, by pupilage, become a good routine engineer, and thus gain a a living for himself, as the be-all and the end-all of his profession. As well might we apprentice a youth to Tennyson that he might become a poet, or to Gustave Doré that he might become a painter of the grand and the terrible. Engineering has its thousand formulæ, and these any studious mind, of a practical turn, may master; but the mastery of all of them will not make the engineer, in the higher sense of the term. With their knowledge alone he may become a private, or even a non-commissioned officer, but never a captain, still less a general, in the great army of engineers. True, as in all other armies, engineering must have its rank and file, and there will be men who can only know and can only do what they are told, and whose whole idea of duty lies in obedience to command, and we would speak with all respect of these men. The engineer whose own mind is all alive with origination and expedients, and who can gain a given end by a dozen different roads, must always respect his faithful assistant, who, with an undying devotion to duty, will scrupulously carry out his orders, working day by day, and, if need be, night after night, copying, filling in details, tracing, taking out quantities, measuring up work, calculating strains and resistances, performing, in short, all the routine of design, and that contentedly at from 30s. to three guineas a week, and who, even with a wife and a little constellation of children, subsists honestly and decently upon his salary, and has generally, if not always, something between him and want. How much the great engineers owe to the conscientious care, the persistent industry, and critical and accurate habits of thought of their assistants can never be fully known; but those who are deep in the experience of our profession know how truly this assistance is indispensable to the success of every great master of our art. To him such assistants—and there are many yet, after all that is said and all that must be admitted of professional degeneration—are what brave and faithful soldiers of the line are to the great general, the victories of whose army are individualised in his own name. None who realize the triumphs of British engineering should forget how much of the brunt and hard drudgery that won them has been borne by the engineering assistants of this kingdom; many of them noble fellows, recruited both from this side and the other side of the border, and from the sister isle. It is these poor fellows, just now, who, while their "governors" are racking their wits to discern the direction of future investment, when new companies will float, and what new phase of engineering will pay, are wondering whether the clouds will ever lift, and whether the great offices in Westminster will ever again be alive with the cheery hum of paying work. The assistant has his own thoughts, and he knows full well that all our modern periodical accesses of national prosperity have been based upon the development of some great material discovery, and that we are not just now in want of new railways, new harbors, new steamships, nor monumental engineering of the grander sort. Even the bolder and original flights of engineering have become tame. There are plenty now who can float a railway over a fathomless bog, or tunnel two miles under a lake, or span a chasm half a mile wide at a single leap, or unwater a mine drowned to its uttermost depths, or take a railway and its rolling stock up an Alpine steep, or put in a pier in a hundred feet of water and mud, or stop a rushing torrent where a sluice has burst in treacherous ground, or perform any one of the hundred miracles which have given such lustre to our profession. We would be glad indeed could we foresee the direction and results of the next great campaign of engineering in the unknown. For the sake of the thousands of our rank and file, who have chosen our profession for life, and who have before now taken its overwork in honest earnestness, incurring all the risks of premature decay, of breaking down long before the allotted time of nature, we would, if we could, point out the precise direction from which they may expect fresh and profitable employment; for the heart always jumps with the nimble and prosperous hand. We can only say, broadly, that great future prosperity must be looked for in fresh discovery and invention, and in this British genius has been too long fertile to allow us to doubt that new and still unexpected sources of wealth will be found. As it has been before, so it will be in time to come, that the improbable and unlikely of to-day, or rather that which but few far-reaching minds can recognize as likely or propable, will nevertheless give the greatest return in general prosperity.—*Engineering.*

### The Names of Coins.

At the present time, when the acts of the "International Committee for a uniform currency," have excited so much interest in all parts of the world, and particularly in the United States, perhaps a few words in reference to the names of the coins now, or formerly in use, may be of interest.

The American dollar is derived from the German "thaler" (literally, "Valley piece," the first thalers having been coined in Goachimsthal, in Bohemia, where there are extensive silver mines). The same name is also used in Sweden and Denmark, where the unit of currency is called a rixdale or royal dollar. As for the sign or abbreviation of dollar ($), authorities are divided as to its origin, but it is generally admitted that $ was originally written with the S on the U; but for the sake of celerity, it was considered to be expedient to change the U to two strokes through the S, which has remained the accepted sign.

The American mill, cent, and dime, the French centime and decime, the Italian centesimo, the South American centaro, are terms derived from the Latin, denoting the thousandth, the hundredth, ard the tenth part of the unit of currency. When the Italian cities were at the hight of their power in the middle of the sixteenth century, their coins naturally spread over the world, and their names were taken for the coins of many other countries, thus the world-renowned Florentine *florin* (in Italian florino, so called from the flower, the lily of Florence, being on the reverse of every coin) was adopted by the French and English, who also give the same name to the German coin *gulden*—derived from geld money. The Venetian *seguin*, in Italian zecchino—from *zecco*, a mint—was adopted by most of the Oriental countries with which the Venetian merchants trafficked.

The Milanese ducat was taken into France and Naples when the armies of these countries overran Milan. The Neapolitan *carlino* is a small coin, with the head of Charles on it. The Roman *scudo*—in French—took *écu* its name from the *shield* originally placed on this coin.

Another Italian coin which spread over Europe was the Roman *grosso*, called in England a grote, in France a *gros*, in Bremen a grote, and still retained in Prussia and Saxony as a little groat or *groschen*. The French *sou* is evidently derived from the Italian *soldo*, or piece with which one can solde or pay one's debts.

The Hanseatic towns also furnished coins, witness the *mark*, so called from the Government *mark*, that it was of good weight. The *schelling* of Hamburg was adopted in England, where it is called a *shilling*, and also by Denmark and Sweden, where they call it a skelling.

Many coins derive their names from the marks or signs, printed on the reverse, and retain the name, although the sign may have been disused. Thus, a coin which has a crown on the reverse was called an *écu* in French, a *crown* in English. A piece which had a cross on it is called a kreuzer in Germany (from the German word kreutz—a cross); although no signs of a cross can be discovered on the modern kreutzer.

The English "pound" was originally a pound of money; but it has been gradually reduced to present form, and called a "*sovereign*," from the sovereign's head being on its face.

In France, during the reign of Louis XVI., there was a coin called a *livre*, or pound, which the republic adopted as the unit of currency, changing the name to that of *franc*, which it still retains.

When the Kingdom of Italy, and more recently the Papal States adopted the French system, they retained the old name of *livre*—in Italian, *liva*, and made that the unit of currency, so that the *franc* of France, and the *liva* of Italy are of exactly the same value.

The "Napoleon" or "Luis," of the French is simply a conventional name given by the French to a twenty franc piece; in the same manner as the Americans call a ten dollar piece an "*eagle*," and as the Prussians have a "*Frederick*." The English guinea derived its name from the fact that the gold from which the first guineas were made came from the Guinea Coast. The English *farthing* is so called from its being the *fourth* of a penny; the derivation of the Spanish *cwarto* is the same, the cwarto being the quarter of a *real* or royal piece.

The names of the South American coins are mostly of Spanish or Portugese origin; the peso, or Reru, is a piece that *weighs*, from *pesar* to weigh; the *centaro* is the hundredth part of the unit of currency, and the *rei* of Brazil is a royal piece. From the above mentioned facts it will be seen that the tendency of all nations has been to adopt the coins of other nations; witness the groat which traveled from Italy to England, France, and Germany.

Sometimes the value was altered, for instance there is a florin in Bavaria worth 40 American cents, and divided into 60 kreutzers, while in Austria there is one of the value of 50 American cents, divided into 100 kreutzers.

To give an idea of the difficulties a merchant doing business with Germany has to encounter, it must be remembered that there are five distinct coinages in use in that country, namely: Prussia and Saxony who use *thalers*, worth 75 cents, divided into 30 groschen; Hamburg, with marks of 30 cents, divided into 16 schillings; Bremen, with its *groten*, and Austria and Bavaria before mentioned.

In Italy the same state of things existed until the establishment of the Italian Kingdom in 1860. Several years ago the French Government proposed to the States whose coinage was the same as hers, namely, to Belgium, Switzerland, and Italy, that the coins of one should pass without dimunition of value in the territory of each of the others. This proposal was immediately accepted by these countries, and by Rome some time after. It is this arrangement, called in Europe "La Convention Monetaire," which is is proposed to extend so as to make a universal currency.—*Cor. Commercial Advertiser.*

### Bronzes.

The art of casting in bronze is of great antiquity; it is stated to have been practiced by the Eastern nations long prior to its introduction into Europe. The Chinese historians say that Yu, who was associated on the throne with Chun, 2,200 years before the Christian era, caused nine brass vases to be cast, upon each of which he had engraved the map and description of the nine provinces of the empire. That the art was much practiced by the ancient Greeks and Romans, and that they attained to the greatest perfection in it, is well proved by the celebrated monuments of their work which remain. The finest collection of ancient bronzes is at Naples; among the specimens there are some showing the very curious manner in which the ringlets of hair, worked separately, were fastened on; many of them are the size of life. Bronze casting in Greece seems to have reached its perfection about the time of Alexander the Great (330 B. C.) The accounts given of the works executed about that time almost exceed belief. After Lysippus, the favorite sculptor of Alexander, who executed, according to Pliny, about 600 works—the art began to decline in that country.

The taste of the ancients was still preserved in Italy in the fourth and fifth centuries, and many important works in bronze casting are recorded as having been achieved by them at that early period. In France, Germany, and England, objects cast in bronze have also been discovered in the tombs of the fifth, sixth, and seventh centuries. During the three following centuries this art seems to have declined, and been little practiced in the Western countries, for we read of no great works being produced by it until the beginning of the eleventh century, when it was revived in Germany under St. Bernard, Bishop of Hildesheim, who had the gates of his church cast in bronze, and who erected, in the year 1022, on the space of it, a bronze column about fifteen feet high, ornamented with bas-reliefs ascending spirally from the base, depicting the life of Christ, in twenty-eight groups.

In France, the revival of this art was of a still later period, the earliest evidence of it being the gates of the church of St. Denis, which were cast in bronze under the direction of the Abbot Suger in 1140, and were enriched with bas-reliefs illustrating Christ's Passion and Resurrection.

Italy furnishes no important evidences of the revival of bronze casting prior to the end of the twelfth century, when Bonano produced the bronze gates of the cathedral of Pisa, and soon after those of St. Martin of Lucca, the large gates of the cathedral of Monreale were also executed by him, and bear his name inscribed on them. Many of the objects used in religious services in Germany, France, and Italy, were made in bronze during the twelfth century, such as candlesticks, candelabra, baptismal fonts, and some of the vessels for the altar. Important specimens of the work of this period are still to be seen in the different churches. The Medieval and Renaissance periods also produced for the same purposes numerous specimens of bronze casting; but as these pieces were always more or less enriched with precious materials, they belong more especially to the goldsmith's art.

Italy possessed, in the sixteenth century, a great number of celebrated artists, who designed and executed with incredible rapidity, statues, groups, monuments, and fountains in marble and in bronze. There were many also who reproduced in bronze, miniature bas-reliefs and statuettes, either from the antique or from the works of cotemporary masters. Florence was most renowned for these works. The pupils of John of Bologna reproduced, in bronze, statuettes of the numerous works of their master. Many of these beautiful statuettes and fine bas-reliefs are found in the collection of the present day, and are much sought for by amateurs. These artists did not disdain to employ their talents on the improvement and decoration of objects of ordinary domestic use; in the museums and private collections of the present day there are many beautiful specimens of their work, such as candlesticks, firedogs, knockers and handles for doors, inkstands, etc., which are justly valued as objects of art.—*London Builder*

### The Pickpocket's Art.

If we are to believe a writer in the *Revue des Deux Mondes*, the art of picking pockets has been carried by the thieves of Paris to a perfection which must excite the envy of the rascality of London. It should be observed, by the way, that the English word "pickpocket" is now naturalized in the French language; perhaps because this particular form of plundering was, until lately, a comparatively rare crime in Paris, or more probably because it was comprehended in the class of thieving in general. At any rate, we should imagine that picking pockets must now be set down as an art requiring the most laborious practice for the achievement of its highest flights, if the skill with which it is accomplished in the Parisian omnibuses is to be taken as a sample of the perfection already attained. We are told that the thief, of course well dressed, enters the omnibus armed with a very small morsel of lead attached to a very fine thread of black silk. The extremity of this thread he holds between his forefinger and thumb, and as soon as his nearest neighbor takes out his or her portmonnaie for the purpose of paying the fare—which is paid in Paris on entering the omnibus—the thief, his eyes of course apparently fixed in contemplation on some far-off object, dexterously launches the bit of lead into the port monnaie just as the owner is closeing it. The purse is then returned to the pocket of the unconscious owner, who never sees the thread, by which it is now in the power of the thief. As soon as an opportunity offers, or is provided by the thief himself, who tumbles, apparently clumsily, against his neighbor at the first stoppage of the omnibus, the purse is gently withdrawn from its owner's pocket, and transferred to that of the rogue, who as soon as possible leaves the conveyance, with a polite salutation to his victim and the rest of the travelers. The feat certainly does seem to border on the incredible. Nevertheless, it is vouched for on the most respectable authority, and after all is not more wonderful than the feats of Indian jugglers of common skill.

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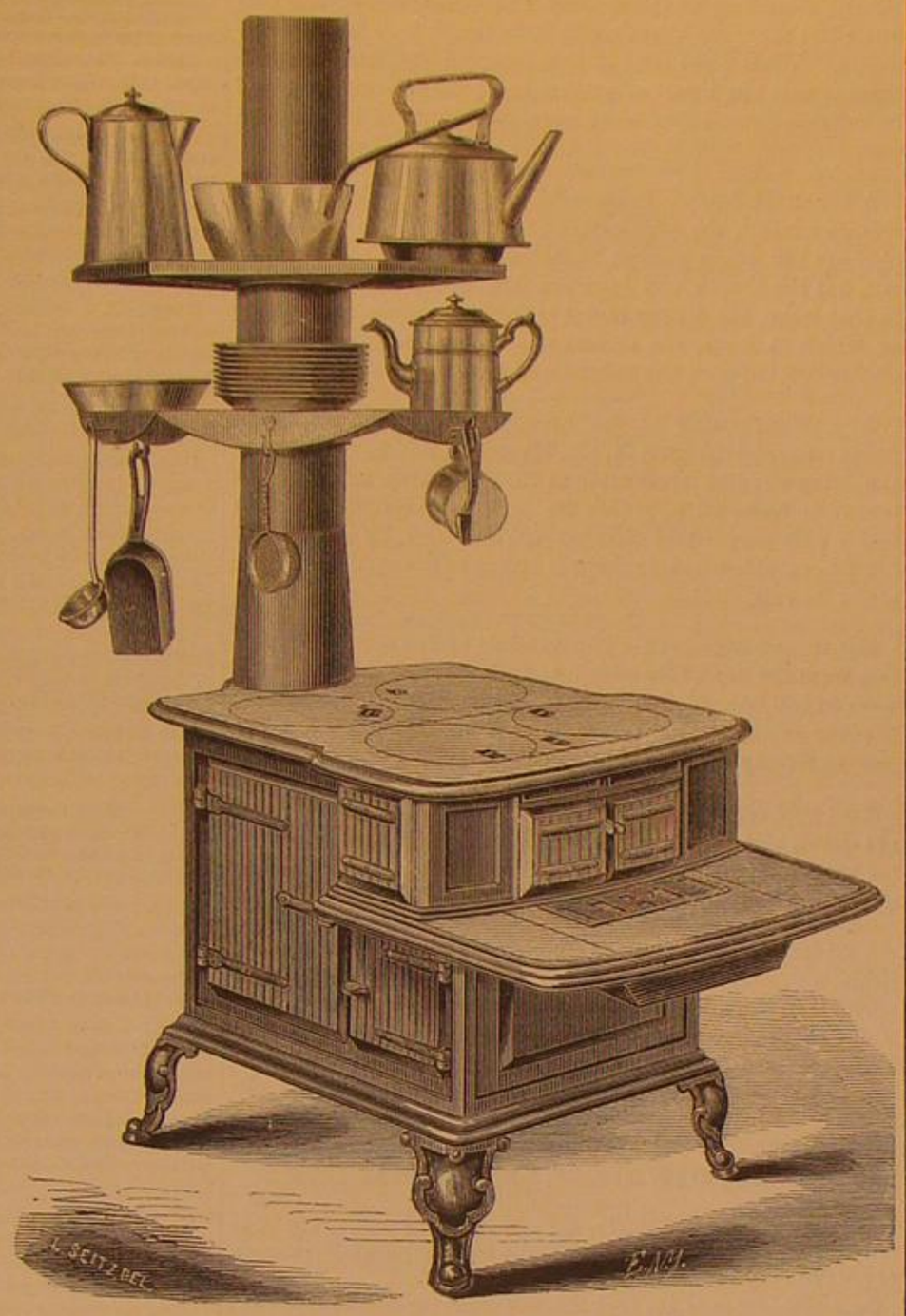
The models in the Paris Exposition show that Denmark was the first to adopt the principle of breech-loading, and also of rifling. The oldest rifled gun dates from the middle of the eighteenth century. It is made of gun metal, is a muzzle-loader, and has a length of five feet. It has eleven grooves of a partly circular form, and nearly an eighth of an inch deep.

### Convenient Appendage to the Cooking Stove.

The device represented in the engraving is intended for the convenience of the cook, and appears well adapted to save many unnecessary steps and much time now wasted. The engraving very plainly shows its construction and appearance when in use. It is simply a series of shelves arranged around the stove funnel within easy reach of the cook, and designed to hold cooking utensils, table ware, and stove implements. A cast-iron ring, either whole or in parts, is attached to the pipe by rivets or other means, and fastened and resting on it are several annular plates which can be rotated. To these the shelves are secured, which may be made sufficiently strong to support any weight it may be desirable to place upon them, although they may be further supported and strengthened by braces. The shelves may be circular, polygonal, or of any form desired, and may be furnished with hooks for suspending such articles as skimmers, shovels, etc. The advantages of this device are sufficiently obvious.



TURNER'S STOVEPIPE SHELF.

It was patented July 23, 1867, by John Turner, who may be addressed relative thereto at Marshalltown, Iowa.

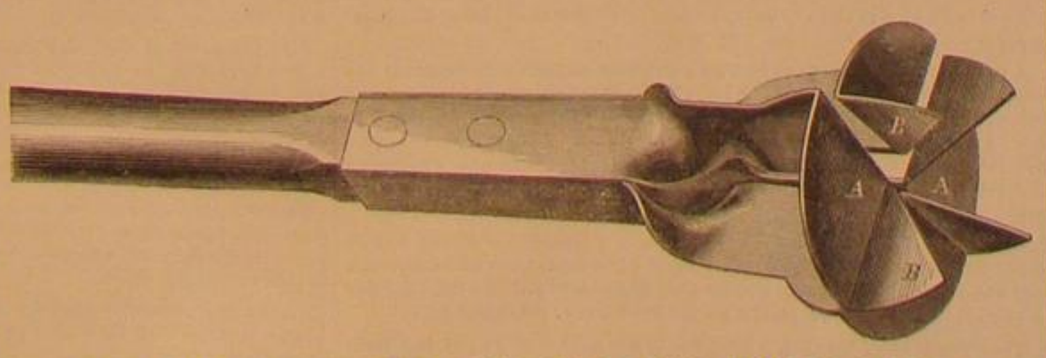
### The Lucimeter.

The various ways of measuring the quantity or intensity of light have always been a matter of paramount interest to philosophers. The earliest contrivance, and certainly an excellent one, due to Count Rumford, consisted in intercepting the light received from a given source, by means of a certain number of plates of dulled glass; the smaller the number required to make the light disappear, the smaller, of course, was its intensity. This was called a photometer. Others have since been constructed on various principles, but they are not generally applicable to one of the commonest problems that occurs in trade—viz., measuring the quality of burning oils by their illuminating power. This, *Galignani* informs us, has now been satisfactorily accomplished by M. Guérard Deslauriers, whose apparatus, which he calls a "lucimeter," consists of two constant-pressure lamps, and a photometer constructed on a new principle. Its shape is triangular; it is made of sheet iron painted black, and varnished, and is divided into two equal compartments. The latter are turned toward the lamps; the observer stands on the opposite side, which presents nothing but a flat vertical surface pierced with a hole bisected by the partition. Each of the two lamps is so placed as to transmit its light to one only of the two compartments, and exactly to the part where the hole is. The latter is covered with a piece of transparent paper on which, therefore, the rays of light from the two lamps are contiguously depicted. If their intensity is the same, the eye of the observer will perceive no difference; if there be any, on the contrary, one of the lamps must be brought nearer or removed further off, until the same intensity be obtained. The difference of distance will then mark the relative qualities of the two oils; which, combined with the quantity burnt in a certain time, is sufficient to determine their marketable value.—*Mechanics' Magazine.*

### Improved Implement for Cleaning Boiler Tubes.

The brooms of corn, or wire frequently employed to remove the depositions in the interior of tubes or smoke flues in steam boilers soon wear, and refuse to support the weight of the head and its appendages. Something more rigid and self supporting seems to be needed. In the flues of a horizontal boiler the ordinary brush bears mainly on the lower interior surface of the flue; the upper surface, on which the unconsumed portions of the products of combustion are so readily deposited, are rarely thoroughly cleaned.

The implement shown in the engraving is composed of three or more segmental disks, the arms of which are springs. The blades, A, are in this case quarter circles, each with a projecting lip, B, curved on its outer edge to facilitate its entrance to the tube or flue. These blades are made of steel, spring tempered, and twisted as seen in the engraving, so as to yield readily in two directions. They are made of such a size as to overlap each other, their united edges thus forming an entire circle. It will be understood that the spring of the blades allows them to pass readily all irregularities, as rivet heads, and at the same time to bear against the entire surface of the interior.




VAN AUKEN'S DEVICE FOR CLEANING BOILER TUBES.

Letters patent were obtained for this device, through the Scientific American Patent Agency, Dec. 18, 1866. Van Auken and Blanchard, manufacturers, Binghamton, N. Y., may be addressed for the article, or any further information desired.

### Turning the Bearings of Crank Shafts.

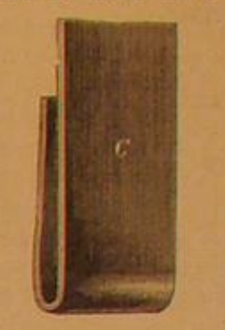
In an account in *Engineering*, of the Society of Engineers' late visit to the far-famed works of John Penn & Son, at Greenwich, occurs the following description of a machine for shaping heavy crank shafts, and turning the crank journals:

It consists of a massive bed—somewhat of a T form in plan—on which the heaviest crank shafts can be secured either transversely or longitudinally. This bed carries a large headstock, in which an annular casting revolves, being driven by suitable gearing. This casting, which is about 6 feet in diameter inside, is furnished with a pair of radial slides, to which tool-holders are fitted, these slides being arranged so that the tools can be set either radially or parallel to the axis of the revolving casting. The exterior of the revolving casting has a V formed on it, one side of this V fitting against a correspondingly shaped surface on the inner side of the headstock, and the other side bearing against a ring which can be adjusted to take up any looseness caused by wear. The headstock has a self-acting, traversing motion along the bedplate, in the direction of its axis, and the tool-holders have also a feed motion on the radial slides of the revolving casting. The manner in which a crank shaft is finished by this machine is as follows: The main body of the shaft is first turned in a lathe in the ordinary way, this being done to facilitate the setting of the work on the machine we have been describing. In this machine the throws of the crank are planed or shaped, and the openings of the cranks cut out, the crank journals or joint being also finished. For effecting the first of those operations, the shaft is placed on the bed of the machine transversely, so that one of the throws stands vertically opposite the headstock, the center line of the shaft being at right angles to the center line of the latter. This being done, the tools carried by the revolving ring or casting plane the surface of the throw by taking a series of circular cuts over it.

The cutting out of the cranks, and the finishing of the crank pins is effected by placing the shaft through the hollow headstock, and adjusting it so that its center line is parallel with, and on the same level as, the axis of the latter, and is distant from it horizontally by the amount of throw of the crank. At the same time, the headstock is brought so that it surrounds the crank to be cut, and the tools, carried by the casting revolving within the headstock, are thus enabled both to cut the opening in the crank, and, when this has been done, to finish the crank pin. One crank having been finished in this way, the work is shifted until the other crank is brought within the headstock. It will thus be seen that the process of cutting out the cranks and finishing the crank pin is just the reverse of turning, the work remaining stationary, and the tools traveling round it. When such heavy masses as large marine engine crank shafts have to be dealt with, it is much more convenient to treat them in this way than to chuck them in a lathe; and in fact, in the case of the largest shafts, it would be almost impossible to finish them by the ordinary process of turning. The consequence is, that these "hollow lathes," as they are sometimes called, are being gradually introduced in most large marine engine works, particularly on the Continent, where they are, probably, more generally known than they are in this country.

### TRUMAN'S PATENT COTTON BALE TIE.

It having been shown that iron bands are greatly superior to rope for baling cotton, their use has become quite general, the main difficulty being to procure a handy, convenient, and inexpensive link or tie for securing the two ends of the iron band, and one which will allow the band to be doubled to the required length before insertion in the tie. It is inconvenient to pass the band through a solid ring or a tie punched from a plate and then bend it, the rigidity of the band often preventing it from being thoroughly tightened. If the bearings of the tie where the band passes through are edged or not round, the band under heavy strain may be cut. Furthermore the tie should be complete in itself with no loose parts to be lost or misplaced. Such seems to be the one illustrated in the engraving.



It is simply a bent iron rod and may be likened to a "sister hook" used on shipboard. The loop, A, of the band is passed through the space between the two ends of the hook, B, when it is turned and the loop, C, passed through in a similar manner. The rounding corners of the hook or tie facilitate this operation and when once fastened the square ends hold the band securely.

This tie is certainly cheap, can be easily and rapidly manufactured either by hand or machinery, is readily attached, and sufficiently strong to withstand any strain required. Patented through the Scientific American Patent Agency, Sept. 24, 1867.

All inquiries relative to the device should be addressed to to J. W. Truman, Key Box 21, Macon, Ga. See advertisement.

### The Egyptian Lotus.

Mr. William Barr, of Bovina, Warren Co., Miss., says that the Egyptian lotus is to be found abundantly in the lakes of Louisiana and Mississippi. "A beautiful specimen was brought to me during the past summer from a lake on Big Black swamp in this county, the leaf of which was fully two-and-a-half feet in diameter, with a deep, cup-shaped cavity. It bears the largest flowers of any plant grown naturally in this country, with the exception of the *Magnolia Macrophylla*. Barlow, in his *Compendium Floræ*, Philadelphia, 1818, speaks of it as being within ten miles of Philadelphia."

In our issue of October 5th, we published a communication stating that the lotus was to be found in the waters of the Southern and Western States. An old tradition represents that eaters of the lotus forgot all that they had experienced—in fact that wakeful memory was annihilated—and on this Tennyson based one of his most beautiful poems, the *Lotos Eaters*. He uses, as *dramatis personæ*, a company of Greek warriors returning, as Ulysses in Homer's *Odyssey*, from the siege of Troy, cast on an island inhabited by the lotus eaters. He says these lotus eaters, finding the shipwrecked mariners, gave them the lotus to eat.

Branches they bore of that enchanted stem,
Laden with flower and fruit, whereof they gave
To each, but whoso did receive of them,
And taste, to him the gushing of the wave
Far, far away, did seem to mourn and rave
On alien shores; and if his fellow spake,
His voice was thin, as voices from the grave;
And deep asleep he seemed, yet all awake,
And music in his ears his beating heart did make.

They sat them down upon the yellow sand,
Between the sun and moon upon the shore;
And sweet it was to dream of Fatherland,
Of child, and wife, and slave; but evermore
Most weary seemed the sea, weary the oar,
Weary the wandering fields of barren foam.
Then some one said, "We will return no more;"
And all at once they sang, "Our island home
Is far beyond the wave; we will no longer roam."

We doubt the statement made by the imaginative poet, and that which tradition brings us; but there are so many varieties of this plant that it is difficult to determine which was meant in the *Odyssey*, or Tennyson's *Lotos Eaters*, as the statements seem to refer to some narcotic plant which may be only the poppy. A shrub in Africa bears berries which taste like dates, and is called the lotus. Another in Barbary bears a very rich fruit. In the interior of Africa, Mungo Park found a large tree called the lotus, which bore berries having a delicious taste, that, when pounded and exposed to the sun in cakes, made a delicious food. The *Nelumbium Speciosum*, or Egyptian lotus, is an aquatic plant, regarded sacred in the Egyptian theology, and also so regarded in India. What the uses may be of the variety found in this country we are unable to say.

## Editorial Summary.

Preserving the Teeth.—A correspondent advises us, from personal experience, of the efficacy of "biting a live black snake from his tail through his back bone" for rendering the teeth imperishable. The only member out of a family of seven, who has not false teeth and the toothache, he attributes his freedom from both misfortunes and the present soundness of these valuable members, after fifteen years' practice with them in cracking nuts and biting pins in two, additional to the ordinary duties of his dental apparatus during that period, to the wisdom exhibited in his early days in following the advice of a sagacious Indian, as above stated. He makes known the fact for the benefit of humanity and with a desire for obtaining some satisfactory explanation therefor. Notwithstanding our horror for the toothache and the inconvenience of wearing artificial masticating instruments we must confess that despite the assurance of our correspondent the remedy to us appears worse than the disease.

Concerning Gas.—The gas companies of New York city and its dependencies, ten in number, have an aggregate storage of over ten million cubic feet, in forty gasholders, working between three and four thousand retorts; turning out 2,500,000,000 cubic feet of gas per annum, and collecting over $8,000,000 form consumers. The London gas companies number thirteen, and last year supplied that city with the enormous amount of 8,653,000,000 cubic feet. The "Parisian company for lighting and heating by Gas" lights the whole of Paris, the great part of the townships of the Department of the Seine and some of those *Seine-et-Oise*. The company have ten gas works fifty gasometers, and in 1866 distributed 1,360,000,000 cubic feet. London consumes on an average 936 feet per head of the whole population. Paris furnishes on an average 740 cubic feet for each inhabitant.

Speculation Run Mad.—We noticed some time since, as the latest sensation, a plan for tunneling the bed of the Atlantic and establishing railway connection between the Old and New World. But even this insane idea is surpassed in its absurdity by a project which we find published in *The Circular* advanced by a New York visionary, to construct a causeway from continent to continent, the navies of the world combining to transport the unnecessary mountains of the continents to a surveyed definite locality in the Atlantic. When completed the half-mile width of surface grade would be sufficient for rail and common roads and would also furnish desirable building lots. He believes this to be the time when faith as a grain of mustard seed shall say unto the mountains "Be ye plucked up and cast into the sea," and be literally obeyed; and urges for the project free public discussion, and the presentation of plans and proposals.

A New Explosive.—A cheap gunpowder in which charcoal is replaced by common glue is thus prepared by M. Pool. The glue or gelatin is first soaked in cold water and then heated in diluted nitric acid until it dissolves. It is next evaporated to dryness, re-dissolved in hot water, and then carbonate of baryta is added to neutralize the acid. The solution is again evaporated, one part of sulphur and six parts of nitrate of potash for every two parts of glue being incorporated as the evaporation proceeds. This gives a slow burning powder which may be rendered more energetic by replacing nitrate by chlorate of potash.

A Gigantic Casting.—Messrs. Rowan & Sons, York street, Belfast, lately made a successful casting of a fly wheel 24 feet in diameter, weighing upward of 18½ tuns, and one of the most ponderous articles that have been produced in that country. The rapidity with which the whole work was done was surprising, seventeen tuns of metal being melted in the space of two hours. The work was effected by means of three ladles, containing respectively eight, six, and three tuns, which were raised by a crane, and guided by a number of the men. So closely were the calculations made that the surplus metal only weighed a few pounds.

Improvement of the Mariner's Compass.—Unless the compass card maintains its position, serious errors may be committed in steering the vessel; and, as ordinarily arranged, it is liable to be seriously affected when the ship at once rolls and pitches, notwithstanding the care taken, by means of gimballs, to render it independent of the vessel's movements. The Earl of Caithness has patented a contrivance in which is employed a ball-and socket joint, and a pendulum weight, the card being by this means maintained in its position however violent or varied may be the motion of the ship.

A California Century (?) Plant.—In a private garden in Santa Barbara, there is a most beautiful specimen of the *Agave Americana* in full blown. The immense circle formed by the great leaves is nearly twenty-two feet in diameter, and the beautiful tapering green column bursting out of the heart of the plant reached the hight of nearly forty feet on the last week of July, the base measuring eight inches in diameter. This plant was grown from a rootling planted in 1857, and now of course is ten years old, a decennial more properly than a century plant.

Prof. Czermak, in the University of Jena has found in the stomach of an Egyptian mummy, a roll of something which proved to be the skin of the sole of the mummy's own feet. Investigation has shown that this was a common practice among the ancient Egyptians, and is explained as symbolic of the eternal separation of the dead from the earth he so long trod, and as a sign of his manumission from the thrall of the world.

An Egg of an Extinct Bird.—M. Grandidier has presented to the French Academy an egg of the remarkable extinct bird, the Epiornis, of Madagascar. Having lately returned from the island, he says the eggs of Epiornis are found on a plain at one side of the island, and at a hight of several metres above the sea level. Strange that though numerous eggs have been discovered, the bones of this creature are rarely found. From what M. Grandidier has learned from the natives there seems little doubt that the Epiornis is extinct.

Cement for Coal-dust Fuel.—One of the best cements for the agglomeration of coal dust fuel is said to be that used in several Continental establishments, consisting of coal tar, gluten and starch. The quantities of these substances are altered according to the quality and properties of the coal dust; but they are very easily ascertained by a few experiments. About 2 per cent of this mixture (say, containing 2½ parts of coal tar, 1 part of gluten, and ¼ part of starch) would be suitable for coal dust of an average quality of bituminous coal.

A Walking Leaf.—In parts of the East Indies there is found an insect, the phyllium, or walking leaf, in which not only are the wings perfect imitations of leaves in every detail, but the thorax and legs are flat, dilated and leaf-like; so that when the living insect is resting among the foliage on which it feeds, the closest observation is often unable to distinguish between the animal and the vegetable.

At a recent sitting of the French Academy of Sciences a paper was received from M. Ch. Musset, in which, referring to the irregularities observable in the concentric zones of the trunks of trees, all of which he finds to be elliptical with a major axis perceptibly directed east and west, he considers it highly probable that this shape is owing to the earth's rotation round its axis.

Balancing Accounts.—The receipts of the Paris Exposition from the day of its opening, April 1st, to September 10th were $1,500,000. A further sum of $300,000 will be required to cover expenses, and this amount is expected to be forthcoming during the seven weeks that remained.

The gold eagle weighs 254⅘ grains; of these 12 9/10 grains are silver, and 12 9/10 are copper. The silver and copper are each one eighteenth of the gold; the silver and copper together are one ninth of the gold.

The famous spring on the Gettysburg battle field contains lithia, a substance which is contained in small fractional proportions in the mineral springs of Germany, and in those of Vichy in France.

The latest authority estimates the population of the world at 1,250,000 000.

### MANUFACTURING, MINING, AND RAILROAD ITEMS.

A Lowell manufacturer has made and sold over 30,000 pairs of ball shoes this year. They are made with canvas uppers and stout soles, and are intended more for use than ornament.

The Secretary of State has been informed of the discovery in Alaska of a seam of pure anthracite coal over thirty feet deep, which has been traced for a mile near a good harbor.

The Dubuque (Iowa) *Times* says: "We have here an unexplored mining field nearly seventy miles square, which has been merely scratched on the surface at a few points, and over $50,000,000 value of lead has been raised. The wonder is that our lead region does not attract greater attention from the mining adventurer.

Opals, rubies and other precious stones have been lately found in California. The varieties of costly rubies thus far discovered are the pure white, and the semi-transparent with blue reflections; the transparent yellow, and lastly and most valuable, the green variety.

The lumber production of Maine this year is estimated at 600,000,000 feet.

The Pacific oil-works recently started in San Francisco, manufacture oil of mustard seed, which can be applied to a variety of purposes, as oiling wood, lubricating machinery, and the manufacture of soap. Other vegetable oils will soon be made at these works, and a very extensive and valuable branch of manufacturing industry is opened in California. The *American Exchange* says: With her oil, her corn, her wine, her precious metals, and almost all other things which she can readily add thereto, what may not be the future of California?

Five lines of railway from the East are to make Omaha their terminus, and four others will tap the Pacific Railroad within 150 miles of that point.

The French house of Petin, Gaudet & Co., which has obtained distinction in connection with the manufacture of steel, possesses six establishments in different departments, employs 5,200 men, and has, besides, steam engines of an aggregate force of 6,000 horse-power. It produces annually 50,000 tuns of iron and steel.

It is estimated that over one million gallons of oil and turpentine are packed in tin cans in this city every month, for shipment and home consumption.

A correspondent takes us to task for publishing an item asserting that the oldest locomotive in America was built in Maine in 1835, and states the Baltimore and Ohio road went into operation in 1830; the Albany and Troy in 1831; the New York and Harlem in 1832; the Camden and Amboy, the Boston and Providence and the Lexington and Ohio, opening in the next two years, and it is hardly to be supposed that all these roads operated without locomotives. Away down in Maine the first line was opened in 1838.

Lawrence, Mass., with her twelve gigantic corporations whose capital stock amounts to $14,000,000 which employ 14,000 hands, run 429,188 spindles and 12,161 looms, and produce weekly 2,220,000 yards of cotton goods, 35,000 of woolen 35,000 of carpets, is rightly named the "city of spindles."

The ironworks of Creuzot, whose works are described in our last issue have obtained a contract to provide 80 locomotives for Russia.

California has another new sensation, in the immense deposit of magnetic ore in Sierra and Plumas counties, which are pronounced the most remarkable of any heretofore discovered in any country. Two million tuns are superficially scattered over a surface three miles in length. This deposit is within ten or twelve miles of the Union Pacific railroad.

In concluding a paper on cotton spinning machinery read before the Institution of Mechanical Engineers at Birmingham, Mr. Platt stated that the number of spindles now employed in the cotton manufacture in Great Britain exceeds 30,000,000. The produce of yarn when in regular work is 64,000,000 miles in a day of ten hours, which gives enough to wind four times around the globe every minute.

The St. Louis and Iron mountain railway is under contract for an extension to connect with the Mobile and Ohio road, at Columbus, Ky. The line passes through the great iron, and lately discovered tin regions, and by adopting the same gage of track, a line of transit will be open at all seasons for the vast commerce of the Mississippi valley.

The number of locomotives on German railroads in 1864, was 4,769, of which 574 were manufactured abroad; but now Germany not only builds her own locomotives, but sent one thousand last year to other countries, such as Switzerland, Italy, France and Russia. The number of engines now used on the railways of Germany is 5,250,340, of which have to be replaced every year. The largest of the German factories is that of Borsig, of Berlin, which has built two thousand railway engines since it was first established in 1841. Of the others, the principal are that of Maffei in Bavaria, that of the Austrian railway companies at Vienna, Egerstorff's at Hanover, and Henschl's at Cassel.

## Recent American and Foreign Patents.

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

Animal Trap.—Samuel Pence, Eaton, Ohio.—This invention has for its object to furnish an improved animal trap of that class in which each animal as it is caught sets the trap for the succeeding one.

Pump.—Martin S. Coller, Milwaukee, Wis.—This invention has for its object to so construct and arrange a pump in connection with a railroad track that the passage of a train of cars will raise the water into a reservoir.

Sawing Machine.—Joseph M. Batchelor, Foxcroft, Maine.—This invention has for its object to furnish an improved sawing machine simple in construction, easily operated, which will do its work rapidly, and will not be liable to get out of order.

Trues.—W. J. Johnson, New Orleans, La.—This invention while it is pressed upward, the elastic band or belt by which it is attached or secured to the person, it is always kept pressed closely to the person, it being impossible for it to get away from the upward pressure under any circumstances.

Lathes.—Benj. M. Levy, Montgomery, Ala.—This invention relates to lathes more particularly for watchmakers use.

Obstetrical Bandage.—Joseph O. Hamilton, Jerseyville, Ill.—This invention is so made or constructed as to fit persons of varying sizes or dimentions, and when worn be perfectly comfortable and easy.

Lock.—Henry Bosch, Mount Vernon, N. Y.—This invention consists in constructing a device by which the bolt of a lock can be locked fast, from the inside where the bolt is locked and which can also be locked fast when the bolt is unlocked thus forming a perfect night latch.

Chimney Cap.—James Hammond, Adams Center, N. Y.—This invention relates to a cap for chimneys which is so constructed as to act as a preserver of chimneys, in completely preventing the rain from entering the top, while at the same time a proper and sufficient draft is obtained or admissible.

Hay Loading Device.—C. H. Gifford, Philadelphia, N. Y.—This invention has for its object to furnish an improved apparatus by means of which a hay fork may be easily and conveniently operated for loading hay.

Hose Coupling.—L. J. Roberts, Corry, Pa.—This invention has for its object to furnish an improved hose coupling so constructed and arranged that it may be quickly coupled and uncoupled and in which the screw threads will be guarded from being bruised or injured.

Stretching Machine.—J. F. Coburn, Newark, N. J.—This invention relates to a new machine for stretching hides of all kinds and consists in so combining a sliding with a stationary frame by means of toggle-levers that by moving the said levers a hide tacked to both frames will be thoroughly stretched both in a horizontal and vertical direction.

Skate.—John Forbes, New York City.—The object of this invention is to so construct and connect the different portions, plates etc. of a skate that the same can be easily taken apart for cleaning and other purposes. The invention consists in forming the drops for securing the foot rest on the same by punching and bending. It also consists in arranging the button by which the foot rest is attached to the runner, T-shaped or in providing the same with slotted heads, so that by running them one quarter round they can be taken off.

Cultivator or Harrow Tooth.—H. F. Paul, Concord, N. H.—This invention relates to a new manner of shaping the flaring wings of cultivator or harrow teeth and consists in arranging the upper end of the wings open at the rear of the main part of the tooth so that the surface soil will fall to the bottom between the teeth and will thereby also cover the track of the tooth leaving no furrow. The invention also consists in making the said wings removable so that they can be replaced whenever desired and when worn out.

Churn.—A. H. Brown, Springfield, Vt.—This invention consists in the peculiar formation of the dasher and bottom portion of the churn vessel, and also the method in which the motion given by the gearing is changed from fast to slow and *vice versa*.

Governor.—Eli L. McNett, Canton, Pa.—This invention relates to a new and improved method of constructing governors for regulating the motion of steam engines and for other purposes.

Gage Cock.—John G. Raymond, Rondout, N. Y.—The object of this invention is the construction of a gage cock (for ascertaining the hight of water in steam boilers.

Cutting Bar.—M. J. Mellyn, Roxbury, Mass.—This invention relates to a new and improved device for cutting off the projecting ends of bolts which are used for fastening tires on to wagon wheels.

Tallying Instrument.—George Farmer, Flint, Mich.—This invention consists in a combination of wheels with figures stamped thereon which are revolved and operated in combination with a dial plate.

Loom for Weaving Tape and Ribbons.—John Rushworth, New York City.—This invention relates to a new and improved method of constructing the rack by which the shuttle is moved in tape and ribbon looms and for all looms in which goods of a similar nature are woven.

Gate.—S. M. Denniston, Hudson, Wis.—This invention has for its object to furnish an improved gate, so constructed and arranged as to be operated by the wheels of the advancing carriage, and which is closed by the same means as the carriage, after passing through the gateway, passes off the platform.

Hay Fork.—C. H. Giffard, Philadelphia, N. Y.—This invention has for its object to furnish an improved fork for loading or unloading hay, which shall be simple in construction, easily operated, strong, and durable.

Butter Cutter.—A. N. Merritt, Gardner, Mass.—This invention has for its object to furnish an improved implement by means of which butter may be cut from the crock or tub in a suitable form and size for the table.

Sled Brake.—H. W. Smith, Rainsburg, Pa., and B. C. Smith, Tolleston Ind.—This invention has for its object to furnish an improved sled brake, simple in construction, effective in operation, and which will give to allow it to pass over obstructions.

Washing Machine.—Samuel R. Holmes, Salem, Oregon.—This invention has for its object to furnish an improved washing machine by means of which the clothes may be easily, quickly, and thoroughly washed, which will not wear or tear the clothes, and which may be operated with a small outlay of power.

Wagon Bed Brace and Fender.—James E. Strode, Carrollton, Ill.—This invention has for its object to furnish a protection to the bottom and sides of the wagon bed, and also a stay to hold the bed to its place.

Churn.—M. M. Brown, Pimento, Ind.—This invention has for its object to furnish an improved means by which motion may be communicated to a churn dasher, and to other machines.

Cradle Rocker.—Patrick Power, Chicago, Ill.—This invention has for its object to furnish an improved rocker, by means of which the cradle or other article to which it is attached may be easily movable from place to pl

SEWING MACHINE.—E. Hodgkins, Marlboro, N. H.—This invention relates to certain new and useful improvements in single thread sewing machines, and it consists in a novel feed mechanism, an improved means for giving a proper degree of tension to the thread, and an improvement in the needle plate, whereby an improved sewing machine of the class specified is obtained.

HORSE RAKE.—Frank Holden, Litchfield, Ill.—This invention relates to a new and improved revolving horse rake, and it consists in a novel construction of the same, and a peculiar arrangement of parts, whereby several advantages are obtained.

SMUT MACHINE.—W. W. Connor, Nobleville, Ind.—This invention relates to a new and improved machine for scouring smut and other impurities from grain, and separating the former from the latter.

HARVESTER.—James M. Kellar, and Martin L. Kellar, Buckeye, Iowa.—This invention relates to a new and improved harvester, of that class provided with a horizontal rotary cutting wheel, and it consists in a peculiar construction and arrangement of parts, whereby several advantages are obtained.

BRICK MACHINE.—A. La Tourrette, Waterloo, and Seth H. Smith, Venice, N. Y.—The object of this invention is to obtain a simple and cheap machine for pressing and molding bricks, one which may be operated by a very moderate expenditure of power, and still perform its work expeditiously and in a superior manner.

METAL TIP FOR SUSPENDING BROOMS, MOPS, AND OTHER ARTICLES.—M. C. HAWKINS, Edenboro, Pa.—This invention relates to a new and improved metal tip for suspending brooms, mops, and other articles for household use, which are provided with wooden handles. The invention consists in striking up out of a single piece of metal or casting a ferrule which is driven on the end of the handle, and received by a rivet or provided with an internal screw to screw on the handle, the outer end of the ferrule being in the form of a loop to catch over nail or hook driven in the wall.

MOLD FOR CASTING ALUMINUM PLATES FOR ARTIFICIAL TEETH.—James B. Bean, Baltimore, Md.—In this invention the contractibility of the aluminum used for casting the plates is compensated by the expansibility of the molds in which the plates are cast, a new composition being used for that purpose

WATER GAGE.—James C. Walker, Waco Village, Texas.—In this invention several tubes pass through the boiler, some under and some above the water, through which currents of air are induced by the heat of the water or steam surrounding them. These currents are made to sound musical notes, and thus indicate the condition of the steam and water in the boiler.

CULTIVATOR.—S. D. Tuttle, and John H. Gans, Eaton, Ohio.—This invention relates to a new and improved device for cultivating corn, cotton, and other crops, which are grown in hills or drills. The invention consists in a novel construction and arrangement of parts, whereby a very desirable implement for the purpose specified is obtained.

MOP WRINGER.—Duane Peck, Rochelle, Ill.—This invention relates to a new and improved device for expressing moisture from mops, while using the same, and it consists in the employment or use of pressure rollers in connection with a treadle, all arranged in such a manner as to admit of the mop being readily adjusted between the rollers, and operated upon by them so as to effectually express the moisture therefrom.

DEVICE FOR EXTRACTING STUMPS, LIFTING STONE, ETC.—G. W. Pressey, Hammonton, N. J.—This invention relates to a new and improved device for extracting stumps, and lifting stones and other heavy bodies. The invention consists in a novel arrangement of pawls with hand levers, and a lifting bar, whereby a very simple, powerful, and efficient lifting device is obtained. The invention also consists in an improved hook or fastening for connecting the lifting bar with the article to be raised.

DEVICE FOR PACKING COTTON.—H. D. Stover and J. W. Hutchison, N. Y. city.—This invention relates to a new and useful improvement in packing cotton, and is designed to supersede the ordinary baling process. The invention consists in compressing or packing the cotton into wooden barrels, whereby several advantages are obtained over the present mode of compressing and baling.

METHOD OF SECURING ARTIFICIAL TEETH TO CAST PLATES.—James B. Bean, Baltimore, Md.—In this invention a plate of aluminum or other similar metal is employed, having recesses into which the teeth are fitted. A groove is left behind the teeth, between them and the plate, into which pins attached to the teeth project, which is afterward filled with tin under pressure, the teeth being thus firmly secured to the plate.

CAR COUPLING.—Freeman Moore and John A. Baker, Carrollton, Ohio.—This coupling consists of a hinged latch, which is arranged within the throat of the draw head, and connected to a forked lever which is acted upon by a spring, and pivoted in such a manner as to adapt the link or shackle to be automatically coupled when the cars come together, or to be instantaneously uncoupled in the event of one of the trucks running off the track. Provision is also made for operating the latch by means of a lever, so that the link can be uncoupled by a person standing upon the platform, the desired end being thus accomplished without exposing the body or limbs to danger.

DITCHING MACHINE.—A. La Tourrette, Waterloo, N. Y.—This invention relates to a new and improved machine for making ditches, and it consists of a novel arrangement of an endless chain of spades or scrapers, whereby the latter may be adjusted to excavate the earth at a greater or less depth, as may be desired, the machine rendered capable of extricating itself with the greatest facility in case of the spades or scrapers meeting with an obstruction, and also allowed to travel and work in a curved path, in cases where a curved ditch is required.

SELF-ACTING PLOW HANDLE.—John L. Keasor, Laconia, N. H.—This invention has for its object to furnish an improved means by which a plow or plows may be connected to a wagon so as to be held and operated automatically.

BRUSH CLAMP.—Arthur Huston, Bristol, Me.—This invention has for its object to furnish an improved brush clamp so constructed and arranged as to be easily attached and detached, which will give the brush a flat or fan shape, which will prevent the brush from becoming worn pointed, and which will render it unnecessary to wind a new brush as is now necessary.

THIMBLE SKEINS FOR AXLES.—John A. Williams, Elizabeth, Ill.—This invention relates to an improved thimble skein for axles, and consists in turning the socket on the belt end of the skein, and connecting the skeins by a rod having a right and left-hand thread furnishing a substantial brace to the axle. The thimble is also open at the extremities and the belt end of the skein and connecting rod are adjusted to the under side of the axle.

MECHANICAL MOVEMENT.—C. D. Snell and J. W. Penny, Mechanic Falls, Me.—This improvement relates to a mechanical movement, and consists of a device for running shafting at any angle without the use of bevel gearing.

HORSE COLLAR.—T. J. Shipley and W. A. Moody, Montezuma, Iowa.—This invention relates to an improvement in horse collars, and consists in a rubber spring adjusted in a hollow pad or shoe and attached to the sides of the collar, which is disconnected at the bottom by hooks secured into the walls of the collar.

COMBINED CRANK, FRICTION WHEEL, AND BRAKE.—R. M. Van Sickler, New York city.—This invention has for its special object to improve the construction of the improved portable elevator, patented by the same inventor Feb. 12, 1867, but it is equally applicable wherever a crank and brake are used.

WASHING MACHINE.—John Vail, Yankee Jim's, Cal.—This invention has for its object to furnish a simple and convenient machine for washing clothes, which shall be easily operated and will do its work quickly and thoroughly.

BALING PRESS.—Thomas D. Guthrie, Galva, Ill.—This invention has for its object to furnish an improved press, designed especially for baling broom corn, but equally applicable for baling other substances, which shall be simple in construction, easily operated, and efficient in operation.

HORSE POWER.—Thomas Wiltse, Jr., Panama, N. Y.—This invention has for its object to furnish an improved horse power, designed especially for operating a drag saw, but equally applicable for other uses, and which shall be simple in construction, durable, and effective in operation.

## 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.*

F. C., of La., asks, "Will a common butterfly valve regulate the engine better by being placed near the steam chest than if it is placed say eight feet from the chest?" The speed will be regulated more uniformly with the valve near the ports.

E. H., of Mo., says: "I hope you will favor your subscribers with a list of articles of manufacture, machinery, etc., for which prizes have been awarded at the Paris Exposition. Will you be kind enough to state in your column of answers to correspondents to whom premiums were awarded for artificial stone, provided the information is at your command." We regret that no report other than that first sent by the cable has ever been published; soon as it is we shall give it to our readers. There seems to be some mismanagement in this matter.

J. C. J., of Va., complains that there is an oxide of iron in the water from which he evaporates his salt which gives the salt a reddish brown color. He desires a remedy, and we think a small quantity of lime water will precipitate the iron from the brine.

C. N. M., of Pa., desires information relative to a treatise on arithmetic suitable for beginners. We can recommend nothing better than Greenleaf's Arithmetic.

H. L. W., of Pa., asks for a "reliable rule for finding the horse-power of a steam boiler, applicable to the different modes of location, fire surface, etc. Steam pumps are being generally introduced in this region to which the steam must sometimes be carried a long distance. How much waste is there in carrying steam 1,000 feet?" The rule for calculating the horse-power of a boiler varies somewhat with its construction. It is safe, however, to allow fifteen square feet of fire surface to the horse-power, and six square inches of grate surface. If your steam pipes are of ample area, and well covered with felt or other good non-conducting material you will suffer but little perceptible loss from condensation in carrying steam through 1,000 feet of pipe.

E. N. C., of N. H., asks if there is any "cheap material of which flues can be constructed which will withstand intense heat without continually burning out. They would be kept at a red heat. Iron will not stand." There is nothing we know of better than fire brick or fire clay.

R. W. M., of N. H.—"How can boilers which have begun to rust be prevented from further rusting?" If the rust is on the outside, coat it with asphaltum dissolved in spirits of turpentine. For inside rusting we know of no certain remedy.

G. T. W., of Miss., asks for a process of making wine from the "sour orange." We are not acquainted with the qualities of that fruit, but probably no process very different from that employed in the grape wine manufacture would be necessary. A few experiments could determine the matter.

G. J., of Me.—"What effect does frost have on cold short iron and on red short iron; and are these qualities most brittle when expanded by heat or when contracted by cold?" Cold short iron when hot is tough, but when cold, brittle. Directly the reverse is true of red short iron. Railroad bars composed of these two differing irons would, we think, be quite unreliable.

J. M., of Conn., asks if it requires the "same degree of heat to melt copper when largely alloyed as when pure." Alloys of copper, zinc, and tin and all other similar alloys require less heat to fuse them than copper.

S. S. E., of Ky.—By addressing Mr. John A. Roebling at Trenton, N. J., you can undoubtedly get a copy of his report on the East River Bridge. It has been published.

J. E. B., of Ohio, asks us which of two air guns will be most effective, one with the air cylinder tapering toward the barrel containing the ball, or one the end of the cylinder of which is square; a piston in the air cylinder compressing the air. He sends diagrams illustrating the two forms. We reply that the static pressure would be the same in both cases, but if, as appears, the question is which form is best adapted to the delivery of a certain amount of air in a certain time the funnel-shaped end of cylinder is preferable.

J. P. J., of Pa.—The "bogie" of the English locomotive engineers is simply and only the four-wheeled truck in use in this country for supporting the forward end of the locomotive. It was invented by John B. Jervis, C. E., author of a treatise on railways, in 1831. Wm. Mason, of Taunton improved the truck by spreading the two axles sufficiently to allow the cylinders (outside) to stand on a level with the center of the driving wheels.

J. D. R., of N. Y.—"What rule is there for approximating the number of revolutions engines are intended to make, while designing them, so as to calculate the horse-power?" "What advantage is there in a double threaded screw?" The number of revolutions determined on in the designing of steam engines is governed by the use to which the engine is to be put, the space and weight, etc., allowed. Those engines which give the best results have a speed of piston of from 350 to 450 feet per minute. Correct data to work from in designing engines can be furnished by a first-class consulting engineer. As to double threaded screws their use is to give a fast thread without cutting away too much of the cylinder on which they are formed. We have seen not only double, but triple, quadruple and quintuple screws cut, where rapid longitudinal motion was required with a comparatively slow rotary motion. While the single thread would be wide apart and quick, the double or triple thread would be close, looking like a fine thread, yet equally as fast.

## Business and Personal.

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

Parties having a Paper Mill for sale or lease will please address, with particulars, Wm. H. Gandey, Lambertville, N. J.

Capitalists, seeking investments, are invited to investigate the merits of "Cotton Tie," illustrated in present number.

Wanted, manufacturers for the best double-shovel (iron) plow in the market. Address Ray & Shalters, Alliance, Ohio.

One of the patented articles included in the property offered for sale by J. I. D. Bristol, in another column, is a combined tea and water urn, which has been tested by one of the editors of this paper, with satisfaction. The dies and other appropriate tools for making the article are offered for sale, with the patent, and would afford a good business.

Send Circulars of the best Oat extracting or separating machines and Paper Sack Flour Packing Machines in the world to W. Hill Box 13, Marshall Town, Marshall Co., Iowa.

Two Valuable Patents for sale or a partner wanted to manufacture. Address E. Fitzki, Quartermaster Genl's Office, Washington, D. C

Wanted to Buy—a cheap Hand or small Horse-power Spinning Machine, for various kinds of fibers, to work a number of spindles. Also, cheap hand or horse-power machinery for preparing the fiber for it. Also, one for making twine or cord. Address P. O. Box 202, Yonkers, N. Y.

Monopoly in pivoted Connecting Links—Four Patents—the last just being issued. Open for manufacturing on royalty, or for sale. Address K. & C., care Holske Machine Co., 528 Water st., New York.

Eureka Cultivator (see illustration page 88), for corn or cotton, the greatest labor-saving production of the age. Capitalists, Planters, and patent right dealers investigate the best selling patent of the times. Pamphlets furnished. Address Omar Arnold, Mount Ida, Wisconsin.

Manufacturers of Improved Rat and Mouse Traps, Butchers' Scales, or other Hardware and Tools will send lists (prepaid) to Ryan & Oliver, Toronto, Canada.

Artesian and Petroleum Wells.—The great Earth Boring Machine with which a hole, from nine inches to three feet in diameter, can can be sunk to a depth of 3,000 feet, through solid rock, can now be seen at 222 Pearl street, New York city.

## NEW PUBLICATIONS.

GOD'S GLORY IN THE HEAVENS.

A very interesting and curious work on astronomy from the pen of Wm. Leitch, D. D., has just been issued by the publishing house of Alexander Strahan, London. The work is copiously illustrated, and the writer's object seems to be to harmonize the arguments of theologians with the discoveries of Astronomers. The work presents a survey of recent astronomical discoveries and speculations, in connection with the religious questions to which they give rise. George Routledge & Son, 416 Broome street, New York.

PROGRESS OF THE WORKING CLASSES.

Statistics and interesting statements of the condition, habits, and sentiments of the working classes of London, from 1831 to 1867. Strahan, publisher. For sale by George Routledge & Son, 416 Broome street, New York.

HAND BOOK ON COTTON MANUFACTURES.

A work on the practical art of manufacturing has been much needed. From a cursory examination of a new hand book before us, and from the reputation of the author, we think every cotton manufacturer, manager, overseer, or operative will be benefited by having a copy for reference. It contains rules and examples for finding the speed and dimensions of all the wheels, pulleys, rollers, etc., necessary to produce any desired result in each and every operation in a cotton mill; rules for finding all the necessary drafts, twist, doublings, and allowance for loss in working, to produce any given number of yarn, etc., etc. The latest and most approved machinery and some of the largest and handsomest cotton factories in the country are illustrated by engravings. James Geldard, the author, has had some thirty years practical experience in cotton manufacturing. John Wiley & Son, 535 Broadway, New York, publishers.

POST ROUTE MAP.

We are indebted to George W. McLellan, Second Assistant Postmaster General, for a copy of a splendid postal map of the New England States. Those of New York and the Middle Atlantic States are in progress and will shortly appear. Besides the distribution to postmasters for the service of the Department, these maps are on sale to the general public, and may be procured at the Post-office Department (Second Assistant Postmaster General), or from the sole agents in Philadelphia, New York (D. Van Nostrand), Boston, and Portland.

POPE'S ESSAY ON MAN.

A new and finely illustrated edition (15 engravings) of Pope's Essay has just been issued from the press of S. R. Wells, 389 Broadway, New York. Whatever may be said by theologians concerning the orthodoxy of this great poet's religious views, his Essay on Man will continue to be regarded one of the masterpieces of English verse, and will attract the attention of, and instruct the intelligent and thoughtful. Price, bound $1; paper covers, 50c.

THE ELEMENTS OF EUCLID AND LEGENDRE, with Elements of Plane and Spherical Trigonometry. By Lawrence A. Benson.

The author of this treatise has prepared and published a text book adapted for the use of schools and colleges, the plan of which being the reducing of geometrical science to the smallest compass, such proportions are only introduced in it as are required to substantiate the principal theorems by which the principles of geometry have practical applications in Trigonometry, surveying, mechanics, engineering, navigation, and astronomy. A new and important feature of this work is the establishment of all geometrical propositions by the direct method of reasoning, dispensing entirely with the *reductio ad absurdum* or indirect demonstration, the author's argument being that every true proposition must be susceptible of proof without any such circuitous process as that heretofore employed for demonstrating certain propositions. The work before us bears the commendation of President Webster and Prof. Docharty, of the College of the City of New York; Prof. J. G. Fox, principal of the Cooper Union Free Schools; also the superintendent of the Board of Education of this city, and has been entered on the list of text books for the ward schools of this city.

THE HISTORICAL MAGAZINE, and Notes and Queries concerning the Antiquities, History, and Biography of America. Edited by Harry B. Dawson, Morrisania, N. Y.

The last number of this periodical is at hand, containing the usual amount of curious and interesting matter. The magazine is under the editorial management of Mr. Dawson, who has had long previous service in the field of American antiquities. It is handsomely gotten up, and serves as a repository for the preservation of valuable historical matter which without it would be irrecoverably lost. We commend the work to the notice of the curious antiquarians and historical students.

A TREATISE ON THE SCREW PROPELLER. By John Bourne, C. E. London. D. Van Nostrand, 192 Broadway.

We have received the closing number—XXIV.—of this highly valuable treatise. Mr. Bourne has done a notable service to marine engineers in the preparation of this series. The illustrations, particularly those of engines, are excellent, and will prove of much service to all interested in the construction of screw engines; and the text is written plainly, forcibly, and lucidly.

THE SPORTSMAN AND NATURALIST IN CANANDA.

Messrs. Hunt & Blackett, 13 Great Marlborough street, London, have recently published in most elegant style the natural history of the game, game birds, and fish, which abound in Canada. The work is copiously illustrated with beautiful colored engravings of game, and the different kinds of fish which abound in the forests of Canada. The author, Major W. Ross King, says, in the preface: "During a sojourn in these regions, extending over a period of three years, constantly rod in hand or roaming the woods with dog and gun, I habitually recorded in my note-book memoranda on the haunts and habits of the birds and animals which I have endeavored to describe in the succeeding pages; and I can only hope that my jottings may be useful to those who read them, with the view of themselves enjoying the same results, and interesting to those who would recall similar bygone days of agreeable recreation." Geo. Routledge & Son, 416 Broome street, New York, have the work for sale.

## EXTENSION NOTICES.

William Wright, of New York City, having petitioned for the extension of a patent granted to him the 13th day of January, 1854, for an improvement in operating cut off valves of steam engines, for seven years from the expiration of said patent, which takes place on the 3d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December next.

John Donlevy, of New York City, having petitioned for the extension of a patent granted to him the 3d day of January, 1854, for an improvement in method of forming plates for polychromatic printing, for seven years from the expiration of said patent, which takes place on the 3d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December next.

Edward A. Tuttle, of Brooklyn, N. Y., having petitioned for the extension of a patent granted to him the 3d day of January, 1854, for an improvement in hot air register, for seven years from the expiration of said patent, which takes place on the 3d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December next.

### Improved Rotary Pump.

To no mechanical contrivance, perhaps, has so much inventive genius been applied as to the means of lifting and forcing liquids. The availability of the many, almost numberless, machines that have been devised to effect this object, depends upon the principle of the amount of, and rapidity with which a vacuum can be produced with the least expenditure of power. For the varied uses to which this contrivance is applied, this object is most readily obtained by the rotary pump. The accompanying engravings represent a very neat and compact pump.

Fig. 1 shows a perspective view of the pump, as placed when driven by power.

Fig. 2 is a perspective view with cover or head removed, showing the interior mechanical arrangement.

Fig. 3 is a perspective view of the cover or head of the pump, showing the position and comparative size of the recess, a similar recess being upon the corresponding opposite interior side.

Fig. 4 represents a hand pump, as placed in a well for general use.

A is a pump case through which the liquid is to be lifted and forced. Within said pump case are two hubs, each having flanges or pistons of a peculiar shape. These hubs are denoted by the letters, B and C. The pistons on the former are denoted by the letters, D and E, and on the latter by the letters, T T, having recesses, R R, between the pistons respectively.

The hub, B, Fig. 2, is moved by the application of power

Fig. 2

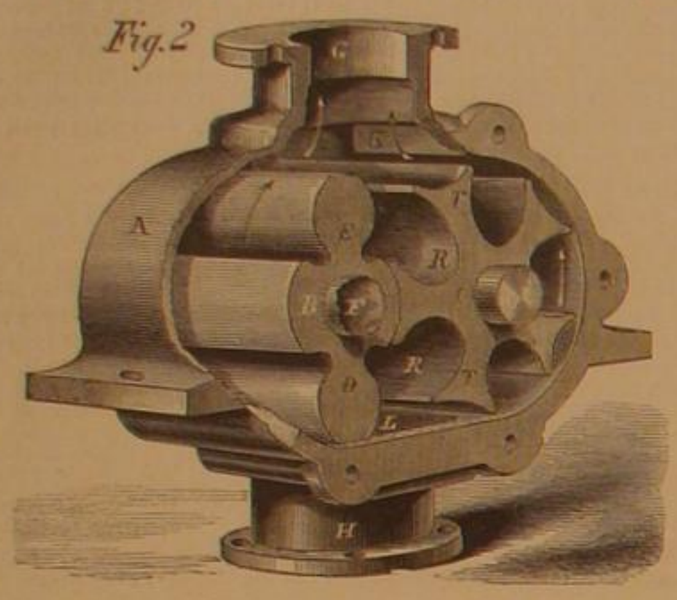
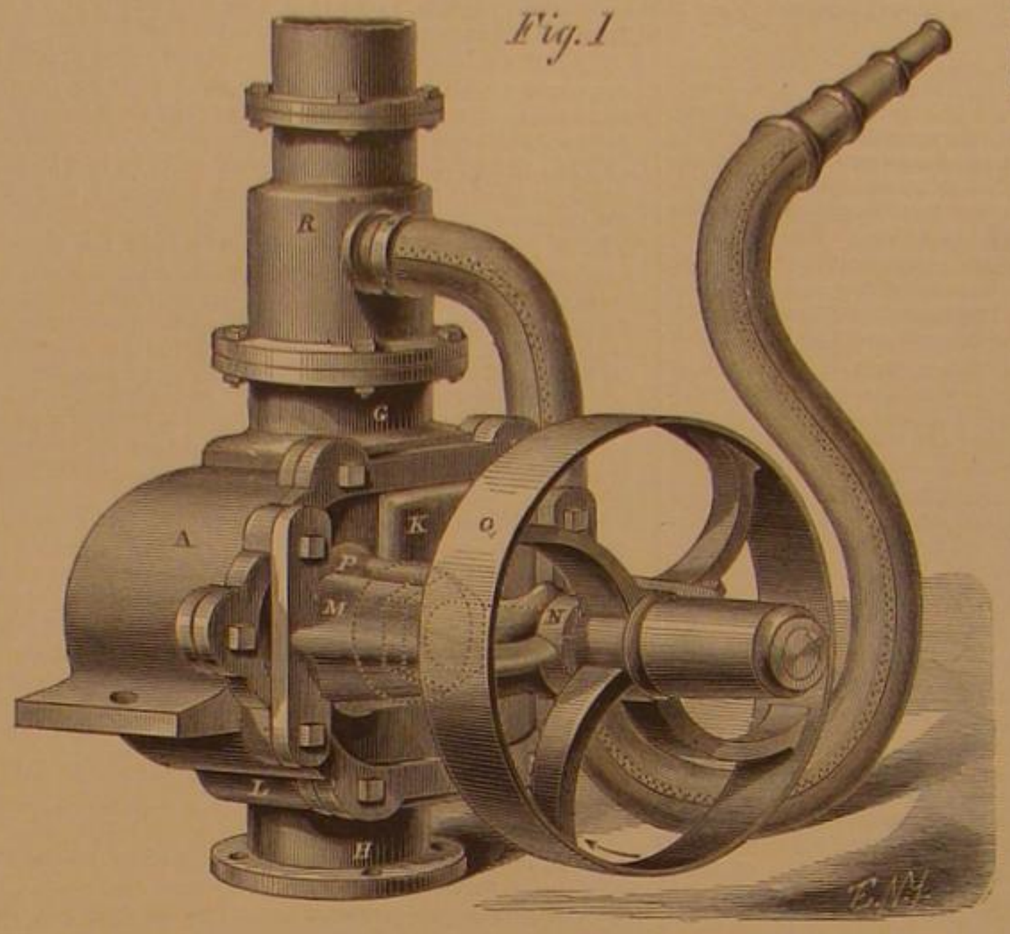


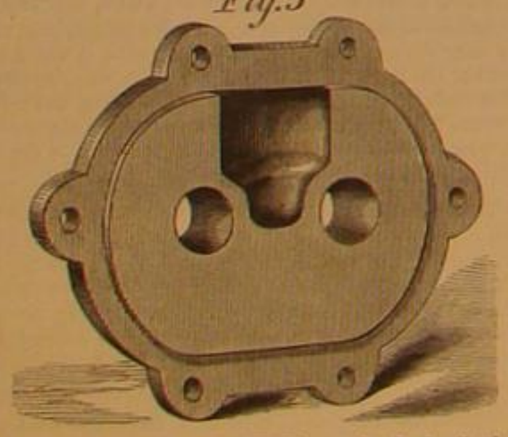

Fig. 1




to the driving shaft, which is seen broken off at F, Fig. 2.

The pistons or flanges, D and E, on the hub, B, are so constructed and arranged that when describing their outer semi-revolutions, the external surface of each respectively moves in close contiguity with the interior semicircular surface of that portion of the exterior case of the pump, and in making their inner semi-revolution they work in contact from point to point throughout their entire extent with the surfaces of the concave recesses, R R, the whole being so constructed and arranged that the convex surface of the one shall impinge upon and press directly against the concave surface of the other from point to point in regular continuity, so as to press out from between the two surfaces all the liquid, and cause it to flow toward the eduction pipe, G, of the pump.

Fig. 3



In like manner the pistons, T T, on the hub, C, throughout their entire semi-revolutions, move in close contiguity with the interior semicircular surface of the external case of the pump, so that the liquid cannot flow backward, past these pistons, toward the induction pipe, H.

In this manner all the liquid which is pressed into the recesses, R R, and the small concavities at the outer extremities of the pistons, T T, of the hub, C, as well as all the liquid which is cut off at each semi-revolution of the hub, B, by the flanges or pistons, D, E, respectively, is carried forward toward the discharge pipe, G, and cannot return toward the induction pipe, H.

In order that the machinery should work without strain, there is provided a recess, K, on the inner side of the cover or head, and a like recess on the opposite interior flat surface of the pump case which is swept by these hubs and pistons. Both these recesses open upward, toward the discharge pipe, G, so that the piston, E, Fig. 2, when passing into the corresponding recess, R, may force the liquid in such recess, R, into the recess, K, of the cover or head, and a corresponding recess, K, on the opposite interior flat surface of the pump case, and thus relieve the machine from all strain resulting from the compression of the liquid, and enable it to flow readily and freely from the recesses, R R, as the pistons, D and E, enter them. As a further relief from strain, this pump is provided with two square chambers, L L, of a corresponding length with the hubs and pistons, thus allowing the liquid to enter and discharge freely.

From the construction of the hubs, B and C, and their pistons, it will be seen that the motion of the hub, C, is not constant, but intermittent, being at rest from the time the neck of the piston, D, leaves the external edge of the piston, T, upon one side, until the neck of the piston, E, strikes the edge of the same piston, T, on the opposite side.

By giving the hub, C, an intermittent motion, the driving hub, B, is made with but two pistons, of such size and shape as to give greater strength, more space for water within the pump case, and consequently a greater flow of water from the pump when in operation than could be done if the hubs had each the same number of similarly shaped pistons, and should be kept in constant motion, or move simultaneously with each other.

By this construction and motion of hubs and pistons, the objection that obtains against many, if not all, the rotary pumps in use, namely, the great amount of friction when working under a pressure, is overcome; for, when the pistons, D and E, of the propelling hub, B, are sustaining the resistance of the liquid, the pistons, T T, of the hub, C, opposite each other, are equally acted upon by the liquid, leaving the hub, C, with its pistons, in a state of equilibrium; consequently but a small amount of force is required to move the hub, C, and but little friction or wear will result even when working the pump under a heavy pressure.

The hubs, B and C, Fig. 2, with their pistons, revolve in the direction indicated by the arrows. M, Fig. 1, is a frame, having a bearing, N, upon which a driving shaft (see dotted lines), connected to the hub of the band wheel, revolves; said shaft passes through stuffing box, P, and connects with the driving hub. The band wheel, Q, revolves in the direction indicated by the arrow. R, Fig. 1, is an air chamber attached to a power pump to equalize the flow of water when thrown through a nozzle, on which is a coupling for attaching hose.

A combination of these various principles in this pump enables it, it is claimed by the patentee, to lift and force a greater quantity of liquid with a given power than any other pump in use, and places its value as a pump in the construction of steam fire engines beyond the question of a doubt.

For particulars respecting sale of territory, or orders for pumps, address Wm. R. Gorgas, Treasurer Drawbaugh Pump Co., Eberly's Mills, Cumberland Co., Pa., or David Stevenson, Jr., Manufacturer, Harrisburg, Pa. Patented, Nov. 20, 1866.

## DRAWBAUGH'S IMPROVEMENT IN ROTARY PUMPS.

### Boiler Water from Gasometer Tanks.

Francis Carroll, of New Orleans, says at the gas works in that city, there is a boiler which has been in use fourteen years and has never collected a particle of scale. The feed water is drawn from one of the gasometer tanks which are supplied from the Mississippi.

### Bessemer Steel Plant.

The construction of converters, blowing engines, hydraulic apparatus, etc., for the Bessemer process has been chiefly carried on by two largs firms—one in Manchester, and the other in Bolton. In addition to these Messrs Tannett, Walker & Co., of Leeds, are makers of Bessemer plant, and are now making a pair of 6-tun converters for Sir John Brown & Co. The greater portion of the plant for a Bessemer steel works in America, that of the Freedom Iron and Steel Company, at Lewistown, Pa., was lately sent off from these works, as was also a heavy plate mill, with a pair of horizontal engines, of 3 feet cylinders, and five feet stroke. Messrs Tannett, Walker & Co. are almost exclusively engaged upon the machinery of iron and steel works, including blowing and mill engines, rolling mills, steam hammers, Bessemer plant, etc., with, occasionally, engineers' tools of special construction. The steam hammers have a peculiar and excellent valve motion, which we shall illustrate in an early number.

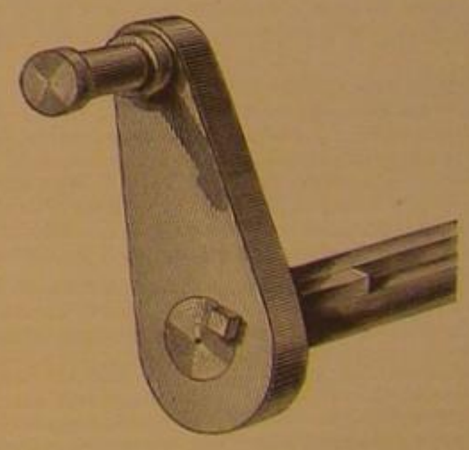
Not long since Sir John Brown & Co., of the Atlas Works, Sheffield, required an accumulator cylinder 36 feet in length. The outer diameter was 36 inches, the inner 26 inches, for a 24-inch ram, and the total weight was to be about 25 tuns. Several makers tendered for the casting, in four 9-feet lengths; but Messrs. Tannett, Walker & Co., successfully undertook to cast it in one. They dug a pit in their foundery floor 34 feet deep, and built up a mold in strong cast-iron boxes, carefully jointed together. The casting was poured so that the lower half rose from the bottom, the upper half being afterwards poured from the top. The ferrostatic head of a column of iron 36 feet high is about 1 cwt. per square inch; so that the mold had to be very strong. The iron, before entering at the bottom, fell upon a wrought-iron plate, which broke the shock of the fall, and secured the steady rise of the metal in the mold. This remarkable work may be compared, with some reason, to a cast-iron gun 36 feet long, and of 26-inch bore—a gun heavier than the 15-inch Rodman. The casting was completely successful, and the cylinder is now in use at the Atlas Works.

Messrs. Tannett, Walker & Co have made many tire-rolling mills, among them that which we illustrated some time ago, as in use at the new Grimesthorpe Works of Messrs. Charles Cammell & Co., of Sheffield. The same tire mills have been made for the Lowmoor Iron Company; the Bowling Iron Company; Messrs. Taylor Brothers, of Leeds; Messrs. Hood and Cooper, of Leeds; the Farnley Iron Company, etc.—*Engineering.*

Fig. 4

### Southgate's Improved Key.

It is well known to machine builders that the ordinary wedge shaped key must be carefully fitted to hold whatever may be secured to the shaft, whether crank, pulley, or gear. The bearing of the key should be mainly on its sides or edges,



and not on its top or bottom. In the latter circumstance the case would be simply a wedge tending to split the hub it was to secure. Of course the action of the key should be principally on its sides.

In the engraving we have a key having four equal sides, the key so seated as to present two sides to the hub and two to the shaft, each having the same and an equal bearing. In the shaft and through the hub is cut a V-shaped spline or key-way, as seen in the engraving; machinists, however, will see that the key is not put in its proper place, but this was done in order to show the crank and the key-way on the shaft. It seems to possess an advantage over the ordinary key and can be made to fit equally as well. It certainly is worthy a trial. The principal objection we notice is the formation of a V-channel in the probable line of fracture, but for one of these lines on this key the ordinary key has two.

Patented through the Scientific American Patent Agency, Sept. 3, 1867, by B. F. Southgate, who may be addressed at Bridgewater, Vt.

A new Telescope for examining objects situated under water, was recently tested on one of the French canals. Reports affirm that pencil marks could be clearly distinguished at a depth of more than five feet. Its practical application will be the examination of the hulls of vessels without its being necessary to dock them.

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VOL. XVII., No. 17....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, OCTOBER 26, 1867.


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(Illustrated articles are marked with an asterisk.)


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## ONE CAUSE OF BOILER EXPLOSIONS.

Whenever a boiler explosion occurs, the attention of the coroner's jury is directed to the discovery of imperfection in the material or workmanship, or a wrong principle in the form and arrangement of the parts. Frequently the engineer and fireman, or the individual who combines both these offices in himself, is removed by the explosion from all opportunity to give his testimony, and the proprietors are unable, if not unwilling to give light on the subject. Sometimes the engineer or fireman is censured, but seldom is the employer reprimanded for his dereliction of duty.

A correspondent, himself a practical engineer, says that it is surprising there are not more explosions. He says that in Connecticut the engineer is often required to be his own fireman, to split his wood, do every "chore" in and around the engine house, and oil the shafting, mend the belts, etc., for the whole establishment for from $1,50 to $2 per day. He asks, "who is going to study and fit himself for an engineer with such remuneration and such duties before him? When the inspectors were last around, they asked one engineer how much his safety valve carried. He replied he did not know what the safety valve was; no one had told him! He had used it to pile wood upon to dry. It being set at eighty lbs., he took hold of the end of the lever to lift it, but it had stuck on its seat, and he was compelled to use a lever to raise it. Another, besides the weight, had a large casting hung on the lever. When asked what it was for, he replied: so it would not blow off. Being told he must have it so as to blow off, at a certain pressure, he said he was not going to have it so it would blow off at all; and added, that the engineer who was there before him had it blowing off nearly every noon, but he had not had it blowing off since he had been there, which was about twelve months. I have seen boilers, where they had been using acids in the water, and the boilers were very badly corroded; still they would not change the feed pipe to good, pure water because it would cost, perhaps, fifty dollars. If any of these boilers had exploded, they would have looked for fault in construction, or want of water, or something of the kind."

"Now why don't our State Legislature make a law prohibiting any one from running an engine who shall not prove he is a competent engineer, and so stop the loss of life which follows these explosions?"

## RAISING OF WATER BY CREATING A VACUUM.

Even before the time of James Watt it was well known that by creating a vacuum in a closed vessel, by condensing the steam with which the vessel was filled, the pressure of the atmosphere would carry water through a pipe to the vessel; yet it is singular that this mechanical fact has never, until lately, been turned to practical account. A correspondent proposes to create a source of power by building a tank into which he leads a siphon connecting with the water. He proposes to work the siphon by exhausting the air. The water thus raised to be used on a wheel.

There is in this city a model of a contrivance by which water is raised and discharged on a wheel, the same water being used over and over again, the only loss being that occasioned by evaporation, which is easily made good by a small pump. The process is to introduce steam—the exhaust of a non-condensing engine is sufficient—into a reservoir connected by a pipe with a supply of water below, and then, by a jet of water condense the steam, creating a vacuum which is instantly filled with water to be discharged into a flume or reservoir, and thence lead to a wheel. It is surprising how much water a quarter-inch steam pipe will furnish the power for raising. A flour mill, we are told, is now running by this method in Virginia, not far from Chambersburg, Pa. This method of utilizing the waste steam of engines seems to promise very satisfactory results.

## PLASTER OF PARIS---GYPSUM.

This substance possesses some peculiar properties. It consists of sulphuric acid, lime, and water, its composition, or rather the proportion of its component parts being similar to that of alabaster. Its abundance in the tertiary basins around Paris has given it the name of plaster of Paris. It is found in Nova Scotia in profusion in the lower carboniferous rocks. It is produced by the decomposition of iron pyrites and limestone in juxtaposition. It is formed wherever sulphuric acid is generated and comes in contact with carbonate of lime. Crystallized gypsum is called selenite, and the ancient Romans are said to have used it as glass. It is often colored by oxide of iron, to gray, brown, red, yellow, and even black.

It is used extensively for making plaster casts and for stucco. It is prepared for these purposes by calcining, which is simply heating it in kilns or kettles until the water is expelled. It is then a fine powder, like wheat flour, and to be used must have the water which it previously held returned to it. To preserve it from contracting the moisture in the atmosphere, it should be kept as nearly air-tight as possible. Much of the plaster or gypsum sold in the market is deteriorated by careless handling and packing. When mixed with water it "sets" quickly, and no time should be lost between the mixture of the gypsum and the taking of the cast. Of late years it has been a favorite substance with dentists in taking casts of mouths to which teeth were to be fitted. We know of no way by which this substance, being once used, can be brought to its original state.

It is used to some extent in glazing porcelain; but it is more largely used as a fertilizer of soils than for any other purpose. Containing a large proportion of sulphate of lime, it is extensively used as a manure. It is excellent for grass of all kinds, furnishing just the nutriment needed.

### Petroleum for Steam Fire Engines.

We notice that at a late fire in Boston one of the steamers was run by petroleum oil instead of coal. The *Traveler* says: "When the alarm was given the steamer started in the direction of the fire, and arriving at the scene of conflagration, her steam gage indicated 100 pounds of steam. Only three minutes were consumed in raising this amount of steam. She remained on the ground six hours and a half, and during that time the steamer averaged 80 pounds of steam and 120 pounds of water pressure, and 100 pounds of water-pressure with two streams. Another remarkable and important fact demonstrated was the steamer, using oil, gained 30 per cent of water pressure over any other engine at the fire, by reason of not choking the exhaust. This is regarded as a great desideratum gained. Another great point shown was, while the streets leading to the fire were choked up with smoke thrown off by the other steamers, scarcely any smoke came from No. 3, using the new fuel."

While we have doubts as to the advantage of substituting petroleum for coal on steamships, we believe that it is possible to contrive an apparatus for its combustion which will be of real value in such cases as the above.

### Tortoise Shell.

A correspondent inquires as to the production and manufacture of tortoise shell. It is the product of a marine tortoise or turtle generally known as the "hawk's bill." The shell, so called, is in reality only the outer covering of the shell proper, and is found simply as scales or plates. These are removed by the application of fire. The turtle is caught and secured to the ground, when a light fire is built on his back, which loosens the plates so they can be removed by a knife. The animal is then left free and the separate plates are in time replaced by a solid plate or shield. The shell is rarely removed from animals weighing less than 160 or 170 pounds, as it is too thin for use in the arts. The shell is manufactured into various articles by being softened in hot water, which renders it pliable and nearly plastic. It is largely manufactured in Providence, R. I.

### Comets and their Tails.

A correspondent from Galveston, Texas, sends a well written, illustrated article on the above subject in which he advances the idea that the comet has "no tail at all; only by darting along with the utmost rapidity, its sphere yields to the impression of atmospheric air and assumes the shape generally seen." We were of the opinion that the orbits of the comets were beyond the reach of atmospheric influences.

### Navigating the Air.

Mr. Frank Oliver of Biddeford, Me. writes that he has constructed a machine by which he can sustain himself in the air by working a crank, and sees no reason why larger machines propelled by steam power could not work. If our correspondent will send a description and drawing of his machine we shall be glad to publish it. "It is wonderful if true."

### American vs. English Muscle---The Yankee Wins.

We see by a cable telegram of the 11th inst. to our daily papers that the jury who had the matter of testing the Chatwood and Herring safes at the recent farcical trial in Paris, have decided our countryman the winner of the wager. What will Mr. Bull say to that?

## FAIR OF THE AMERICAN INSTITUTE.

DEPARTMENT OF THE DWELLING.

Entering the exhibition halls by the main door, and turning either to the right or left, the visitor finds himself in the section allotted to the display of articles of domestic utility, an extensive and varied collection, embracing all apparatus for warming, lighting, cooling, and ventilation; all kitchen utensils and machines for washing and preparing clothes; cabinet and table furniture; ornaments for the dwelling, and building accessories and permanent attachments. So large is the number of articles which are properly classed under this comprehensive division, that a mere mention of each would make a report too voluminous for our columns, and we must limit ourselves to a brief note of a few of the more especially prominent.

In the section allotted to the exhibition of cooking and warming apparatus is the Imperial Range, made by Moneuse & Duparquet, measuring 27½ feet long by 5 feet 9 inches wide. There are eight fire-places, two broilers on one end, fourteen baking and eight warming ovens. The flues are led off below the floor and the range is accessible on all sides. Near this range is placed a four-oven caboose with its accessories, made by Thos. M. Sheppard, also a brass yacht stove and several creditable specimens of copper work, by the same manufacturer. Bramhall, Deane & Co. exhibit a large French range for which they claim economy of fuel, simplicity of management, and by the employment of a patent water front, great external coolness.

The Francestown soapstone works show several soapstone stoves, which from their novelty attract considerable attention. A stove having several new features and rejoicing in a somewhat pretentious title, is Calvin Pepper's Radical Cooking Stove. The air is here fed to the fire through a perforated metal plate covering the entire upper surface of the fire, so that the combustion actually proceeds from above downward. Cooking can be done by radiant heat alone, the flame and heated products of combustion passing beneath the kettles, etc., into and around the baking oven. Although designed for burning coal or wood, it can be readily converted into a petroleum or coal gas burner. In the assortment of gas stoves we notice the Union and the Dome cooking stove. The latter has the perforated plate which is common to all gas stoves, so situated as to be beyond the reach of dirt, or accident, or damage from the flame, and has moreover an air tube through the burner bringing an upward current of air in contact with the aerified gas at the point of ignition, securing a strong and steady flame, and free from that almost universal evil of gas stoves, their unpleasant odor.

Before leaving this group we must notice the case of grates, fenders, and fire irons exhibited by Messrs. Jackson & Co. Theirs is conceded to be the handsomest display made by any exhibitor in the section.

Messrs. Jackson & Co. have on exhibition at their new and elegant warerooms in Union Square an arrangement for heating rooms by burning gas in an open fireplace which is very ingenious and attractive. The gas jets are so concealed in imitations of logs of split wood that when ignited the fireplace has the appearance of containing a glowing wood fire.

For lighting our dwellings, the petroleum lamp makers present for inspection a varied collection of their wares, Julius Ives & Co. having perhaps the largest assortment. One of the good points in the Ives lamp is the arrangement of a tube in the burner, providing thereby a means for filling without the inconvenience of unscrewing or removing any of its parts. The shade and chimney are combined with the cone of the burner, and all are opened together by a hinge whenever the wick is to be reached, or the lamp filled or lighted. Danford's atmospheric lamp dispenses entirely with chimneys, a brilliant and steady flame being obtained by supplying artificially a steady stream of oxygen around the flame, a train of clockwork in the base of the lamp furnishing the means for accomplishing this end.

Next to the stoves and heating apparatus, by way of contrast, are placed the refrigerators. One of these household necessities exhibited by Stephens & Ritchie has slate substituted for charcoal, as a non-conducting medium, thereby doing away with the dampness and musty odor which often arises from refrigerators lined with other substances. The Zero refrigerator, a too suggestive name to be attractive at this season; also a milk, wine, and water cooler, which is a convenient article for housekeepers, are exhibited by Alex. M. Lesley.

Confronting the visitor at his entrance into the main hall is one of Frink's double-cone reflectors. This is but one of an assortment of these contrivances, which are intended for economizing, by concentration, of gas, kerosene, and daylight. The body, of the form required, is made of tin, and is covered with plates of glass corrugated upon one side. For lighting public buildings or show windows these reflectors are to be highly commended.

Leaving for the present a description of the imposing array of washing machines of every conceivable construction, and which from their number require a report by themselves, we turn to the group under which cabinet furniture is classified. First stands the invalid bed, invented, as a circular informs us, by a soldier while lying sick in hospital. The bed is divided into three equal parts, each of which may be inclined at varying angles, allowing the patient to assume a variety of positions, changes very acceptable to the invalid.

Mr. A. S. Lyman presents for public approval a bedstead constructed on the principle illustrated in these columns some time ago. The object of his invention, it will be remembered, is to filter and purify the impure air supplied to the sleeper for respiration, to dry it when too damp, and in summer to cool it. To effect this the head board is made

double, to serve the purpose of a reservoir for holding some lime, charcoal, and ice. The former is placed beneath the bed, so that the currents of cold air near the floor are made to pass over it, when the moisture and carbonic acid are absorbed. By this means the air is warmed and rises through a charcoal filter, when if required during the summer season, it passes over ice, finally emerging through an opening directly over the pillow. The effect of this constant current of pure air, is first, that more of it is taken into the lungs, and thereby the whole system is stimulated and the health improved. A pamphlet before us explains further why there is no danger of taking cold, and why sleeping in pure air tends to protect from diseases resulting from exposure during the day, the testimony on this point, as well as to the merits of the apparatus, being that of many eminent physicians of this city.

Several ingenious combinations of household conveniences, useful when economy of room is a desideratum, are shown, explained, and operated by their respective inventors. Brewster's ironing board, hat rack, table, and closet; McMore's writing desk and table; Phelan's combined dining and billiard table; Bennett's table-bed, and combined seat, sofa bed, sick chair, and rocking chair; these all have such expressive titles that further notice is unnecessary. Luckow & Nachtheim's circular extension table is in form the segment of a circle; thereby, it is claimed, it will seat a larger number of people in a smaller space than the old-style long table. The conversational element in a party dining at one of these tables must of necessity be somewhat limited, as fully one half of the company sit *dos à dos*. The table is made of ten parts, which may be separated and a small center or ordinary dining table can be made.

The adjusting and folding chairs made by Chas. C. Schmitt are advertised as the most elegant chairs manufactured, and from an inspection we are inclined to admit the claim. The upholstery is elegant and the form of construction affords the greatest comfort to the body.

The constant jingling of a bell invites public attention to E. Holmes' burglar alarm telegraph, which is so arranged that the opening of a window or door when the apparatus is set, completes a magnetic circuit, and an alarm is sounded, much to the discomfiture of the baffled intruders. Webb's Universal Protector subserves a like purpose, but in a different way. Dispensing with a battery, in this arrangement a gong bell over the door or window has a train of clockwork within it, which when wound up is set off by inserting a key in the lock of the one, or attempting to raise the other.

Brown's carpet stretcher and tack-driver is an instrument by which the operator can stretch and tack down a carpet at the same time, and with as little effort as the subsequent sweeping of the same may be accomplished. The American papier mache manufacturing company have an assortment of pails, basins, toilet sets, milk pans, spittoons, etc., all made of chemically prepared paper, yet which are impervious to the action of water and acids. These articles may be placed in an oven until water will boil in them, without injury; and, furthermore, they will not break, shrink, water soak, rust, or fall to pieces. The manufactory of this company is situated at Greenpoint, L. I.

PUMPS, MACHINERY, TOOLS, ETC.

There is quite a collection of power and hand pumps in the exhibition, all of them worthy of attention and some of them possessing merits so obvious that the mechanic cannot overlook them. The Metropolitan Rotary Engine Co. exhibit a very powerful pump, which delivers a beautiful round stream. It is a rotary pump very compact and quite simple in its internal construction. The builders claim that it will maintain a vacuum of twenty-eight inches, and during a trial of seventy-two consecutive hours a constant vacuum of twenty-nine and a-half inches was maintained. It seems to be well designed for durability as well as efficiency; it certainly appears to be as durable as any rotary pump can be expected to be.

The steam pumps exhibited by the Niagara Steam Pump Works, 9 Adams St. Brooklyn, N. Y., are excellent hydraulic machines. One style has the piston rod of the steam cylinder in common with that of the pump chamber—the machine being horizontal. Another has a crank, and the engine and pump can be readily disconnected so that the former may be used to drive any machinery.

Messrs Terwilliger & Co. exhibit some of their welded steel and iron burglar-proof safes. They are composed of a series of plates made of steel and iron welded, the steel outward, secured by conical bolts running through and through. Each plate is separately held, so that if one is forced off, the remainder are not thereby weakened. We venture to say that it would be impossible to throw open the side of one of these safes in twenty-nine minutes if operated upon in the same ridiculous manner as were those at the Paris Exposition.

Dion's Fire Detector is intended to give an alarm of fire instantly. It does not depend upon magnetism or electricity, but its parts are absolutely connected, and it is governed wholly, in its action, by the variation of the common thermometer. Its principle and operation appear to be faultless. The office is at 80 Cedar st., N. Y. Ward's Dish Washer and Dryer is a portable tank for holding hot water, having a shaft running longitudinally through it on which are two disk brushes of wood for washing, and two similar disks faced with sponge for drying. It does its work with dispatch and thoroughly.

Fuller's Tuck Creaser, attached to a Wheeler & Wilson sewing machine in the north gallery, is a device which seems to be a great attraction, especially to lady visitors. It can be attached to any of the sewing machines in use and is intended to fold or crease the fabric to be sewed into plaits. For shirt bosoms and skirts it is just the thing. The operator has only to guide the cloth when the plaits will be laid narrow or wide, according to an adjustable guage, and securely held by stitching.

We notice two knitting machines, the Bridgeport, Conn., machine and the Hinkley machine made at Bath, Me. The former knits a tube, the dimensions of which—or the "narrowing and widening"—are governed by the removal or insertion of needles by the operator. It is very compact and quite simple. But we think for simplicity and actual usefulness persons interested in such machinery should examine the Hinkley machine. An illustrated description of the latter will soon appear in these columns.

Next to the card machine—which we have not room to notice this week—there is no machine which deserves the attention of visitors more than Clark's Spooling Machine. It is certainly a curiosity. The empty spools—those on which the sewing thread is wound when purchased from the stores—are placed in a movable hopper, and when one is filled, which is done with great rapidity, another empty spool is automatically raised to a position where the spindles engage with it, and the end of the thread is instantly passed into a slit in the head of the spool, when the thread is rapidly wound in concentric layers up to the top of the heads. This done, the filled spool drops instantly out of the way, the thread being cut and fastened into the slit in the head, when the machine is ready for another spool.

Cory's Angular Bit-stock is a device for boring holes in places impossible to be reached by the ordinary auger, and preferable to the "universal joint" bit-stock so generally used. Gas fitters, plumbers, and carpenters should examine this useful tool.

Notwithstanding the excellent good management of the fair we have to record two serious accidents. A mechanic named P. McGowan while attempting to remove a cent from the anvil of the Goulding & Cheeney's drop hammer had his hand smashed by the descending hammer and amputation was found necessary. He has a family, and a subscription for his relief has been started. Visitors at the fair may hand their contributions to manager Hicks or chief engineer McElroy.

On Thursday the 10th, Dean Linnell, the engineer of the Babcock & Wilcox engine, fell into the fly wheel, and after being whirled several times around, was thrown with great violence on the Getty pump, breaking off the air chamber, of cast iron. His collar bone was broken and it is feared he was much injured internally. He has a wife and child in Providence, R. I.

The fair will close Oct. 26th, and those who feel interested in the mechanic art should embrace the opportunity to witness one of the best exhibitions ever seen in this country.

## ISHERWOOD'S COG-WHEEL PROPELLER ENGINE--AN INTERESTING COMPARISON.

Several of the British built screw propeller steamers, as is well known, frequently make passages both ways across the North Atlantic at the average rate of 14 knots (of 6,086 feet) per hour. These vessels are of about the same size as the *Wampanoag* class of screw steamers built by the Navy Department with machinery planned by the Chief of the Bureau of Steam Engineering. Hence a comparison between these vessels with respect to their speed cannot fail to be interesting. Let us take the screw steamer *Periere* engined by Napier of Glasgow, which has made so many rapid runs; the immersed midship section of this vessel is nearly the same as that of the *Wampanoag*, and as to the models it is pretty certain that the latter is considerably the best, as one of our most skillful naval constructors, Mr. Delano, "spread himself," as the saying is, in modelling this ship. The *Pereire* has more than once steamed across the Atlantic at the rate of 14 knots and when put on her mettle has easily attained in "smooth water uninfluenced by wind or tide" 15 knots. According to Mr. Isherwood's official report he contrived the steam machinery of the *Wampanoag* to give her "a maximum speed of 15 knots per hour."

The engines of the *Pereire* are direct acting and the whole of her steam machinery weighs only some 650 tuns including the boilers, while Mr. Isherwood's machinery in the *Wampanoag* class weighs some 1,200 tuns. This immense difference shows how little practical knowledge the Steam Department of the Navy possesses on the important subject of marine engineering.

In this case, throwing aside for the present the improper proportion of the details, this enormous difference in weight may be, for the most part, accounted for by the fact that the Chief of the Bureau of Steam Engineering, in spite of the remonstrances of the most distinguished engineers in the country used an inferior boiler known as "Martin's patent" (employed only in the U. S. Navy), and also interposed between the engines and the propeller eighteen cog wheels of immense size and weight.

It seems that the scores of direct-acting engines heretofore contrived by this officer for the Navy, had given such wretched results that it is attempted in this case to achieve success by cramming a sharp vessel with that exploded engineering makeshift a "cog wheel" or "geared" screw engine. The plan of connecting the engine to the propeller by means of cog wheels is not so very objectionable on a smaller scale; but when this device is applied to engines working up to the great power these engines are required to develop in order to give the stipulated speed to the vessel, the weights, the space and the complication are so greatly increased and practical difficulties of such a formidable character are entailed by the use of cog wheels, of such proportions as these, that no one with adequate engineering judgment would entertain the idea of using them after he had scrutinized the subject.

We sincerely hope, as the *Wampanoag* is the pioneer of four more of the same kind, that she may be a great success in point of sustained high speed; for failing in this point they will be practically worthless as war vessels.

Of course, the further a comparison is pushed between such machines as the engines of the *Periere*, etc., and those of the *Wampanoag* the more strongly is the want of engineering skill and common sense on the part of the designer of the steam machinery of the latter made manifest.

For instance the *Wampanoag* is so loaded with boilers, smoke pipes and "cog wheel" engines that she cannot carry near coal enough in her bunkers to cross the Atlantic at top speed, as is constantly done by many screw vessels—such as the *Periere*. And so much space is filled with machinery on the *Wampanoag*, that a large portion, of even the small amount of coal she can stow, is carried in bunkers built on the deck in the quarters of the crew, instead of in the hold, as is the case with the other vessels we have alluded to. Yet, as we have seen, although such an immense space in the *Wampanoag* is devoted to machinery, and bunkers are built in the quarters of the men, she is unable to carry coal enough to cross the Atlantic at such speed as it is frequently crossed by working vessels of much less pretensions and with only *one* pipe. It is only by running at low speed and practicing economy that such a voyage could be made under steam.

We think that this fact alone is sufficient to stamp the steam machinery of the vessel as a blunder without parallel, of its kind.

And finally to make the matter still worse it should be remembered that the *Wampanoag's* engines are so tied up by the proportions of the cog wheels that when they are working to their full power they must be operated in accordance with the "seven-tenths cut-off theory" as laid down in the Steam Blue Books of the Navy Department. In other words the pistons move at so low a speed that the steam must follow them at least seven-tenths of stroke, in order that they can work off the steam from her twelve boilers.

While the other vessels to which allusion has been made are worked with an independent cut-off the *Wampanoag* must work practically "non expansively."

Hence this highly improper distribution of steam, for engines of this magnitude, decreases still further the power of the already inadequate supply of fuel.

### Delicious Coffee.

One of the most delightful features of a breakfast is good coffee. Broiled chickens, Spanish mackerel, fresh eggs, and light rolls make a good breakfast, but the flavor of all these edibles may be spoiled by a cup of poor coffee. We have recently had in use a new coffee pot called the "Aroma Condenser," invented by N. Holtz, of Greenpoint, L. I., which has given the most perfect satisfaction to our household.

The means by which the desirable property of a good cup of coffee is attained are very simple. A coiled pipe, similar to the worm pipe of a still, leads from the vessel containing the coffee into a chamber above, into which cold water is poured after the coffee commences to boil. The steam rising into the coiled pipe is thus condensed, and the water with the aroma which in common coffee pots is allowed to escape, is conveyed back into the vessel containing the coffee. The same plan of a pot is said to be equally adapted to making tea.

### Probable Uses of the Telegraph.

An exchange asks: Why should not every house have its telegraphic wire? When gas was first applied to purposes of illumination, it was used only in the public buildings and streets, and even now on the continent of Europe it has been introduced but sparingly into private dwellings. Why may not the telegraph wire be extended and diffused—if we may say so—as the gas pipe has been. Suppose a network of such wires laid from a central point in the city to the library or sitting room of every dwelling, and an arrangement made for collecting news similar to that controlled by the associated press. Through the wires, then, this news might be instantly communicated to each family, without the work of time rendered necessary to put it into type, print it, and distribute it by means of carriers. A fire, a murder, a riot, the result of an election, would be simultaneously known in every part of the city. Of course, this would do away with newspapers, but what of that? All things have their day, and why should such ephemeral things as newspapers be an exception to the rule?

### Boring Rock With an Eight Tun Drill.

In No. XIV., current volume, page 215, we made, in our column of Manufacturing, Mining, and Railroad Items, a notice of the performances of a rock-drilling machine, which, it was said by "the papers," sunk four feet into the solid rock at every blow. The work was being performed at the Keokuk Rapids, on the Mississippi, in Rock Island county, Ill. In reply to our desire to know the structure of rock which could be thus penetrated by a single blow, a correspondent, A. C. S., of Sabula, Jackson county, Iowa, sends us the following statement:—"A fine-grained, compact, and homogenous rock, exhibiting but little trace of crystalline structure until examined under the microscope, when it shows a conchoidal fracture. It is somewhat soft, but grows harder after exposure to the atmosphere. He says it is believed by some that the contemplated improvement in the navigation of the river will prove a failure."

Preservation of Anatomical Subjects.—The object which is to be preserved is dipped in a mixture formed by adding to seven parts glycerin, one part brown sugar and half a part niter, until a slight deposit begins to be perceived on the bottom of the vessel. Putrefaction is thus entirely prevented, the object when taken from the solution being perfectly rigid, but by hanging it in a warm and dry place, the muscles and articulations will recover all their pliancy.

# OFFICIAL REPORT OF PATENTS AND CLAIMS

**Issued by the United States Patent Office,**

FOR THE WEEK ENDING OCTOBER 8, 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.*

### 69,530.—GRAIN DRYER.—J. W. Adams, Elyria, Ohio.

I claim the chamber, D, pipe, B, and diffuser, C, arranged in combination with the shell, A, for the purpose and in the manner substantially as set forth.

### 69,531.—LEMON SQUEEZER.—A. Barbarin, New Orleans, La.

1st, I claim the combination of plunger, K, when provided with the spring, b, and otherwise constructed, substantially as herein described, and the receiver, A, when the latter is provided with the vibrating or tilting perforated diaphragm or bottom, C, as and for the purpose set forth.

2d, The above combination, in combination with the frame, B G, H J, as herein described, for the purpose set forth.

### 69,532.—SEEDING MACHINE.—H. Barber, D. C. Van Brunt, and G. W. Van Brunt, Harrison, Wis.

1st, We claim the arrangement of the gear wheel, I J K, and lever, F, and stop, f, beneath the machine, and remote from the wheels, for the purposes specified and substantially as described.

2d, We claim the combination and arrangement of the axle, G, gear wheels, I J K, lever, F, and stop, f, operating substantially as and for the purposes described.

3d, We claim the arrangement of the stop, f, with respect to the bent lever, F, and pinion, J, substantially in the manner for the purposes specified.

4th, We claim the arrangement of the slide, m, provided with the arm, n, with the toothed lever, N, as and for the purposes described.

5th, We claim, in combination with the last foregoing, the arrangement of the scale and pointer, p, for the purposes set forth.

6th, We claim the peculiar construction of the segment, k, and its arrangement with the lever, R, for raising the plow, as and for the purposes herein described.

### 69,533.—DRILLING MACHINE.—G. W. Bishop, Stamford, Ct.

Antedated Aug. 27, 1867.

1st, I claim the combination of the arbor, C, screw-rod, D, wheel, G, and friction clutch, I, arranged and operating as herein shown and described.

2d, The combination of the cam-lever, P, with the bracket, J, perforated back plate, R, and pins, o and m, substantially as and for the purpose herein specified.

3d, The combination of the arm, L, and plate, M, with the bracket, J, constructed and arranged substantially as and for the purpose specified.

### 69,534.—MALT KILN.—Wm. Blakey, Baltimore, Md.

1st, I claim the provision in a malt kiln of mechanical appliances for stirring the grain, substantially as set forth.

2d, The combination of one or more steam pipes, and a furnace for supplying heat in a malt kiln or grain dryer, substantially as and for the purpose set forth.

3d, The combination with a malt kiln, of the worm, E, and condenser, F, substantially as and for the purpose described.

4th, A galvanized iron casing in a malt kiln, for the purposes set forth.

### 69,535.—GATE.—L. F. Brown, Keokuk, Iowa.

I claim the cranks, F F', with their cylinders, the posts, E E', pulleys, H I, H' I', K K', the cylinder, G G', and rope, L L, or their substantial equivalents, combined and arranged as and for the purposes set forth.

### 69,536.—COOKING STOVE.—Charles H. Buck, St. Louis, Mo.

I claim providing the doors of stoves with concavo-convex glass windows, secured within flaring openings through the stove doors by means of rings, h, substantially as described.

### 69,537.—HEATING STOVE.—Charles H. Buck, St. Louis, Mo.

I claim the construction of the stove with a fire pot above the middle plate of the outer cylinder, such fire not being surrounded by a perforated air chamber, C, in combination with a perforated conic hood, G', which has a cylindric terminus, a a, all arranged and operating substantially in the manner and for the purpose described.

### 69,538.—CHURN.—Thomas W. Buck, Fawn River, Mich.

I claim the valve, E, with its removable sieve-like slide, when employed for the uses and purposes expressed.

I further claim the arrangement of the valves, D and E, constructed and operating substantially as shown, for the purposes set forth.

### 69,539.—PAPER FILE.—Francis Buhl, Newark, N. J.

I claim the paper file described above, consisting of the back, a, with pins set in its face, and clamp, b, with a slot or holes to receive said pins, said clamp being held at one end by the spring, c, or its equivalent, and at the other end by a tapering bolt, which by its taper adjusts itself to the thickness of the papers inclosed, and holds the clamps tightly upon them.

### 69,540.—SASH LOCK AND SUPPORT.—F. P. Canfield, Boston, Mass.

I claim, 1st, The combination as well as the arrangement of the friction roller, W W, and a bolt, N N, substantially as described and for the purpose set forth.

2d, The friction roller, W W, when made with the two cylinders, W W, connected by a smaller toothed axis, V, in combination with the incline, C, substantially as described and for the purpose set forth.

### 69,541.—MACHINE FOR SHEARING SHEEP.—Charles P. Clark, and Lewis Delent, Beaver Dam, Wis.

We claim, 1st, The revolving knives, e e, substantially as set forth.

2d, The comb or series of guards, H, substantially as herein described, and for the purposes set forth.

3d, The revolving knives, e e, the guards, H, in combination with the wheel, d, the frame, a a, and the gearing, F, substantially as and for the purposes described.

### 69,542.—STEAM HEATER.—Edward B., Josiah S., and Wm. S. Clark, Philadelphia, Pa.

We claim, 1st, The combination substantially in the manner described, with an ordinary stove for warming buildings, of a coil of steam pipes, provided with an automatic feed valve, which supplies water as fast as evaporated, thus maintaining the water at an uniform level, preventing the burning of the pipe, and dispensing with an external steam drum.

2d, The combination substantially as described of the water drum and float valve, with the heating coil and balancing pressure pipes, for the purpose of preventing pressure on the valve.

### 69,543.—WOOD LATHE.—Henry T. Clay, Philadelphia, Pa.

I claim, 1st, The spring, e, or its equivalent, arranged on the grooved wheel, F', as and for the purpose described.

2d, The construction of the wheels, U U', each consisting of two disks, r and r', with an intervening ring of gum elastic, when the said disks can be adjusted toward each other for the compression of the ring as set forth.

### 69,544.—TURNING LATHE.—F. W. Coy, Boston, Mass.

I claim the combination and arrangement of the belt wheel, C, the bearing, H H, the cap, D, and the spindle, B, substantially as described and for the purpose set forth.

### 69,545.—GRAIN SEPARATOR.—Amasa Curtis, Warren, Ill.

I claim, 1st, In combination with a shoe constructed as herein described, I claim the arrangement of the spouts, F F, with the opening, c, into the same, in the manner and for the purposes herein specified and shown.

2d, The opening, m, in the rear end of sieve, I, arranged in combination with the side spouts, F, substantially in the manner and for the purposes set forth.

3d, The arrangement of the boards, K L, in such a manner as to bridge the opening, d, and discharge at opening, c, into side spouts, F, substantially as and for the purposes described.

4th, In combination with the said false bottom, K L, I claim the sieve, J, provided with the air stop, J', arranged and operating as and for the purposes specified.

5th, The slide, M, and board, N, when arranged in combination with the shoe provided with a close bottom, substantially as and for the purposes described.

6th, The arrangement of a series of fine sieves, R, below the sieves, I', and terminating at and in combination with the side spouts, F, substantially as and for the purposes set forth.

7th, In combination with an overshot fan blast, I claim the arrangement of the regulating valve, C, so as to operate in the manner herein specified.

8th, The arrangement of an air blast regulator, D, in combination with a grain separator shoe, provided with a close bottom, substantially as described.

9th, The arrangement of the reversible feed regulator, B b, in combination with the hopper of a grain separator, as and for the purposes specified.

10th, Suspending the shoe upon springs, S, in combination with knuckles as and for the purposes set forth.

### 69,546.—TRACE FASTENING.—D. W. De Forest, B'lyn, N. Y.

I claim the construction of the head of the shank or stem of the fastener, with its under side countersunk to receive the head of the pin, in combination with the same, substantially in the manner and for the purpose as herein specified.

### 69,547.—DEVICE FOR MANUFACTURE OF WATCH KEYS.—Virgil Draper (assignor to Oscar M. Draper), North Attleboro, Mass.

I claim the combination of the shank holders, the dies for forming the heads, those for forming the pipe projections, and those for forming the cavities in such projections as set forth.

### 69,548.—HARNESS SNAP.—George B. Durkee, Alden, N. Y.

I claim a harness snap, composed of the tube, A, or equivalent, hinged hook, B, and spring, D, constructed, arranged, and operating substantially as herein described.

### 69,549.—HARNESS SNAP.—George B. Durkee, Alden, N. Y.

I claim, 1st, a harness snap, having a spring lever and stop, C, constructed and operating substantially as herein described.

2d, The combination of the hook, A, shank, A', stop lever, C, and either one or both springs, B B', arranged substantially as herein set forth.

### 69,550.—HAME.—George B. Durkee, Alden, N. Y.

I claim, 1st, The telescopic joint, N C, constructed and arranged in the manner and for the purpose substantially as herein described.

2d, The link, D, in combination with the adjustable loops, D', for the purposes and substantially as described.

3d, The slotted hook, E, in combination with the hinged lever, E', constructed, arranged, and operating in the manner and substantially as herein described.

### 69,551.—MACHINE FOR SEPARATING THE EXTERIOR OR BARK FROM THE INTERIOR OR PITH OF SORGHUM, AND OTHER PLANTS.—R. N. Eagle, and William F. Goodwin, Washington, D. C., assignors to themselves and Wm. Duane Wilson, Des Moines, Iowa. Antedated September 5, 1867.

1st, I claim a barrel or case adapted to receive and inclose the stalk or cane for the purpose of effecting a separation of the bark or woody substance, from the pith or interior.

2d, A tube or tubes provided with a sharp edge or annular knife, on the small end, which enters the cane between the bark and the pith, thus separating the bark or exterior from the pith or interior parts of stalks or canes, constructed as described, and operated in any manner or by any means whereby the tube can be made to accomplish the purpose set forth.

3d, A yielding tube or collar, U, hinged or attached to the plate, I, or its equivalent, around the hole or mouth of the chamber of the barrel, A, at one end, and held together by the spring, n, or its equivalent at the other end, and which collar incloses and hugs the small end of the tube, B, thus forming a conductor which guides the end of the cane to and centers it on the end of the tube, B, constructed and arranged to operate in the manner and for the purpose substantially as described.

4th, The piston or pistons, H, with the rod or rods, P, which operate in the chamber or chambers of the barrel or cases, A, and serve to discharge the cane from the same, arranged to operate in the manner and for the purpose substantially as described.

5th, The handles, O and O', bars, Q and Q', levers, L and L', arms, K and K', wedge, V, and pins, V1 and V2, and plate, T', constructed and arranged to operate in the manner and for the purpose substantially as described.

6th, The cross head, T, guide rod, G4, bars or pitmen, R and R', cranks, N and N', and shaft, X, arranged to operate in the manner and for the purpose substantially as described.

7th, The plates, I I I, which serve as a means of attachment for the barrels, A, and collar, U, and being securely attached to the under side of the platform, F, serve to hold the barrels and collars in their places, arranged in the manner and for the purpose described.

8th, The hopper or hoppers, J, and trough or troughs, E, constructed and arranged in the manner and for the purpose set forth.

9th, The saws, S' S', shaft, W3, pulley, W4, and platform, W2, constructed as described, and arranged to operate in the manner and for the purpose set forth.

10th, The saws, S S S, shaft, W', and box, B O X, constructed and arranged to operate in the manner and for the purpose described.

11th, The platform, or frame, E, to which the several parts of the apparatus are attached, arranged in the manner and for the purpose set forth.

12th, The fork or spreader, G, for the purpose set forth.

### 69,552.—DERRICK.—Francis M. Everingham, Lafayette, N. Y.

I claim the described derrick, and all the parts as arranged.

### 69,553.—WAGON BRAKE.—Corydon A. Fargo, Soquel, Cal.

I claim, 1st, A brake, constructed with the arm, E, and link, G, together with the connecting rods, D and I, having a variable connection with E and G, respectively, or their equivalents, operating substantially as and for the purpose herein described.

2d, The vibrating suspended arms, c c, and the cross bar, d, attached to the bar, K, for producing parallel motion, substantially as herein described.

### 69,554.—DOUBLE EYE-GLASS.—John Federhen, and Wm. C. Sherman, Boston, Mass.

We claim a double eye-glass, provided with an elastic band attached to the arms for the purpose specified.

Also, The pressure bands or elastic pads, G G', attached to the inside of the frame, substantially as herein described, and for the purpose specified.

### 69,555.—HILL SIDE PLOW.—F. Feldhaus, Baltimore, Md.

I claim the construction, combination, and arrangement of the board shank, a, and movable mold board, c, as shown.

Also, the segmental clevis, d, either horizontally or vertically arranged as described.

Also, the flanged share, S, as constructed and applied.

### 69,556.—GAS BURNER.—Joseph S. Ford, Philadelphia, Pa.

I claim the combination of the key, a, and burner, A, with the cove, b, of the base, B, with vent holes, d d, substantially in the manner described, and for the purpose specified.

### 69,557.—CARRIAGE WHEEL.—Walter K. Foster, Bangor, Me.

I claim the arrangement of the ends of the felly, substantially as above described, viz., so as to be supported by the ends of the male contracting screws, or by plates of metal, separate from the nuts, and placed between the two, and sustained by such screws.

I also claim the formation of the braces, h, of the nuts, with recesses, i i, in their inner sides, such being as and for the purpose set forth.

I also claim the tire as made with its inner surface concave transversely to fit to a corresponding convexity of the felly, as set forth.

I also claim the formation of the block, E, with the peculiar recess, r, or its equivalent, in combination with the formation of the nuts with counterparts to enter such recess, as set forth.

I also claim the combination of the braces, h h, with the tire, A, the nuts, D D, and the right and left screw thereof arranged substantially in manner and so as to operate as set forth.

### 68,558.—STEERING APPARATUS.—Wm. H. Foster (assignor to himself and Michael R. Perkins), Portsmouth, N. H.

I claim the arrangement and combination of the two windless pulleys, E F, and their ropes, b b1, and four leading blocks, G, with the single hand-wheel shaft, C, and with the tiller, T, extended in opposite directions from the rudder head, A, the whole being substantially as hereinbefore explained and as represented.

### 69,559.—CARRIAGE.—J. Gale, M. B. Ames, and F. Blaisdale, Lawrence, Mass.

1st, We claim the lock braces, d d1, in combination with the standards, B B, having projections, C C1, substantially in the manner as and for the purposes set forth.

2d, We claim the connecting rod, P, in combination with the lock braces, d d1, substantially in the manner described and for the purposes set forth.

### 69,560.—CANT HOOK.—J. W. Gerrish, Bethel, Me.

I claim the combination of the metallic socket, d, the staff, a, hinged projection, c, and pike head, b, with the cant hook, c, when constructed and arranged substantially as described.

### 69,561.—CUCKOO CLOCK.—Chas. K. Giles, Chicago, Ill.

1st, I claim supporting the cuckoo, or its equivalent, upon a single vertical post, arranged as described, and shown and provided with a cam, f, and cross arm, e, substantially in the manner and for the purposes specified.

2d, In combination with the post, D, and arm, e, I claim the arrangement of the cam, G, and wheel, F, or its equivalent, substantially as and for the purposes specified and shown.

3d, I claim the arrangement of said arm, e e1, and post, D, with the count wheel, substantially as herein set forth.

4th, I claim, in combination with the post, D, provided with a projection, g, the arrangement of a spring, s, operating substantially as shown and described.

### 69,562.—TRACE BUCKLE.—Wm. B. Hayden, Columbus, Ohio.

1st, I claim the construction of the tongue, C, with the bulge, e1, for the purpose described.

2d, The combination of the bar, d, and the bulge, e1, of the tongue, C, for the purpose described.

3d, Construction of the lever, D, with the bar, k, as and for the purpose described.

4th, The buckle, constructed and operating in the manner herein described.

### 69,563.—INSTRUMENT FOR WRENCHING BUNGS OUT OF BARRELS.—August Herde, Baltimore, Md.

I claim the above instrument, when constructed as described and for the the purpose set forth.

### 69,564.—AMALGAMATOR.—Frederick G. Hesse, San Francisco, Cal.

1st, I claim separating, as to size, by means of the separating channel, h, wherein the particles are acted upon by the two opposing forces—centrifugal force and resistance of a current of water, said current being produced by a centrifugal head, and made adjustable in the manner and for the purpose substantially as described.

2d, Combining separation with grinding in order to prevent the grinders from acting upon particles already fine enough, substantially in the manner as described.

3d, I claim the revolving amalgamating chamber, A, in combination with the current of water, as described.

4th, I claim the discharge, T, in combination with the filtering chamber, F, and a current of water produced by centrifugal action for the purpose and in the manner substantially as described.

5th, The annular channel, g e, formed behind the grinding surfaces and in combination with the annular disk, a a, forming an annular channel under C, which communicates with g, for the purpose of producing, by centrifugal action, an upward current therein, the strength of which may be regulated by the dimensions of n, for the purpose, substantially as described.

### 69,565.—SPRING SEAT FOR VEHICLES.—William Hughes, Brandon, Wis.

1st, I claim the combination, substantially as described, of a seat capable of moving freely vertically between its guides, with a series of supporting cylindrical rubber springs, arranged sidewise, within their guides.

2d, The combination, as described, of the rubber cylinders, with the shelves sliding vertically in their guides.

3d, Making the lower tier of springs of larger diameter than the upper, as described, for the purpose set forth.

### 69,566.—GAS COCK.—C. B. Littlefield (assignor to himself and T. W. Porter), Boston, Mass.

I claim a gas cock, D, and joint, A, so constructed and arranged that when the cock, D, being open, is turned to a stop in one direction, it will shut the gas entirely off, but when turned to a stop in the opposite direction, will nearly but not entirely shut off the gas.

### 69,567.—WASHING MACHINE.—Seth Lockwood, Holly, Mich.

I claim the body, A, provided with washboard, B, in combination with blocks or beaters, D D, shafts, g g, pitmen, h h, and the double crank rod, E, when the whole are constructed, arranged, and operating as and for the purpose herein set forth.

### 69,568.—HEATING FURNACE.—M. F. Magliocco, Phila., Pa.

1st, I claim a series of vertical tubes, c, arranged within an air chamber, B, in combination with exterior tubes and casings through which the products of combustion pass from a fire place to a flue, substantially as and for the purpose described.

2d, The combination of a cylinder, A, containing a fireplace casing, C D, and tubes, e e, the whole being constructed and arranged within an air chamber, substantially as and for the purpose set forth.

3d, A plate, q, arranged within the air chamber, B, in respect to the cylinder, A, and openings, n, substantially as and for the purpose set forth.

### 69,569.—BEEHIVE.—John Matthius, Pemberton, Ohio.

1st, I claim the hive, A A1, and case, C, with their openings, a a1 b b1 and f, arranged as set forth, in combination with the tube, c, substantially as and for the purpose described.

2d, The inclined planes, H H, in combination with the hive, A, and tube, c, substantially as and for the purpose set forth.

### 69,570.—COUPLING FOR VACUUM CUPS, BREAST PUMPS, ETC.—Morris Mattson, New York city.

1st, I claim the use and application of the elastic collar and cap, A, for coupling or connecting the different parts of vacuum cups, breast pumps, and other instruments, substantially as described.

2d, The arrangement of the rigid plug, D, or its equivalent, in combination with such elastic and adjustable coupling, substantially as set forth.

### 69,571.—RICE OR SEED DRILL TOOTH.—Daniel. E. McSherry, Dayton, Ohio.

1st, I claim the construction of a rice drill tooth of the form substantially as shown and described, and with a transverse ridge, a, upon the inside of its back plate.

2d, The construction of the adjustable drag or coverer, D, upon the back of the tooth, substantially as described.

### 69,572.—CURTAIN FIXTURE.—William T. Mersereau, Newark, N. J.

I claim combining with the knob and pulley the circular plate, spring, and rack, provided with the cup-like projections, for the purposes set forth.

### 69,573.—MANUFACTURE OF THE CHLORIDE OF ZINC.—James E. Mills, Brooklyn, N. Y.

1st, I claim producing the chloride of zinc directly from such ores as contain either the oxide of zinc, carbonate of zinc, or silicate of zinc, by digesting such ores with muriatic acid, substantially as hereinabove set forth.

2d, Freeing the chloride of zinc from the gelatinous silica which is formed therein, when the said chloride is produced from the silicate of zinc, as above, by evaporating the water and excess of acid therefrom, and redissolving the chloride of zinc, substantially as described.

3d, Separating the iron and manganese from the chloride of zinc, made directly from the ores when they exist in proportions injurious to the product, by drying the digested mass, oxidizing to a high degree the iron and manganese and redissolving and drawing off the chloride of zinc, substantially as and to the effect hereinabove specified.

### 69,574.—CAR COUPLING.—James Milne, Perthshire, Scotland.

1st, I claim the pivoted cross head, B, shaft, C, plate, D, and hook, E, in duplicate for coupling cars, arranged and combined, substantially as described.

2d, I claim, in combination with the above, the rod, G, projecting horizontally or vertically, as described.

### 69,575.—IMPLEMENT OR WRENCH.—J. Mott, Danville, Cal.

I claim the above described wrench or implement, constructed and arranged to operate as and for the purposes set forth.

### 69,576.—FEED-WATER HEATER.—John Nicholson, Allegheny City, Pa.

I claim a water heater for steam boilers, when constructed, arranged, and operating substantially in the manner herein described and for the purpose set forth.

### 69,577.—LATHE CHUCK.—John O. Connor (assignor to himself and E. M. Ketchum), Buffalo, N. Y.

I claim a bolt-centering chuck for lathes constructed, arranged, and operating in the manner and for the purpose, substantially as herein described.

### 69,578.—PUMP.—Nathan Page, Jr., Danvers, Mass.

I claim the combination and arrangement of the corrugated covering, E, the barrel, A, one or more openings, e, and the tubular plunger, B, opening into the handle, C, through the tube, B1, all suostantially as described.

### 69,579.—REEL.—Josiah Foreman Palmer, Auburn, N. Y.

1st, I claim the combination of a reel or swift with the pivoted adjustable plate and clamp or frame for supporting the same so that the said reel or swift may be tilted or adjusted to different angles of inclination with respect to the said clamp or frame, substantially as and for the purposes set forth.

2d, The combination with the slotted clamp or holding frame, of the adjustable plate for supporting the spindle, and the screw and thumb nut for adjusting and holding the said plate in position, substantially in the manner and for the purposes specified.

3d, The combination with the arms of a reel or swift, such as described, of a knob or handle, constructed and arranged as specified, so as to be adjusted and held at any desired point upon the said arms.

### 69,580.—SHEEP HOUSE.—David Pangle, Belmont, Ohio.

I claim an improved sheep house of any required length, hight, and width constructed and put together with panels, G, figs. 1 and 2, or sections held together by tenants, B, on ends of stringers, A, and pinned with movable pins, C, etc., after the plan and in the manner set forth in the foregoing specifications.

### 69,581.—BALL ALLEY.—J. D. Patrick, San Francisco, Cal.

I claim the above described arrangement of the targets, D, and oblique backs, C, in combination with the alley, A, and return alley, B, substantially as set forth.

### 69,582.—OIL CUP.—William P. Patton, and Jacob R. Miller, Harrisburg, Pa.

The peculiar combination and arrangement of the adjustable spindle or plug, 2, with the shank, c, of an oil cup, constructed and operating substantially as described.

### 69,583.—ANIMAL TRAP.—T. S. Phillips, Cassadaga, N. Y., assignor to himself and M. J. Bellows, Dunkirk, N. Y.

I claim an animal trap having a revolving table, A, provided with catch and bait bars, C, at each end and upon opposite sides thereof, coil spring, F, spring catch, c2, and stop pin, d, constructed and operating substantially as herein described.

### 69,584.—CONVERTING CIRCULAR INTO RECIPROCATING MOTION.—Thomas Plumleigh and Charles Plumleigh, Dundee, Ill.

We claim the device to convert circular into reciprocating motion, consisting of two wheels, A A, supplied with triangular cogs or cams, B B, and secured to an axle or shaft, c, in such a manner that the cogs of one wheel are directly opposite to the recesses of the other wheel, and the slide, p, shaped to fit the recesses of the cogs, B B, and of the length equal to the space between the projecting points of the cogs of one wheel and the receding points of the cogs of the other wheel, said slide being supported by means of a bolt, G, playing in a slotted box, D, or some other equivalent means, the whole constructed and operating substantially as and in the manner herein described and specified and for the purposes set forth.

### 69,585.—TELEGRAPH APPARATUS.—C. H. Pond, Oberlin, O.

1st, I claim a hinged or jointed self-adjusting connection for completing, working, or governing the local circuit, constructed substantially in the manner described.

2d, The hinged and self-adjusting leaved spring, o o', for regulating the movement of the armature lever, when arranged substantially as described.

3d, A double local connection by means of a three-leaved spring, o', to be brought into action under the influence of a strong current.

4th, The reacting springs, o, in combination with the armature lever, b, helices, a a', and adjusting screws, e k, substantially as and for the purpose set forth.

5th, The jointed forker, w', spring, n, connecting screw, h, in combination with the armature and reacting springs, o o', substantially as and for the purpose set forth.

### 69,586.—BROOM HOLDER.—John G. Powell and Wm. A. Morse, Philadelphia, Pa.

We claim the extended arms, m m, made from one continuous piece of wire coiled or otherwise, bent to produce sufficient spring in combination with the base, B, substantially as shown and described and for the purpose set forth.

### 69,587.—CLOTHES HOOK.—Silas S. Putnam, Dorchester, Mass.

I claim the bracket, A, with its recess, e, and slot or opening, c, in combination with the hook, C or D, constructed and operating substantially as described.

### 69,588.—CARRIAGE SPRING.—J. G. Reiff, Farmersville, Pa.

I claim the arrangement and construction of circular or elliptic springs by decreasing the thickness of the leaves or plates, multiplying and increasing their number and making the plates tapering gradually, substantially as and for the purpose set forth, the spring to be made of wood, iron, steel, or any material, and for the purpose set forth in the specification.

### 69,589.—MACHINE FOR DRESSING RATTAN.—N. H. Richardson, Fitchburg, Mass.

I claim the stop, J, in combination with the head, G, and a series of scrapers, m, operating substantially as described for the purpose set forth.

### 69,590.—PREPARING PAPER PASTEBOARD AND OTHER MATERIALS TO BE USED AS PACKING FOR STEAM ENGINES.—James Ross, Somerville, assignor to himself and L. Fairbanks, assignors to William Adams, Somerville, Mass.

I claim the composition herein described whether composed of one or more or all of the ingredients named, as and for the purpose specified.

### 69,591.—HYDRAULIC ENGINE.—L. M. Sabin, St. Louis, Mo.

1st, I claim the combination of vat, A, and pipes, vat, B, and cylinders, C C', piston, E E', rods, D D', lever, W, valves, F F' and K K', and rods, H H', as above named and described and for the purpose set forth.

2d, I claim the combination of cylinder, C C', pistons, E E', bars, D D' and H H', valves, F F' and K K', and lever, M, as above named and described and for the purpose set forth.

### 69,592.—BRICK MACHINE.—Samuel Shreffler, Joliet, Ill.

I claim the combination of the shaft, b, provided with the radial mixers, with the double inclined spiral plane, c, and friction rollers, f f.

I claim the carriage, g, of the peculiar shape and construction shown in combination with the dogs, f f, and rod, l, with operating lever, m, when arranged and operating substantially as described.

### 69,593.—STRAW CUTTER.—James D. Smith, Richmond, Ind.

1st, I claim operating the knife, B, by means of the tri radial grooved disk or cam, C, either with rotary or reciprocating motion, substantially as described.

2d, I claim operating the feed by means of the knife in combination with the lever and pawl, substantially as described and for the purpose specified.

### 69,594.—MANUFACTURE OF ILLUMINATING GAS.—John W. Smith and Thomas H. Phillips, Washington, D. C.

I claim an improvement in making gas from coal tar with the method above described of determining the quality and quantity of gas at any time of the operation by the use of stop cock, H, as represented and described.

### 69,595.—PUMP.—Flavius J. Underwood, Rock Island, Ill.

I claim the cylinders, A, top chamber plate, B, and discharge tube, C, in combination with the trap valve, F, substantially in the manner and for the purpose as herein set forth.

### 69,596.—BURIAL CASE.—James H. Van Houten (assignor to Noah W. Klug and Albert Caswell), New York City.

1st, I claim a burial case or casket composed of two transverse parts, A B connected together by a screw, substantially in the manner as and for the purpose set forth.

3d, The slide, D, in connection with the case or casket, constructed substantially as described.
3d, The combination of the plugs, c c, with the burial case, A B, and slide, D, the whole made substantially as and for the purpose shown and set forth.

69,597.—Mode of Securing the Bars of Piles or Fagots.—G. Walters and T. Shaffer, Phœnixville, Pa.
We claim securing the bars comprising the piles or fagots for cruciform and other shaped wrought-iron beams or girders by clamps, in the manner and for the purpose described.

69,598.—Churn.—Moses Walton, Marlboro, Ohio.
I claim the adjustable beaters, D, head, C, in combination with the hollow shaft, a, sleeve, E, extension arms, J, and clamp, I, substantially as and for the purpose set forth.

69,599.—Railway Switch.—Wm. Wharton, Jr., Philadelphia, Pa.
1st, The combination of the permanent rails, A and A', of the main track, the permanent rails, B and B', of the turnout, the switch rails, D and D' (the former being inclined), and the movable guard rail, I, the whole being arranged and operated substantially as and for the purpose set forth.
2d, The switch rail, D', and guard rail, G, coupled together or forming a part of each other, in combination with the rails, B and B' A and A', and switch rail, D.
3d, The switch rails, D and D', and guard rails, G and I, in combination with the permanet rails, A and A', of the main track and the permanent rails, B and B', of the siding, substantially as and for the purpose set forth.

69,600.—Corn Harvester.—Charles W. Williams, Wyandotte, Mich.
I claim the combination of the driving wheels, A A, provided with drums, B B, the belts, C C, pulleys, D D, connecting rods, E E, knives, F F, cross heads, H H, guide rods, I I, oscillating tables, K K, levers, L L and M, rods, N N, caster wheel, W, seat, Z, pole, Y, with the frame, X X, arranged substantially as described for the purpose designed.

69,601.—Knife Cleaner.—H. Woodward, London, England.
I claim a knife cleaner, a series of jaws pivoted at or near their lower ends and held together at the top by a suitable spring fastening, substantially as set forth.
2d, The combination with the jaws, A, bolt, b, and spring band, c, of the facings, a a, of leather or other suitable substance, substantially as set forth.
3d, The combination with the jaws, A, of the frame, B, chamber, C, and holes, d d, substantially as set forth.

69,602.—Plumb Level.—John T. Zimmerman and Henry Baker, Lancaster, Pa.
1st, We claim the regulating plate, G, with its base, h, and slot, i, and binding screw, H, in combination with the index, F, provided with four points, f f f f, constructed and operating in the manner specified.
2d, We also claim the arrangement of the united supports, B B', by the cross plates, C, in combination with the clamping screw, E, when constructed in the manner and for the purpose set forth.

69,603.—Blacking Brush.—Robert Adams, Cincinnati, Ohio.
I claim, 1st, The application of the glass ball, E, to the mixing the blacking, as specified.
2d, The mode of applying spring holders, B B, spreading brush, D, in combination with blacking box, C, glass ball, E, and recessed circle, G, in top of polishing brush for reception of blacking box, C, as constructed and operating for purposes set forth.

69,604.—Automatic Wagon Brake.—Stephen Alley and Samuel D. Williamson, Clifty, Ind.
We claim, 1st, The combination of the hind axle, B, braces, C, reach, A, and links, D, arranged to operate substantially in the manner and for the purpose set forth.
2d, In combination with an automatic wagon brake the bed, F, and bar, I, with or without the rollers, G, substantially as and for the purpose set forth.

69,605.—Scissors and Button Hole Cutter Combined.—J. A. Althouse, New Harmony, Ind.
I claim a buttonhole cutter, B, attached to a pair of scissors by the same rivet, a, when constructed and operating as herein shown and described.

69,606.—Harvester.—James Anthony, Ledyard, N. Y., assignor to Cyrenus Wheeler, Jr., Auburn, N. Y.
I claim, in combination with a frame in two parts and hinged to the main axle as a common center, the two levers, E G, one on each frame and operating conjointly to raise or hold in a raised position the rear frame and cutting apparatus connected to it, substantially as described.

69,607.—Machine for Grating Vegetables.—Horatio Arthur, Martinsburg, N. Y.
I claim the combination herein described for grating vegetables, using for that purpose the arrangement illustrated and specified.

69,608.—Feeding Rack for Cattle.—G. W. Balding, Angola, Ind.
I claim the notched interlocking boards crossing the box diagonally and projecting beyond the sides of the same and secured to the upright posts in the corners of the box, in combination with said box, all constructed and arranged as described and shown for the purpose specified.

69,609.—Wash Tub Attachment.—Oren Baldwin, Keokuk, Iowa.
I claim a washing tub attachment having the center shaft, B, handle, I, cross piece, C, and the beater, F, with its faces, G G', to press the clothing against the board, H, together with the board, K, all arranged as specified.

69,610.—Horse Rake.—Levi B. Ball, Dayton, Ohio.
I claim the housing, B, constructed and operating as described in combination with spring, F, tooth, C, plate, D, bolt, E, and nut, G, substantially as and for the purposes set forth.

69,611.—Land Roller.—W. W. Ballard, Davisburg, Mich.
I claim arranging a series of rollers, C C, to the frame, A, by means of the bars, H, constructed as set forth and for the purposes described.

69,612.—Roofing Compound.—Oscar M. Bartholomew (assignor to himself and W. P. Sherman), Elmira, N. Y.
I claim a composition of matter compounded from the ingredients named and in the manner substantially as and for the purpose set forth.

69,613.—Sawing Machines.—Joseph M. Batchelor, Foxcroft, Me.
I claim the arrangement of the horse, N, rod, G, and treadle bar, P, as and for the purpose specified.

69,614.—Mode of Constructing Molds for Casting Aluminum Plates for Artificial Teeth.—James B. Bean (assignor to himself and A. H. Balderston), Baltimore, Md.
1st, I claim the thin metallic impression cup, C, for the purpose specified.
2d, I claim the use of the model made in several pieces, substantially as and for the purpose described.
3d, I claim the process of constructing molds for casting aluminum plates for artificial teeth, substantially as above described.

69,615.—Method of Securing Artificial Teeth to Cast Plates.—James B. Bean (assignor to himself and A. H. Balderston), Baltimore, Md.
1st, I claim the dental plate cast of aluminum, or other similar metal, having the recesses, E E, and the channel, e e, behind the teeth when they are in position, substantially as described.
2d, I claim the process above described of forcing melted tin or other metal around the teeth and platinum pins, as and for the purpose specified.
3d, I claim the use of melted tin for the purpose of filling the channel or cavity, e'' e'', and attaching the teeth having platinum pins as for vulcanite work to a metallic plate, as and for the purpose herein shown and described.

69,616.—Automatic Blotter.—Joseph E. Billings, Belmont, Mass., assignor to himself and B. H. Moore, Boston, Mass.
What I claim as my invention and desire to secure by Letters Patent is the combination of the covers, the blotting paper and the spring, or its equivalent, substantially as and for the purpose specified.

69,617.—Bed Bottom.—Luzerne M. Bolles, Cooperstown, N. Y.
I claim the combination of irons, B, rods, C, key blocks, D, keys, E, hooks, F, links, H, and cross bar, G, or their equivalents, with each other and with the bedstead, A, arranged as described and set forth for the purpose specified.

69,618.—Composition for Saturating Paper and other Fabrics.—A. T. Boon and I. Stafford, Galesburg, Ill.
We claim the application and use of saccharine matter employed, substantially in the manner and for the purpose as herein specified.

69,619.—Latch Lock for Doors.—Henry Bosch, Mount Vernon, N. Y.
I claim the spring lever, e, in combination with the double lever, c, pivoted to the latch bolt, a, and provided with the knob, b, for the purpose of locking the said spring latch bolt in either a closed or open position, substantially as described.

69,620.—Churn.—Courtland Boyer, Marshall, Mich.
I claim a churn dasher with inclined perforated slats, F, operated in connection and combination with a churn, B and B, substantially in the manner and for the uses set forth.

69,621.—Gas Light Multiplier.—John F. Boynton, Syracuse, N. Y., assignor to Henri L. Stuart, New York City.
I claim, 1st, A closed box containing capillary material or its equivalents, with entrance and exit tubes so as to charge gas with volatile hydrocarbons, substantially as described.
2d, A box with a lid and close joints, so as to form a carbureting chamber for gas, substantially as described.
3d, A close chamber or box with cloth or other capillary material on rods or supports, substantially as described.

69,622.—Insulator for Telegraphs.—David Brooks, Philadelphia, Pa.
1st, I claim the combination, substantially as described, of a vessel or tube of blown glass with a telegraphic wire insulator, for the purpose described.
2d, A wire holder, A, and case, B, in combination with a tube or vessel, C, of blown glass arranged between the holder and case and insulated from both, substantially as and for the purpose specified.
3d, A recess arranged between the case, B, and holder, A, and containing paraffin, for the purpose set forth.
4th, A detachable cylinder, D, arranged in respect to the holder case, B, and vessel, C, and insulated from the same, substantially as and for the purpose set forth.

69,623.—Churn.—A. H. Brown, Springfield, Vt.
I claim, 1st, The angles in the cylindrical portion of the churn marked a', substantially as described.
2d, The dasher, E, forming an oblique longitudinal section of a cylinder, attached to the arms as shown, and operating substantially as and for the purposes described.
3d, In combination with the dashers, E, I claim the scrapers, b, attached to the arm, D, substantially as shown and described; also the latch, I, and button, k, as and for the purpose set forth.

69,624.—Churn.—M. M. Brown, Pimento, Ind.
I claim the bar, G, cord, H, balance wheel, E, and shaft, F, in combination with the churn and dashers, as herein set forth for the purpose specified.

69,625.—Hawse Pipe.—Parker Burnham, Gloucester, Mass.
I claim the adjustable hawse pipe, B, arranged within the bow or side of the vessel, when constructed and operating substantially as and for the purpose set forth.

69,626.—Reversible Railway Ticket Safe.—Jotham G. Chase, Springfield, Mass.
I claim, 1st, The arrangement in a railway ticket safe of the slotted cover or lid, a, with the base, A, having the inclined ribbed floor, q, all constructed and operating substantially as herein described and set forth.
2d, The arrangement in the end, H, of the base of said railway ticket safe, of the recess, a, for the purpose and in the manner substantially as herein specified.
3d, A railway ticket safe attached to the arm of a car seat, in such manner as that it shall be reversible as described, and equally accessible upon either end of the arm of the seat, substantially as described and herein set forth.

69,627.—Horse Collar.—Simon G. Cheever and James Forgie, Boston, Mass.
We claim the employment of such shaping piece when applied and confined directly between the covering tube which confines the stuffing and the leather which forms the outer finishing cover.

69,628.—Belt Clasp.—Joseph Chenoweth and John McLain, Auglaize Co., Ohio.
We claim the manner of construction of the clasp as herein described, for the uses set forth.

69,629.—Suspender.—C. H. Cleveland, Selma, Ala.
I claim the suspender or shoulder brace composed of two single straps, C C, each passing from its attaching strap at the one side over the shoulder to the attaching strap on the other side of the body, substantially as herein described.

69,630.—Hide Stretching Machine.—John F. Coburn, Newark, N. J.
I claim, 1st, Connecting the frames, A and B, of a hide stretching machine, by means of toggle levers, and operating the latter by ratchet bars, D D', and pinions, f f, substantially as herein shown and described.
2d, The frames, A and B, when arranged as and in combination with the toggle lever, C, ratchet bar, D', obliquely sliding board, E, and lever, h, all made and operating substantially as and for the purpose herein shown and described.

69,631.—Railway Water Elevator.—Martin S. Collar, Marquette, Wis.
I claim, 1st, The combination and arrangement of the irons, P, springs, R, cross bar, L, bar, M, bent lever, K, connecting bar, J, bent lever, X, and piston rod, E, operating as described, for the purpose specified.
2d, In combination with the above, the conical valve, G, constructed as described, consisting of the leaves, g1, hinged to opposite sides of the seat, g2, in such a manner that the water as it rises through the pipe will force the leaves back against the sides of the tube, said leaves reclosing by their own gravity, substantially as described, for the purpose specified.

69,632.—Bed Bottom.—H. M. Conklin, Syracuse, N. Y. Antedated Oct. 2, 1867.
I claim the combination of the bed rails, a a, the traversing bar, B, and the fastenings composed of the webbing, D, slat protections, E E, and the buttons, F F, all substantially in the manner described and arranged and for the purposes set forth.

69,633.—Machine for Stretching Leather.—J. F. Connolly and W. B. Hughes, Newark, N. J.
We claim, 1st, The arrangement of serrated racks, c, and catches, f, or their equivalents, in combination with the stretching beam, B, substantially as and for the purpose set forth.
2d, The arrangement of hinges, c, in combination with the end pieces, a a, of the stretching frame, A, substantially as and for the purpose described.
3d, Making the stretching frames detachable from the power mechanism, substantially as and for the purpose described.
4th, The arrangement of racks, D, and pinions, F, in combination with the stretching beam, B, constructed and operating substantially as and for the purpose set forth.

69,634.—Smut Machine.—W. W. Conner, Nobleville, Ind.
I claim, 1st, The combination and arrangement of suction blast spout, I, consisting of the horizontal part, d, provided with deflectors, f f, and vertical portions, e e', the discharge spouts, J J', grain receiving and air tube, N, fan case, B, communicating with the vertical spout, c, cylindrical screen, F, within the case, G, communicating at one end by the funnel-shaped passage, H, with the screen, B, and its other end communicating by spout, P, with the vertical spout, e', when all are constructed as described, whereby the grain at one passage through the machine is subjected to the action of three distinct blasts of air, as herein set forth.
2d, The valves, Q R, constructed and applied within the suction blast spout, substantially as and for the purpose set forth.

69,635.—Pump Valve.—Jas. E. Cronk, Poughkeepsie, N. Y.
I claim, 1st, The valve, D, in excess of the length of cylinder it covers, in combination with the concave seat in the side of said cylinder, substantially as described and shown.
2d, In arrangement therewith the contraction of the cylinder to permit of the play of the valve, whether provided with the flaring cup or not, all substantially as shown and described.

69,636.—Tanning.—Charles J. Cushing, B. F. Walls, and Wm. A. Wood, Hancock County, Ky.
We claim the vatting and tanning in a cold liquid solution under one operation and in one compound vatting and tanning solution.

69,337.—Device for Advertising.—Asahel Davis, Lowell, Mass.
I claim making a case of drawers or pigeon holes with a place in the front of each drawer for a card showing the wants of the proprietor, with a drawer or pigeon hole receptacle back for the reception of replies, when constructed substantially as described.

69,638.—Apparatus for Oiling Propeller Cranks.—Jesse Davis, New York City.
I claim arranging the feed oil can, d, with a cotton wick running through the pipe, c, to a sponge or mop in its lower end, in combination with a perforated receiving box, b, and connecting pipe, c, substantially as and for the purpose herein described.

69,639.—Canal Lock.—Horace H. Day, New York City.
1st, I claim a canal lock constructed and operating in the manner substantially as and for the purposes herein described.
2d, I claim in a canal lock constructed as above, the pipes or channels placed in or at the sides of the lock chamber and used for filling and emptying the same, substantially as and for the purposes herein described.
3d, I claim series of valve openings at certain different hights, in combination with said pipes or channels, for the purpose of letting the water into and out of the canal lock successively at said different hights, as herein specified.
4th, I claim in combination with the said canal lock, the construction and arrangement of the vertical main gate or gates, to be operated by hydrostatic power, and constructed substantially as described.

69,640.—Gate.—S. M. Denniston, Hudson, Wis.
1st, I claim the hinge, C, the pivoting pin of which is formed with a spiral or auger-shaped thread upon it, fitting into the spiral thread cut in the eye of the hinge, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the plates, H, levers, G, and bar, F, or their equivalents, with the platform, A, and downwardly projecting pivoting pin of the lever hinges, E, of the gate, B, substantially as herein shown and described and for the purpose set forth.
3d, The combination of the plate, L, lever, K, or their equivalents, and lifting pins, J, with the platforms, and pivoted hooks, I, substantially as herein shown and described and for the purpose set forth.

69,641.—Carriage Doors.—P. Devilliard and A. Postweiler, Paris, France.
We claim the application to the doors of landaus and carriages similar thereto, of a jointed frame work connected to the door by means of bolts, as herein described and illustrated by the accompanying drawings.

69,642.—Transplanter.—C. R. Disbrow, Bath, N. Y.
I claim a taper-formed transplanter with a sliding side, a', arranged substantially as and for the purpose herein described.

69,643.—Plow.—J. G. Dodge, Louisville, Ky.
1st, I claim the frame constructed as shown and described.
2d, The share, P, having the flange, T, arranged to fit in the recess at the front of the frame and form a section of the landside, as set forth.
3d, The plate, N, arranged to fit in the space under the bar, f, and in connection therewith form the rear portion of the landside, as shown and described.
4th, I claim forming the landside of a plow of stationary section, b, and the removable sections, f and N, when constructed and arranged as described.
5th, I claim securing the plate, N, to the frame by means of the notch, w, and the flange, a, as set forth.
6th, Securing the flange, T, in place by means of the point, o, fitting into the notch, o', on the front edge of the section, b, substantially as described.

69,644.—Die Plate.—James D. Driggs (assignor to himself and Edward Merrill), New Bedford, Mass.
I claim the frame, B, and cylinder, C, with set screw, D, applied to a die plate, substantially as and for the purpose herein specified.

69,645.—Padlock.—Benjamin, John, Samuel B., and Augustus H. Ebert, Frederick, Md.
We claim the construction of the cylinders, I L and M, with their tumbler, K, pin, F, and turntable, E, when arranged, combined, and operated as herein described and for the purposes set forth.

69,646.—Clamp for Ropes and Wires.—John H. Elward, Mendota, Ill.
I claim a double acting clamp for suspending ropes and wires consisting of a bifurcated cam lever, B, having the parts, C E and E', and the intermediate projection, F, arranged to operate substantially as described.

69,647.—Tallying Instrument.—Geo. Farmer, Flint, Mich.
I claim a registering or tallying instrument constructed substantially as herein shown and described, that is to say, with the two disk wheels, C and D, the levers, f and G, the cams, F and i, and the spring pawls, a, in combination with the dial plate, A', the whole instrument constructed, arranged, and operating substantially as herein described, for the purposes set forth.

69,648.—Annunciating Fire Alarm.—Amedee and Eugene Fontaine, Fort Wagne, Ind.
1st, We claim combination of the expansive wire, l, the weighted lever, D, the fan, A, the segmental wheel, B, the stop lever, C, the segmental wheel k, pinion, j, and hand, i, each of which are constructed and operated for the purpose and in the manner specified.
2d, The combination of the segmental wheel, B, and train operated thereby, and pinion driver, b, for the purpose of so setting thermometrically the apparatus, substantially in the manner and for the purpose described.
3d, The segmental wheel, B, constructed in the manner specified, in combination with the stop lever, for the purpose of maintaining the same relative position of the upper end of said stop lever to the fan, A, the same being operated substantially as set forth.
4th, The stop lever, C, the fan, A, and the helical spring, a, and train, in combination with the bell pull or slotted bar or rack, m, the same being constructed in the manner and for the purposes specified.
5th, The combination of the alarm with the annunciator, the same being constructed in the manner and for the purposes substantially as specified.
6th, The ratchet, G, pawl, s, lugs, o, stop levers, p, the projection, u, on pawl, s, the same being constructed, combined, and operated in the manner and for the purposes specified.
7th, The arm, v, on pawl, s, and fan, w, for the purpose of locking and releasing the train, the whole being constructed and combined in the manner substantially as specified.

69,649.—Skate.—John Forbes, New York City.
1st, I claim forming the drops, a and f, on the toe and heel plates respectively, by punching and bending, so that they are part of the said plates, as set forth.
2d, The manner of securing the heel and toe plates to the posts on the runner, by means of slot-headed buttons, c and g, fitting into T-shaped slots in the said posts, as described.

69,650.—Machine for Washing Sand, etc.—David L. Furnier, Bostraver, Pa.
1st, I claim the method as herein described of crushing and washing sand or rock by means of revolving wheels operated by cross or horizontal shaft beneath the pan.
2d, The construction of iron boxes or elevators, that receive the sand and water mixed in the manner as and for the purpose described.
3d, The scraper that enters each and every box, in the manner and for the purpose described.

69,651.—Horse Hay Fork.—C. H. Gifford, Philadelphia, N.Y. (assignor to himself and Elbridge Sims), Antwerp, N. Y.
I claim an improved hay fork formed by the combination of the prongs, C, prong shaft, B, rigid arm, E, catch bar, D, pivoted to arm, E, spring, F, and frame, A, with each other substantially in the manner herein shown and described.

69,652.—Hay Loader.—C. H. Gifford, Philadelphia, N.Y. (assignor to himself and Elbridge Sims), Antwerp, N. Y.
1st, I claim the adjustable friction pulley, E, arranged in journals in the arms, C', and adapted to bear against the periphery of the wheel, A, as and for the purpose specified.
2d, The combination of the crane, H, rope, G, pulley, F, operating lever, E, and beam, D, with each other and with the frame of the wagon substantially as herein shown and described and for the purpose set forth.
3d, The combination of the rake, I J, with the frame of the wagon and with the rotative apparatus substantially as herein shown and described and for the purpose set forth.

69,653.—Churn.—E. L. Gilman, Somerville, Mass.
1st, I claim the dashers, G G, constructed as described and used with the shaft, F, in the manner and for the purposes set forth.
2d, The cups, H H', perforated as described and used upon the lid, A', with the dasher shaft, F, in the manner specified.
3d, The arrangement of the frame, B, upon the lid with wheels, C C C1 C2, pitmen, E E, with their dashers and shafts operated by the wheel, D, in the manner and for the purposes described.

69,654.—Portable Fence.—N. J. Glover, Waveland, Ind.
I claim a portable zig-zag fence with the panels separated and supported by the wedges, V V, and braces, N N, as constructed and shown.

69,655.—Machine for Pulverizing Rocks, Ores, etc.—W. F. Goodwin, East New York, N. Y. and Chas. B. Squire New York City.
I claim the series of ribbed or cogged wheels, B2 B3 B4 B5 B6, enclosed within the drum, B, which wheels mesh together and with the teeth or ribs on the inner surface of the hoop of the drum the revolving of which revolves the pinion wheels constructed and arranged to operate in the manner and for the purpose substantially as described.

69,656.—Machine for Crushing Rocks, Ores, etc.—W. F. Goodwin, East New York, N. Y. and Chas. B. Squire, New York City.
1st, I claim the long bars, A and A', placed end to end in a horizontal line with each other in the frame, F, and having their outer ends pivoted in the bolts, B, one on each end of the frame, F, and having their inner ends operated independently of each other by means of the cams C C', and pitmen, P P', arranged to operate in the manner and for the purpose substantially as shown and described.
2d, The blocks, K, and K', and spring, I, arranged to operate together in the manner and for the purpose substantially as described.

69,657.—Baling Press.—T. D. Guthrie Jr., Galva, Ill.
I claim the combination of the follower, H, screw, I, gear wheels, J E P, shafts, L R, clutches, M O, and S U, gear wheels, N T, and segment, X, having external and internal teeth and provided with sockets, V, for the reception of the levers, Z, with each other and with the frame of the press substantially as herein shown and described and for the purpose set forth.

69,658.—Sliver Can for Cotton, etc.—Wm. Hamer, Littl Lever, near Bolton, England.
I claim the spiral spring, c, supporting the movable metal plate, b, in the can, a, having the perforated bottom all constructed and operating as described for the purpose specified.

69,659.—Obstetrical Bandage.—J. O. Hamilton, Jerseyville, Ohio.
I claim an obstetrical supporter formed in three parts, B C D, and provided with elastic bands, G, extension pieces, K, loops, H, gores, L, and slits, I, all constructed and arranged as shown and described.

69,660.—Chimney Cap.—James Hammond, Adams Center, N. Y.
I claim the chimney cap constructed as described of one piece of cast metal hollowed out upon its under side, B, and having the legs, C, and with its ends and sides, B, flared outward as herein shown and described.

69,661.—Water Closet.—J. B. Hanniniann Detroit, Mich.
I claim the arrangement and combination with the lever, j, of the seat, c, and sliding bar, m, substantially as described.

69,662.—Universal Coupling.—Chas. Haskins, Penn Yan, N. Y.
I claim the channels, a, in the arms, B, and ledge, C, between the arms as and for the purpose herein set forth.
2d, The cross, D, when provided with pivots as described and used to connect the two parts of universal coupling substantially as specified.

69,663.—Treating Straw, Wood, and Other Materials for the Manufacture of Paper.—A. M. Hastings, Rochester, N. Y., and Stoughton Pettebone, Niagara Falls, N. Y.
We claim the treating of straw, wood or other fibrous material for the manufacture of paper pulp by boiling the same in a solution of caustic alkali liquor of suitable strength in a closed cylinder or vessel at low temperature not in any case to exceed 300° Fah., accompanied with internal agitation of the contents of the vessel or cylinder produced by wings, brackets, or any other means or mechanical appliances and preferably by the use of a rotating cylinder furnished with wings or brackets as above described.

66,664.—Metal Tip for Suspending Brooms, etc.—M. C. Hawkins, (assignor to himself and Alonzo Perry), Edenboro, Pa.
I claim the metallic tip for brooms and mop handles constructed as described consisting of the struck up or cast spherical end, L, having the upper edge of the opening, F, nearly in its center and presenting a smooth surface to the hand of the user as herein shown and described.

69,665.—Egg Cup.—Clifton Hellen, Washington, D. C.
I claim an egg cup formed of the sides, A A, consisting of the bowl for holding the egg and the base or feet, B B, on which the cup stands in combination with the hinge, C, and spring, D, as herein set forth and described.

69,666.—Sewing Machine.—C. Hodgkins, Malboro, N. H.
I claim the rod, S, fitted transversely and horizontally in the upper part of the needle arbor, E, secured therein by the pressure pin, o, and provided with holes, r, for the thread, s, to pass through substantially as and for the purpose specified.

69,667.—Horse Rakes.—Frank Holden, Litchfield, Ill.
1st, I claim the sliding rods, L L, connected with the shaft, I, operated through the medium of the foot lever, J, in combination with the hooks, n n on the straps, m m, in which the rake-head, l, is fitted, arms, E E, and pendants, h h, substantially as and for the purpose specified.
2d, In combination with the above I claim the arms, E E, supporting the rake and pivoted to the oblique pendants, h h, substantially as described for the purpose specified.

69,668.—Washing Machine.—S. R. Holmes, Salem, Oregon.
I claim 1st, The rollers, D, and roller frames, B and C, placed in a vertical position and vibrating at the same time in opposite directions in combination with each other and with the box, A, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the double crank, G, and pitmen, I and J, with the vertical roller frames, B and C, and with the box, A, substantially as herein shown and described and for the purpose set forth.
3d, The combination of the lever K, connecting bar, L, crank shaft, M, and slotted plates, f', with each other and with the box, A, and sliding frame, F, substantially as herein shown and described and for the purpose set forth.
4th, The combination of the roller frame, C, and sliding frame, F, with each other substantially as herein shown and described for the purpose of giving to said roller frame a longitudinal and lateral movement at the same time.

69,669.—Buckle.—A. H. Hopkins, Goshen, Ind.
I claim a harness buckle formed with two tongues, b b, hung in the middle in opposite directions to lift and catch on the opposite flat sides of the frame against the cross-bars, d d, and provided with tuck-loops, c c, on each side substantially as and for the purposes herein described.

69,670.—Lamp Heater for Dental Purposes.—J.C.House, Lowville, N. Y. Antedated, Sept. 25, 1867.
I claim the construction and use of the cylindro-conical dome, D E, in combination with the winged cup, d, the perforated diaphragm plate, e, or their equivalents as set forth in the above specification.

69,671.—Sewing Machine for Working Buttonholes.—Edmund Howard and W. H. Jackson, Flushing, N. Y.
We claim, 1st, The combination of the hook lever or needle, K, and split lever or needle, Y, or their respective equivalents, both acting the one after the other to carry the thread from the shuttle or other under thread carrier of a sewing machine to the upper side of the cloth being sewed and around its edge when such levers are arranged to operate together and with reference to the ordinary sewing mechanism of the machine, substantially as described and for the purpose specified.
2d, Operating the hook and split levers, K and Y, or their respective equivalents, with reference to the ordinary sewing mechanism of a machine by and through the forward and backward movement of the shuttle or other under thread carrier of the machine, substantially as and for the purpose described.

69,672.—Amalgamator.—W. W. Hubbell, Philadelphia, Pa.
1st, I claim the series of revolving angular-faced bars, e, operating as described over the cells, a, or bed of quicksilver upon the saturated ore to force it down and longitudinally successively into contact with the quicksilver for the purpose of enabling it to take up the gold and silver in the ore and form an amalgam thereby extracting these metals from their ores.
2d, The construction and arrangement of the feed wheel, b, and water way, r, to operate together and with the said angular-faced revolving bars to regularly supply them with and saturate the ore for amalgamation, in the before mentioned manner.
3d, The construction and application in connection with and behind the bars, e, and amalgamating bed, a, of a waste basin or basins, or amalgam reservoir, b d, adapted to receive and save the quicksilver, gold and silver, or amalgam, as it is sometimes driven back in and with the ore by the action of the bars before settling, as described.
4th, The construction, arrangement and gearing of the revolving pulleys, or their equivalents, to revolve all the bars together by connections or shafts extending through the side piece, w, and with the feed wheel, substantially as described.
5th, The construction of the side pieces, v and w, with the ends of the bars

and their revolving appliances so that the bars may be readily removed to collect the amalgam and be again restored to their place and work without disturbing the revolving appliances, substantially in the manner and for this especial purpose as described.

69,673.—HAND LOOM.—Henry D. Hunt, Danville, Ill.

1st, I claim the segmental levers, H, pivoted to the lay, C, in combination with the long curved levers, e, the hook, a, the spring, d, the cords, g, and the drivers, I, constructed, arranged and operating substantially as and for the purposes herein described.

2d, The adjustable pawl, p, and screw, p2, connected with the lathe and in combination with the ratchet wheel, p1, on the cloth beam, D, arranged and operating as and for the purpose specified.

69,674.—BRUSH CLAMP.—Arthur Huston, Bristol, Me.

I claim an improved brush clamp, A, formed in two parts, a1 and a2, and in substantially the form and manner herein shown and described and for the purpose set forth.

69,675.—BATHING APPARATUS.—James Ingram, N. Y. City.

1st, I claim the syringe, k, fitted with a piston to receive movable weights and provided with supply pipes and discharge cock, as and for the purpose set forth.

2d, The arrangement of pipes and cocks specified in combination with the bath tub, as and for the purposes set forth.

69,676.—TRUSS PAD.—W. J. Johnson, New Orleans, La.

I claim the truss constructed as described with the thumb pad, B, hinged to the rim of the annular pad, A, the latter pressing against the body in one direction while the former by the action of the spring, F, in the recess, C, presses against the herma with a lifting action, as herein shown and described.

69,677.—MACHINE FOR COMPRESSING PEAT.—John Jones, Baltimore, Md.

I claim the application of pitted, grooved or corrugated rollers, for the purpose specified.

I also claim the direct application of heat to the pressing apparatus.

69,678.—SELF-ACTING PLOW HANDLE.—John L. Keasor, Laconia, N. H.

1st, I claim attaching one or more plows to the side of a wagon, substantially as herein shown and described

2d, The combination of the horizontal bar, C, vertical bar, E, horizontal beam, F, and brace bar, H, with each other and with the plow, B, and wagon, A, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the pivoted bar, I, chain, K, or its equivalent, and lever, L, with each other and with the plow, B, and wagon, A, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the lever plow cleaner, N, with the plow, B, and wagon, A, substantially as herein shown and described and for the purpose set forth.

69,679.—HARVESTER.—J. M. and M. L. Kellar, Buckeye, Iowa.

1st, We claim the circular cutter, I, and finger plate, H, arranged in connection with a grain platform, E, and attached to the main platform, A, substantially as shown and described to admit of being raised or lowered or turned up to a vertical position, as set forth.

2d, The horizontal revolving rake arm, S, with rake, T, attached and arranged and applied as shown to admit of being rotated from the hub of wheel, K, and raised and lowered either simultaneously with or independently of the grain platform and cutting apparatus, substantially as shown and described.

3d, The lever, R, and lever frame, P, attached respectively to the standard, J, and lips, j j, and arranged and combined as shown for raising and lowering the cutting apparatus.

4th, The placing of the rake arm, S, on the standard, J, and connecting it with the hub, s, of the wheel, K, and with the rod, U, and bell crank, y, as shown to admit of the rake being rendered operative and inoperative at any time when desired.

69,680.—FENCE POST.—J. E. and A. H. Kendeigh, Amherst, Ohio.

I claim the herein-described post when constructed of sheet iron provided with flanges, B, and ears, E, in combination with the boards, F, in the manner substantially as set forth.

69,681.—SCYTHE FASTENING.—S. U. King, Windsor, Vt.

I claim the combination and arrangement of the adjustable bearer, D, and its two series of adjusting teeth with the metallic head, A, and the clamp, C, applied thereto, as specified.

I also claim the bearer, D as made in two parts, r s, arranged in manner and for the purpose specified.

I also claim the combination and arrangement of the teeth, m p, and the adjustable arm, E, and the head, A, substantially as described.

I also claim the application of the adjustable arm, E, to the plate, b, by means of the journal extended from the arm and by the bearing for such journal made in the plate as specified the same serving to relieve the screw, q, from lateral strain of the scythe tang such as would tend to loosen the screw in the snath.

69,682.—DITCHING MACHINE.—A. La Tourrette, Waterloo, N. Y.

1st, I claim the combination in a ditching machine of the endless chain, d f, curved spades or scoops, e, bars, K K, drums, J L, propelling shaft and rope, F O, gearing, G H, sweep shaft, I, chain, D E, and the parts, M N a, or their equivalents, for regulating the penetration of the spades, all arranged and operating substantially in the manner herein set forth.

2d, In a ditching machine constructed and operating as herein described, I claim the extensible chains, D E D E, applied to the front axle, in the manner and for the purpose set forth.

69,683.—BRICK MACHINE.—A. La Tourrette, Waterloo, N. Y., and Seth H. Smith, Venice, N. Y.

We claim the reciprocating mold bed, G, when operated from the vertical shaft, C, of the mud mill by means of the revolving curved arm, F, and when so arranged that the molds, b b, are filled at one revolution of the shaft, C, as herein shown and described.

69,684.—SUGAR EVAPORATOR.—Louis Lefevevre, M. D., New Orleans, La.

I claim the construction of the multiple evaporators and triple cylinders, one or more kettles communicating with each other, as herein described and for the purpose of evaporating juice or liquid by direct fire or steam, as set forth.

69,685.—LATHE.—B. M. Leury, Montgomery, Ala.

I claim the combination of the arbor, A, wheels, F G, and pawl wheel, I, grooved pulley, L, and pinion wheel, J, arranged substantially as and for the purpose described.

69,686.—CARRIAGE TRUCK.—Albert Marshall, Methuen, Mass.

I claim a carriage truck or bed, constructed substantially as described for the purpose set forth.

I also claim, in combination with the above, connecting the rear axle to the perch, L, and spring, K, by means of the plates, i k n p, and bolts, b m, constructed and arranged substantially as described.

69,687.—GOVERNOR.—Eli L. McNett, Canton, Pa.

1st, I claim the bars, C, upon the spindle, A, connected to the balls, E, by the rods, b, said balls connected to the short bar, D, on the spindle, A, at an angle of about 45° with the bar, C, by means of the rods, a, which are connected to the sliding sleeve, B, by the rods, d, all operating as described, whereby the momentum of the balls aids the centrifugal force to shut off the steam and the inertia of the balls aids the centrifugal force to let on the steam, as herein shown and described.

2d, The combination and arrangement of the cross bars, C D, rods, a b d, balls, E, and sliding sleeve, B, as herein set forth for the purpose specified.

69,688.—PASSENGER REGISTER.—John Melling, Rochester, N. Y.

1st, I claim the arrangement of the deflecting plate and hollow sill, A, in combination with the lever, F, substantially in the manner and for the purposes herein described.

2d, In combination with the deflecting plate, C, and lever, F, the worm gearing and register hand and dial, all arranged and operating in the manner shown and described and for the purpose set forth.

69,689.—CUTTING TOOL.—M. J. Mellyn, Roxbury, Mass.

I claim the bar, A, constructed substantially as shown and described with the anvil, C, and socket, E, in combination with the chisel, B, substantially as and for the purposes herein set forth and described.

69,690.—BUTTER CUTTER.—A. N. Merritt, Gardner, Mass.

I claim the combination of the inverted cylindrical cup, A, movable plate, F, or its equivalent center pin, C, and cutting wire, D, with each other substantially as herein shown and described and for the purpose set forth.

69,691.—SCOOP FOR SCALES.—Fred. Meyer, Newark, N. J.

I claim as an article of manufacture a scoop for scales, made of one piece of metal, as and for the purpose specified.

69,692.—SLED BRAKE.—T. S. Minuiss, Meadville, Pa. Antedated Sept. 26, 1867.

I claim the scraper, B, armed as described and operated by the lever, C, as and for the purpose set forth,

69,693.—CAR COUPLING.—Freeman Moore, and J. A. Baker, Carrollton, Ohio.

1st, We claim the latch, D, in combination with the forked lever, E E1 E2, the same being arranged so as to automatically couple the link or shackle, G, substantially in the manner set forth.

2d, The combination with the above of the lever, I, bar, I' and arm, J, the same being arranged as described and employed to uncouple and disconnect the cars in the event of running off the track, substantially as set forth.

3d, The combination of the latch, D, link, F, forked lever, F F1 F2, and spring, H, all arranged and operating in the manner and for the purpose specified.

4th, The combination with the coupling and uncoupling devices herein described, of the lever, L, arranged and employed in the manner and for the purpose set forth.

69,694.—MOP WRINGER.—Duane Peck, Rochelle, Ill.

I claim the roller, C, sliding in the groove, b, of the inclined bars, a, the toggle, C c, rod, D, treadle, F, spring, F, sliding roller, G, bearing against the springs, d, all combined and arranged to operate as herein described for the purpose specified.

69,695.—ANIMAL TRAP.—Saml. Pence, Eaton, Ohio.

I claim the construction and arrangement of the levers, J K, one end of each being pivoted to the partitions in the chamber, L, and the other ends to the slides, H I, and pivoted to each other in the center, the bent lever, M, secured at one end to the bar, K, and passing through the block, N, in partition, C, secured to the tilting platform, O, in the center chamber, the spring, R, and lever catch, S, as herein described for the purpose set forth.

69,696.—LINE HOLDER.—Daniel Peters, and Robert F. Williams, Keokuk, Ohio.

1st, We claim the lever, B, with a cross head, d, and a crotch, c, substantially as and for the purpose described.

2d, The bracket, A, with its lugs, e e, substantially in the manner and for the purpose described.

3d, The arrangement of the lever, B, so that the line may be passed between its cross head and the plate, and also through the crotch, c, substantially in the manner described.

4th, The manner substantially as described of constructing the bracket plate, A, with a socket bearing, a and the lever, B, with a pivot, b b, so that these parts may be connected together without any auxiliary device, such as a rivet or detached pin, as set forth.

69,697.—CULTIVATOR COUPLING.—Joshua Pierport (assignor to himself and Sidney S. Tuttle), La Harpe, Ill.

1st, I claim the turn-table clevis, with the head, g, in combination with the axle arm, a, both constructed and operating substantially as and for the purpose herein described.

2d, The combination of the clevis, and the axle arm, a, with the connecting bar, E, arranged and operating as and for the purpose described.

69,698.—ROCKER FOR CRADLE.—Patrick Power, Chicago, Ill.

I claim the combination of one or more rollers, C, with the rocker, B, substantially as herein shown and described, and for the purpose set forth.

69,699.—MOTIVE POWER FOR LOCOMOTION AND OTHER PURPOSES.—D. A. Pratt, Fremont, N. Y.

1st, I claim the mode and manner of adding the power of one coiled ribbon or main spring, or in lieu thereof a "coiled spiral wire spring," to another, by gear or its equivalent, in such a manner that the power of each and all of them shall reach one or more common centers or "units of power," substantially as described.

2d, The use of spiral wire springs, in "sets," as well as also a coiled ribbon or main spring, in groups, as herein described, for motive purposes.

3d, The mode and manner of attaching this particular power, as herein set forth, to the driving wheels of the carriage thereof, for the purposes and as described.

4th, The combination of this power, when thus accumulated, with three or more pinions and gear as described, and for the purposes set forth.

69,700.—KEYHOLE GUARD FOR DOOR LOCK.—D. A. Pratt, Sing Sing, N. Y.

I claim the V-shaped cam, or spiral screw, revolving on the arbor, a, of the key, for the purposes of expanding or contracting the arm, b, or lip, c, also the serrated arm, b, as well as the combination of said serrated arm, b, and lip, c, with said cam.

69,701.—STUMP EXTRACTOR.—G. W. Pressey, Hammonton, N. J.

I claim the pawls, H H, constructed in annular form, so as to fit loosely on the lifting bar, B, and provided with pendent arms, f, in connection with the levers, E E, all arranged and applied to operate in the manner substantially as and for the purpose set forth.

I also claim the holding and retaining pawl, I, when used in combination with the pawls, H H, and the levers, E E, substantially as and for the purpose specified.

I further claim the pin, e, fitted on the lifting bar, B, in combination with the lower perforated bent end of the lifting bar, all arranged for the purpose of holding the chain to the lower end of the lifting bar, substantially as shown and described.

69,702.—BOILER GAGE COCK.—John G. Raymond, Rondout, N. Y.

I claim the disk or button, C, arranged substantially as described, in combination with the tube, A, and aperture, c, as and for the purpose specified.

69,703.—WOODEN PAVEMENT.—Robert L. Ream, N. Y. city.

I claim, in the construction of wooden pavements, the removable and replacable notched keys, for locking in transverse directions, sections made of a series of blocks spiked, grooved, and banded together as herein described, so that the sections may be taken up when pipes or sewers are to be laid in the street, and readily laid down again, or for repairs, as set forth.

69,704.—SELF-ADJUSTING ELASTIC GATE.—Peter S. Reist, Oregon, Pa.

I claim the construction of self-adjusting elastic gate as herein described, and for the purposes set forth.

69,705.—ROTARY STEAM ENGINE.—Rudolph W. Riess, Philadelphia, Pa.

1st, I claim the reversible valve, C, of a rotary engine constructed and arranged substantially as described.

2d, In combination with the above, the lever, K, constructed of hinged parts, substantially as described.

69,706.—HOSE COUPLING.—L. J. Roberts, Corry, Pa.

I claim the hose end, B, constructed with coupling pins, b', and the independent nut, C, constructed with a screw thread, bayonet slots, and one or more springs, D, in combination with each other, and with the hose end, A, substantially as herein shown and described, and for the purpose set forth.

69,707.—CARTRIDGE FOR FIRE-ARMS.—Jacob Rupertus, Philadelphia, Pa.

1st, I claim a projectile, A, having a central opening, a, in combination with a case, C, arranged in front of the projectile for containing the powder, all substantially as set forth.

2d, The combination of the projectile, A, and its central opening, a, with the case, B, its détonate chamber, and indented or grooved projecting, g, the whole being arranged substantially as and for the purpose set forth.

3d, The casing, C, composed of paper or other fabric, and wire net work, and secured to the front of the projectile, all substantially as described.

69,708.—LOOM FOR WEAVING RIBBONS, ETC.—John Rushworth, New York city.

I claim the metal rack, A, constructed of bars, d d, and rods, c c c, as shown and described, combined with the strap, h, and pinions, f f, in the manner and for the purposes set forth.

69,709.—CARD SETTING MACHINE.—James Russell (assignor to himself and H. A. Collins), Springfield, Mass.

I claim the spring, G, formed in the carrier rod, and adjusted by means of the arm, J, and set screw, H, substantially in the manner and for the purpose herein set forth.

69,710.—SEEDING MACHINE.—A. V. Ryder Germano, Ohio.

1st, I claim the bed piece, D, provided with the ears, h h, as and for the purpose described.

2d, The revolving seed box, g, bed piece, D, plated upright or bar, a, beams, A, and E E, and hopper, C, all constructed and combined as and for the purpose described.

69,711.—LOOM.—Levi Scovfield (assignor to himself and Justin B. Walt), Farmington, Wis.

1st, I claim the stop bar, f, when attached to the stepping bar, H, and used to stop the cams, a a1 a2 and a3, alternately, thereby preventing the momentum of the cam shaft from carrying up too far one of the cams that in turn would prevent the descent of the harness, and a full shed of the warp, substantially as described.

2d, The sliding bar, S, when constructed with the arms, b and b', the arm, b1, set out from the face of the bar so as to allow the cam, n, to work against the arm, b, and the cam, h, against the arm, b', and used to operate the treadle, L, substantially as and for the purpose set forth.

3d, The double cams, h and n, when attached to the cam shaft, R, and used to operate the sliding bar, S, and at the same time holding the latter and the treadle in position, while the shuttle is thrown substantially as and for the purpose set forth.

69,712.—HORSE COLLAR.—T. J. Shipley, and W. A. Moody, Montezuma, Iowa.

We claim the hollow pad, B, fitting over and securing the ends of horse collars, said pad having upon its inside the longitudinal rubber springs, C, which springs fit over the ends of the collar, and are secured to the outside of the walls in holes, e, by means of the hooks, d, as herein shown and described.

69,713.—HORSE RAKE.—J. H. Shireman, York, Pa.

1st, I claim a continuously revolving axle, or shaft, B, with ratchets and pawls, or their equivalents, applied to both wheels, substantially as and for the purpose described.

2d, In a horse hay rake I claim placing the ratchets and pawls upon the inner sides of both driving and transporting wheels, substantially as described.

3d, I claim the combination of a driver's seat, G, a pressure contrivance for holding the teeth down to their work, a continously revolving axle which is furnished with a lifting device, and a device connected to the rake head, which, at the will of the operator, can be thrown into gear with the lifting device of the axle, for the purpose of discharging the gathered hay from the rake teeth.

69,714.—SPIRIT METER.—W. Siemens and J. G. Halske, Berlin, Prussia.

1st, I claim the measuring drum constructed and arranged as herein described so as to rotate with a springing motion, that is to say, provided with three compartments so formed that the center of gravity of the spirit during its influx into said compartments shall lie in a vertical plane passing through the axis of the drum, substantially as shown and set forth.

2d, The alcoholometer in combination with its index and supporting spring, substantially as and for the purpose herein shown and specified.

3d, The mechanism herein described for imparting to the counterwork a motion which shall at all times be proportionate to the volume of pure alcohol contained in the spirit or liquid which passes through the measuring apparatus.

4th, The combination with the mixing vessel, N, of the pipes or tubes for the induction of the spirit or liquid arranged as described so that when spirit of varying strength is conducted into said vessel the heavier shall enter above and the lighter below the alcoholometer, substantially as and for the purposes set forth.

5th, The combination with the measuring drum and interior cylinders, K, of the mechanism for obtaining a sample of the spirit proportionate in quantity to the volume of the said spirit which is measured, arranged and operating substantially as set forth.

69,715.—ELECTRICAL TORCH.—John K. Simpson, N. Y. city.

1st, The herein-described electrophorus consisting of the hard rubber tube, c, the metallic plate, F, and the metallic tube, B, connected through the plate, D, and rod, a, with the outer surface of the rubber tube, C, and through the rod, m, and ring, E, or its equivalent, with the outer surface of the handle, A, arranged and operating as set forth.

2d, I claim the perforated cup, N, provided with a suitable nipple, O, and uninsulated wire, w, attached to said nipple, arranged in the manner and for the purpose described.

3d, I claim the combination of an electrophorus situated near the lower end of a torch, the perforated cup, N, at the upper end of said torch, and the insulated conducting wire, J, between the electrophorus and the perforated cup, so arranged as to receive the spark or sparks from the electrophorus and conduct the same opposite to the end of the uninsulated wire, w, situated above the nipple, O, of the perforated cup, N, the whole being arranged and operating in the manner and for the purpose substantially as set forth and described.

69,716.—WAGON HOUND AND POLE BRACE.—Fridolin Smith, Tiffin, Ohio.

I claim the construction of the hound and slider of the two bent strips, A A', secured to the axle bolster and provided with filling pieces, b, and blocks, o, substantially as described.

69,717.—SLEIGH BRAKE.—H. W. Smith, Rainsbury, Pa., and B. C. Smith, Fokeston, Ind.

1st, We claim the combination of the brake irons, F, operating ropes, H, roller, S, or its equivalent, tongue rope, I, and sliding rope, K, with each other and with the tongue and frame of the sled, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the brake irons, F, operating ropes, H, roller, S, or its equivalent, frame, L, and roller, M, with each other and with the box, E, and frame of the sled, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the brake irons, F, operating ropes, H, roller, S, or its equivalent, and roller, P, with each other and with the frame of the sled, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the coiled springs, G, with the brake irons, F, and operating ropes, H, substantially as herein shown and described and for the purpose set forth.

69,718.—CHURN DASHER.—Johnson Smith, Kansas, Ill.

I claim the shaft, B, with eight horizontal arms, B', to which are connected the diagonal slats, C C', in such a manner that their inner ends nearly meet at the center of the shaft, so that the cream may be caught by the slat, C, and carried to and under the slat, C', as and for the purposes specified.

69,719.—MECHANICAL MOVEMENT.—C. D. Snell and J. W. Penney, Mechanic Falls, Me.

1st, We claim the sliding collar, D, in combination with the upright, C, or its equivalent, and in combination with the pitmen, H and K, or their respective equivalents, in manner and for the purposes substantially as described.

2d, The collar, G, sliding in the sliding collar, D, and in combination with it and with the upright, C, or its equivalent, in manner and for the purposes substantially as described.

3d, The sliding collar, G, in combination with the pitmen, E and F, or their respective equivalents, and in combination with the cranks, a and b, in manner and for the purposes substantially as described.

4th, The pitmen, E F H and K, and collars, D and G, in combination with the shafts, A and B, and cranks, a and b, all substantially as above set forth and described.

69,720.—ARMOR FOR HOOFS OF HORSES.—Henry Splitdorf, Brighton, Mass.

I claim the armor, C, for protecting the feet or hoofs of horses or other animals, made substantially as described above, by fastening a series of plates to each other or to a flexible foundation, B.

69,721.—COTTON PRESS.—H. D. Stover and John W. Hutchinson, New York City.

1st, I claim the construction and arrangement of the suspended tube, C, within the frame, A, provided with the plunger, I, attached to the screw rod, H, adjustable cross bar, G, wheel, J, guide rods, E E, as, herein set forth.

2d, Binding the upper part of the staves of the barrel, D, together, by means of the band, M, having parallel projections, b b, upon its ends, and oval links, N, substantially as herein shown and described.

3d, Securing the barrel, D, beneath the tube, C, and plunger, I, by means of the adjustable blocks, K, and keys, L L, constructed and arranged as herein set forth.

69,722.—WAGON BRACE AND FENDER.—James E. Strode (assignor to himself and Thomas H. Strode), Carrollton, Ill.

I claim the plate, A, having shoulders or flanges, B, formed upon or attached to its under side, and jaws, C, formed upon or attached to its outer edge or side, substantially as herein shown and described and for the purpose set forth.

69,723.—METAL ROOFING.—John B. Stryker, Philadelphia, Pa.

I claim a roof composed of transverse sheets, a b c, one side of each of which is passed over and nailed to grooved strips, B, and the other side soldered to the adjacent sheet over the strip and covering the edge of the first sheet, whereby neither the means of fastening nor the seams are exposed, substantially as described.

69,724.—SLEIGH BRAKE.—Frank Teelin and Jacob A. Swift, Blossvale, N. Y.

We claim the direct motion of the tongue, T, upon the levers, S, by means of rods, A A, arranged and applied as represented and described.

69,725.—CULTIVATOR.—S. D. Tuttle and J. H. Gans, Eaton, O.

1st, We claim the sliding or adjustable doubletree, K, applied to the draft pole, G, substantially as shown and described, and connected to the plow beams, E, on the axle, C, all being arranged to operate substantially in the manner as and for the purpose set forth.

2d, The pivoting of the draft pole, G, to the main frame, A, in connection with the pivoted socket, H, and the foot piece, J, all arranged to operate substantially as and for the purpose specified.

3d, The arm or lever, N, provided with the foot piece, O, and the toothed segment bar, P, on the front cross piece of the frame, A, the arm or lever, N, being attached to a plow beam, E, and all arranged substantially as and for the purpose set forth.

4th, The rake, S, connected to the arms, V, fitted on the axle, C, and having the springs, W X, attached to them substantially as shown and described.

5th, The application and arrangement of the rope, Y, as shown and described, for the purpose of raising the rake when required.

6th, The combinating of the sliding doubletree, K, plow beams, E, on the axle, C, and the pivoted or laterally adjustable draft pole, G, all arranged to operate in the manner substantially as and for the purpose set forth.

69,726.—WASHING MACHINE.—John Vail, Yankee Jim's, Cal.

I claim, 1st, The combination and arrangement of the sliding box or tub, B, the pounders, D, shafts, E, cams, H, and shaft, I, with each other and with frame, A, substantially in the manner herein shown and described and for the purpose set forth.

2d, The combination of an ordinary wash board, C, and movable side, b', with the tub, B, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the levers, N and O, and block, P, with the sliding tub, B, and with the frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the lever, K, shaft, L, arm, M, and movable frame, G, with the pounder shafts, E, and with the frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

69,727.—COMBINED CRANK, FRICTION WHEEL, AND BRAKE.—R. M. Van Sickler, New York City.

1st, I claim attaching the crank to the wheel in such a way that it may be turned or moved back so as to bring its handle to, or nearly to, the center of the said wheel, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the crank, F, friction wheel, C, brake strap, D, and brake lever, E, with each other and with the pinion shaft, B, substantially as herein shown and described and for the purpose set forth.

69,728.—SPINNING MACHINE.—Franz Voegtli, Montgomery City, Mo.

1st, I claim the combination and arrangement of the parts, F F1 f f1 f2 f3 f4 and G, substantially as and for the purpose described.

2d, The automatic feeder, H H1 G G1 and g g1, to distribute the threads upon the spool, D, substantially as set forth.

3d, The general combination of all the parts as shown, substantially as and for the purpose set forth.

69,729.—HOT AIR, STEAM, AND WATER GAGE.—James C. Walker, Waco Village, Texas.

1st, I claim the pipes, L M N O, passing through steam boilers as above described, as and for the purpose set forth.

2d, The combination of the boiler, A, the pipes, L M N O, the valves, v v v v, and the reeds or whistles, c c c c, substantially as and for the purpose specified.

69,730.—FAUCET.—Clemens Weaver, Easton, Pa.

I claim the plunger, C, sleeve, B, spring, D, and valve, E, arranged in the faucet, constructed in the manner and for the purpose set forth.

69,731.—CULTIVATOR AND HARROW TOOTH.—R. West and H. F. Paul, Concord, N. H.

1st, We claim extending the flaring parts or the wings of a cultivator or harrow tooth back beyond the rear edge of the body of the tooth, and having the space between the said wings, open on top, to allow the surface soil to fall over the edges of the wings into the furrow made by the tooth, substantially as herein shown and described.

2d, Having the wings, B B, of a cultivator or harrow tooth removable from the body, A, of the tooth, substantially as and for the purpose herein shown and described.

69,732.—HARVESTER.—Cyrenus Wheeler, Jr., Auburn, N. Y.

I claim, in combination with a main frame, in two parts, and having the the axle, or its equivalent, as a common center of motion, a two-armed lever to one of the arms of which it is connected the draft of the machine, while the other transmits the former of the team to the raising up of the rear frame and its connected parts, substantially as and for the purpose set forth.

69,733.—RAILWAY.—T. Whittemore, Cambridgeport, Mass.

I claim the bolt holder as made with its external notches formed substantially as set forth.

I also claim, in connection with the bolt holder, having its external notche formed as described, the arrangement of the outer bolts with screws pitche in opposite directions, as explained.

I also claim the combination and arrangement of the auxiliary bolt heads with the bolt holder rails and lap bars, the whole being as specified

I also claim the combination of the bolt holder, constructed as described, with the bolts, the rails, and the lap bars, as specified.

I also claim the arrangement of the check grove, b, and the lap bar, the bolts and nuts, or the same and the holding plate, applied to the two rails, substantially as set forth.

69,734.—MACHINE FOR MAKING NAILS FOR HORSESHOES.—William Wickersham, Boston, Mass.

1st, I claim, in horse-nails machines, the device of two series of working rolls, one series for the side and one for the edge of the nails, so arranged that each succeeding pair of rolls from the first shall have a greater motion than the preceeding pair, suited to the increasing length of metal as it passes through the machine, and so arranged that where the rolls are formed, as described, a wire of indefinite length, in passing continuously through the machine, will be completely formed into nails, or partially so formed, ready for another similar machine to finish, as described.

2d, The construction of a series of pairs of working rolls in horse-nail machines of cylindric form with grooves or spaces on the outside, having the same form and depth extending from one end to the other of the rolls, and suited for the side or edge of the forming nails, and so arranged in the series that each succeeding pair shall have wider spaces than the preceeding ones, and suited to the increasing length of the forming nails as they pass from the first to the last of the series, substantially as described.

3d, The arrangement of the working roll on the shaft, with washers, which are transferable from one end of the roll to the other, in such manners as that all parts of the roll may be successively used, as described.

4th, I claim the application to the rolls, herein described, of a stream of water, in the manner and for the purpose set forth.

5th, I claim the device herein described for separating the head of the nail from the point of the succeeding nail, in the manner and for the purpose set forth.

69,735.—THIMBLE SKEIN FOR AXLES.—John A. Williams, Elizabeth, Ill.

1st, I claim the elongated skeins, B B, furnished with a socket at the but end thereof, in manner and for the purposes substantially as above set forth and described.

2d, Adjusting the thimble skein beneath the axle by means and manner for the purposes substantially as above set forth and described.

3d, Constructing the thimble skeins, B B, in one piece, with open extremities, b b, through which the wooden axletree passes, in manner and for the purposes substantially as above set forth and described.

4th, The connecting rod, D, furnished with a right and left-hand thread or any equivalent, for the same, and setting into the sockets, C C, or their equivalent, or the thimble skeins, B B, in manner as and for the purposes substantially as described,

5th, Securing the thimble skeins to the axletree by means of the bolster

bolts, E, working in the slots or mortices, e e, in manner and for the purposes substantially as above set forth and described.

69,736.—House-Power.—Thos. Wittse, Jr., Panama, N. Y.

The combination of the driving wheel, A, having oblique teeth, a1, formed as described, upon the outer side of its rim, the vertical shaft, B, horizontal shaft, E, pinion wheel, F, band pulley, G, band or belt, H, pulley, I, and crank pulley or wheel, J, with each other and frame, C, the sliding pitman box or bridge, L, the frame, C, and crank pitman, K, substantially in the manner herein shown and described and for the purpose set forth.

69,737.—Electric Steam Gage.—E. A. Wood, Utica, N. Y.

1st, I claim the mode, substantially as herein described, of indicating the pressure of the mercury column by means of insulated points in the mercury tube connected with like points on the index.

2d, Combining with an ordinary mercury column a galvanic battery, substantially as described for the uses and purposes mentioned.

3d, The mercury column and index, constructed and operating substantially as described.

69,738.—Composition for Concrete Pavements.—Russell Fisk, New York city.

1st, I claim the mode, substantially as set forth, of corresponding and preparing concrete blocks for paving.

2d, The mode of laying pavements by the use of concrete blocks, imbedded and united, substantially as set forth.

## REISSUES.

2,770.—Heel Stiffners.—John Ashton Greene, Brooklyn, N. Y., assignee by mesne assignments of Daniel E. Hayward, assignor to Alfred B. Ely and Charles Wild, trustees. Patented October 27, 1863, reissued October 8, 1867. Division A.

I claim as a new article of manufacture for the heels of boots and shoes, a stiffening made of India rubber, mixed with ground rags, or other suitable fibrous material, and formed in molds substantially as and for the purpose described.

2,771.—Heel Stiffners.—John Ashton Greene, Brooklyn, N. Y., assignee by mesne assignments of Daniel E. Hayward, assignor to Alfred B. Ely and Charles Wild, trustees. Reissued October 8, 1867. Division B.

I claim as a new article of manufacture a heel stiffener or counter of India rubber, and its compounds, which is shaped and vulcanized in the mold in which it is formed, and made as set forth, for the purpose described.

2,772.—Horse Rakes.—James D. Jones, Columbiana, Ohio.

Patented May 9, 1865.

I claim, 1st, The pivoted seat, g', in combination with the levor, s, and catch, 11, when used for the purpose of holding the rake teeth, 1, to their work, as herein described and set forth.

2d, The combination of the unshipping piece, r, pivoted seat, g, and catch, 11, with the lever, s, when used for the purpose of unshipping the slide, I, and for holding the lever, s, and thereby keeping the teeth, 1, to their work, substantially as herein described and set forth.

2,773.—Refrigerator.—M. C. Longacre, Cleveland, Ohio.

Patented March 15, 1864.

I claim the combination with the open frame ice-box, A E, the movable rack, O, movable corrugated plate, F, movable rack, g, trough, H, and waste paper, I, with a refrigerator or provision room, for the purpose herein specified.

2,774.—Shingle Machine.—Charles S. Burt, Dunleith, Ill., assignee of Harriet L. Low, administratrix of H. H. Low. Patented April 19, 1859.

I claim, 1st, In a shingle machine operated by means of a vertically reciprocating frame, E, which feeds a shingle bolt to a circular saw, C, I claim the use of a rack and pinion by which a constant and uniform feed motion is secured while the shingle is being sawed, substantially as described.

2d, In a shingle machine such as is above contemplated, I claim the use of a rack and pinion for feeding uniformly the bolt to the saw, in combination with another rack and pinion, by which the frame, E, is elevated preparatory to placing a new cut, substantially in the manner above described.

3d, In a sawing machine of the kind herein set forth, I claim the instrumentalities above described, or their fair equivalents, for securing the automatic working of the machine, substantially as described.

2,775.—Spring Hinge.—Charles E. Stanley, Cleveland, Ohio, assignee of Doctor Joseph Sherbruene Smith. Patented May 19, 1857 Antedated May 12, 1857.

I claim, 1st, The construction of a hinge with a tubular joint, having a torsion spring therein, and with devices for adjusting and retaining said torsion, substantially as and for the purposes described.

3d, The combination of the center pin, adjusting or screw pin, headed or capped spring, and tubular hinge, constructed and arranged to operate as and for the purpose substantially as described.

Note.—Fifty-five patents in the above list of claims were issued through the Home Office of the Scientific American Patent Agency.—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.*

56,410.—Improvement in Folding Chairs.—Benjamin J. Harrison and James Condie, New York City. Dated July 17, 1866. Application for reissue received and filed Sept. 27, 1867.

1st, We claim so constructing and combining the legs, A, and B, with the front and back seat rails that in folding the chair the front seat rail shall pass underneath the back one, substantially as and for the purpose specified.

2d, The attachment of the rearmost edge of the flexible seat to the back, E F, below the pivots by which the back is attached to the legs, B, whereby the back is held in position by the weight upon the seat, substantially as and for the purpose specified.

3d, The transverse bar, G, so arranged in relation with the pivoted back seat rail, C, the back, E F, and the legs, B, to serve as a brace to hold the back in position when the chair is opened and as a handle by which the chair may be carried when closed, substantially as herein set forth.

4th, A folding chair composed of the crossed legs, A B, flexible seat, D, back, E F, pivoted back seat rail, C, and transverse bar, G, the whole constructed, combined, and arranged substantially as and for the purpose specified.

51,897.—Spike.—International Patent Bolt Machine and Split Spike Company, New York City, assignees by mesne assignments of Lancelot Kirkup, Brooklyn, N. Y. Dated Jan. 2, 1866. Application for reissue received and filed Sept. 24, 1867.

I claim a railroad split spike the prongs of which have inclined edges terminating in flat points, substantially as set forth, and are so constructed that when the spike is driven into the wood the prongs will be bent outward in a plane parallel with the plane of the split in the spike, the whole operating as described.

48,694.—Water Wheel.—T. J. Kindleberger, Springfield, Ohio. Dated July 11, 1865. Application for reissue received and filed Sept. 30, 1867.

1st, I claim the springs applied to the opening and closing mechanism of the gates where a plurality of gates are used for a single wheel, so that any one of said gates, in case of being prevented from closing, will not prevent the closing of the others, as herein set forth.

2d, The arrangement of the bent arms, C, and levers, D, with the set screws e, springs, g, plate, E, the pendant pins, h, the segment, G, and pinion, H, for operating the gates, B, as set forth.

3d, The arrangements of the buckets, I, of serpentine form, substantially as herein described and set forth.

4th, The cap, I, through which the shaft, J, of the pinion, H, passes and covers and protects the parts for opening and closing the gates, as herein set forth.

5th, The cap, I, provided with the boxes, k, having following blocks in their recesses, with one or more set screws to each, to adjust them to the shaft, F, substantially as herein described and set forth.

62,084.—Wash Boiler.—M. W. Staples, Catskill, N. Y. Dated Feb 12, 1867.

I claim forcing by pressure of steam a circulation or current of water or suds through the clothes in the process of washing or cleansing them, as applied to a washing boiler, substantially as herein described, or by any equivalent device.

19,321.—Plow.—George Watt, Richmond, Va. Dated Feb. 9, 1858. Additional improvement dated Aug. 2, 1859. Application for reissue received and filed Sept. 27, 1867.

1st, I claim the combination in a plow of a landside having an inward inclination from its base toward the mold board, and a neck, breast, or standard having a diverse or outward inclination, substantially as set forth.

2d, I claim constructing mold board and land side of cylindrical surfaces intersecting along the cutting edge of the plow, in combination with the curved standard, S, the whole being constructed substantially as and for the purposes herinbefore set forth.

3d, I claim the combination of the eccentric roller, r, beam, B, notches, i, and cuff, f, 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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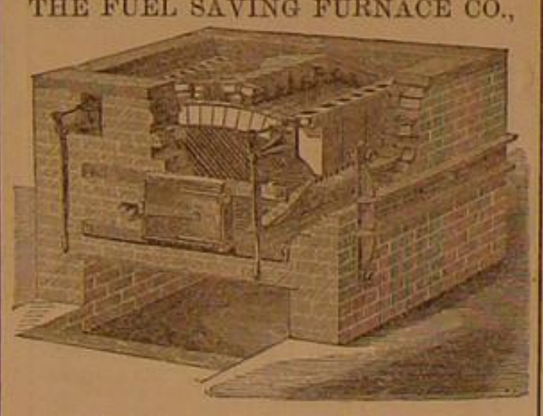

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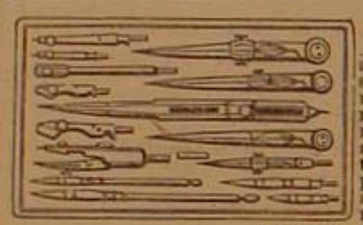

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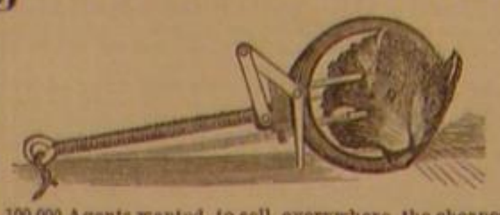

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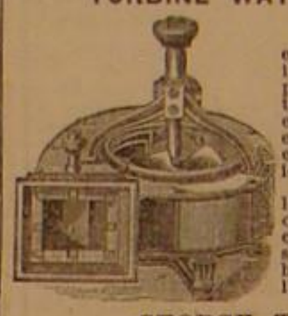

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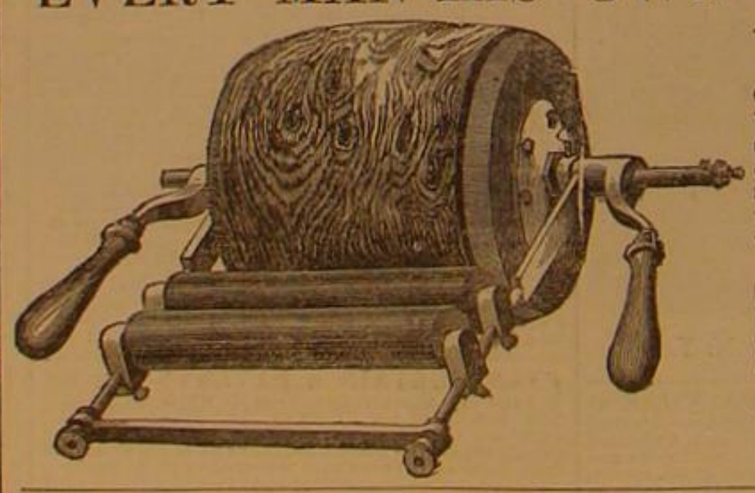

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# SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

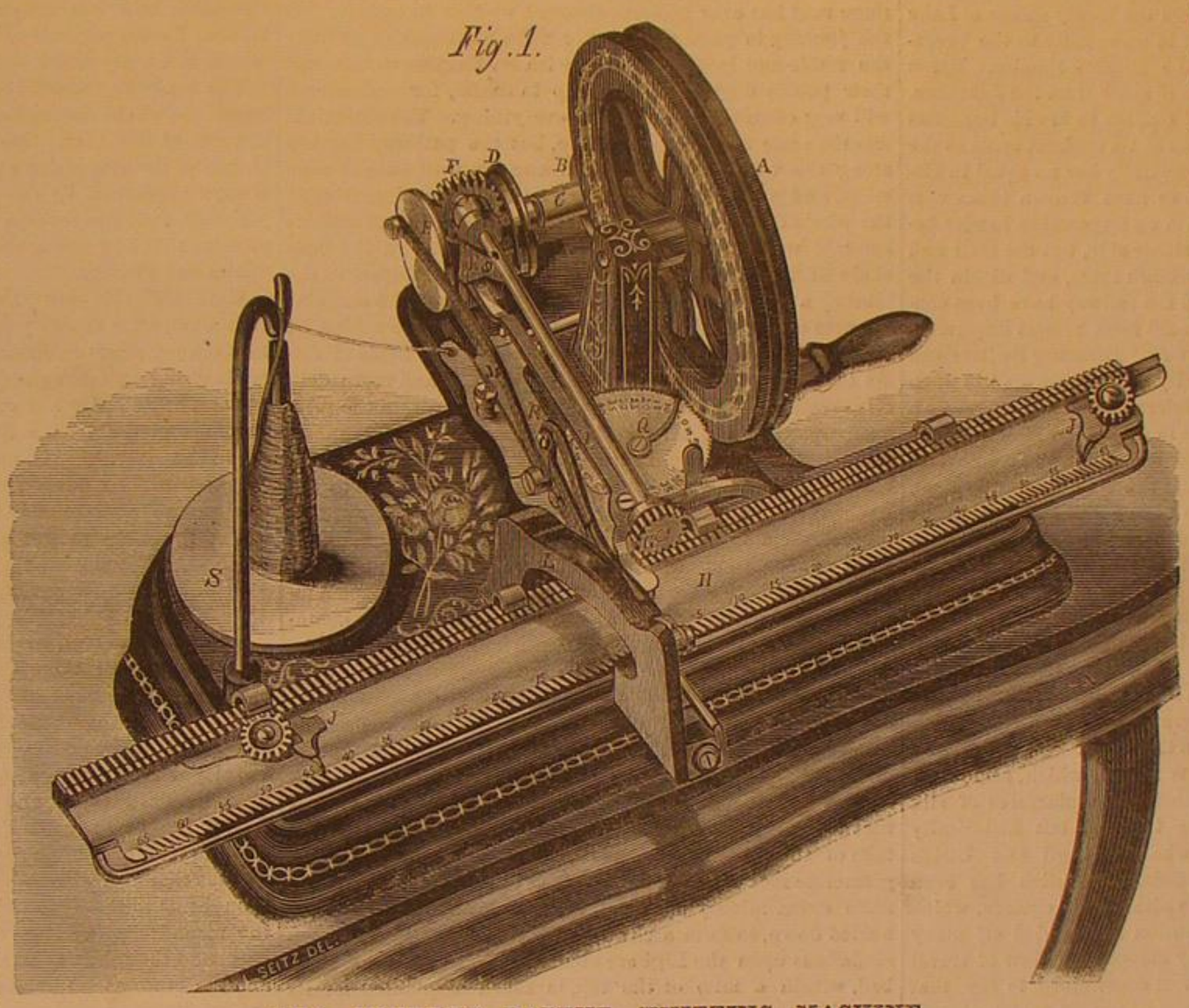
Vol. XVII.--No. 18. [NEW SERIES.] NEW YORK, NOVEMBER 2, 1867. $3 per Annum [IN ADVANCE.]


## Improved Single-Needle Knitting Machine.

The Hinkley Family Knitting Machine is the result of a successful attempt to produce a Knitting Machine adapted to the formation of all plain or fancy knit fabrics for family use in a simple and expeditious manner, while free from the complications to which all other "Knitters," with needles numbering from 75 to 125, are subject, although they are generally capable of producing merely a straight circular tube, only susceptible of change by varying the tension of the loop or stopping the machine and taking out or inserting needles each time it is desired to widen or narrow a single stitch.

The desideratum of a simple, cheap, and yet substantial household machine, producing the handsomest and best work, is obtained by the use of a single eye-pointed needle, in connection with a simple looping mechanism and a work-supporting comb traversing longitudinally in front of the needle, which by suitable contrivances, is governed in its motion either automatically or by the operator at option, according to the design of the intended fabric.

Fig. 1.




THE HINKLEY PATENT KNITTING MACHINE.

The driving wheel, A, Fig. 1, is supported by a standard on the base of the machine, adapted by its crank for hand power, and by passing a band over its grooved periphery to a balance wheel under the table, for a treadle, as in sewing machines. It drives the friction pulley, B, on the shaft, C, which engages in the groove of the driver.

This pulley is the subject of a special patent, and is composed of two parts or halves—one fast and the other loose—facing each other and holding between them a thin circular disk of steel, which by two equi-distant corrugations, springs them apart and is adjustable by set screws, thus giving a short connection without the usual wear on the journal, making no noise, and having a slip sufficient to save the working parts should any obstruction suddenly interfere when in rapid motion.

The disks, D and E, on shaft, C, engage through a right and left hand worm respectively on their inside faces, with the gear, F, and through its shaft and corresponding gear, G, communicate a traversing motion to the rack on the comb, H, of one tooth to each revolution of themselves, each of course reversing the former direction, as by the lever, I, the gear, F, is thrown from connection with one to the other worm.

This shifting lever, I, is either worked automatically at its anterior projection by the arrival of the indexes, J, on the comb—which are moved to any point on the comb at pleasure, governing the width of the fabric—or by shifting the lever by the finger of the operator, in each case, if desired, while the machine is at high speed. The change of position of the lever, I, cants the dog, K, centered in a slot on a swinging bearing, which dog, then striking a small projection on the inner face of D or E, between the worm and the journal, throws the gear, F, into connection with the opposite worm at once, reversing the direction of the rack.

The necessary reciprocating movement of the needle carrier, which holds the needle and its tension, is obtained from the crank pin on the disk, E, by a connecting bar, M, which also operates the looping mechanism, supported on the bracket, L, through the medium of the slotted arm, N, and the oscillating quadrant, O, (see Figs. 2 and 3), in exact conjunction with the advance of the needle, P, and replaces a new loop on such successive tooth of the traversing comb as the needle removes its predecessor.

The numbers to which the indexes, J, Fig. 1, point show at once the width of the fabric, while they remain in that position, and the counter, Q, is pushed forward one notch by each change of the lever, R, giving, at a glance, the number of stitches in length that the work has progressed, thus automatically saving the old drudgery of counting each stitch, as is still necessary in hand work, or by other knitting machines, and reducing the labor of knitting a stocking or any other fabrication, to a simple rule of changing the indexes at such times as the counter has enumerated a certain number of loops or stitches in length.

The bobbin, S, is attached or detached from the base by means of a short screw, projecting from its bottom, which screw also fits in a screw shank in the center of disk, E, and by springing the connection off the crank pin and lifting the gear, G, from the rack by the cam lever, I, the bobbin can be attached to the disk, E, and the machine is instantly transformed into a self-spooler, which winds its yarn from the swifts at great speed without interfering with the work on the machine. Beside obviating the use of a spooling machine and bobbin stand, this arrangement provides against the interference of a child or others during the absence of the operator, as while disconnected, as it is in a second, work in progress cannot be disturbed.

Fig. 2

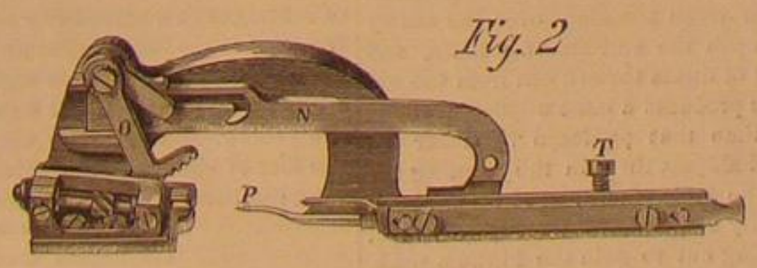
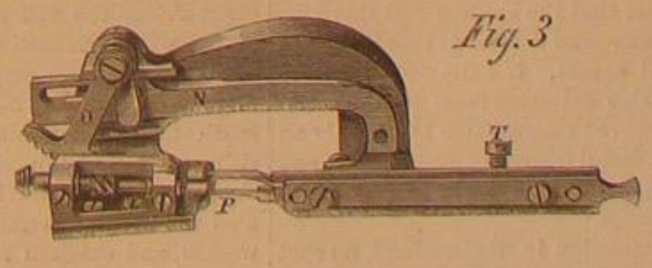



Fig. 3




The work hangs from the teeth of the comb in front of the machine, in the plain view of the operator, and, unlike all other knitting machines, this uses no weights to drag down the work from the needles, thus requiring a different weight for each variety of work; here a small rod, seen under the comb, obviates their necessity. In Figs. 2 and 3, T represents the tension screw, which will regulate the yarn to be knit, close or loose. In one the looper and needle are in contact, as when the stitch is to be removed, and the other shows them receded from one another.

It will also be apparent, that by the use of a traversing comb, of any length, either straight, curved, or circular, that one needle performs the work previously requiring as many needles as the comb has teeth, that the "widening" and "narrowing" is adjusted, stitch by stitch, or as many as is desirable, in an instant, by sliding the indexes along the comb. By the arrangement of the "looper," taking the loop from the under side of the needle at each advance, and placing it on the tooth in readiness, it "sets up" it own work and will not require the loops to be "cast on" previously by hand, that the stitch must be the same as that taken by hand from one needle to the other, and that each edge will be a selvedge edge like cloth, and the top of the work—as for instance, a stocking—will be "finished" as it comes from the machine.

From the simple arrangement of parts, it is also evident that both the work and the machinery are in full view of the operator, and easily understood by any one; the machine can be run by the hand or the foot, like a sewing machine; that any size yarn or cord can be used that will pass between the teeth of the comb, which are constructed to admit of all grades,; that by its gearing an extreme high speed can be reached, which, with the quickness of widening and narrowing, gives it the preference over the hitherto "fast" knitters; that any desired shape can be produced, regular or irregular; that the tension can be altered in a second; that by reason of its friction gear and worm arrangement it is almost noiseless. It also knits the button-holes in a garment, knits in different yarns without tying them together; knits any fabric from an Afghan to a pair of gloves; knits a stocking complete with a hand heel, knits double if desirable, and requires only a seam up the back to produce hosiery equal to hand-knit, and superior to those formed of a tube with only a small "bulge" on them for heels, and which, after washing, are liable to return to an almost uniform tube.

This machine is patented in this country, Great Britain, France, Belgium, New Brunswick, etc, and received a medal for simplicity at the Paris Exposition. It is manufactured by the Hinkley Knittting Machine Co., at Bath, Me., and all orders and applications for agencies, etc., should be addressed to Edward Sewall, the Sup't and Treas., at that place. G. E. Harding, the General Agent for New York, will also furnish information and machines at his office, 726 Broadway, New York city.

## Period of the Growth of Man.

Prof. B. A. Gould, from statistics derived from the register of two and a half millions of men in the U. S. Army, has brought out the fact that men attain their maximum stature much later than is generally supposed. This takes place commonly at 29 or 30 years of age; but there are frequent instances of growth until 35, not very noticeable,—a yearly gain of a tenth of an inch perhaps, still a growth. After 35 the stature subsides in similar proportions, partly perhaps from the condensation of the cartilages, partly because of the change in the angle of the hip bone. The age for maximum stature comes earliest to the tallest men, as if it were the necessity of unusual development. Foreigners were shorter than men of native birth. The hights of men seemed to depend on the place of enlistment. A Massachusetts man enlisting in Iowa was an inch taller than if he had staid at home. As we go West, men grow taller. One man measured more than 6 feet 10 inches. Out of one million, there were five hundred thousand who measured more than 6 feet 4 inches; but men of such stature do not wear well. In Maine, men reached their greatest hight at 27, in New Hampshire at 35, in Massachusetts at 29, in New Jersey at 31. The tallest men, of 69 inches, come from Iowa. Maine, Vermont, Ohio, Indiana, Minnesota, and Missouri, give us men a little over 68; and the average of all shows the Americans to be "a very tall people."

THE WEIGHT of a million of dollars in gold (currency) is 53,750 Troy ounces, or 4,479 lbs. 2 oz., equal to 2 ¼ tuns.

## EDITORIAL CORRESPONDENCE.

*From Germany to Italy over the St. Gothard—Swiss Towns, Mountains, Lakes, Glaciers, and Rivers*

ARONA, Lake Maggiore, Sept. 10, 1867.

I suppose that no other country in Europe is so well known to tourists as Switzerland. Easy of access from Great Britain and all parts of the Continent, it is not surprising that so many travelers rush to this most wonderful region. It is roughly estimated that fifty thousand English people visit Switzerland during the months of July, August, and September, and I should judge that about one half of the whole number of visitors this season were Americans, some of whom are wonderfully expert at climbing Alpine hights, and in itinerating on foot over long fatiguing passes. The only ascents of Mont Blanc which have been made this season were performed by two gentlemen from New York. With the exception of some of the smaller mountains, the ascents of which are comparatively easy, I have contented myself with a view of the immense snow-capped summits from beneath, rather than undergo the peril and fatigue of undertaking to climb to their tops. Switzerland is literally a land of mountains, lakes, cascades, glaciers, and rivers, the charms and grandeur of which have inspired the pens of poets, philosophers, and sages, who seem never to weary of their ceaseless beauty and variety. Gibbon found a spot upon the lovely shores of Lake Leman where he devoted himself in tranquility to the preparation of his great history of the Roman Empire. Byron watched the falling of avalanches of snow from the Jungfrau, and visited the gloomy prison of Chillon to fire his immortal genius, and Rousseau selected one of its choicest spots as the scene of his Heloise, which sentimentally has no equal in European literature. Nature seems to have thrown these vast mountain chains together to form an impassable barrier between the countries that lie on either side, but the skill and ingenuity of man has broken through them, and within the last few years the high road and the railway have been constructed to penetrate where it would seem almost impossible for man or beast to thread their way. Entering Switzerland from the rich and populous old city of Bale, which lies upon the Rhine, the railway for a considerable distance traverses a flat country, and then commences to ascend the mountains by a gradient of 1 in 20; the Mont Cenis pass is 1 in 12. Several valleys are crossed on bridges, and the line constantly rises, until in some cases the trains run high above the picturesque little villages down in the valleys below. The Unter Hauenstein, which is two thousand feet high, is pierced by a tunnel over eight thousand feet in length, and serves as an outlet for the chief traffic between western Germany and Italy over the great pass of the St. Gothard. From the hights at this point the first view is had of the immense snow peaks of the Bernese Alps, and the traveler is conscious of having entered a land which combines more of grandeur and sublimity than any other spot of equal size upon the globe.

The next most important city is Zurich, which, aside from its agreeable situation and extensive manufactures of silk and cotton, possesses very little interest, but historically it is remarkable as the place where Zwingli and Ulrich began the reformation in Switzerland. Zurich has been sadly afflicted this summer by a visitation of cholera, which in spite of every sanitary precaution has carried off many of its inhabitants and effectually stopped the flow of travel in that direction. And here I feel constrained to say that amidst all these wonderful charms of nature which abound in Switzerland, there are also added some repulsive features which cannot escape the notice of travelers. In spite of the abundance of water which invites every inhabitant to observe the strictest degree of cleanliness, I should say as a general thing that the rural populations were quite as filthy as those of any other country I have visited. The *châlets* are constructed to shelter under the same roof men, women, children, cows, goats, pigs, and poultry, and the practice is very common, even among farmers near the larger villages, to form the compost of stable manure and household refuse in the front door yard, the odors of which, it seems to me, ought to arrest the attention of the sanitary authorities. I do not wonder that the cholera has this year visited some of the Swiss towns—the wonder is that it has not prevailed to a more fearful extent. If extremes in nature abound in Switzerland, so also extremes meet in the social life, for among the more improved classes there is not only an aristocratic pride but a wonderful degree of good order and cleanliness; therefore as a general rule there is very much more to admire than to condemn.

Of the many points of attraction in Switzerland, no spot possesses more interesting features than Luzerne. The town itself is old and picturesque and by no means particularly nice, but the lake and surrounding mountain scenery, together with the historic associations connected with the name of William Tell, all combine to render this place one of the most sought after in all the Swiss Cantons. The land side of the town is still protected by an ancient wall surmounted by watch towers erected five hundred years ago, and there are some quaint old bridges across the Reuss, one of which has a curious fresco of the dance of death, which represents how the grim monster indiscriminately took his victims of every age, rank, and station, during the visitation of the plague in 1409.

A carriage drive of an hour and a half leads to the rude old chapel which was erected on the spot where Tell shot the tyrannical Gessler. The drive to this chapel along the borders of Lake Luzerne is grand and lovely in the extreme. The roadway is skirted by cheerful Swiss cottages, usually of the first class, beautiful fields well covered with fine fruit and park trees, and in sight of the Rigi and some of the peaks of the snowy Alps, which lift their white caps far above this most beautiful lake.

The most interesting object in Luzerne is the monument to the Swiss guards who fell while defending the royal family of France, Louis, XVI., Marie Antoinette and their children, when the infuriated mob attacked the Palace of the Tuileries during the first French revolution of 1792. The design is by Torwaldsen, and represents a lion of colossal size mortally wounded, with a broken spear in his side, endeavoring to hold in his paws the shield of the Bourbon family. The figure, 28 feet long and 18 feet high, is chiseled in the perpendicular face of a sandstone rock overhung by creeping vines and shrubs, and there is a small pond of water at the base of the rock supplied by a little streamlet that flows down the cliff, which forms a sort of mirror to reflect the image of the dying lion. The design of this monument is certainly unique, and when it is considered that these brave Swiss were hired soldiers and fell fighting for the royal family when assailed by their own subjects, it becomes most touching and impressive.

The ascent of the Rigi is made from the pleasant little village of Weggiss, which is reached from Luzerne by steamer in about half an hour. It is very fashionable to ascend the Rigi; therefore almost everybody undertakes it, and I must confess that the toil and fatigue are amply repaid by the wonderful panorama that breaks upon the vision. No carriage road has ever been constructed up this mountain, but the journey is performed either upon horseback or on foot; the feeble and infirm, together with fat English women and their poodle dogs, are carried up in chairs, for such people will very often persist in seeing everything. The summit is less than one mile above the lake, but the pathway zigzags along the western slope of the mountain a distance of nine miles, and traverses gardens, fruit orchards, and pasturage the whole distance. The view of the lake beneath and its emerald waters, which always remain visible, and the long chain of the Oberland Alps that lie beyond, impart to the journey a constant and thrilling interest. One of the singular features of the Rigi, peculiar also to many of these Alps, is, that it affords pasturage for flocks of sheep and herds of cattle to its very summit. Nothing is sweeter and more delicious than these mountain grasses, which constitute the principal wealth of the neighboring inhabitants. As the snows disappear the flocks and herds gradually ascend the mountain, following the productions of spring, which rise to life under their feet from day to day, until the snows of autumn compel them to retire to the valleys below. There are upward of four thousand cattle, chiefly cows, and numerous flocks of sheep that feed upon the Rigi, and the herdsmen reside in rough little *châlets* all along up the sides of the mountain. About one third of the distance up a small chapel has been erected for the use of the herdsmen. Apart from the spiritual benefits which this place affords to the humble worshippers, there is also attached to it a shed where excellent beer is supplied to refresh the weary body. This combination of chapel and beer-shed is not exactly according to the rigid institutes of Calvin—who I believe was a Swiss—but I notice that the pilgrims of Mont Rigi are usually very glad to partake of the refreshment thus offered. Vast masses of conglomerate rock lay scattered all along the wayside, and during some extraordinary upheaval immense boulders have been hurled down, to form archways over the path. Hotel accommodations upon the Rigi are abundant. The best, the Kaltbad, within a mile of the top, is much frequented for its magnificent views and bracing mountain air, and many visitors spend weeks at this comfortable resting place. A smaller hotel stands a little nearer the top, and the Rigi Kulm, a house capable of lodging two hundred people, is perched upon the very pinnacle, and is always crowded during the season, chiefly by those who wish to spend a single night.

I noticed upon the register of this hotel that names were registered as early as March 22d and as late as December 26th. In some places the narrow bridle path runs along the edge of fearful precipices, and a single misstep would throw the traveler hundreds of feet into the dark abyss beneath.

The day of our ascent was cloudless, and we reached the summit in good time to behold a most brilliant sunset, and at eight o'clock the full moon came beaming over the snowy peaks, which, reflecting upon the surrounding lakes, and combined with the myriad of lights thrown out from the numerous villages and *châlets* produced a most wonderful effect, much finer to my mind than that produced by either the rising or setting sun. At half-past three in the morning the sleepers were aroused by the Alpine horn, and in a few minutes the house was hurriedly emptied of its occupants, men, women, and children rushing out to gain the highest peak, some with bed blankets thrown over their shoulders, some in morning gowns and slippers, all anxious to witness the rising of the sun, which is considered one of the chief features of this mountain view; and indeed the sight is well worth all the trouble it cost to obtain it, but frequently, owing to the fogs that gather about the summit, thousands go away disappointed. I met one old gentleman who had doggedly persevered ten days in endeavoring to see the sun rise, and finally had his perseverance rewarded. The panorama of the Rigi sweeps over a circumference of three hundred miles, and embraces a combination which in extent and variety is scarcely equaled by any other in Switzerland. The labor of supplying the wants of so many visitors is prodigious. The supplies are carried up chiefly upon the backes of mules, but trunks, valises, and other articles are carried upon the backs of men and women. It is not unusual to see one of these men with his wooden rack strapped upon his back, lugging one of those immense trunks which are nearly as large as the *châlet* that covers his head, and scores of lads are eagerly watching to carry the pedestrians' effects up or down, and it is surprising how much they will undertake to perform. These people will sometimes make two of these trips in a day. The descent of the Rigi is most usually made on foot, as the exercise of riding down is not considered the most agreeable, and although not much of a pedestrian, by the assistance of an Alpenstock and an occasional draft of fresh milk, which is readily obtained at the wayside, I made the walk without much fatigue in three hours.

Lake Luzerne, or more properly the Lake of the Forest Cantons of Uri, Unterwalden, Schwytz, and Luzerne, which surround its shores, is unquestionably grander and more sublime than any other lake in Europe. It is completely walled in by stupendous mountains, with here and there a picturesque village, which seems to stand upon the accumulated debris which for ages has been washed down from the hights above. At one time, before roads were cut along the lake, one of these little villages boasted of being the smallest independent state in Europe, as its inhabitants, sheltered from assault, refused to recognize any other earthly government except their own.

At the upper end of the lake is the poor little village of Fluelen, where begins the carriage road over the St. Gothard into northern Italy. Diligences leave daily for Bellinzona, 76 miles, but travelers who wish to enjoy the scenery of this great pass to advantage, must either take a carriage or perform the journey on foot. Preferring the former as the more agreeable and less fatiguing, we engaged an outlandish-looking Italian *vetturini* to transport us over to Lake Lugano, which is twenty miles beyond Bellinzona.

The roadway follows the tortuous windings of the river Reuss the whole distance clear up to Lake Lucendo, near the summit of the pass. Its waters rush through the wild gorges of the mountains at a fearful velocity, the effect being always hightened by the immense rocks that stand in its pathway, and the volume is augmented by the numerous streams that flow down the mountain sides from the melting snows and glaciers.

Until 1832 this pass was only made over a bridle path. At that time, after twelve years of labor, the neighboring Cantons opened a carriage road—one of the finest in Europe. The engineering in some places is of the boldest character. Side terraces or galleries are cut along the face of the granite hights, sometimes at a distance of nearly a thousand feet above the river. In the narrower gorges it was necessary to let the workmen down from the top of the mountains by means of ropes, to enable them to drill and blast into the face of the rocks to get a foothold to work a tunnel underneath. And thus ascending, we reach at length

> "The Gothard's hights, where everlasting lakes,
> Fill'd from Heaven's founts, supply the streams below—
> Another river, issuing thence, will guide
> Thee into Italy, thy land of promise."

At the summit there are two common hotels, some peat beds, five St Bernard dogs, and several little lakes of clear water, from one of which rises the river Ticino, which accompanies the tourist on his journey to Italy, down through the awful Val Tremolo, so deep that snow lays in midsummer upon its dark edges, and the roadway descends from this fearful hight by abrupt zigzags, which coil along the steeps like the folds of a huge serpent basking in sunlight.

I was thankful when we had rounded the last curve that brought us to the little village of Ariolo, where we rested for the second night. Here everything has an Italian appearance, and though it is many miles from Italy, the language and the customs are Italian. Owing to the existence of cholera in Italy, we were compelled to obtain a certificate from the Syndic at Faido that we had come from the mountains, but this did not save us from suspicion; therefore, upon arriving at Lugano, at ten o'clock at night, our carriage was stopped and we were invited to walk into a small room and undergo the agreeable process of fumigation; and upon leaving Lugano the next day for Lake Maggoire, and before crossing the frontier into Lombardy, we were again entertained at "Hotel Fumiger." People coming up from Italy were required to quarantine for a few days before being allowed to proceed.

Many years ago I remember to have read a graphic description of the sensation of gloom experienced by the writer, of midnight in a ruined city and upon the lonely desert, but it seems to me that almost anything would be preferable to the awful dullness of this region. Hotels, streets, carriages, steamers all deserted, and a general melancholy hangs about everything. Such is the effect upon a people oppressed by the fear of cholera. The skies, however, are bright, and the vine, mulberry, and the fig grow luxuriantly. S. H. W.

### Gatling's Gun in Europe.

A French journal announces that the Ordnance Department of France is quietly supplying Gatling's Gun to the artillery corps. The Press of Vienna says: The artillery committee, in presence of the Archdukes William and Regnier, as well as the Minister of War and a large number of officers, has just made some experiments with a new firearm, which has been called the *mitrailleuse*, invented by MM. Montigny and Christoph of Brussels. This weapon is composed of 31 steel barrels placed in a common tube. The apparatus opens behind and receives 31 cartridges which, by means of a piece of mechanism, enter the barrels. The 31 shots are fired successively, and the whole operation only takes 30 or 40 seconds. The experiments were not successful; many of the shots missed fire, and very few went straight. The *mitrailleuse* appears very inferior to the cannon on the Gatling system (American). The latter fires 100 to 120 shots a minute, and the former only 60 to 70. Messrs. Gatling, moreover, have much improved their cannon, and before long are going to submit to the Austrian Government a ten-barrelled revolver cannon which will fire 300 shots a minute.

## A NEW THEORY OF CHEMISTRY---THE GALVANIC BATTERY DISSECTED, AND SPECULATIONS CONCERNING OZONE.

At the meeting of the New York Lyceum of Natural History on Monday, 14th inst., a paper was read by Prof. Charles A. Seely, of this city, on "Chemical Dynamics." We present below the principal features of the communication in a condensed form.

In recent treatises on chemical physics may be found tables of the calorific equivalents of various elements. These tables show the amount of heat evolved in the union of various pairs of elements. This heat is commonly known as the heat of combustion. One gramme of hydrogen (H), burning in chlorine (Cl), evolves 23,783 units of heat. This amount of heat involves, indicates, or represents a certain definite amount of force which was used in its production. This force has been designated chemical affinity, and is often supposed to be a species of attraction. The heat of combustion is a measure of chemical affinity.

The heat of combustion has been supposed to be the result of a collision or clash of atoms; the atoms are brought together by an attractive force, and on the collision, the movement takes the form of heat. Is affinity an attractive force, and does it obey the laws of gravity, and other forces of attraction? Is affinity proportioned to mass, and does it vary inversely as the square of the distance? Attraction implies condensation, a phenomenon which does not necessarily take place in chemical unions, and if affinity were like gravity, the force being proportioned to the mass, the ordinary numbers of the chemical equivalents would express its distribution among the elementary atoms. Can the force which the heat of combustion represents be divided among the atoms, and if so, what is the portion of each? Of the 23,783 units of heat involved in the combustion of H in Cl, how much was due to the H, and how much to the Cl? What is the potency equivalent of H, and what of Cl?

It has been found by experiment that if three metals, A, B, and C, be so related that A is capable of displacing B and C from their combinations, and B is also capable of displacing C, the heat developed by a substitution of A for C will be exactly equal to that developed in the substitution of A for B, together with that developed in the substitution of B for C. From this and other similar facts, the author infers that each free atom is endowed with a definite and constant potency, which exists in it as a latent force, and which assumes the form of kinetic or effective energy only in the act of combination, when it appears, and is measurable as heat. The author has constructed a table of atomic potencies by the following process: Let A, B, and C, be three elements, and let their respective potencies be represented by x, y, and z, expressed in terms of heat units. Then from experimental data we have x+y=m, x+z=n, y+z=o, from which the values of x, y, and z, are easily determined. The numbers, however, thus obtained, as true representatives of the dynamical value of atoms, are not altogether satisfactory or consistent with each other. The available experimental data are, at the present time, insufficient in amount and accuracy for a determination of numbers with that exactness which is demanded by scientific men. But a study of the table in its imperfect form suggests entirely new paths of research, and will assist in the comprehension of facts already known.

As an example of the application of this dynamical theory, the following illustration will suffice: In the union of H and Cl, the potency or energy of the atoms appears and escapes in the form of heat. After the union, they remain together by virtue of a sort of atomic inertia. To decompose the HCl (hydrochloric acid), the lost potency must be restored; the decomposition involves the same amount of force as the original act of union. If zinc (Zn) be added to HCl, and takes the place of H, then Zn must give up its potency, and H must resume as much as it lost in the original union. The H is eager for that which the Zn seeks to give; the force passes directly from the Zn to the H, and the Cl is throughout impassive. It happens that Zn has an excess of potency above the H, and this excess escapes with the H in the form of heat. This view of the case is well confirmed by experiment.

Again: suppose a plate of Zn and of platinum (Pt) be immersed in hydrochloric acid, a condition of things which may be represented thus: Pt, H Cl, H Cl, H Cl, Zn, and which, moreover, is a type of a voltaic circle. The Zn being pure or amalgamated, does not combine with the contiguous Cl. But yet there exists an affinity between them. Also, there is an affinity between the Pt and the contiguous H. There is a pull on all the Cl toward the Zn, and of the H toward the Pt. Moreover, the H at the right is held in a sort of suspension between the atoms of Cl on each side of it. The word polarization well expresses this peculiar relation of the atoms. The Zn is on the point of giving up its potency, and the H *contiguous to the* Pt is ready to receive it, but there is no path between the two which the potency can take. Now, in this condition of affairs, let the Zn be connected with the Pt by means of a metallic wire, and the potency of the Zn passes over to the Pt, and through the latter to the contiguous H, which now assumes its elementary form. The Zn being freed from its potency, unites with its neighbor, Cl. The passage of the potency along the wire is what we call electricity. The excess of what the H needs to exist as an element, takes the form of heat and escapes, and it is this excess which measures the amount of useful work which can be obtained from a battery in practical operations.

If this electrical theory be true, it appears that there is but one kind of electricity, and that in the battery it moves only through the wire, and not through the liquid. It will be observed it is from the Zn to the Pt, while the old theories make the course of the so-called positive current in precisely the opposite direction.

The author here gave an interesting speculation concerning ozone It has recently been determined that ozone is an allotropic form of oxygen, differing essentially in the fact that it has a greater specific gravity. Oxygen, in separating from a compound, rises to its ordinary form by two lifts or stages. First as ozone, then as oxygen, the latter containing and requiring an addition of potency. The battery, therefore, which is economical of its force, sets free the oxygen in the decomposition cell only as ozone, and thus it escapes; the potency which is required to raise the ozone to the form of oxygen must come from other sources. When oxygen is set free from combination at a temperoture below 300°, it probably always takes the form of ozone. Also, it is likely that the hydrogen escapes in a condensed form on the surface of the platinum, and provided as much of the energy of the battery is taken away for outside work as possible, the hydrogen takes up heat from the platinum and the solution which it needs to exist at the ordinary tension and temperature.

If this theory should prevail after it has been submitted to the scrutiny of the scientific public, it will bring about a radical change in our notions of chemical phenomena. It reduces chemistry to a branch of mathematical philosophy, and makes properties and changes of properties of matter, only cases of positions and motions of atoms.

## Correspondence.

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

### Cipher Writing---A Universal System.

MESSRS. EDITORS:—So much has recently been said in the columns of different newspapers throughout the country on the subject of "Cipher Writing" and "Deciphering," I have made bold to request a limited space in your valuable sheet for the purpose of ventilating a few ideas of my own on this much discussed question. The late comments on this subject have arisen partly from a story recently published in *Blackwood*, in which cipher writing is indulged in by one of the characters, and the art of *deciphering* by another. The story itself is not pertinent to the question, other than the remarks of the hero in explaining his theory of the art of *deciphering* any *written* words in *cipher*, and he is not the only one who has asserted that *any* written cipher can be deciphered, and this belief has spread itself through hundreds of newspapers influencing their thousands of readers. As a late editorial justly remarks, "If the whole system of cipher writing can be unlocked by other means than the key, its extension and use as practiced at the present moment by thousands of business men and others in the transmission of valuable telegraphic dispatches regarding stocks, gold market, merchandise, police matters, and the secret business of the general government, is of but little account, and anything but a safe medium to transact business requiring absolute secrecy, from all but the person or persons intended, and may account for some strange developments in civil as well as military life." Now, all this may be true as applicable to any ordinary system of cipher; and the writer in *Blackwood* is undoubtedly correct in his explanations of how to decipher any cipher writing in common use; but I must beg him to make *one* exception in favor of a system of "ciphers" of my own invention, that I am confident will baffle the keenest wit that ever lived to decipher without the key. It is the simplest of all ciphers, because it requires *no written* key to understand. The key is carried in a person's mind, and *can't* be forgotten, because of its perfect simplicity; or it may be varied at pleasure, and the key be found *anywhere* in the Christian world, but useful only to those for whom the cipher may be designed. Another feature about this system is, that no matter how extensively its principles might be understood, any two or more persons could intelligently understand each other either by letter or telegraph, without the least danger that others in possession of its secret workings could be any the wiser had they *years* to study an intercepted sentence, unless it was so designed by the person sending the sentence, for the reason that it is susceptible of an infinite number of curious variations. I will now, with your permission, give a short sentence in this queer cipher, with the English of it underneath, and following which I will give a second sentence in the same cipher, and invite the most astute wit to decipher the second line, although with an example before him, each cipher rendered into English, and containing almost every letter of the alphabet—at the same time assuring all that the second line is as simple and easy of rendition as the first; and, though it may not seem so, yet is deciphered by the same key as the first line, when in the hands of one who not only understands its principles, but for whom the sentence is designed:—

*Cipher*—2 3, a, 44 9 6 4 1 2, B, 27 15, C2, B, 2, a12 13 14 15, C1 6 3 7 4, D11, G2 10 3, I30 6 26 4 25 10 26 31, H1 2, I1 30 31 3, K5, I, 30 10 11, K5 7, M5, K1 3 4, I29 10 30, 6 7 a38.

*English of above*—"Washington came first—just, virtuous, brave, devoted, kind, loving."

*Sentence to be deciphered*—2 4 a1 2 25 23 5 27 13 13 17 16 7 7 9 38, E, 34 30, F9.

A glance at the above lines will show that the ciphers in the first line, with their English letters to correspond, do not make sense when applied to the second line, and herein is the mystery. On counting, the reader will find three more figures in the first line of ciphers than there are English letters in the explained sentence; and I will so far explain as to state, that the ciphers, 2 3, a, do not belong to the sentence, properly speaking, but are explanatory of the key—the first proper cipher letter is the figure 44, which stands for W.

Now, let some of the readers of the SCIENTIFIC try their skill at the last sentence, and give a satisfactory elucidation of it, and the proper key if they can, and, when all have failed (as assuredly they will), I will, with your kind permission, in another issue, make the whole matter as plain as daylight, and furnish a cipher that will baffle detection.

Troy, N. Y. C.

### How to Manage Kerosene Lamps.

MESSRS. EDITORS:—I herewith communicate my "say" on the "Kerosene Lamp Question," which is founded on experience and actual experiment.

If the brass-work, cone, etc., is heated unusually hot, it will cause gas to generate in the lamp, which, as it produces pressure, will force itself up through and around the wick and ignite, causing the lamp to sputter, and even snap itself out. Now if, when it is "sputtering" the brass-work is cooled off, for instance, by wrapping a wet cloth around it, the lamp will cease sputtering and snapping and burn as it should.

An examination, while operating as above, will generally reveal charred and saturated wick burning around the base of the wick tube, or the flame of the lamp may impinge on the cone, owing to its being slightly turned or the wick having a ragged corner, causing the brass to heat and generating gas. Low proof oil, forming gas at a low temperatue, is consequently more unsafe to use. If the wick fits the tube properly, blowing down the chimney is the best way to extinguish it, for the following reasons:—It is perfectly safe, the wick need not be trimmed for several days, thus obviating the necessity of regulating it every time it is lighted. A slight puff or a gentle flirt of the fingers across the top of the chimney, in an upward, slanting direction is all that is necessary. A tremendous and badly aimed blast is generally used, where a mere puff would suffice, if properly directed.

If the wick fits the tube, it is impossible to drive the flame down into the lamp by blowing into the chimney.

EXPERIMENTER.

Port Henry, N. Y.

### A Proposed Flying Machine.

MESSRS. EDITORS:—I have heard whisperings of flying machines and other novelties of late—whether proceeding from Mr. Glaishere's new society, "*in nubibus*," I cannot say—but if anything of this kind is to be accomplished, my impression is we shall hear of it first from our side of the water; and, if you will permit me, I will give a brief outline of an idea that has occupied my mind, and which may be worthy the attention of parties interested, on taking to themselves wings. It seems hopeful to me, that, as we can support our bodies in the water, by two inflated bladders fixed across the chest, and over the shoulders, leaving our arms free for all necessary movements, so we might, in like manner, suspend ourselves in the air by the aid of a small elongated balloon filled with hydrogen gas, attached by a light frame of cane or wicker work fitting to the figure, and secured by strappings of stout linen, leaving the arms at perfect liberty to work the wings or other contrivances for progression and guidance—the wings made of strong fine silk, smoothly stretched over whalebone frames, capable of extension and retraction at pleasure. But in order to facilitate the operations of the wings, certain mechanical movements will be needful; and these I would propose to inclose in a kind of cuirass of the lightest of metals (aluminum), closely fitting to the chest, and which the arms and hands can completely command. The hydrogen gas is easily obtained from refuse iron and sulphuric acid, which can afterward be converted into a green vitriol. Experiments at trifling cost can be made to ascertain the volume of gas and size of balloon required to poise the body safely and easily in the air; and I am very sanguine that the success of progression and steering will eventually be perfected by some one of your clever correspondents.

I dare not trespass further, either on your patience or your waste basket, as that may be. Fluttering about over the chimney pots, on gaily gilded wings flashing in the sun, will be a pretty sight; but mounting over high precipitous rocks or rivers, would save our thews and sinews, and, may be, our lives; and one apparatus would be of easy conveyance and of small compass.

For reconnoitering and prospecting purposes I think this plan might answer well. THOMAS INGLE.

The Velletta, Ensworth, Hants, Eng.

### A Correction.

MESSRS. EDITORS.—I perceive that owing to a mistake in copying, a serious error occurred in the article, Volumetric Estimation of Barium page 244 of issue of Oct, 19, the sentence reading: "If a crimson coloration is produced add liquid from the burette until only a slight crimson tint is produced;" should have read: If no coloration is produced, cautiously add liquid from the burette until a crimson tint is perceived on testing with nitrate of silver in the manner described. Please insert this in your next issue and oblige,

GEO. H. MANN.

Troy, N. Y.

### That Big Saw Again.

MESSRS. EDITORS:—I notice a communication in Vol. 17, No. 13, of the SCIENTIFIC AMERICAN, dated Sept. 18, 1867, under the signature of Lamar Foss. Your correspondent attributes to me a statement which he cannot show in any written or printed paper from me viz.: "that a 15 horse power will driv a 52-inch saw of my make as hard as it can be driven." have never made any such statement.

Forty horse-power can be expended in running a 52-inch saw of my make and the saw can be made to cut 40,000 feet of inch lumber in ten hours with that power. Furthermore, I am prepared to demonstrate by actual trial that with a twenty horse-power well applied and a saw of my manufac-

ture well kept in order, I can saw 25,000 feet of inch lumber in ten hours from good clean pine, poplar, or hemlock. In the hard, gnurly native timber of Connecticut, or in the muddy, gritty timber so often floated there a saw cannot be expected to work to one half its capacity.

What some men call 15 horse-power will not rate 10 horse-power taking into consideration the way it is used; *i. e.*: the horse-power as estimated by Watt, 33,000 lbs. raised one foot per minute. I have seen steam engines and boilers rated at 40 horse-power that were so miserably set up and worked that 10 horse power could not be obtained. The quality of fuel generally used in saw mills will not generate the greatest amount of steam, and consequently greater heating surface is required in the boilers or there is a deficiency of steam. Among the various kinds of water wheels in use, many are greatly over-rated in power. Judging from my own experience not one power in fifty, either steam or water, is ever tested; it is nearly all guess-work.

At Sandy Lake, in Mercer county, Pa., is a mill which I erected and in which I put the first of my saws ever run this side of the Rocky Mountains. The size of boiler is 12 feet long, 3 feet in diameter, two 12-inch flues; the engine, 7-inch cylinder, 10-inch stroke. I never carried over 90 lbs. of steam. No one would rate that engine over ten horse-power. The mill has an upper and lower saw 56 and 42 inches in diameter, and sawed the first year over 2,000,000 feet of lumber running only 10 hours in the 24, and has sawed more than 1,000 feet per hour of inch boards.

I am prepared to prove to your correspondent my assertion, viz.: a mill will cut 1,000 feet of inch lumber to the horse-power in ten hours. I assert that a 15 horse-power properly worked with a 52, 54, 56, or even a 60-inch saw will drive the saw to do a good business. Much, of course, depends on the quality and condition of the timber. J. E. Emerson.

### Lifting Pumps and their Pipes.

Messrs. Editors.—On page 211 current volume, Mr, Wm. Edwards says your answer to A. T. of Kansas was erroneous; assuring your Kansas correspondent at the same time that "a pump in such a situation would suck water considerably more than 23 feet." With proper qualifications the assertion is true, but under ordinary circumstances it will not work.

I have made pumps, and experimented frequently with ref erence to the proper length for suction pipes; my conclusions are that unless the channel or bore is enlarged as their length is increased they will not work when 31 feet long, which would be the length of A. T.'s suction unless he continued his eight feet depth dug at the mill to the river bank. Add to his 31 feet hight 100 feet length and he would have 131 feet suction pipe. Dig a channel from the mill to the river and his suction pipe would then be 123 feet long; under ordinary circumstances neither lengths would work. Suction pipes of pumps are usually made with a 2 inch bore. In a length of 123 feet the friction against the sides in consequence of the rapid flow of the water through the long narrow channel would be so great as to stretch the water out into a very meager stream, or breaking with a loud report before it reached the valve chamber, defying the most ingeneous to make it work without an increased bore. But, make the bore of the pipe say 4 inches for the upright part and 3 inches for the horizontal length, with joints perfectly air tight, and in my opinion the pump will work satisfactorily and Mr. Edwards' assertion be true. J. W. Shaffer.

Sterling, Ill.

If our correspondent will again refer to the page and paper to which he calls attention, and read carefully the article on which the criticism is based he will find that the advice there given is suitable for him and that the position of this paper is correct.—Eds.

### Paris Academy of Sciences.

At the last sitting a paper was received from M. Soret on solar radiation. The actinometer he uses consists of a ther mometer with a blackened bulb, and enclosed in a blackened box. The latter is pierced with a hole two centimeters in diameter, admitting a ray of light which falls on the bulb. The temperature of the thermometer continues to rise until it looses by radiation or by the action of the ambient air as much heat as it receives from the sun. In order to protect the thermometer from the influence of extraneous warmth, the blackened box is surrounded with melting ice. From a series of observations made with this instrument it appears that the moisture of the atmosphere influences the intensity of direct solar radiation; and in general, other circumstances being the same, the more aqueous vapor the air contains, the less intensity there is in the radiation of solar light. Radiation increases with altitude, but its increase is less rapid than the increases with altitude, but its increase is less rapid than the fall of the barometer. The density of the atmosphere being the same, the radiation observed at a great altitude is undoubtedly stronger than at a lower one, and the diminution of radiation as the sun inclines towards the horizon is much less at a high altitude than in the plains.—M. Robt sent in an article on chloride of lime, showing: 1, that all acids displace hydrochlorous acid in liquid chloride of lime; 2, their action ceases then if the hyporchlorous acid set at liberty is not in contact with hydrochloric acid or some oxidable acid; 3, that if the contrary is the case, chlorine is evolved; 4, and that at all events hypochlorous acid excersises no action on chloride of calcium. In a paper on the electric spark, M. F. Lucas calculates that while the voltaic focus now used for lighthouses is equal to the light of one-hundred and twenty-five Carcel lamps a solitary electric spark, having but an apparent intensity of ons-twothousandth of a Carcel lamp, would be seen from a greater distance than the voltaic light above alluded to. He therefore recommends the periodical discharge of strong batteries of Leyden jars instead of the permanent lights now in use.

### American Champaigne in France.

One of the most interesting manufactures of the American Department of the Paris Exhibition is that of the still and sparkling wines, colored and uncolored, which are exhibited by a score of American wine manufacturers. These wines, after being tested by the best judges, have been pronounced worthy of being compared to the most prized productions of France. These sparkling wine comes near to the champaignes of the best marks—"Reims," "Epernay," and "Chalons"—and this American manufacture is coming strongly into competition with our own products in the markets of the new world. The grapes which yield this product are the Catawba, the Isabella, the Delaware, the Diana, the Virginia, the Seedling, etc. Six specimens of these sparkling wines have been pointed out by the jury. In the first line stand the samples of Messrs. Werk & Sons, of Cincinnati, Ohio. We understand that in their wines the best qualities of grapes and finest of crystallized sugar are used, and the same skill employed as in the manipulation of the best manufactures of France. Mesers. Werk, being natives of France, are acquainted with all the minutest details in the cultivation of grapes and the production of wine The elder Mr. Werk was one of the first promoters of this branch of industry in the United States. Their vineyards are located near Cincinnati.

[We translate the above from *L'Invention*, an excellent monthly journal of science, published in Paris by Charles Desnos. We are much pleased to record this strong commendation of a comparatively new branch of industry in our country, but which has already become very important. There is no good reason why we should depend upon European nations for our supplies of wine, and we think the importation in this branch must gradually decrease, although statistics show the consumption to be greatly increasing.

Eds.

### Shell Cameos.

The shells employed for cameo cutting are the cassis rufa, and several species of cyprea, called cowries. They are dense, thick, and consist of three layers of differently colored shell material. In the cassis rufa, each layer is composed of many very thin plates, or laminæ, which are perpendicular to the plane of the main layer; each lamina consists of a series of elongated prismatic cells, adherent by their long sides; the laminæ of the outer and inner layers are parallel to the lines of growth, while those of the middle layer are at right angles to them. In cowries there is an additional layer, which is a duplicature of the nacreous layer, formed when the animal has attained its full growth. At the London Exhibition there was a very fine collection of shell cameos, from Rome, owned by the engraver Seculine. Certain natives of India prepare shell cameos with rude but efficient instruments for cutting them, and the Indian department in the Exhibition showed numerous specimens.—*Dr. Feuchtwanger.*

### A Cement for Iron and other Substances.

A correspondent asks, "What is the best known substance for sticking sheepskin to iron." We reply, that any fibrous material can be "stuck" to metal, whether iron or other metal, by an amalgum composed of glue dissolved in vinegar, hot, with one-third of its volume of white pitch pine, also hot. The composition will give a sure and certain return.

## Editorial Summary.

Elementary Education in France.—One third of all the inhabitants of the French Empire are unable to either read or write. This unwelcome fact has just been forced upon the attention of the enlightened among that nation by the publication of two maps entitled "France that can read, and France that can write." In the latter, the districts in which persons married in 1866 who could not sign the registry—in a proportion varying from thirty to seventy per cent—are marked in black. Fifty-five departments thus denounced comprise all the south, center and west of France. The averages of the illiterate married in 1866 is thirty-three per cent. As regards primary instruction France accordingly is in the lowest rank of the European powers.

Tailless Cats.—A correspondent in Sudbury, Mass, informs us of the existence of a race of felines in that vicinity all of whom are destitute of caudal appendages. Tradition ascribes their origin to a farm where many rabbits were kept, and a mixture of races was the consequence. In confirmation of this Darwinian idea our correspondent asserts that the tailless cats of the present generation have the crook of the legs and the jumping gait, characteristic peculiarities of the rabbits. A frightful mortality in every litter of these curiosities tends to prove that by an unnatural effort nature has produced this mongrel race. The generous offer of our correspondent for an editorial cat of this family is gratefully accepted.

Whooping Cough Infectious.—M. O. Poulet read at a late meeting of the French Academy a paper with this title, in which he stated that during an epidemic of whooping cough which prevailed in his neighborhood, he found in the air expired by a number of children suffering under it, a vast number of infusoria, identical in every case, and which had the property of communicating the disease to persons inhaling them.

Profoundly Impressed.—It is reported that during the visit of Abdul-Aziz to the Paris Exposition, he inspected the greatest triumphs of science and art with an air of dignified repose, which was in fact the stupid tranquillity of ignorance. The only thing in the building that caused a smile of intelligence to pass over the Sultan's face was a punching machine in full work, and when told by his interpreter that it was capable of administering one thousand punches a minute, he replied with decided animation that he would take one home with him for the benefit of the heads of those who had persuaded him to leave Turkey.

The Aeronautical Society of Great Britain contemplate holding an exhibition in May, 1868, of machinery and apparatus relating to objects of an aeronautical character. There are several expensive designs for the accomplishment of aerial transit at this time under construction. It is proposed to offer a prize to any aeronaut starting from any part of continental Europe who shall reach England in a balloon nearest to a given point without replenishing his gas at any time during the days of reception allowed for articles of exhibition.

Another New Motor—An English patent has just been issued for an invention for employing gaseous hydrochloric acid to work on a piston and to produce motion. The gas is evolved from its solution by means of sulphuric acid and after it has done its work it is condensed by transmission through water, then, being liberated from the water by evaporation, it may be used over again any number of times. The parts of the apparatus with which the gas at any time comes in contact must be made of, or coated with glass, to prevent corrosion.

Musical Anthropology.—M. Ketis, of Brussels, has collected an immense amount of documents on the music of the greater number of modern nations, which have enabled him to divide them into several well-defined groups. From the models of flutes and lyres furnished by the pictures on Egyptian and Assyrian monuments, he has constructed instruments with which he has been able to revive musical systems buried for thirty centuries. He hopes from these systems to distinguish races as they have been previously recognized by languages; only less precisely.

The Remedial Properties of Grindstone Grit.—It is a common notion that the grit of the grindstone has some wonderful quality of healing which does not obtain with the sediment of ordinary stones on which iron is not used, as millstones. There is reason in this opinion, as the *debris* of the grindstone is a mixture of silica and ferruginous oxide. The healing properties of the *debris* of the grindstone lie in the oxide of iron, which, in this form, in some diseases is worth many medical prescriptions.

Compasses for Iron Ships.—The late M. Evan Hopkins has proposed a new plan for remedying the deviation of the compass needle in iron ships, his object being first to neutralize or destroy the polarity acquired by the iron ship while building, and removing the compass from the sphere of attraction exercised by the iron of the vessel. A horseshoe magnet is to effect the first object, and elevating the compass to a sufficient hight is to accomplish the other. He proposed to place a reflector near the elevated compass, in such a way that the card may appear like the face of a clock, and be capable of being read at the distance of twenty feet from the helm.

Poisoning by Phosphorus.—M. Dybkowsky, in a recent memoir states that the poisonous action of phosphorus is entirely due to the formation of phosphoreted hydrogen gas, which, in passing into the blood, rapidly combines with the oxygen present. Hence he concludes that death from phosphorus is nearly equivalent to death by asphyxia.

A comic paper called the *Philosophe* recently appeared on the streets of Paris with a large portrait of Bismark, representing him as an ogre in the act of sharpening a knife to devour little children. The sale was prohibited and the police seized all they could find. Bismark is not much loved in Paris, but he is more feared than any other man in Europe.

Correction.—In our answer to H. L. W. of Pa., on page 263 No. 17, present volume Scientific American the matter reads that the grate surface of a boiler per horse power is "six square inches." It should have been "half a square foot," a mild difference of only 66 square inches.

Spontaneous Combustion.—A fire recently occurred in the woolen mills of Messrs. Annens and Minot at Elbeuf, France, which was caused by the spontantaneous combustion of a heap of refuse wool impregnated with oil. The Scientific American has frequently warned manufactures of this source of danger.

Player's Patent Hot Oven, illustrated in our paper a few months ago, has been put into practical operation in this country with great success by Horace L. Brooke, of Baltimore, Md. The use of this oven is said to effect a clear saving of $10 a tun in iron smelting.

Dr. R. J. Gatling, inventor of the celebrated Gatling gun, sailed for Europe on steamer *Percire*, Oct. 19th.

### American Toys, where Made.

A writer in the *Commercial Advertiser* has been investigating the business of making various kinds of toys, with the following result:

"The tin toys used in this country are now nearly all made in Merriden, Conn., where large quantities of tin household goods are also manufactured. It occurred to the makers of these latter that their scraps could be advantageously used for toy objects, and with the advantage of labor-saving machinery, they have driven their German rivals from this market.

Wooden toys of the less fragile kind are largely manufactured in several Connecticut towns. These consist of children's wheelbarrows, drums, rocking-horses, carriages, carts, blocks, rail cars, hoops, sleds, etc. Many of these objects are also made in this city and Philadelphia.

The new sensation toys, as the dancing negro of a few years back, and the present returning ball and Quaker popgun, are all made here. The patentees of these articles are said to have made fortunes. The railroad train and several other new toys, in great demand when first presented, have also been mines of wealth to those who patented them. The red india-rubber balloons are made in France, and filled here with gas. They are by no means strong, and the gas soon escapes.

Pewter toys, comprising soldiers, landscapes, trees, etc., are now largely made in this country, and though many are yet imported from Germany, their manufacture continues to be a profitable branch of business. New York monopolizes much of this industry. An Italian firm during the war realized a considerable sum by the manufacture of toy tea cups and saucers, the chief material of which was lead.

The stuffed bodies of dolls are made in New York, Boston and Philadelphia, as also the arms; but Germany still sends many. The arms of stuffed dolls are an especial article of commerce. They are not, like the legs, attached to the bodies, but are sold separately. Families will often make the bodies and legs for their children, but buy the arms on account of the difficulty of making fingers. The heads are likewise purchased, and are either of French porcelain and finely featured, of German china or papier mache, of English wax, of American india rubber, or of a new imitation of papier mache lately patented in Philadelphia. This latter is of thin layers of muslin, coated with oil paint, which has the advantage of washing without injury and is exceedingly strong, though by no means of fine finish.

India rubber hollow toys of every description, except balls, are said lately to have drooped in sale. Grotesque birds and men that squeaked when squeezed, seem to no longer to charm by their music.

The india rubber dolls' heads, lately much in use, are superseded by the new Philadelphia article spoken of.

Large mechanical toys, such as velocipedes, imitation steam engines, steamers, etc., are made here; as also kaleidescopes. A negro jig dancer, propelled by steam, is the latest Yankee notion. A kerosene lamp heats a small brass vessel full of water and shaped like a top. It revolves in its socket, and moves a wire which communicates with the figure.

Aside from those we have mentioned, and a few others, most of the objects seen in a toy store still come from Germany. Children are largely employed in their preparation there, but American children go to school. It is surprising at what an early age German children are availed of in this respect. At six years, there, certain simple duties are performed by them upon portions of toys. Farmers of two or three acres employ their entire families in toy making during the winter months. The result of this labor is seen in Noah's arks. A youngster of very tender years paints the bodies of Noah's family and the animals with one color, and another child, a little older, dots the artistic countenances, or daubs patches of varied colors on the bodies. Wooden dolls are mostly made in Germany by the country people. Marbles come exclusively from Saxony, and are prepared in molds by machinery, from a clay not found in other countries. The material for agate marbles is obtained in the Hartz mountains of Germany.

A Japanese top has been lately in vogue, and several Chinese toys have been for years in use. It is worthy of notice that the hints for toys manufactured for generations past in Germany have been usually taken from China.

Croquet instruments are made in Pawtucket and Providence, Rhode Island, and in Boston and Springfield, Mass.

Maple is the wood principally used, though lignum vitæ is sometimes employed. For most expensive kinds boxwood is the material. This has become an immense business, and is likely to continue so, as croquet is yet by no means as common a game in the South and West as in the East. Small balls, for parlor use during the winter months, are also made. The new game of martelle employs the same woods. The parlor balls are of ivory.

There are few better or less explored fields for fortune than the invention of toys, and ingeniuty seems constantly drawn in that direction."

[The number of applications for patents in toys, during the past few years, has been gradually increasing. We never knew a patentee of any kind of a toy that did not make money out of his patent.—EDS.]

### Marmalade.

A paper was read in the British Association on the "Confectionery and Marmalade Trade of Dundee"—a trade which has been in existence for seventy years. Some curious facts were stated which we copy:

The quantity of marmalade made in Dundee at the present time amounts to above 1,000 tuns annually, for the production of which more than 3,000 chests of the finest bitter oranges are used.

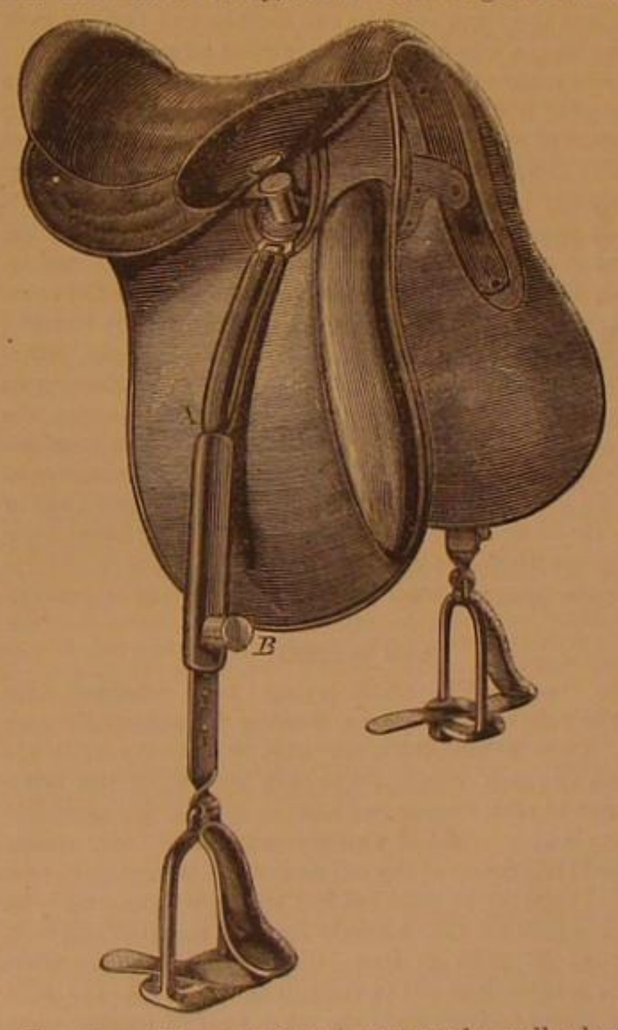
These are imported from Seville, as it has been found that the oranges grown in and around that city possess a peculiar and agreable aroma, which renders them better adapted for the purpose than those of any other district either in Spain or Italy. When the marmalade is prepared, a sufficient quantity of sugar is added, to preserve it thoroughly, without in any degree impairing the flavor. About four hundred persons are directly employed at the Dundee confectionery works, and it may be added that occupation is furnished to many more in connection with them. For example, one of the Newcastle potteries is to a large extent employed in turning out the well-known printed jars for marmalade. Of these there are about one and a half millions required every year, costing upward of £6,500. The marmalade season, as it may be called—that is, the period during which all that is required of this preserve for the year's supply must be made—usually continues about four months, viz., from the begining of December to the end of March.

The manufacture of confections is also carried on on a very large scale, and embraces an immense variety of lozenges, comfits, candied peels, etc., to supply the constantly increasing demand both for the home and colonial markets. The quantity of sugar, chiefly refined, used for the confections, marmalade, and preserves made in Dundee, it would be difficult to estimate; but it probably amounts to two thousand tuns annually.

By way of giving a scientific term to the paper, the writer stated that "the word 'marmalade' is supposed to be derived from an Indian fruit not unlike the orange, called the *Ægle marmelos*, or Indian *bael*, from which at one period, a similar conserve seems to have been made."

### MEYER'S SAFETY SADDLE.

The object of this saddle appears to be not only to make an easy seat for the rider and a comfortable appliance for the horse, but to insure safety, in case of the fright of the horse,




to his rider. The contrivance seems to be well adapted to these ends. The frequent accidents occurring from the entanglement of the foot in the stirrup, the fatal consequences of being drawn by the foot, as was Achilles by Priam, seem to demand some arrangement by which the rider can extricate himself from a very bad situation.

The saddle in the engraving is made to fit the horse, the frame being of iron instead of wood. But the improvement is mainly in the appendages to the saddle. The stirrup strap is of a metal strap secured in the leather of the strap proper, and held in place by a spring catch, seen in the engraving under the saddle flap. The strap is in two parts and swiveled at A, so that it may be turned in any direction. At B is another spring catch which allows of a raising or lowering of the stirrup. By the use of the upper catch the stirrup strap may be instantly disengaged, so that if the rider is in danger of being thrown he or she may disengage the strap to prevent being caught when thrown or leaping from the horse. The stirrups are hinged to accommodate themselves to the action of the foot. It was patented through the Scientific American Patent Agency Sept. 18, 1867, by Jacques Meyer, 104 Ewen st., Williamsburg, N. Y., who will answer all inquiries relative thereto.

### A Shaft in the Oaks Colliery.

Number two shaft is in a condition different from that of number one. Great timbers secure its sides, and the eye can penetrate it but to a very little distance. This is the main way to the workings, and was with immense labor choked up and stopped soon after the calamity. But what is going on in the great mine is not left entirely to be guessed at. Penetrating the mass of material used in blocking the shaft, is an iron pipe of the circumference of a dessert plate with a secure groove-lidded top. This extends right down to the subterraneous ways where are still entombed three hundred human beings and forty horses and ponies.

The object of this pipe is that the gas in the terrible place may be measured as to its strength and quality, and to this end outside the big pipe there is affixed an indicator, and every hour note is taken of the pressure shown, and entered in a book. This is part of the night watchman's work. "I should imagine that the gas must have been well nigh exhausted by this time," I remarked. "You never were more mistaken; coom up here and see for yoursel'." was the obliging reply. "Up here" was up a short ladder, and after depositing his lamp ("safety" though it was) at a considerable distance, my guide led the way. I did not see him take the lid off the pipe, so I cannot explain how it was done, but I knew the moment that it was done by the strong blowing. "Put oop you han' mon, and feel it." This I did, and whistling through my fingers the foul blast made them feel as though webbed. "Put thy face ower mon—just a instant; keep thy mouth shut." And this, blockhead that I was, I likewise did. It was only for an instant, and without doubt I shut my mouth. But where was the use of such a mild precaution against so insidious an enemy? I must have closed every pore of my skin to have escaped its poisonous influence. I paid the penalty of my rashness. Breath of death as it was, it crept into me, and not that night nor next day but the day following, it roused in its lurking place, and, alas! the twisting it gave me! I never yet was seasick, but if that affliction is a tenth as horible as mine-gas sickness, commend me everlastingly to the land.—*James Greenwood.*

### Europe on the Western Hemisphere.

It may be interesting to know what territory in this hemisphere is claimed by European nations. The *Hartford Courant* says: The European nations owning territory in America are six in number—England, Spain, France, Holland, Denmark, and Sweden. To England belongs all the territory north of us known as British America, as also the Bermudas, the Bahamas, Jamaica, several small West India Islands, English Guiana in South America, and the Falkland Islands. These embrace altogether about one hundred and fifty thousand square miles and a population of nearly five millions. France owns St. Pierre and Miquelon, a small group of islands off the coast of Newfoundland, Martinique and Guadeloupe among the West India Islands, and French Guiana in South America. The population of these possessions is three hundred thousand. Spain owns Cuba, Porto Rico, and the Spanish Virgin Islands. This last scanty remnant of a domain, which once included half of South America, and a quarter of North America, has a population of less than two millions. Holland rules Surinam or Dutch Guiana in South America, and a few small islands of the West Indian group. The number of their inhabitants is not one hundred thousand. Denmark is in possession of the three West Indian islets of St. Croix, St. Thomas and St. John, with a population of thirty-eight thousand; while Sweden exercises sway over the petty adjoining isle of St. Bartholomew, containing but twenty-eight hundred souls. It will thus be seen that the people subject to foreign domination in the New World does not amount to so much as a third of the population of our country alone. Of the six foreign powers only one, England, has a foothold on the mainland of North America; while only two others, France and Holland, have possessions on the continental portion of South America.

### Toads.

The paper on "Toads," in *Harper's Magazine* for October is original and descriptive, and does justice to a much maligned member of the animal creation, for whose bad name Shakspeare and Milton are largely responsible. We quote a passage, which informs us why toads are so cold. The writer says: "The abundant moisture and coolness of the toad, so essential to his health and comfort, help to make him disagreeable to us. As the moist coolness of a dog's nose startles any one who feels it unexpectedly or in the dark, so does the invariable dewy cold and clammy sweat of the tood, when touched, offend many a civilized simpleton. I say civilized, remembering that the black barbarians of Senegal, availing themselves of this perpetual coolness produced by the abundant moisture and rapid evaporation on the skin of toads, are in the habit, as Adamson informs us, of applying toads to their foreheads as they traveled in torrid heats over burning sands, on the same principle that Roman ladies of the imperial age carried cooling pots in their hands and bosoms in the form of living serpents; or that the languid beauties of Turkish seraglios pass between their fingers the refrigerating fragrant beads of their amber tusbecs.

"In every toad there is a sack of pure water, not at all connected with the kidneys, but serving as a reservoir, and furnishing, doubtless, a part of the fluid which perspires from the skin. This fluid is very harmless in the common English and American toads. So, also, is the liquid which is largely secreted by the bean-shaped bunch on each side of the toad's head, as well as that which is so freely ejected when you suddenly grasp a toad in your hands. Most persons are afraid of these fluids, and imagine them poisonous. They are mistaken. Not even Macbeth's weird sisters could now find venom in the common toad. It is true, however, that these juices have a slightly irritating effect when applied to the eyes, or to a flesh wound, and that cat or dog does not like to take a second taste. But they are substantially harmless."

COMPOSITION OF BRITANNIA METAL.—Ordinary Britannia metal is composed of equal parts good red brass, antimony, tin, bismuth, and lead.

## PROGRESS OF THE PACIFIC RAILROAD---THE SYSTEM ADOPTED FOR LAYING THE TRACK.

A correspondent of the *Evening Post*, writing from Omaha, under date October 11, thus describes the progress of work on the great Pacific Railroad and the mode of laying the track

To the people of the East the Pacific Railroad, building thousands of miles away in a desert country, and meeting obstacles only to overcome them is a great enterprise; but to the western man it is the one great topic of conversation. In fact, almost every man here is in some way personally interrested in it, either actually working on the road, or getting out ties, or cutting cord wood, or in some one of the numerous contracts connected with it.

### THE DIFFERENT PACIFIC RAILROADS.

Here is a Union Pacific and a Central Pacific, and a Union Pacific Eastern Division, and a Northern Pacific, and a Southwestern Pacific. Of these the Union Pacific, and the Central Pacific are the great Pacific Railroad we read about, and when completed will form one continuous line from Omaha to Sacramento. The Union Pacific has already completed nearly five hundred miles west, commencing at Omaha and the Central Pacific is in running order more than a hundred miles east of Sacramento. They will unite somewhere about Salt Lake City. Both roads have government assistance and both roads have their bonds in market. The Union Pacific Eastern Division, starting from Wyandotte, Kansas, follows the Smoky Hill route, passes through Leavenworth and Topeka, and is now in running order to a point called Ellsworth, about two-hundred and twenty-five miles out.

It is this road that has been threatened by the Indians, and to the building of this that Ragged Shirt Tail and his companions object. This road also receives government assistance, and as now projected will strike the Union Pacific at some point west of Denver, and will be a sort of branch of it. The Southern Pacific, starting from St. Paul is as yet hardly under way, and the southwest branch running from St. Louis to Rolla, and thence by way of Santa Fé, through Southern California to San Francisco, is in about the same condition. The Northern Pacific is not intended to strike San Fransisco, but rather Portland or some city in Oregon, and the Southwest Branch very likely will make some point lower down on the California coast its western terminus. But while these other roads are debating what rout to take, or how to raise the the funds to build the road with, the Union Pacific has thoroughly built and equiped nearly five hundred miles of road, is already within a hundred miles of Denver, and although running through a waste of wildernsss almost uninhabited, more than pays its expenses.

### WEST FROM OMAHA.

You get into the cars at Omaho at six in the evening. There is nothing in the passengers to remind you of the extraordinary nature of your trip, unless it is that almost every one has a rifle, and that the conversation smacks of buffalo, and the miners, and fronteer adventures. Comfortable sleeping cars are attached, and when you wake up in the morning we have passed Fort Kearney and are fairely on the Plains. As far as you can see to the right is one broad unbroken expanse of plain. On the left is the Platt with its bluffs, and here and there a straggling willow or cottonwood. But we have passed the region of timber, and shall see no more until we come to the present end of the road beyond Antelope, where on the bluffs a few stunted cedars and pines wrestle with the winds for their existence. The "Plains," in the sense in which the word is generally used, means all that immense tract of country which is without timber and without water. Sometimes this is an immense prairie, level as a floor and covered with waving grass; sometimes a plane hemmed in on either side by barren bluffs. Rain seldom falls here, and it is only available agriculturally for stock raising. After leaving Fort Kearney no farms are to be seen, but instead, now and then a scared antelope startes up and makes off over the plain, and the immense horns and the bones of buffalo lying along the route show where they have been killed. At Fort Kearney four Englishmen came aboard the train who had been out on a five days' hunt, and had killed fifty buffalo. The tongues they cut out, and the carcasses they left. They did not want the meat, and they only killed them for the sport of the thing. It is just this wanton waste of useful life that so enrages the Indian and excites an anger which is vented on the first white men he is strong enough to overcome.

### HOW THE TRACK IS LAID.

Breakfast is over and work commences at half past six, but it is not till seven that it is fairely under way. We shall only see the track-laying to day, for the grading, which is a separate part of the work, is already completed to Cheyenne, thirty miles ahead. The work of track-laying is divided into three parts:—the tie-laying, the track-laying proper, and the bolting and spiking.

### THE TIE PLACERS.

First come the engineers, who fix the line of the ties, determining where they are to go; next a set of skilful work men who put down a few ties at the proper level, enough to determine the position of the rest of the ties, and finally the great body of the layers, who fix the remaining ties on the level of those already down—workmen follow, throwing in dirt and ramming it down, and all is then ready for the track-layers. These are a gang of ten stalwart fellows, in whose work is the great attraction. Taking an open truck of a car, they run it back to where the rails were dumped off of the supply train, and load it with rails and the proper number of joints and spikes. A couple of horses are then hitched to the car and haul it to the end of the track, when they are unhitched and sent back for another load leaving in their place a small but intelligent horse, that performs his work with great steadiness and zeal.

### THE RAIL LIFTERS.

The truck being at the end of the track and the wheels blocked, at a word from the foreman five men on each side seize a rail and pull it out over the front of the car to its full length. "Down," sings out the foreman, and down comes two rails into their proper places on the ties. In an instant the man at the farther end has applied a measure and adjusted the width, the man next the car has whipped out the blocks, the little horse knows that now it is his turn and strains and pulls, and the car runs over nine yards more of the Union Pacific Railroad. "Whoa up!" the horse stops, the wheels are blocked, again two more rails are seized, "Down" cries the foreman again, and down come nine yards more. It is very exciting to watch this work, but you can't keep still. Every fifteen seconds the voice of the foreman rings out sonorous "Down," and every fifteen seconds another set of rails respond with heavy clang. Occasionally a rail comes out that is not perfectly straight. In this case instead of putting it down, one end is rested on the truck, all the men steady it, and a mighty Hercules, seizing a tremendous sledge hammer, deals it such blows as soon reduce it to its normal line.

### THE RATE OF BUILDING.

Nine yards in fifteen seconds! Great heavens, what a pace! This is thirty-six yards a minute; nearly a mile and a quarter an hour. At this rate, counting ten hours a day for work, and estimating the distance to Sacramento at one thousand six hundred miles, the work would be done in a little more than four months. But follow the truck along, and you will see why it is that this pace is not kept up, and why two miles a day is about an average of the work. A truck carries thirty rails. It exhausis its load then after dropping fifteen sets of rails, and must go back for another. This is what takes time, for the rails are heavy and slow to be loaded, and the truck must be run back to the point where they were unloaded from the supply train. As the track advances, this point recedes, and the truck must be run further and further back each time until a new load can be dumped off nearer.

This and many other difficulties reduce the track laying to an average of about two miles a day. In September, owing to the want of bolts and spikes, only ten miles of track were laid. The most constant forethought and the greatest energy are necessary to keep always ready rails enough, and bolts enough, and spikes enough, and the thousand and one articles, the want of any one of which would stop the work. And indeed, considering that the iron comes from all over the country, much of it from New England; that the ties are brought from wherever they can be got, many from Michigan, Minnesota and Wisconsin; that everything must be transported by a single line of track to Council Bluffs, thence across the uncertain Missouri River in boats, and again five hundred miles to their destination, and that the daily consumption of rails alone for two miles progress is two hundred tuns, and of ties five thousand two hundred and eighty, and of everything else in proportion—considering all this, I say, the wonder is not that the progress is not greater, but that it is as great as it is.

### THE BOLTERS.

But to resume: The track laying I have described only leaves the rails in their places, resting there by their own weight. Close behind the truck from which the rails are laid come two men who place at each jointing of the rail a clamp, and at each sleeper two spikes. These clamps, called the Fish clamps, consist of two pieces of strap iron, which are placed lengthwise of the rail and in the hollow of it, and are bolted together by bolts passing through them and both rails. The rails are thus securely fastened together and form one continuous piece of iron. Close behind the clampers come the spikers, who put in enough spikes to hold the rails in their proper position until the main body of spikers come up, when the exact width of the rails is fixed, the sleepers finally settled, and the last spikes driven home—and the work is done. This is the main work, but a dozen branches of it are going on all at the same time. Fifty mule teams are constantly hauling up sleepers, water carts are making constant trips to supply the whole establishment with water. Bridge men, three or four miles ahead, must permit no delay from bridges, and the telegraph must be the *fidus Achates* of the railroad. Every twenty miles a water tank is to be constructed, and wood wherever it can be got must be cut up and hauled for the engines.

The Rocky Mountains are now in sight. Thirty miles further and Cheyenne will be reached, and it is hoped the Black Hills this fall. The winter will then set in so as to prevent further work this year. But next year, when spring opens, it will again go on and with renewed energy. General Dodge, the Chief Engineer of the road, who has just returned from a six months' exploration of the mountains, reports finding an easier grade and an abundance of excellent coal. Already steps are taking to form a new territory, to be called Wyoming, and to be made up of parts of Colorado, Idaho, Dakota and Nebraska. Build the railroad, and the railroad will populate the new territory.

## Restaurants of the French Exhibition.

Of the many singular features of the French Exhibition, now drawing to a close, nothing is more striking than the elegant restaurants that surround the building. A certain amount of space was appropriated for this purpose to the various countries that had departments in the Exhibition, and the restaurants were fitted up, supplied and served in accordance with the tastes and customs of these varied nationalities. A Frenchman can get his coffee, wine and bread, a German his beer, sausage and sour krout, a Yankee his sherry cobbler, and pumpkin pie, the Englishman his beef, mutton and pale ale, and so on through all the whole list of edibles which the science of gastronomy can suggest to satisfy the appetite. At midday the work begins, and for two hours the music of crockery and the rattle of knives and forks seems to absorb the attention of everybody.

It is doubtful however if these restaurants have success in a financial point of view. The Paris journals already announce that the chief *restaurateur* of the French Department is a bankrupt, and that his liabilities are $300,000, and there is considerable grumbling on the part of the waiters in some of the others that their wages have not been paid, and a general collapse of empty purses is expected to crown the enterprise.

## MANUFACTURING, MINING, AND RAILROAD ITEMS.

The total silk production of California for 1867 is estimated at 210,000 cocoons and the supply of mulberry far exceeds the demand. The business is quite profitable just now, but the silk men are advancing cautiously.

The "swamp angel" which during its service before Charlestown, S. C. gained a great notoriety, is now lying at a machine shop in Trenton, N. J. awaiting its turn to be broken up and fashioned into more peaceful and useful implements.

Fire-clay, rivaling the best deposits of Europe, is found within four miles of St. Louis. The bed is fifteen feet thick and very extensive. Fire brick made of this clay is capable of resisting very high temperatures, and is excellent material for retorts, alembics, crucibles and furnaces.

The Missouri and Mississippi railroad is now under construction. The charter provides for the building of a road from Macon, on the North Missouri railroad, to the mouth of the Des Moines in the northeast part of the State, where a connection will be made with the Iowa system of railroads, and with those of Illinois by means of the road which terminates at Warsaw on the opposite side of the Mississippi river.

The marbles of Vermont have become one of its chief sources of wealth. The quarries and mills near Rutland, supply a large per cent of the marble of domestic production which is used in this country for statuary, monumental and other purposes, where a fine grade is desired. A capital of several millions of dollars is employed in the business, and a large proportion of those who have embarked in it have been in an eminent degree successful.

Among the new manufactures put in operation in San Francisco during the past year, are the Pacific Woolen Mills for manufacturing knit goods at the rate of $500,000 annually; the Golden city chemical works with a capital of $2,000,000, for preparing a great variety of chemicals and medicinal extracts; the San Francisco Glass Works for making white and colored glass to the extent of $150,000 a year, and the new Linseed oil and Paint Works, with capacity to supply the whole Pacific coast. These with minor enterprises inaugurated during the same period have absorbed more than $3,000,000 capital and will turn out manufactures to half that amount yearly.

The elevation of Iron mountain, Missouri, is 228 feet and the area of its base 500 acres. The solid contents of the cone are estimated at 230,000,000 tuns.

In Mexico there exist 197 different kinds of minerals among which are gold, silver, iron, copper, lead, zinc, mercury and tin. The following are said to be peculiar to that country: Rhodium, gold silenid of mercury, zochillanite, jalapite, iodyrite, coccinelo, plunbic, silver obsidian, and vanadite.

A British consul in Japan gives a remarkable account of the wealth of the lead, iron and coal deposits in the island of Yesso. In one place coal forms the sea cliffs, and in another he walked four miles over an iron sand which contained over 60 per cent of metal. There are also indications of gold and copper.

A very singular and quite complicated railroad accident, or series of accidents occurred last month on the line between Manchester, (Eng.) and Derby A cattle train of twenty-three cars entering the Peak Forest tunnel came into collision with a gravel train which had preceded it. One life was lost and much damage done, but the mischief did not end here, for both trains were standing on a steep incline, down which the recoil started the remaining cattle cars. An express train was standing on the rails and seeing the trucks approaching, the engineer reversed his engine and jumped off, but before the express had retrograded many rods a second collision ensued, the express train then continuing to back at a furious speed until stopped on an up grade by the loss of steam.

## Recent American and Foreign Patents.

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

INDICATOR FOR PUNCHING MACHINES.—W. Welch, Bridgeport, Conn.—This invention relates to a new device by which the number of strokes of punches, shears, milling machines, and all such machines, in which reciprocating motion is generated by rotating motion, can be registered, said device being so arranged that the registering apparatus can be put at rest when it is not desired that the strokes should be counted, as for instance, for lubricating, repairing, and testing purposes.

MANGLING MACHINE.—Johan Johansen, Springfield, Ill.—This invention has for its object to furnish an improved mangle, simple in construction, strong, not liable to get out of order, and which will do its work quickly and well without injury to the fabric.

HOSE COUPLING.—Moseley S. Curtis, New York City.—This invention consists in securing the parts of the coupling to each other by sliding blocks, and in operating said blocks by means of eccentric grooves formed in a movable part of the coupling.

ARCH BARS AND DOUBLE ANDIRONS FOR EVAPORATING CANE JUICE, ETC.—Gaius S. Deane, Grand Rapids, Mich.—This invention has for its object to furnish improved bars and andirons designed especially for farmers' use in supporting their evaporating pans and fire wood in arches built by them in the sugar bush for manufacturing sugar, but which are equally useful in other situations.

CARRIAGE CLIPS.—Edwin Meeker, Bridgeport, Conn.—This invention relates to certain improvements in the manufacture of carriage and coach clips, and consists in forming the same by means of dies, while they were heretofore made by hand.

FINE-TOOTH COMBS.—James H. Briggs, Brooklyn, N. Y.—The object of this invention is to so arrange a metal strip or band on fine-tooth combs, that the said combs may thereby be strengthened, or that two half combs may thereby be united to make one.

COMPOSITION FOR ROOFING.—Andrew P. Jackson and Otis Pratt, Warsaw, Ind.—The main feature in this invention is the use of a mineral found in great quantities near Dayton, Ohio, in combination with tar, sulphur, plumbago, and litharge, as a roofing material.

PROPELLER AND CURRENT WHEEL.—A. B. Smith, Yankton, Dakota.—This invention is a device which can be used as an endless chain propeller for steamboats, or as a water wheel to be rotated by a running stream for the purpose of furnishing motive power to drive machinery.

LOCK FOR FIRE-ARMS.—Wm. F. Kussmaul, Baltimore, Md.—In this invention a spring stop is provided, which catches under a shoulder of the hammer and holds it up from the cap when the gun is not in use. When the gun is cocked the spring stop automatically retires and leaves the hammer to descend upon the cap.

COMBINED COTTON PRESS AND FEEDER.—Henry Zellner, Columbia, Tenn.—In this invention the ginned cotton is fed to the machine through a shute in which it is cleaned from dust. It is then forced into the press under

follower, which presses it to the bottom of the tube, where it is held down by a novel device while the follower returns for a second tubefull. This process is repeated till the bale is completed.

SAUSAGES.—Jacob L. Chevalier, Newark, N. J.—This invention consists in combining fish, either fresh or salted, with pork or lard, and with or without potatoes, for preparing the article of food known as sausages.

LADY'S TATTING SHUTTLE.—Silas Schofield, Plainville, Mass.—This invention consists in attaching the shuttle to a holder and providing for winding the thread on the shuttle by a key or crank, thereby greatly facilitating the operation.

WIND MILL.—E. W. Mills, Syracuse, N. Y.—This invention relates to a new and improved method of controlling and regulating the power of the wind and to its application to a pump or other purposes.

ARTIFICIAL LEG.—Henry L. Mills, St. Paul, Minn.—This invention relates to an improved method of constructing an artificial leg, and consists in several devices and arrangements for securing comfort and convenience to the wearer and making a strong, cheap, and durable artificial limb.

TRANSPLANTER.—C. R. Disbrow, Bath, N. Y. Patented Oct. 8, 1867.—This invention relates to a new and improved mode of constructing an implement for the use of gardeners in transplanting plants and shrubs, to remove them with the soil in which they grow without disturbing the roots.

SCISSORS.—J. A. Althouse, New Harmony, Ind. Patented Oct. 8, 1867.—The design of this invention is to combine a buttonhole cutter with an ordinary pair of scissors, for the sake of convenience and economy.

APPARATUS EMPLOYED IN THE PREPARATION OF COTTON AND OTHER FIBROUS MATERIAL.—Wm. Hamer, Little Lever, England. Patented Oct. 8, 1867.—This invention relates to the removal of the silver from the case or coiler, and consists in placing underneath the material a spring of metal, so that as the silver is removed from the top of the can or coiler its lower portion is raised upward by the spring, and thereby prevents breakage.

APPARATUS FOR OILING PROPELLER CRANKS.—Jesse Davis, New York City. Patented Oct. 8, 1867.—This invention is designed to obviate the difficulty of oiling journals of propeller cranks and other inaccessible parts of machinery, and provides the means of lubricating them with regularity and certainty and no waste of oil.

LOOM.—H. D. Hunt, Danville, Ill. Patented Oct. 8, 1867.—This invention relates to an improvement in hand looms, and consists in connecting movable plates and levers attached to the lay with the breast beam and the shuttle devices, in such manner that the movement of the lay shall operate on the devices to throw the shuttle and other devices connected with the take up of the cloth beam and the working of the treadles and yarn beam.

CULTIVATOR COUPLING.—Joshua Pierpont, La Harpe, Ill. Patented Oct. 8, 1867.—This invention relates to an improvement in the axle and coupling of cultivators, and consists in casting the arms of the axle with a longitudinal groove on the upper side of each, for receiving the ends of a wrought iron connecting bar and a box or boxes on the under side, for receiving a turntable clevis.

BUCKLE.—A. H. Hopkins, Goshen, Ind. Patented Oct. 8, 1867.—This invention relates to an improved plan of construction in metal buckles for harness leathers, or straps of any kind, and consists in forming a rectangular buckle with two tongues, one at each end, hung upon a center bar on opposite sides, in opposite directions, and each tongue provided with a tuck loop for the end of the strap.

HAY FORK.—B. F. Stewart, Cadiz, Ohio.—This invention relates to an improvement in the construction of hay forks, and consists in attaching two curved tines or prongs to a handle by a pivot, on one of which prongs is pivoted a link that is connected with the other prong by a wrist working in a slot, the parts being so arranged and operated that when the prongs are closed they can be pushed into the hay, opening as they penetrate into it, until they are fully expanded to take up a load, which, upon being lifted by the handle and deposited in place in the usual way, is released from the fork by drawing with a hand rope upon the link that connects the prongs in order to close them again.

DEVICE FOR CAPPING SCREW.—Orrin W. Swift, New Haven, Conn.—This invention relates to a new and improved device for capping screws, that is to say, covering the heads of the screws with a white metal cap, and closing the edge of the same all around underneath the edge of the head, and at the same time pressing the portion of the cap over the nick in the screw head directly into the nick without cutting away the cap over the nick as is now done.

OIL CAN.—Charles Williams, Vineland, N. J.—This invention relates to a new and improved oil can of that class which are used for oiling machinery, and are generally made small or portable. The invention consists in the application of an elastic tube to the interior of the nozzle of the can, the tube being loaded with a weight at its free or disengaged end, whereby all of the oil within the can may be expelled from it, and the oil prevented from leaking out of the nozzle in case the can be casually upset.

HUB AND AXLE FOR VEHICLES.—D. M. Buckhart, Mount Kisco, N. Y.—This invention relates to a new and improved metallic hub and axle for vehicles, and it consists in a novel construction of the hub whereby the spokes may be firmly secured in it, the hub allowed to turn on its axle with but little practice, and the whole rendered capable of being adjusted at a greater or less distance apart, as may be desired, and other advantages obtained.

CART SADDLE.—John Bea, Newark, N. J.—This invention relates to a new and useful improvement in saddles, which are used with cart harnesses, and by which the horse is made to sustain a portion of the load of the cart. The invention consists in a novel manner of constructing the saddle, whereby the same may be manufactured at a much less cost than hitherto, and equally as good a saddle obtained.

TIE FOR BALE HOOP.—J. L. Sheppard, Charleston, S. C.—This invention relates to a new and improved tie or lock for connecting together the ends of bale hooks, after the bale has been properly compressed. The object of the invention is to obtain a tie or lock for the purpose specified, which will admit of the ends of the hoop being readily connected together, and which will also admit of bales being repressed without detaching the hoops from the bale, or the tie or lock from the ends of the hoops.

GRAIN-DISCHARGING DEVICE FOR REAPERS.—K. H. C. Preston, Manlius, N. Y.—This invention consists of a revolving toothed head or shaft applied to the platform of a reaper in such a manner that it will receive the grain as it is cut, and when a sufficient quantity of grain has been deposited upon it, be capable, by a semi-revolution, of discharging the grain from the platform without the liability of becoming choked or clogged, and without tangling the grain.

PANEL TABLE.—J. G. Greene, Port Henry, N. Y.—This invention has for its object to so construct the panel ends of sewing machine cases, and other articles of furniture, or the paneling at the side of a room, or beneath a window, that it may be drawn out and form a table.

GOPHER TRAP.—John Curtis, St. Charles, Min.—This invention has for its object to furnish an improved trap for catching gophers, which shall be simple in construction and effective in operation.

TERRASPHERE.—Eleazer Root, Indianapolis, Ind.—This invention relates to improvements in the terrasphere, for which letters patent were granted on the 18th day of December, 1866.

HAY RAKING AND LOADING DEVICE.—Hosea Willard, Vergennes, Vt.—This invention relates to a certain new and useful improvement on a machine for raking and loading hay, for which letters were granted, bearing date August 1st, 1866. The invention consists, 1st, in an improved means for discharging the elevated hay from the upper part of the endless elevator, whereby the hay is discharged at the point specified, in a perfect manner. The invention consists, 2d, in an improved application of the endless elevator to the machine, whereby the teeth of the elevator are allowed to yield or give perfectly to obstructions which may be in their path, or yield to inequalities of the surface of the ground. The invention consists, 3d, in the application of wing rakes to the machine, and endless feeders or conveyors connected therewith, whereby the machine is made to operate over a comparatively wide area, and rendered available for raking up and loading hay as left on the field by the mowing machine.

WAGON BRAKE.—L. E. Woodard, Owasso, Mich.—This invention relates to an improvement in the construction of brakes for wagons, and other vehicles, and consists in attaching a brake bar to the reach to act upon the wheels by means of an eccentric headed lever or cam, in such manner that the brakes may be quickly and powerfully applied, and instantly disengaged from the wheels to relieve them from pressure by a slight movement of the eccentric lever.

SMOKE STACK.—Patrick Kelly, Nashville, Tenn.—This invention consists in placing within the chimney or smoke stack certain arrestors, deflectors, and conductors, which not only prevent the escape of the sparks from the chimney, but collect and discharge them.

DUMB WAITER.—T. B. Bryson, Newcastle, Pa.—The nature of this invention consists in constructing a portable dumb waiter, easily fitted in a dwelling house for opening up through the floor of an upper room, over another room or cellar, without requiring a closet to inclose it, or occupying space in the upper room permanently.

MOLE TRAP.—John Westcott, Patchogue, N. Y.—This invention relates to an improved mole trap, and consists in a pair of forks pressed together by a spring. These are kept apart by a metal dog, the trap set lengthwise, in the channel made by the mole in the ground.

EXPANSION DRILL.—Gilbert Mackinnon, Portsmouth, N. H.—This invention consists in attaching expansible cutters to a suitable cutter holder and expanding the same by a wedge and screw arranged so that by turning the nut on the screw the size of the tool can be varied.

BALING PRESS.—Geo. H. Hoke and John A. Brown, Elizabeth, Pa.—This invention relates to an improved baling press, for hay, cotton, or other substances, and consists in improvements in construction by an arrangement of a lever and toggle connected with a beater or follower operated directly by means of ropes and capstan, with horse-power.

MATHEMATICAL INSTRUMENT.—William Rutherford, Athens, Ga.—This invention relates to an improved mathematical instrument for the use of civil engineers, surveyors, navigators, architects, and draftsmen generally, in plotting a survey from field notes, the traverse or rhumb line of sailing vessels, laying down plans of buildings, etc., with great facility and accuracy.

TOY ENGINE.—James L. Warner, New York city.—This invention consists in the application of a glass boiler, which is provided at the top with one or more tubular iron jointed arms. The said boiler is suspended from a wire or other rope, in which a swivel is arranged, to allow the boiler to revolve. The boiler is filled with liquid, of any desired description, and is suspended above a lamp so that steam is generated in it. The steam escaping through the the curved tubular arm, rotates the boiler by reaction.

ELEVATOR.—Joshua Walker, Kansas City, Mo.—This invention relates to a new and improved device for elevating articles, and is more especially designed for loading the tenders of locomotives with wood or coal, although it is applicable to other purposes. The object of the invention is to economize in labor and facilitate the loading of boats, locomotive tenders, etc., etc.

SASH FRAME.—J. E. Cowdery, Wheatland, Iowa.—This invention relates to an improvement in sash frames, and consists in an L or tongue-shaped lip attached by its long arm to the meeting rail of each sash, so that the tongue of each will enter the groove of the other when the window is closed.

MINERAL PAINT.—J. R. Smith, Keyport, N. J.—The object of this invention is to make a composition which, when used as a paint, shall form a water and fire-proof paint.

CARRIAGE WHEELS.—Reuben Brooks, Rockport, Mass.—This invention relates to a new and improved method of joining the felleys of carriage wheels whereby the wheel is rendered much more durable than it is when the felleys are joined in the ordinary way, and it consists in providing a metallic clamp for the support of the joint at the end of the spoke.

STOVE.—C. H. Roberts, Troy, N. Y.—This invention consists in applying wood to the knobs of stove doors, whereby the doors may be handled without danger of burning the fingers.

SEEDING MACHINE.—B. A. Shearer, Crown Point Center, N. Y.—This invention relates to a new and improved machine for sowing seed broadcast, and it consists of a revolving grooved cylinder arranged or applied in a novel way and using in connection with the same a series of harrow or covering teeth, all being applied to a frame mounted on wheels and provided with a seed hopper.

KEYS FOR BOLTS.—Nathan Adams, Altoona, Pa.—This invention relates to a machine for making split or spring keys for securing bolts, and it consists in the use of dies and levers whereby the bar from which the key is to be made is cut, bent into the required shape, and then dropped, the whole operation requiring but two moves of a lever, the whole machine being very small and compact.

ADJUSTABLE ROLLER FRAME FOR ELEVATOR PLATFORM.—R. M. Van Sickler, New York.—This invention has for its object to furnish an improved attachment to an improved elevator, patented by the same inventor Feb. 12, 1867, so as to make it more convenient and efficient in use, and which may at the same time be used with other elevator platforms with equal facility and advantage.

JAWS FOR BENCH VISES, ETC.—Nathaniel Wilton, Groton, N. H.—This invention has for its object to improve the construction of the jaws of lathe dogs, bench vises, etc., so that they may be able to hold the work firmly whether it be straight or tapering.

HAY RAKER AND LOADER.—Archibald Campbell, Peoria, Ill.—This invention has for its object to furnish an improved machine for attachment to hay wagons by means of which the hay may be raked and elevated upon the wagon rapidly, conveniently, and without requiring extra help.

GRAIN AND MEAL DRYER.—John R. Evertson, Mount Vernon, Ind.—This invention has for its object to improve the construction of the improved grain dryer patented by the same inventor Nov. 27, 1866, and numbered 59,989, so as to make it more effective in operation, and so that the same effect may be produced with a smaller amount of fuel.

HORSE-POWER.—Zacharias Tobias, Covington, Ohio.—This invention has for its object to furnish an improved horse-power, so constructed and arranged that the labor of loading the horse-power upon and unloading it from a wagon every time it is transported from one place to another may not be necessary.

## 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.*

P. W. S., of Mass.—The so-called granite of Quincy, Mass., is really sienite, and as a building material is preferable to real granite, the mica in the latter tending to contribute to its disintegration. Sienite—that quarried at Quincy—is composed of felspar, quartz, and hornblende.

G. D. G., of N. Y., says: "A friend of mine is trying to make a marketable hard soap from the following recipe: 5 bars B. T. Babbitt's German Erasive Soap; 5 quarts of water; three ounces of borax, and 1 ounce spirits of ammonia. But his product is too soft and shrinks badly. He asks how it can be made harder and less shrinkable." We reply: use one quart instead of five quarts of water to get a harder product, and keep the soap in a damp cellar to prevent shrinking. But the proposed improvement on the original Babbitt soap will not pay for the trouble. The recipe is probably a catchpenny imposition.

A. G., of Fla., says: "I see in your issue of Oct. 5th, page 216, that J. H. S., of Ohio, asks how he can harden steel plows without springing. This is my recipe: Chalk the share thoroughly, then heat it a cherry red and lower it slowly into a tank or barrel of rain water—in an upright position—and it will not spring."

C. D., of Mass., asks us to tell him how to find the horse-power of a steam engine. We have replied to this question at least six times in as many months through this column. If C. D. will examine back numbers of this paper—which we have not time to do—or read Bourne's Hand Book of the Steam Engine he will procure the knowledge for himself, and it will be all the more valuable to him for the labor expended.

J. D. P., of Pa.—The tin foil used in putting up tobacco is now made of lead and tin. The exact process we do not understand, but believe it is similar to the manufacture of gold wire, a bar of lead being coated with tin and then rolled to the requisite tenuity.

C. H., of Conn.—The note you refer to concerning the employment of a cane held above the head as a protector from rain in lieu of an umbrella, if published in these columns, was probably noticed as a popular humbug. We are not aware of such an invention, and cannot accept the explanation you propose.

A. M. A., of N. Y.—Enamel colors used by jewellers are metallic oxides incorporated with a fusible flux such as borax, flint, oxide of lead, etc. The jeweller labors under considerable difficulty during the process of application, for the tints on the palette in most cases differ from those they assume after being heated sufficiently to cause the color to become fixed to the ware. If "over fired" or "short fired" the color is destroyed beyond remedy in one case, or assumes one of the intermediate variety of shades, in the other; the definite heat which alone gives the color a perfect hue, is only recognized after long practice.

J. B., of O., is referred to the corresponding column on page 87, current volume, for cements for water joints.

A. J., of Md.—Needles made of steel, and called at first Spanish needles, were introduced in the reign of Queen Elizabeth, but by whom invented, history fails to tell. Pins, such as we now use, seem to have been unknown in England until about the middle of the fifteenth century. Previously, substitutes were employed made of box wood, ivory, bone, and a few of silver, all being necessarily of such large size that brooches and hooks and eyes were much employed in preference for holding together the parts of the dress.

L. F. S., of N. Y.—The latest explanation for the autumnal change of leaves with which we are acquainted is that of M. Carey Lea, of Philadelphia. He considers light to be the primary cause, the tendency always being to produce photographic colors. While the leaf retains its full vitality this influence is successfully resisted, but in autumn the leaf gradually loses its hold upon the branch, and the action of light predominates producing the change. These views we previously published on page 181, Vol. XV.

P. D., Canada.—Hollow water grate bars are very old.

C. R. W., of Pa., asks for a thermometer to ascertain the temperature of molten iron. Above the boiling point of mercury heat is measured by its effect upon solids. Wedgewood's pyrometer is the oldest instrument of this kind, and is founded upon the contraction of clay at high temperatures. Daniell's pyrometer is more exact, depending upon the expansion of a platinum bar encased in a sheath of black lead. A line under our "Business and Personal" column would bring you the address of manufacturers of these instruments which we are unable to furnish.

S. G., of N. Y., asks what is the greatest number of times that any piece to be brought to the shoulder can be fired in a minute, how it is constructed, what kind of a charge is used, and if it has more than one trigger. We refer our correspondent to the Ordnance Board of the War Department. We have seen a Sharp's rifle brought to the shoulder and fired twenty-one times in a minute. Its construction must be familiar to all interested in these matters. Other pieces, we are informed, excel this in rapidity.

P. C., of Me.—Your article on the combustion of fuel is anticipated by a similar one in this issue of the SCIENTIFIC AMERICAN. Your facts have been so often reiterated that it hardly seems necessary now to reproduce them. We reserve the article for possible future use.

W. C., of Ohio informs us that he has sent a communication on boiler setting which has not been published and asks what he shall do to obtain a hearing. In reply we would say that we wish for *facts* not surmises, and want them boiled down to their essence. "This rule," as the military men say, "is general."

T. I., of England, proposes, for a light water power, building a tank in which is an upright pipe, bent as a syphon, the longer limb descending outside, below the reservoir, with some means of exhaust to induce the flow of water which will be discharged on a wheel. But he wishes to return the water back and asks how it is to be done. He inquires also how he can obtain some of the ingenious American tools he sees noticed in the SCIENTIFIC AMERICAN and refers to an improved gimlet and a back saw, as examples. If he will refer to No. 17, current Vol., he will find the leading editorial contains some information on his first inquiry, and in our issue of July 13th, page 23, and that of July 20th, page 37, he will understand about the back saw and gimlet. Any responsible dealer in tools and machinery can furnish him with American improved tools. Probably advertisers in the SCIENTIFIC AMERICAN will notice this call from across the water.

H. H., of Wis., sends us a carefully prepared paper on mechanical power which we have read and the statements of which we have considered. If they are valuable they are too verbose, and as they controvert the experience of years and the observations of scientists we decline to publish them in the form presented. Our correspondent sneers at science as having "for ages believed in false theories." Let him present the opposing facts and we will welcome them.

## 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 241, Houston, Texas.

Mr. N. E. Blake, who obtained a Patent for a Roofing Composition, will please address R. C. Graves, Barnesville, Ohio.

Sewing-Machine Cabinet-Case Manufacturers or Patentees, and Manufacturers of Sewing-Machine Oilers please publish your address in this paper.

Wanted—Address of Manufacturers of Bullets and Cartridges, C. H. Remington, Dubuque, Iowa.

A Young Man, who has completed the Scientific Course in the Cooper Institute and received the Medal and Diploma of the same, desires a situation as assistant to a Civil Engineer or Surveyor. Best of references given. Address A. Doerflinger, 489 Columbia st., Brooklyn, N. Y.

Shingle-Sawing Machine and Portable Grist Mill Wanted.—Send descriptive circulars, with cuts and prices, Thos. Hoge, Milo, Wetzel county, W. Va.

## EXTENSION NOTICE.

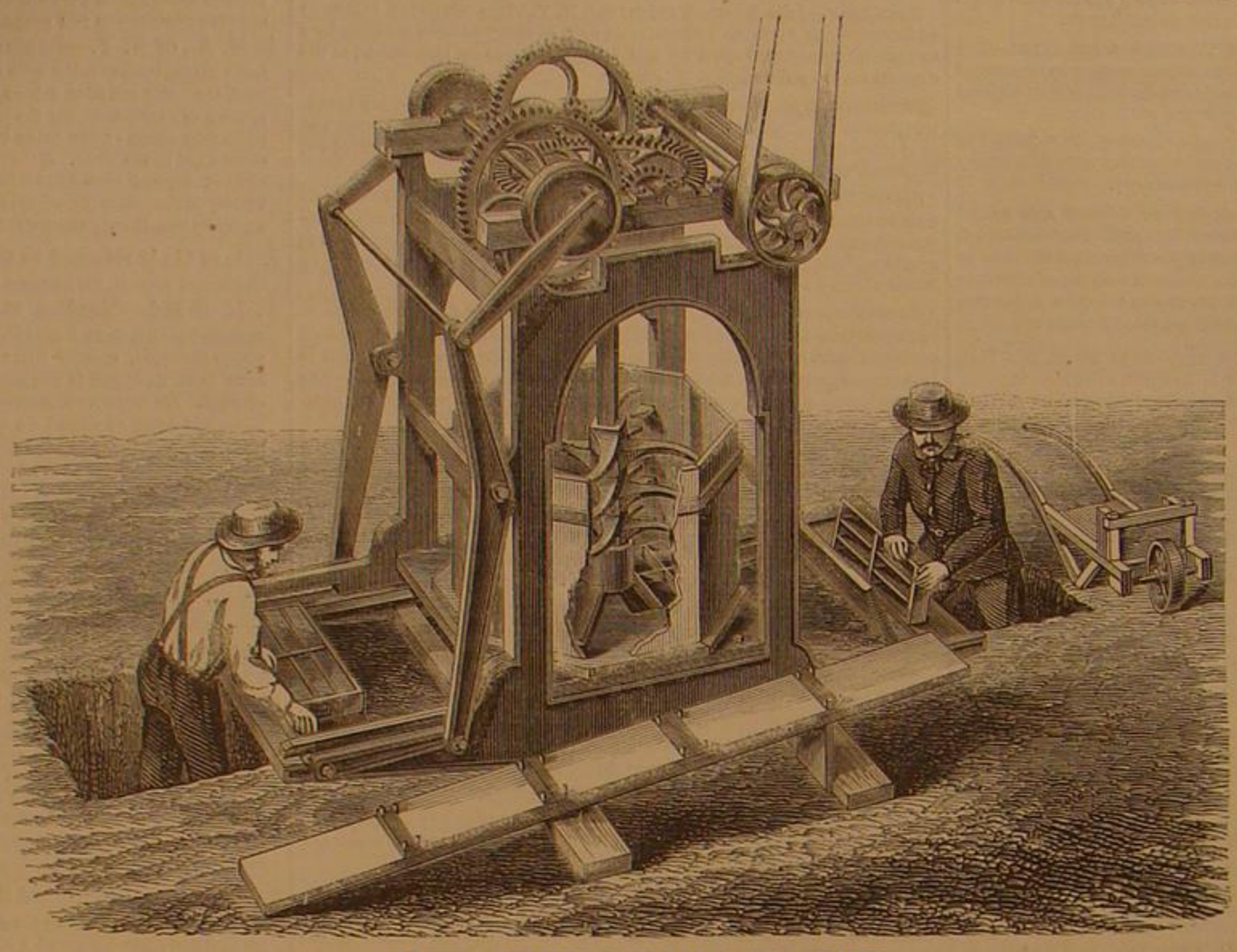
Charles R. Harvey, of New York city, having petitioned for the extension of a patent granted to him the 24th day of January, 1854, for an improvement in air-heating furnaces, for seven years from the expiration of said patent, which takes place on the 24th day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of January next.

### Improved Brick Molding Machine.

The simplicity of the machine represented in the engraving renders any detailed description unnecessary. The inventor says in brief: "The nature of my invention consists first, in the flat, square, or triangular bar for pulverizing the clay; then the mode of stepping the shaft within the clay box, that is to say the projecting hub on the bed plate with its wooden conical seat in combination with the cavity in the stem of the screw, by means of which the surrounding clay is excluded from the step to prevent the wear, and the screw is brought down near the bed plate to wipe as closely as possible without contact. Thus the throat of the screw gathers within itself a charge of clay which cannot escape except through the openings of the bed plates into the molds beneath. The open portable mold frame with a projecting flange, the mold resting on a single detached plate for a bottom, so that when the mold is thrown on the floor the brick does not come at the same time in contact with the ground because the flanges prevent this result; but the concussion is just sufficient to start the brick when it slips easily from the mold."

The cavity in the center of the screw or sweeping blade incloses the step of the shaft and allows the blade to come clear to the bottom of the mill. The molds are carried from the mill by the rocking bars seen in the engraving driven by the cranks at the top of the machine. It will be noticed that the grinding machinery is geared down so that the expenditure of power will be much less than in some less heavily geared machines. The clay is taken direct from the bank and passed through a pulverizer which reduces it to dust and frees it from stones and other foreign matters. Water it then thrown upon it and it remains in soak all night. This part of the operation is of great importance at the South, as it has all the effect of winter digging. By steam or water power this machine is claimed to produce three thousand bricks per hour, while the labor of one horse will yield eight hundred.

It is the subject of two patents granted to Francis H. Smith, who may be addressed relative thereto, Box 556, Baltimore, Md.



SMITH'S BRICK MOLDING MACHINE.

## Science Familiarly Illustrated.

### The Gordius or Hair Worm.

Every one who has lived in the vicinity of ponds or streams, must often have seen in the water a worm or snake resembling in appearance a coarse human hair. To the unaided eye the resemblance is perfect, with the exception of motion. It is a common notion that these worms were originally hairs, and that the transformation has been effected in some mysterious way by the action of the water. When a boy, we have frequently dipped them up in buckets, and watched their motions for hours. They are from seven to thirty inches long, and are frequently found in the bodies of beetles, and in moist earth, as well as in the water. Sometimes they are found floating, snarled into a knot or curl, and enveloping a little white mass. This mass contains its eggs, which are agglutinated together, and number millions. When seen on the surface of the earth in dry weather, they are brittle, and if handled will break like a dry twig. A rain, however, or heavy dew, will restore their suppleness. A writer in one of our exchanges thus details his observations made on one of these worms:

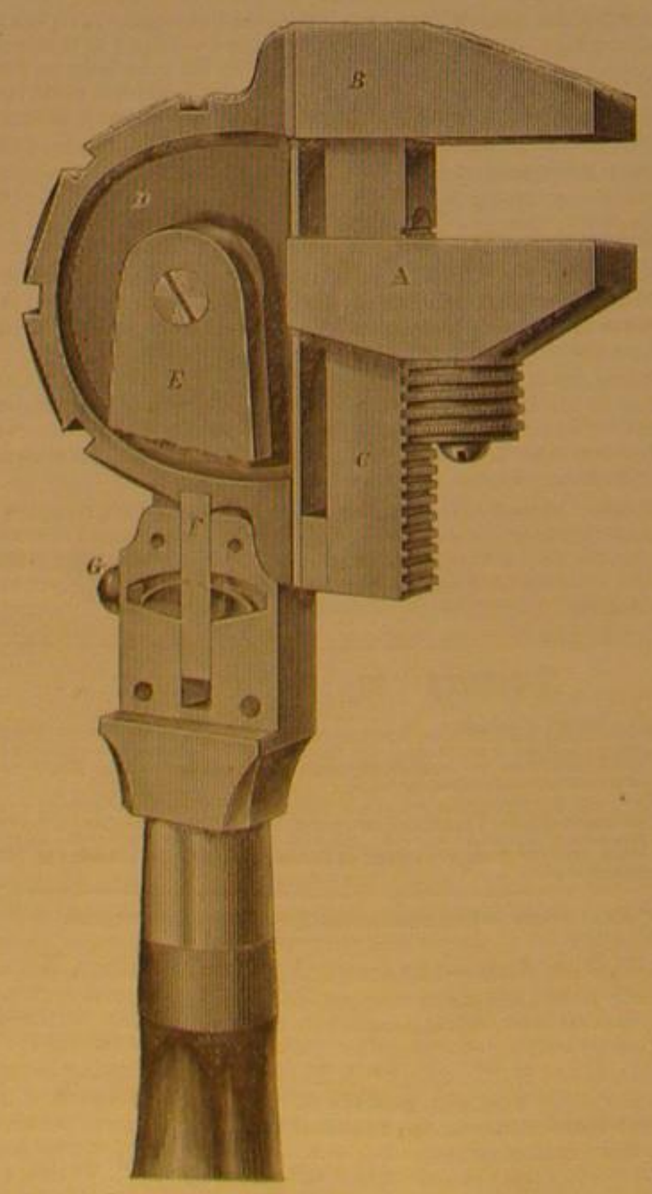
"When I first received it, it was coiled up in a close roll at the bottom of the bottle, filled with fresh water that contained it, and looked more like a little tangle of black sewing-silk than anything else. Wishing to unwind it, that I might examine its entire length, I placed it in a large china basin filled with water, and proceeded very gently to disentangle its coils, when I perceived that the animal had twisted itself around a bundle of its eggs, holding them fast in a close embrace. In the process of unwinding, the eggs dropped away and floated to a little distance.

"Having finally stretched it out to its full length, perhaps half a yard, I sat watching to see if this singular being, that looked like a long black thread in the water, would give any signs of life. Almost immediately it moved toward the bundle of eggs, and, having reached it, began to sew itself through and through the little white mass, passing one end of its body through it, and then returning to make another stitch, as it were, till the eggs were at last completely entangled again in an intricate net-work of coils. It seemed to me almost impossible that this care of offspring could be the result of any instinct of affection in a creature of so low an organization, and I again separated it from the eggs and placed them at a great distance, when the same action was repeated.

"On trying the experiment a third time, the bundle of eggs had become loosened, and a few of them dropped off singly into the water. The efforts which the animal then made to recover the missing ones, winding itself round and round them, but failing to bring them into the fold with the rest, because they were too small, and evaded all efforts to secure them, when once parted from the first little compact mass, convinced me that there was a definite purpose in his attempts, and that even a being so low in the scale of animal existence has some dim consciousness of a relation to its offspring. I afterward unwound also the mass of eggs, which, when coiled up as I first saw it, made a roll of white substance about the size of a coffee-bean, and found that it consisted of a string of eggs, measuring more than twelve feet in length, the eggs being held by a gelatinous substance that cemented them and prevented them from falling apart. Cutting this string across, and placing a small section under the microscope, I counted on one surface of such a cut from seventy to seventy-five eggs; and estimating the entire number of eggs according to the number contained on such a surface, I found that there were not less than eight million of eggs in the whole string."

### White's Improved Monkey Wrench.

The ordinary monkey or screw wrench is one of the most useful tools in the machine shop, factory, mill, stable, or on the farm. It can be so readily adapted to all sizes of nuts, and to hexagonal as well as square heads and nuts, that no other single implement will subserve so many useful purposes. The ratchet wrench is slow of action and is not capable of so many adaptations; and it would be desirable if the screw wrench could be made to serve the purpose of the crooked or S-wrench and some other forms designed for special occasions. Such is the object of this improvement.




The jaws of the wrench are arranged in a similar manner to those on the common screw wrench, the movable jaw, A, being advanced to or receded from the fixed jaw, B, by a nut which engages with the segmental thread cut on the shank, C. This shank is firmly secured to a semi-circular disk, D, which turns on a pivot or screw passing through the arms, E, by which means the jaws may be rotated around half a circle. The periphery of this disk has a number of notches into which fits a spring pawl, F, which is receded from contact with them by a knob, G, to be operated by the thumb or finger. In the engraving a portion of one of the arms is broken away to show the pawl. From this description the action of the wrench can be easily understood. The jaws may be secured in any position between the two opposite points of a half circle so as to be adapted to the situation of the nut to be turned. Thus the wrench may be used as an ordinary screw wrench, a hook wrench, a straight wrench, or a curved wrench, while the jaws may be set to accommodate any size of nut. Machinists and others who require wrenches will see the advantages of this device.

Patented August 1, 1865 by James White, Cleveland, Ohio. The patent is for sale. Application should be made, personally or by letter to J. H. Beardsley, 119 Nassau street, New York city, or to the inventor, Cleveland, Ohio.

### Novel Application of Electro-Magnetism.

The last number of the *Cosmos* contains an article of considerable interest of the various applications of electro-magnetism by Prof. Glæsener, of the University of Liége, in Belgium. Among them there is a Chronograph for the measurement of very minute particles of time, and which deserves some description as regards its application to artillery. Suppose it be required to measure the velocity of a cannon ball. For this purpose let a series of targets, consisting of hoops intersected by wires, be placed at given distances. The wires of each hoop communicate with a separate electro-magnetic apparatus, by which an iron pencil-holder is kept in an unvarying position by attraction so long as the circuit is not interrupted. Opposite and close to this pencil-holder there is a cylinder turning on its axis at the rate of four revolutions in a second. Its surface, which is covered with paper, is divided into 500 parts by lines drawn parallel to its axis, so that each part represents one two-thousandth of a second. Its motion is effected by clockwork. Now, whenever the electric current is interrupted the pencil-holder ceases to be attracted and falls on the surface of the cylin ler, on which its pencil, therefore, describes a line. Whenever the circuit is completed the pencil-holder is re-attracted and leaves the paper. Let us now suppose a cannon ball to be fired through all these targets, so placed, of course, as to lie in the path of the curve described by the missile. Each time it passes through one of the hoops it snaps asunder one of the wires: the circuit is consequently interrupted, the pencil-holder falls and marks the precise time of the passage. And so on, from target to target, each of which, as we have said, is connected with a separate apparatus. In this way both the space and the time employed in going over it being determined, the velocity, which is the ratio of time to space, is determined also to a fraction of one two-thousandth of a second.

### The Brazilian Pebble--Natural Glass.

J. W., R. B., and A. G. A., of Ill., have a dispute they wish us to settle. It is whether "the so-called pebble spectacles are stone, or a superior glass made from a peculiar stone. Are there stones large and clear enough to be ground to make spectacle lens?" We do not care to act as arbiters in disputes, but will furnish the information desired. The lenses are made from a rock or quartz crystal, which may be considered a natural glass. The Brazilian pebble is highly esteemed because it is harder than glass and not so liable to be scratched. It has a lower dispersive power than other pebbles and than many glass lenses. A splendid specimen, spherical and perhaps three inches diameter, is to be seen in a jewelry store in Brooklyn.

Pickwickian Antiquarians.—An exchange asserts that the Minnesota Historical Society, in their late excursion to Lake Minnetonka, to investigate the remains of the "ancient mound builders"—a race dwelling in this country long before the arrival of the Indians—were successful in finding several human bones, which after a labored discussion proved to be the broken limbs of trees. A supposed skull elicited great attention from its remarkable phrenological development, but a rustic demonstrated to the learned gentlemen that the supposed cranium was in truth a mud-turtle's shell. Several mounds, it is stated, have been prepared and supplied with bones and pieces of broken crockery, for the future investigation of this society.

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## MALLEABLE QUALITIES OF LEAD.

Probably scarcely any other metal, not excepting even gold, presents more interesting qualities for investigation than lead. One of those qualities is its malleability, and its quality of being compressed upon itself, the latter a quality for which we have no definite term. If a leaden ball lodges in the bore of a smooth bore or rifle it is almost impossible to start it. We have seen a Colt's pistol, with barrel only six inches long, which had, lodged in it and imbedded one into the other no less than fourteen conical bullets. The one which first lodged was probably propelled by an insufficient charge of powder, not enough to send it out of the muzzle, and the successive charges were not powerful enough to move it. On the fourteenth round the barrel opened longitudinally. Another case occurred in which the bullet of a rifle lodged about midway of the barrel and the rammer was tried repeatedly to remove it without effect. At last a hardened steel rod was driven completely through it, cutting a plug out of its center, and leaving a ring of lead which had to be drilled and reamed out. In a small town in Massachusetts a large rock disfigured the village green, which had been drilled for blasting and a blast repeatedly fired to split it, without success. At length it got to be used as the town gun for firing salutes. A shrewd, thinking mechanic conceived the idea of tamping a charge with lead. He did so and split the obstinate rock into removable pieces.

A large public building was, some years ago, in process of erection in Boston. It was built of granite blocks and the outer seams of the lower courses were closed with lead tamped in with a set and hammer. This work was intrusted to an inexperienced apprentice, who continued to force the lead in until he cracked the stone immediately above the seam and opened the vertical seam in the next course. As the building was between forty and fifty feet high the lead must have raised many tuns weight by the simple force of a hand hammer.

In the same city a large ornamental iron fence was erected around a square. The hollow iron posts rested on granite blocks set in the earth, having a cross section of fourteen or fifteen inches. The iron posts were secured to the stone by means of iron rods one and a quarter inches diameter. These were upset and broadened at the lower end and dropped into a hole in the stone about four inches deep, the hole being largest at the bottom. Lead was poured into the hole around the iron bar, the post lowered to place and secured by a nut on the upper end of the bar. Several of these stones were split in setting-up the nut and the lead was found to be nearly as hard and compact as the iron. In this case it could not have been the heat of the melted lead that split the stone, for it would not have been sufficient to produce such a result.

It would seem that this quality in lead might make it useful in quarrying stone. In the city of New York there is a large bed of very fine granite, extending from Thirty-first street on the west side and from Twenty-fourth street in the middle, to Sixtieth street on the north. The material of the Croton Aqueduct was mostly taken from Tenth Avenue near Forty-eighth street. Owing to the contiguity of dwellings and other buildings, blasting, except to a very limited extent, would be dangerous. The usual method of separating the blocks is by inserting wedges of iron cased with sheet iron into quadrangular holes drilled in line a few inches apart which are then driven, gradually and simultaneously, until the mass is separated. The adhesiveness of lead would appear to give it an advantage in this case over the sheet iron

Lead has also the quality of expanding after being closely compressed, or of regaining, in some degree, its original porosity. For this reason pressed leaden bullets are not in favor, because, in time, they expand or swell beyond the limits of the mold or matrix in which they were pressed, and become too large for the caliber of the bore for which they were intended.

## THE RELATIVE ECONOMY OF ANTHRACITE AND BITUMINOUS COAL IN STEAM BOILERS.

Theoretically considered, the more volatile combustible (*i.e.* hydrogen) there is in a coal, the greater will be the quantity of water evaporated per pound consumed; for the reason that the heating power of a fuel is measured relatively by the quantity of oxygen that will enter into combination with its combustible constituents.

Hence a pound of hydrogen, as it combines with three times more oxygen than a pound of carbon, has three times more calorific power; and consequently a coal which contains hydrogen, must be a better steam generator than one which does not, such as anthracite.

It is of course assumed that the furnace is of proper construction to produce perfect (or nearly so) combustion. To insure perfect combustion it is necessary to supply and mix the combustible gases driven from the fuel by the heat of the fire, with a sufficient quantity of air to furnish the necessary weight of oxygen to saturate them; and also that in that portion of the furnace where this mingling of the air with the gases takes place, a sufficiently high temperature is maintained to cause them to combine with the oxygen. If these conditions are not fulfilled, it is almost unnecessay to add that the furnace, instead of being a chamber where the fuel is thoroughly burned, is turned into a gas retort, and an immense proportion of the combustible matter passes up the chimney, and is wasted.

The construction of boiler furnaces, to fulfill the chemical requirements we have mentioned as necessary to thoroughly burn the fuel, and to prevent smoke, if it contains hydrogen, is now so well understood, that it is disgraceful for those using bituminous coal for steam purposes to obscure the landscape with black smoke. In our opinion the prevention of smoke is a proper subject for legislative interference, as regards both stationary boilers and locomotive engines. As to railroads, it should be one of the conditions of future charters that their engines shall not belch forth black smoke; and as for those roads already in operation, the law should compel them, by a good round fine, for any engine seen to smoke, to alter them so as to prevent this nuisance.

We will venture to say that most of our readers have been made as black as chimney sweeps by a ride of even less than fifty miles on a railroad on a hot summer's day. This nuisance, for the most part, is endured by the sufferers without rumbling, on the supposition that it cannot be prevented. This, of course, is a popular fallacy; and when one sees a locomotive tearing along, and belching forth volumes of smoke as black as ink, he is pretty safe in concluding that the managers of that road are either too ignorant or too parsimonious to cause the trivial changes to be made which will effectually put an end to this sooty nuisance.

With that species of coal known as "semi-anthracite," it is of course considerably easier to prevent smoke and soot than with bituminous. In fact, furnaces of ordinary construction, fired with a little care, can use coal with thirteen or fourteen per cent. of volatile combustible, with scarcely any smoke at all.

In order to show practically the difference in the evaporative power of anthracite and hydrogenous coal, we will give the following experiments, which were made with a semi-anthracite coal of the following analysis, and anthracite of good quality:

| | | |
|---|---|---|
| Fixed carbon | 79.64 | per cent. |
| Volalatile combustible | 13.16 | " |
| Moisture | 0.39 | " |
| Sulphur | 0.82 | " |
| Ash | 5.98 | " |

Weight of one cubic yard, 2,217 lbs.

The experiment was made in the boiler of a ferry boat, near Boston, doing the same quantity of constant and regular work in both cases—the result was:

| | lbs. | | hours. |
|---|---|---|---|
| Coal, anthracite, consumed | 47,467 | in | 93 |
| " as per above analysis, consumed | 36,807 | " | " |

Difference in favor of semi-bituminous 10,660 lbs.; or, in other words, the semi-anthracite, according to this experiment, had some 23 per cent. more evaporative power than the anthracite, or in the ratio of about 5 to 6.

Other experiments of a similar nature, which have fallen under the observation of the writer, appear to confirm the above results.

No doubt the superior cleanliness of anthracite, and the fact that even if its combustion is not perfect, it is not made manifest by black smoke, are strong arguments in its favor, and will continue to maintain the high reputation which it has so long enjoyed for steam generating purposes; but then we know that with proper management, and suitable furnaces, the evaporation of the bituminous is much greater.

## THE LARGEST PAIR OF PROPELLER ENGINES IN THE WORLD.

The direct acting engines for the English iron clad *Hercules* built by John Penn and Sons at Greenwich, near London, are the largest pair of screw engines ever constructed.

They are of the double trunk variety, a style built almost exclusively by the Messrs. Penn. There are two cylinders, each 127 inches in diameter, by 4 feet 6 inches length of stroke of piston; the diameter of the trunks is 47 inches, whose area being deducted, gives the pistons an effective diameter of 118 inches.

These engines are intended to run 60 revolutions per minute, consequently the two pistons, pass through a volume of 84,600 cubic feet per minute; they are to be supplied with steam by the ordinary horizontal tubular boilers, containing in the aggregate about 1,000 square feet of grate surface; they will be fitted with superheaters. It would seem therefore that these engines are intended to be worked highly expansively, and notwithstanding the comparitively small boiler capacity, the eminent engineer who constructed these monsters promises for them no less than 7,200 indicated horse power. Judging from the performance of many engines of similar style built by this firm we have no doubt that this enormous power will be realized. A comparison between the engines of the *Hercules* and those of the U. S. S. *Wampanoag* cannot fail to show that the planner of the machinery of one of these ships has made a big mistake.

The *Wampanoag* engines are geared and are expected to make 30 turns per minute, the cylinders are two in number and are 100 inches in diameter by 4 feet stroke of piston Hence the pistons will sweep through a volume of 26,784 cubic feet per minute. So while the *Hercules* has a capacity of cylinder represented by 84,600 cubic feet, the *Wampanoag* has a cylinder capacity represented by only 26,000 cubic feet. In other words, although the eminently successful builder of these big direct acting engines employs over three times more cylinder capacity than Mr. Isherwood does in his "cog wheel" engines, he uses considerably less boiler than that blundering engineer. As a consequence, while the engines of Mr. Isherwood will only work up to some 4,000 indicated horse power, those of Penn will work up to 7,200 indicated horse power. Again the 7,200 horse power engines take up about 8 feet 6 inches, in the length of the ship, less than the 4,000 horse power engines, and their boilers occupy some 20 feet less in the same direction. Thus if the *Hercules* engines were placed in the *Wampanoag*, she would be urged by more than double her present power, and at the same time much less room would be occupied in the vessel by machinery, and, *ceteris paribus*, she would be driven over 18 knots per hour.

It would seem that Penn and other successful builders go ahead just as if the U. S. Navy Steam Blue Books with their "seven tenths cut-off" and non-superheating theories had never been published.

## AMERICAN INSTITUTE FAIR.

### TOOLS AND MACHINERY.

Horatio Allen of the Novelty Works exhibits a propeller engine of the pendulum variety, although differing in some respects from the ordinary pendulum engine. The cylinder is suspended at its upper end, and projecting across in the line of oscillation is a beam, one end of which carries a connecting rod which drives the feed, and the other end one which drives the air pump. Secured to the lower end of the cylinder is a frame which carries the slides for the cross-head, or rather the sliding box, and oscillates with the cylinder. The crank wrist connects with the sliding box and the combined motions—oscillating, reciprocatory, and revolving—are very smooth. A link motion governs the action of the valves. Although this engine is in the exhibition, driven by a belt and not by steam, it is worthy the notice of engineers, although there are some faults of construction which detract from its merits.

There are several drops and hammers which attract considerable attention. A very simple one is that exhibited by Charles Merrel & Sons, 556 Grand street, New York City. It is Goulding & Cheeney's patent with Water's improvement. The drop or hammer is suspended in a frame by a piece of hard wood planking, which, is clamped when raised between two rollers on horizontal shafts at the top. The drop is raised and released by the ordinary treadle, which either brings the rollers in contact with the surfaces of the plank or disengages them. The advantages claimed for the wooden plank over a leather belt are durability, rigidity, absolute contact, and direct action. This is the drop under which poor McGowan had his hand crushed, and has been illustrated in these columns.

The Grimshaw Compressed-Air Hammer is a rapid working machine, the blow being given by the compressed air in a cylinder. Its operation, under skilfull manipulation, is instantaneous and it is under perfect control. A steam engine drives the machine and compresses the air, the whole apparatus combined in one heavy frame. The cushioning at the end of the stroke can be instantly regulated at will. The air compressor, when not in use to drive the hammer, can be employed to give a blast. The machine can be used as a drop, hammer, pass, punching machine, etc, and can be worked by one man.

Sturtevant's Pressure Blower is one of the most efficient rotary blowers we have ever seen. It seems to require much less power in proportion to the blast delivered than the ordinary fan blower owing to peculiarities in its construction. It is difficult to describe it without diagrams, but mechanics witnessing its operation can readily understand the principles of construction and working. These blowers are manufactured in Boston, Mass. Waltons & Leonard, 58 John street, are the sole agents for New York and vicinity.

The New York Steam Engine Company make quite a display of machinists' tools, consisisting of a car-wheel borer, planer, upright drills, shaping machines, bolt cutter etc, the latter a machine that produces a beautiful thread, its capacity ranging from half an inch to two-and-a-half inches diameter. These tools are noticeable for strength and good workmanship rather than for extraneous finish.

Pratt, Whitney & Co., of Hartford, Conn., exhibit one of

their engine lathes with Slate's patent taper attachment, which was illustrated on page 124 No. 8, Vol. XVI., Scientific American. The lathe at the Fair is sold to the Swedish Government, for which and the Austrian government the firm has done a large amount of work. Being in New York on its way to its destination it was detained for a time for exhibition. Like all their tools, this shows the perfection of finish and accuracy. For boring tapering holes, as well as turning tapers, machinists will acknowledge it to be a valuable tool.

J. A. Fay & Co., of Cincinnati, Ohio, show a fine collection of wood-working machinery. An observable merit in their machinery is its excellent proportions of material, together with good workmanship.

In saws, R. Hoe & Co., and the American Saw Company both of New York city, make fine displays. W. P. Miller, also, of San Francisco, Cal., has a specimen of his adjustable teeth in a large circular saw. Both of these latter have been illustrated in these pages. This department of the exhibition proves that very great attention is now being paid to the perfecting of tools in their details.

The brick machine of D. W. Seeley of Albany, N. Y., illustrated in the Scientific American page 279, No. 18, Vol. XV., is at work turning out bricks from the raw clay brought in barrels, without the straw, the want of which seemed to be the great annoyance to the Israelitish slaves in Egypt. The rapidity of its operation and the perfection of its products are sufficient recommendations of its utility and general advantages.

One of the curiosities in the exhibition is the machine for putting up tobacco in papers—tin foil. Its operation is a marvel until investigated. The parts exposed to view are few and apparently simple, but like the automaton chess player of Maelzel, the machinery that gives them life is concealed in a box. The tobacco being placed in a sort of hopper, a piece of tin foil and a corresponding piece of paper is placed on a platform when, by the turn of the crank, the envelope is folded into shape, the tobacco forced in, and the paper filled ready for sale and delivery. It can be operated either by hand or power.

We regret that the agricultural department in the south gallery is without attendants, and that the machines are not in many cases furnished either with cards containing names of the exhibitors, or circulars giving any description of operation. Among the agricultural machines are several which seem worthy of notice, but not being furnished with the claims of their exhibitors and no space being allowed for their thorough examination, we are obliged to pass this department by without further notice.

Mr. Linnell, who was so cruelly mutilated by falling into the engine he was driving died on the 18th of October. Mr. McGowan, who lost his right hand under the Merrill hammer is doing well. Being a practical mechanic, depending upon his daily work for his daily support, his case is a hard one. Both these men have, or had, dependent families, and it seems as though the Association ought to donate the proceeds of one day's exhibition to their benefit. If the Board of Managers cannot afford that, let the exhibition be extended one day for this purpose, and a notification to that effect would bring out hundreds, who would not otherwise visit the exhibition.

### DEPARTMENT OF THE DWELLING.

Before concluding our notice of this section, there are a few articles of merit yet to notice. The remontoir tower clock, manufactured by G. M. Stevens & Co., of Boston, hourly, at least, attracts general public attention. This clock is claimed to be the most reliable and best timekeeper ever introduced. The escapement is a remontoir action and produces an impulse upon the pendulum which is exactly alike during each and every minute. The agents for this city, Benedict Brothers, also exhibit four regulator clocks with compensating pendulums.

In the cutlery department, Clement Hawkes & Maynard have a fine case of ivory and pearl-handle knives. Two cards of pocket knives, artistically arranged, ranging from the most delicate of penknives to the homelier but more serviceable jacknife, and comprehending over three hundred different styles, are samples of the manufactures of D. F. Smith & Co., of Bronxville, N. Y. A bale of brown cordage in an unconspicuous place, is labelled as specimens of rope made from California vegetable hair, but further information relative to this real curiosity, beyond this simple statement, is unfortunately not forthcoming. Near this bale the Union Fence Company have erected one of their combination fences, which, though made of wood, has all the appearance of stone with the strength of iron. The work on these is all done by machinery, the several parts are snugly fitted, and are driven together with lead and oil, while the neatness, strength and asserted cheapness make this one of the best fences in use.

For a simple article of domestic utility, the combined dustpan and broom of Clough & Bryant commends itself to favorable notice. The handle of the pan is made hollow and through it slides the broom handle, thus giving to this badge of the tidy housewife a neat and compact form. Equally convenient is Richmond's rubber rack for holding brooms, brushes, canes and whips. The arrangement consists simply of a disk of india rubber having slits perforated in it, so that the handle is grasped and firmly held in its upright position.

There is an imposing display of glass and silver-plated ware exhibited by house-furnishing establishments of the city, but we have not the further space to devote to this department,

### DEPARTMENT OF DRESS AND HANDICRAFT.

Although this is one of the most attractive of the seven grand divisions, under which the managers of the Fair chose to classify the articles offered for exhibition, yet from the nature of the department our report must be somewhat brief and cursory. We might go into ecstacies over the really beautiful specimens of wax flowers and autumnal leaves, which so perfectly mirror nature as to cause a constant succession of rarified superlatives to flow from the lips of enraptured beholders—but we forbear. Space might be filled by an enumeration of the articles of female adornment displayed in attractive show cases, but such description would hardly fall within the scope of these columns; and, for a like reason, although the subject might not prove so incomprehensible, we must omit any elaborate notice of goods of gentlemen's wear. Rolls of cloth are there, woolen, cotton and silk, the comparative merits of which must be discussed by the awarding committee only. Of sewing and knitting machines, we have already noticed the more important.

To the non-professional eye, the imposing array of artificial teeth daintily mounted upon velvet cushions, is somewhat appalling, while the cases of dental instruments are to most observers, too suggestive of past or prospective torture to be attractive. There are about three hundred practicing dentists in this city, and although all are not exhibitors here, the profession does not lack for representatives, most of whom claim for their wares points of superiority, which, however, are not peculiarly striking to the general nor even the repertorial eye. We notice that several exhibitors have adopted an impressive method of proving to the world their claims as benefactors of the race, by conspicuously posting duplicate photographs of the same personage: one with sunken cheek and general antique expression, while the other picture, representing the individual provided with a set of the exhibitor's patent improved dentures, would have been accepted by old Ponce de Leon—unacquainted alike with either dentists or photographers—as conclusive evidence of the existence of his long sought rejuvenating spring.

Though thus unceremoniously dismissing this Department, there are several novelties which are worth referring to. The Bangs Williams' News Company, of Providence, exhibit a large and varied assortment of rich fancy boxes for holding handkerchiefs, gloves and jewels, which, although pronounced by most observers French goods, are made in Providence, and are now brought before the public for the first time. The American Kaleidoscope Company have made a decided improvement on this optical toy, and given it something more of importance than it hitherto possessed. As previously constructed, only transparent objects could be shown in it, but by admitting the light so as to be reflected to the eye, opaque objects, such as flowers, insects, and stones, as well as transparent ones, may be used, and being elegantly constructed, the improved kaleidoscope is destined to become very popular.

There are several exhibitors of bronze goods, among which we may note the small fancy bronzes and carte-de-visite mountings of P. Mignot, and the bronze clocks and gas fixtures of the Tucker Manufacturing Company.

Under the second grouping there is a case of vulcanite cravats and bows, by the New York Hard-rubber Collar Manufacturing Co. These and Merritt's scarf and tie-holders—the latter a neat frame or plate whereon can be formed a scarf or tie, without sewing—are conveniences whose virtues are at once apparent to the masculine mind.

The American Fishhook and Needle Company, of New Haven, have a case of hooks of different sizes made entirely by machinery at the rate of two hundred a minute. This company is the pioneer in this manufacture, hitherto all hooks having been made by long and tedious hand processes.

### FINE ARTS.

Prang's chromos are almost, if not quite as natural as water colors or oil paintings. Chromo-lithography is the art of painting pictures from stone in colors. The most difficult branch of it—which is now generally implied when chromos are spoken of—is the art of reproducing oil paintings. When a chromo is made by a competent hand it presents an exact counterpart of the original painting with the delicate gradations of tints and shades, and with much of the spirit and tone of a production of the brush and pallet. The impressions from the stone are taken on thick white paper which passes through a heavy press before being used. Among the most beautiful, to our eyes, were Nos. 8 and 10—scenes from the White Mountains, and late autumn in the same beautiful region—from an oil painting by A. T. Bricher. Prang, of Boston, has carried this art to greater perfection than any other publisher in this country.

Hanging low and almost out of sight, we notice a small picture by Clinton Lovelidge, of Brooklyn, N. Y., "Forest Winter Scene." Woodland sounds are ever impressive, and in the mystery of its voices lies much of the fascination of the forest, but the effect of stillness which this scene conveys is almost painful in its intensity. A path on which the snow lies white and untrodden, opens directly through the woods without curve or break to divert the eye, and on either side the gray stems of the trees stand gaunt and weird like grim sentinels. E. H. Nichols, Esq., has a large painting "Scene on the White Mountains," the foreground is particularly good, and the rocks are very true to nature. The U. S. Machinery Carving Co., corner of Second avenue and 22d street, exhibit machine carving on wood and marble. There are many specimens of this carving, and those on wood are much superior to the efforts on marble. Among the latter are some alto and basso-relievos, and some bordering in intaglio; but there is not distinctness and clearness enough of outline: they have the smooth effect of casting, and we miss the sharply defined yet delicate and firm mark of the chisel. But for ornamentation in wood and all decorations of that kind, for cabinetware picture frames, and the numerous uses to which woods of different kinds are put—it is an adaptation of machinery of great value. The pattern or device once made, any number of duplicates can be carved directly from the block of wood, and the pattern can be placed at any desired angle, thus producing different effects from one pattern.

James Prentice, optician, 164 Broadway, New York, shows a handsome case of mathematical and drafting instruments, and the Willard Manufacturing Co., 684 Broadway, a collection of camera tubes and lenses. Both of these collections are worthy notice.

### The Musketo Pest.

The cool weather we are now enjoying has not yet rid us of the pest of the musketo; any suggestion therefore for defending ourselves from their attacks will be welcome. The Philadelphia *Ledger* says:

"Of the various remedies proposed, none are so efficacious as the use of musketo netting in the windows and around the beds at night. But as this is not always practicable or convenient, we must resort to other means for bidding defiance to our enemies. Of these, the best is the smoke produced by burning a small quantity of what is technically called, "Persian Insect Powder." This consists of the powdered flowers, and perhaps young stems and leaves, of a plant known to botanists as *Pyrethrum caucasicum*, a kind of chamomile cultivated largely in Germany, resembling the common garden chamomile in many of its properties, and of which all the various "insect," "magnetic" and "fly" powders are wholly or entirely composed. For use against musketoes, a small quantity—about what could be heaped upon an old-fashioned silver dollar, if any of our readers remember the size of that coin—is placed at bed time on a plate, and the top of the heap touched with a lighted match until it shows a red coal. The mass will then smoulder gradually away, filling the room with a light smoke, which narcotizes the musketoes and keeps them quiet for several hours, after which it may be necessary to repeat the operation. The evolution of the smoke will be facilitated by stirring the burning powder from time to time, so as to secure perfect combustion, although this is not absolutely essential. The powder may be also twisted up in a light cylinder of paper, and burnt in that form. Its use, as described, against musketoes, gnats, etc., has long been known to the Chinese and Tartars, who mold it into sticks and burn in their tents and dwellings, which would in many cases be uninhabitable without it. The same substance, in its powdered state, is also used to great advantage in preventing the attacks of roaches, bedbugs, fleas, ants, etc., and in keeping flies off the dining tables. It is perfectly harmless to mankind, and may be eaten as freely as chamomile, and the smoke is not at all injurious. This latter, it may be mentioned in addition, has much the same effect on flies as on musketoes—not destroying them, but merely throwing them into a stupor.

"Carbolic acid, poured upon a rag and hung near the bed at night, also acts very favorably, by its powerful odor, in keeping away musketoes. This is, however, more disagreeable to most persons than the smell of the burning insect powder, which resembles that from a mild cigar."

## OFFICIAL REPORT OF PATENTS AND CLAIMS

### Issued by the United States Patent Office,

FOR THE WEEK ENDING OCTOBER 15, 1867.

*Reported Officially for the Scientific American*

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

| | |
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| On filing each 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.*

69,739.—Corn Planter.—Geo Abbott, White's Corners, N.Y.

1st, I claim the dutch wheel, I, and spring rod, K, in combination and arrangement with the gearing and planting apparatus of a corn planting machine, for the purposes and substantially as described.

2d. The planting leg, G, connected with the driving wheel by means of appropriate gearing, in such manner that the leg may be caused to move up by the mechanism, and let fall by its own gravity and plant hills at intervals, substantially as set forth.

3d, The seed gatherer, H, arranged with the seed box, O, partition, O', and tube, R, for the purpose of picking up and carrying the requisite number of kernels to form a hill and depositing the same in the planting leg, substantially as described.

4th, The valve, L, placed at the foot of the planting leg and operated by means of the rod, v1, lever, v2, and cam, F1, for the purpose and substantially as described.

5th, The spring rod, K, operating upon the dutch wheel, I, to advance or set the planting gear, substantially as set forth.

6th, The hill marker or projection N, near the foot of the planting leg, G, by which each hill is individually marked, substantially as set forth.

7th, The shield, P, placed in the seed box around the feed slide, for the purpose and substantially as described.

8th, The cam wheel, F, by which a planting leg and marker and a seed gatherer, either or all, may be operated, for the purpose and substantially as described.

9th, The vertical slide or seed carrier, H, arranged with the seed box, O, partition, O', and tube, and operated by the cam, F2, for the purposes and substantially as set forth.

10th, The slotted swivel joint, i2, as a means of connecting the pendant, i1, to the overhanging bar, T, for the purpose and substantially as described.

69,740.—Machine for Making Keys for Bolts.—Nathan Adams, Altoona, Pa.

1st, I claim the device for cutting the bar, consisting of the cam, a on the lever, F, die, B, and cutter, H, all made and operating substantially as herein shown and described.

2d, The combination of the gauge, b, with the cutter, H, die, B, and cam, a on lever F, substantially as set forth.

3d, The spring, K, provided with the pin, l, and cam, y, in combination with the bar, D, substantially as described for the purpose specified.

4th, The construction and arrangement of the slotted [illegible] A, pivoted dies, B B, arms, e e, pivoted bar, D, slotted rod, E, lever, [illegible] g cam, b, cutter, H, stationary bridge, G, cage, h, spring, K, having [illegible] and pin, l, all operating as described for the purpose specified.

69,741.—Railroad Switch.—Sidney Allen, Newton, and Jas. P. Snow, Roxbury, Mass.

1st, I claim the suspended pivoted guide shoe or shoes, F, constructed as described and arranged to be adjusted between the wheels and the rail flange, K upon the elevated track, whereby said wheel is guided

raised track upon the branch track, as herein set forth for the purpose specified.

2d, The combination of the weighted or drop levers, H, with the suspended shoes, and frame, E, of the car, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the operating levers, J, with the weighted levers, H, and with the frame, E, of the car, substantially as herein shown and described and for the purpose set forth.

4th, The raised and flanged guide block, K, constructed as described, connected with the rails of the track at the point where the branch track leaves the main track, substantially as herein shown and described and for the purpose set forth.

5th, The combination of the guide block, L, with the rails of the track at the point where the branch track leaves the main track, when used in connection with the depressed rail and deepened track, substantially as herein shown and described and for the purpose set forth.

### 69,742.—ARTIFICIAL LEATHER FOR FLOOR COVERINGS.—Stephen M. Allen, Woburn, Mass.

1st, I claim the sheets made by combining pulped or ground tanned leather scraps with vegetable fiber, and pulped untanned animal skins, to be used in the manufacture of floor coverings or carpets, substantially as before described.

2d, Sheets made by combining pulped or ground tanned and untanned animal fiber or scraps of skins with vegetable fiber, further combined with bullock's blood or fibrine, pulped and run off into sheets, substantially as before described and for the purposes specified.

3d, I claim the stuffing, painting, staining, or printing, in the manner and for the purposes specified, sheets made by combining tanned scrap leather and vegetable fiber with untanned scraps of hides, or with the further combination of bullock's blood or fibrine, manufactured substantially in the manner and for the purposes set forth.

4th, As a new article of manufacture, a floor covering or carpet made by first forming a sheet of leather scraps and vegetable fiber combined with untanned scraps of hides, or with the further combination of bullock's blood or fibrine, the whole manufactured substantially as herein set forth.

### 69,743.—CULTIVATOR.—A. H. Allison, Charlottsville, Ind.

1st, I claim the axles, d, in combination with ties, C C, when constructed and arranged as and for the purpose herein set forth.

2d, The beams, D D, the blocks, H H, the rod, m, the rods, g g, and the disks, h, the whole constructed and operating substantially as herein specified.

### 69,744.—SAW MILL.—Leonard Anderson, Painesville, Ohio.

I claim, 1st, The combination in the frame, A', of the vertical slideways, C", and diagonal tongues, G G', operating substantially as and for the purpose herein specified.

2d, The vertical slideways, C", when used to guide and carry the head of the saw, and at the same time to carry or support the jaws of the saw guides, N N, substantially as and for the purpose herein set forth.

### 69,745.—SAFETY VALVE FOR OIL STILLS.—Samuel Andrews, Cleveland, Ohio.

I claim the herein described safety valve constructed and applied to oil stills, substantially in the manner as and for the purpose set forth.

### 69,746.—WINDOW SASH FASTENER.—H. G. Arnolds, Rochester, N. Y.

I claim a sash lock composed of bolt, H, tumbler, G, and notched plate, arranged as and for the purposes set forth.

### 69,747.—PISTON PACKING.—Mifflin W. Baily, Westchester, Pa

I claim spiral spring, S, catch spring, C S, applied to piston heads for pumps or any kind of engines, when combined with the packing of said piston head, for the purpose and in the manner above set forth and described.

### 69,748.—ASH SIFTER.—David W. Barker, New Haven, Ct.

I claim, 1st, In combination with the case, A, and serve or netting, B, the beaters, D, operating substantially in the manner herein set forth.

2d, In combination with the beaters, D, the handle, E, and case, A, I claim the protecting flange, a.

3d, The combination of the plates, m and n, and sleeve, l, with the beaters, D, and netting, B, when constructed so as to form the bearing for the beaters, substantially in the manner herein set forth.

### 69,749.—CART SADDLES.—John Bea, Newark, N. J., assignor to himself and Timothy D. Gladston, Boonton, N. J.

I claim, 1st, The plates, b b, attached to the bar or bow, A, one at each end, in combination with the plates, C C, having holes, c, made in them, and leather or other flexible material attached, which are stuffed to form pads, B, substantially as shown and described.

2d, The straps, D D, attached to the saddle tree between the ends of the bar or bow, A, and the plates, b b, when said straps are applied to or used in combination with a cart saddle constructed in the manner substantially as herein shown and described.

### 69,750.—CULTIVATOR.—H. Bean, Schuylkill, and J. D. Tyson, Lower Providence, Pa.

I claim, 1st, The combination with the main frame, A, of the levers, D, and brace rod, d, arranged to operate as shown and described.

2d, The sliding bar, I, provided with the cord, F, and chains, l, or their equivalents, when arranged to operate as and for the purposes set forth.

### 69,751.—WASHING MACHINE.—D. C. Bernhardt and S. F. Houston, Charlotte, N. C.

We claim the frame, C, having rollers, D, and supported by the springs, when the same is in combination with an inclined bearer frame having a roller, and the whole is constructed, arranged, and operated substantially as described.

### 69,752.—PROCESS OF OBTAINING USEFUL FIBERS.—Dana Bickford, Boston, Mass.

I claim, 1st, The preparation of the fiber of the above named weed, substantially as before described and set forth.

2d, The uniting the pulp or fiber with rubber and other gums, also the imi-

### 69,753.—DEVICE FOR LOCKING DOORS AND WINDOWS.—A. H. Boyd, Rockville, Mass.

I claim the system of bolts so connected and arranged that all the bolts may be simultaneously operated from one point, both to lock and unlock each bolt, also having an independent provision for operating it from the inside of the room, all substantially as set forth.

### 69,754.—SHOE HOLDER.—A. N. Breneman, Lancaster, Pa.

Antedated Oct. 12, 1867.

I claim the construction and combination of the front piece, A, and back piece, B, united by a hinge, C D E, in the manner and for the purpose specified.

### 69,755.—COMB.—James H. Briggs, Brooklyn, N. Y.

I claim the connector, B, constructed as described, when provided with right-angular flanges, a, fitting into longitudinal grooves cut into the comb, A, as herein set forth, for the purpose specified.

### 69,756.—COMBINED PUMP AND MEASURE.—J. M. Brooks and Perry Munson, Independence, Iowa.

We claim the arrangement of the scale rack, D, segmental pinion, G, and piston, B, in combination with the cylinder, A, nozzle, J, and faucet, H, substantially as and for the purpose set forth.

### 69,757.—CARRIAGE WHEEL.—Reuben Brooks, Jr., Rockport, Mass.

I claim, 1st, The metal clamp, C, constructed as described from a plate of metal, provided with the central hole, a, for the passage of the tenon of the spoke, the sides of said clamp bent around the joints of the fellys flush with the sides and tread and secured to the end of the tenon of the spoke by means of the holes, b, fitting therein as herein set forth, for the purpose specified.

2d, Jointing the ends of the fellys of carriage wheels at the end of a spoke by means of the clamp, C, constructed as described, in such a manner that the tenon of the spoke shall pass through the hole, a, in said clamp, and firmly secured therein by the pressure of the ends of the fellys, as herein shown and described.

3d, Supporting the fellys by means of the shoulder of the spoke bearing against the outside of the plate, C, and firmly securing the ends of the fellys by means of rivet bolts passing through the holes, c c, in said clamp, substantially as described, for the purpose specified.

4th, The insertion of rivet bolts in the holes, c c, through a clamp securing the ends of the fellys of carriage wheels, for the purpose of tightening said fellys, substantially as herein shown and described.

### 69,758.—PUMP.—George Bruce, Corydon, Ind.

I claim the cylinder, A, piston heads, C, cam grooved disk, H, and connecting rods hung in said cam groove, when all are constructed and arranged together substantially as and for the purpose specified.

### 69,759.—DUMB WAITER.—F. B. Bryson, Newcastle, Pa.

I claim the arrangement of a dumb waiter for passing up through the floor of an upper room and the spring catch operated by the rod, h, in combination with the weight, g, and the spiring, n, substantially as and for the purpose herein described.

### 69,760.—HUB AND AXLE FOR VEHICLES.—D. M. Buckhout, Mount Kisco, N. Y.

I claim the cast metal hub provided with the circular chamber, b, and the mortises, f, to receive the tenons of the spokes, the projections, h, and the plate, G, to screw on the periphery of the chamber, b, in combination with the boxes, F F', fitted within the chamber, b, and the collar, C, and V-shaped flange, D, on the arm, A, all arranged substantially as shown and described.

I further claim the arm, A, fitted on the axle, B, and secured by set screws, a, substantially as shown and described.

### 69,761.—HAY SPREADER.—G. E. Burt, Harvard, Mass

I claim, 1st, The shield, H, constructed and arranged substantially as described for the purposes set forth.

2d, The arrangement of the forks, J J, the arm, k, the shafts, a a and P, substantially as described and for the purposes set forth.

### 69,762.—WELL POINT.—Henry J. Cady, St. Louis, Mo.

I claim the manner of connecting the tube, K, to the point, B, and the tube, P, to the pipe, A, and to each other, as above described.

### 69,763.—PUMP VALVE.—H. G. Cady, St. Louis, Mo.

I claim a valve constructed of the cylinder, B, bevelled packing or seat, B, flexible ring, F, with its weighted tongue, A, all arranged substantially as shown and described.

### 69,764.—HAY RAKER AND LOADER.—Archibald Campbell, Peoria Ill.

I claim, 1st, The rake head, H, when hinged to the rear cross bar of the frame, A, and provided with the teeth, I, bent in such a manner that the upper part of their front portions shall extend above the rollers, F, and return to the head, H, forming an acute angle, said teeth and rake head adjusted by means of the set screw, Z, in the upper part of the cross bar, as herein described for the purpose specified.

2d, The arrangement of the carrier frame, J, constructed as described, roller, k, upon its vertical part, carrier, L, pulleys, F, frame, A, and adjustable rake and teeth, H I, as herein described for the purpose specified.

3d, The arrangement of the adjustable pivoted frame, N, roller, P, carriers, I, R uprights, O, roller, E, and frame, J, as herein described for the purpose specified.

4th, The combination of the guides, S, with the upper carrier frame, N, substantially as herein shown and described and for the purpose set forth.

5th, The slotted uprights, O, in combination with the pivoted carrier, N and frame, A, for adjusting said carrier to the varying height of the loaded hay, as herein shown and described.

6th, The combination of the bent lever or arm, V, and rod, W, with the rake shaft H, and frame of the machine, substantially as herein shown and described and for the purpose set forth.

7th, The arrangement of the levers, J, clutches, G D, shaft, E, rods, U, rollers, F, and shafts of wheels, B, as herein described, for the purpose specified.

### 69,765.—VAPOR BATH.—M. B. Carleman, Chicago, Ill.

I claim, 1st, The cylinder or vessel, H, when divided into an upper and lower chamber by the block, K, substantially as and for the purposes specified.

2d, The reservoir or cup, J, when provided with a stop cock, I, in combination with the vessel, H, substantially as specified.

3d, The block, K, when provided with the recess, e, and one or more lateral passages, f, substantially as described.

4th, The vapor generator, H, when provided with the block, K, in combination with the pipe, G, constructed and operating substantially as shown.

5th, The cover, N, when provided with the opening or slit, k, and the lappets, O, constructed substantially as and for the purposes specified.

6th, The combination of the generator, H, cup, J, block, K, with the chair or couch, A B, and cover, N, substantially as and for the purposes specified.

### 69,766.—DRAPERY HOOK.—Edwin Carrington, West Meriden, Conn.

I claim the herein-described drapery hook formed by an upward inclined slot, d, opening into a recess, a, in the metal of larger diameter than the width of the slot and formed upon a base so as to be secured, substantially as specified.

### 69,767.—ROPE OR LINE HOLDER.—A. J. Chase, Boston, Mass.

I claim, 1st, The combination with the supporting plate or bracket, c, and stud or curved projection, f, of the swivelled clamp, d, under the arrangement and for operation as set forth.

2d, The combination with the bracket, c, curved projection, f, and swivelled clamp, d, of the plate, a, and screw, or equivalent fastening device, formed in one piece with said plate, substantially as and for the purposes herein shown and set forth.

### 69,768.—BLANKET FASTENER.—L. C. Chase, Boston, Mass.

I claim, 1st, The arrangement of stud, c, and plate, b, in connection with each other and also with loop, d, when fastened to a blanket by means of shield, a, and rivets, e f, substantially as and for the purpose described.

2d, And in combination therewith the strap, g, slotted at h, when fastened to the blanket between shield, a', and twin washer, j, by rivets, e' f', as and for the purposes described.

### 69,769.—COMPOSITION FOR SAUSAGES.—J. L. Chevalier, Newark, N. J.

I claim in the preparation of sausages the combination of materials herein specified about in the proportion, as set forth.

### 69,770.—DEVICE FOR TURNING THE LEAVES OF BOOKS.—Cyrus C Clapp (assignor to himself and R. M. Burdick), Hartford, Conn.

I claim, 1st, In a leaf-turning device the combination of the pedal, r, shaft, s, arm, t, spring pawl, u, ratchet, n, for holding or releasing the wheels, i, substantially as described.

2d, I claim the clips, l, with the cord, 3, secured loosely in the holes, 2, of the arms, l, substantially as and for the purpose described.

### 69,771.—TRACE FASTENING.—Lucas C. Clark, Plantsville, Ct.

I claim the cock eye, A, the guide or fastener, C, when attached to the whiffletree, B, the whole arranged and used substantially as described.

### 69,772.—VALVE FOR STEAM ENGINES.—James Colbath, Worcester, Mass.

1st, I claim the combination of the piston, B, constructed as described with the cylindrical piston valve, D, operating as and for the purpose set forth.

2d, The enlarged recesses, q', near the ends of the piston valve, D, in combination with the apertures, r r', communicating with the spaces, o o', in the steam chest, as and for the purpose specified.

### 69,773.—SASH FRAME.—J. E. Crowdery, Wheatland, Iowa.

I claim in a sash frame facing the meeting rails, A A, of each sash with metallic trough-shaped lips, B B, so that the tongue of each will enter the groove of the other when both sashes are closed, substantially as and for the purpose set forth.

### 69,774.—SCALES.—S. W. Cox, New Haven, Conn.

I claim a scale for weighing letters, etc., constructed so as to operate substantially as described.

### 69,775.—KNITTING MACHINE.—Thomas Crane, Fort Atkinson, Wis.

1st, I claim the application of pressure to the work at a point which is directly beneath each needle for the purpose of holding down the loops last formed during the ascent of the needles thus maintaining such a condition of the loops as will ensure their being cast off from the needles with certainty, substantially as described.

2d, The pressure bars, J, applied to a sliding frame, G, or its equivalent, which moves in concert with the yarn carrier, g, substantially as described.

3d, Providing for moving the device which holds down the work to one side of the jacks when not required to work between the jacks, substantially as described.

4th, The combination of one or more pressure bars, J, or their equivalent, with one or two straight rows of needles, substantially as described.

5th, Extending the ends of the jack frame beyond the ends of the rows of jacks so as to admit of the removal of bars, J, longitudinally from between the jacks, substantially as described.

### 69,776.—KNITTING MACHINE.—Thomas Crane, Fort Atkinson, Wis.

1st, I claim the employment of spurs or combs arranged and operating substantially as described for the purpose of holding the work in proper position during the ascent of the needles.

2d, The notched plates, J J, in combination with levers, p p, or other equivalent means for moving the slotted bars, G G, and the comb spurs, substantially as described.

3d, In combination with a knitting machine having one or two straight rows of needles, I claim holding the work down in place during the ascent of the needles by a device or devices arranged beneath the needle beds, substantially as described.

### 69,777.—ANIMAL TRAP.—John Curtis, St. Charles, Minn.

I claim the combination of the sliding gate, C, springs, D, lever, E, wire loop, H, cord, I, and forked rod, J, or its equivalent, with each other and with the box, A, substantially as herein shown and described and for the purpose set forth.

### 69,778.—HOSE COUPLING.—M. S. Curtis, New York City.

1st, I claim securing the parts, A and B, of the coupling to each other by means of the sliding blocks, C, substantially as herein shown and described.

2d, Operating the sliding blocks, C, by means of eccentric grooves formed in the movable part, D, of the coupling, substantially as herein shown and described.

### 69,779.—BED BOTTOM.—W. F. Dougherty, Mt. Pleasant, Iowa.

I claim the clevis, E, as constructed and arranged in combination with the spring, C, and hook, c, substantially as described and operating as set forth.

### 69,780.—BROOM CLAMP.—Justus Day, Holley, N. Y.

I claim the employment of caps or blocks, M M, attached outside the clamp and leaving the slot or space, D, for the winding of the wire, as herein set forth.

### 69,781.—ARCH BARS AND SUPPORTS FOR CONSTRUCTING FURNACES FOR EVAPORATING PANS.—Gaius S. Deane, Grand Rapids, Mich.

1st, I claim the bars, A B and C, constructed substantially as herein shown and described for the purpose of supporting evaporating pans upon arches in making sugar and for similar uses.

2d, The double andiron, D, constructed substantially as herein shown and described and for the purpose set forth.

### 69,782.—STEAM GAGE COCK.—T. B. Dexter, Lynn, Mass.

I claim a gage cock provided with the double headed valve, c, arranged to operate in combination with the valve seats, M and N, located at opposite ends of the chamber, B, substantially as shown and described.

### 69,783.—ALLOY FOR JOURNAL BOXES AND OTHER PURPOSES.—G. W. Dismas, Chesterville, Ohio.

I claim a composition for journal boxes, bearings and other mechanical purposes, composed of copper, glass, borax, prussiate of potash and tin as herein described and for the purposes specified.

### 69,784.—APPARATUS FOR SEPARATING GOLD, ETC.—William T. Duval, Georgetown, D. C.

1st, I claim the series of chambers or traps, c, so constructed and arranged that greater freedom of egress is afforded in each successive chamber, whereby the velocity of the current is reduced and the heavier particles are deposited successively therein according to their specific gravity, substantially and for the purposes set forth.

2d, In combination with said series of chambers, c, a centrifugal or other suitable pump to force the current and at the same time to agitate the earthy liquid, substantially as and for the purposes specified.

3d, The arrangement of the pump at the top of said series of chambers so as to operate the apparatus by producing a vacuum therein, essentially as and for the purposes described.

4th, The arrangement and combination of the pump and the series of chambers, c, as shown in fig 5, with the straight suction pipe, J, essentially as and for the purpose set forth.

5th, In combination with said series of chambers, c, I claim the pipe, D, for operating by a column or head of water, substantially as described.

6th, I claim the chambers, c, constructed in separate parts, as represented, the nozzle of each protruding into the chamber of the next forming annular receptacles, substantially as and for the purposes specified.

### 69,785.—GRAIN DRIER.—J. R. Evertson, Mount Vernon, Ind.

1st, I claim the combination of two or more furnaces, D E, with the oscillating pan, A, in such a way that the flue of each preceding furnace may open into the upper part of the succeeding furnace, substantially as herein shown and described and for the purpose set forth.

2d, Forming offset, shoulder or step, a', in the oscillating pan, A, at or near the point or point at which the flue of the preceding furnace enters the upper part of the succeeding one, substantially as herein shown and described and for the purpose set forth.

3d, Forming one or more openings or slots, h', in the cover, H, at or near the offset or offsets, a', substantially as herein shown and described and for the purpose set forth.

### 69,786.—METHOD OF SLOTTING THE LIPS OF RAILROAD CHAIRS.—David Eynon, Richmond, Va.

I claim the method herein described of slotting railroad chairs.

I also claim the hooked cutter, constructed as described.

### 69,787.—DEVICE FOR TRANSMITTING ROTARY MOTION.—L. D. Flanders, Philadelphia, Pa Antedated Oct. 1, 1867.

I claim the shaft, B and C, geared together and each furnished with a worm, f, gearing into a wheel, D, in combination with an adjustable frame, E, shaft, F, and bevel wheel, I, gearing into a bevel wheel on the shaft, O, the whole being constructed and operating substantially as described.

### 69,788.—GATE.—Daniel Flint, Sacramento, Cal.

I claim the combination and arrangement of a crotched hinge, F, with forked arms and the cords, G G', and weights I I', with the automatic catches, N N', all substantially as described and for the purposes set forth.

### 69,789.—WAGON REACH.—E. F. Flood, Chicago, Ill.

1st, I claim a curved or bent reach when so constructed that the line of draft is the same as in the straight reach and so that the reach rests on and is supported by the sway bar as in the ordinary reach substantially as and for the purposes set forth.

2d, The curved reach, A, in combination with the iron, e, of the sway bar when such iron is extended and so constructed as to furnish a support for the reach in all positions substantially as and for the purposes mentioned.

### 69,790.—FURNACE FOR STEAM BOILERS, ETC.—H. K. Foote, Oil City, Pa.

1st, I claim the combination with a furnace of the retort, A, constructed substantially as described when arranged to be used in connection therewith for the purposes set forth.

2d, The combination and arrangement substantially as described of the retort, A, within a furnace and connected to the boiler by the pipe, F, and with the reservoir, H, as described.

3d, The admixture of air by means of an air pump or its equivalent with the gases obtained from the decomposition of steam by means of the heated carbon in the retort before ignition when used in combination with an ordinary furnace substantially as described.

4th, The admixture of the vapor of hydro-carbon in the manner described with gases obtained from the decomposition of water or steam in the manner described for the purpose of generating heat in connection with the furnace of steam boilers substantially as herein described.

### 69,791.—DAMPER.—I. L. Frankem, Indianapolis, Ind. Antedated Sept. 14 1867

I claim a draft regulator having tube, A, conduit, B, rod, D, and a series of cut-offs as described substantially as herein specified.

### 69,792.—PUMP.—W. A. Fry, Worcester, Pa.

I claim the within described body of a pump composed of the three detachable sections, a a1 and a2, connected together and inclosing passages and chambers all substantially as described.

### 69,793.—BUCKLE.—J. N. Gaston, Lyons City, Iowa.

I claim the buckle frame, E, and stops, D D, when constructed arranged and operating substantially as and for the purposes set forth.

### 69,794.—HAY RAKER AND LOADER.—Austin Godfrey, Dupage, Ill.

1st, I claim the combination with a furnace of the retort, A, constructed substantially as described when arranged to be used in connection therewith for the purposes set forth.

2d, The combination and arrangement substantially as described of the retort, A, within a furnace and connected to the boiler by the pipe, F, and with the reservoir, H, as described.

3d, The admixture of air by means of an air pump or its equivalent with the gases obtained from the decomposition of steam by means of the heated carbon in the retort before ignition when used in combination with an ordinary furnace substantially as described.

4th, The admixture of the vapor of hydro-carbon in the manner described with gases obtained from the decomposition of water or steam in the manner described for the purpose of generating heat in connection with the furnace of steam boilers substantially as herein described.

### 69,791.—DAMPER.—I. L. Frankem, Indianapolis, Ind. Antedated Sept. 14 1867

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### 69,792.—PUMP.—W. A. Fry, Worcester, Pa.

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### 69,793.—BUCKLE.—J. N. Gaston, Lyons City, Iowa.

I claim the buckle frame, E, and stops, D D, when constructed arranged and operating substantially as and for the purposes set forth.

### 69,794.—HAY RAKER AND LOADER.—Austin Godfrey, Dupage, Ill.

I claim the adjustable rake, a a a, in combination with the shoe, b, and elevator, f f f when constructed and operating in the particular manner and for the purposes set forth.

3d, The frame, I, with its fastenings to the main frame, b, as set forth in combination with the cylinder, e, and rake, a a a, and reach or fastener, g, when constructed and operating conjointly in the particular manner set forth.

### 69,795.—CHURN.—M. C. Gordon, Knightstown, Ind.

1st, I claim the dash, C, with tubes, D D' D" D"', etc. Fig. 2 with gradually tapering diameters by means of which dash and tubes the milk is forced upward in jets and the globules containing the butter broken and thereby the separation of the butter rapidly and effectually accomplished substantially as and for the purpose set forth.

2d, The dash, C, tubes, D D' D" D"', etc. Fig. 2 in combination with breaker, E, Fig. 2 so arranged that the milk when forced in jets through tubes, D D' D" etc., in dash, C, is violently thrown against the breaker, E, and the breaking of the globules or particles of milk and the separation of the butter therefrom is rapidly and effectually accomplished substantially as and for the purposes set forth.

### 69,796.—MEDICAL COMPOUND.—D. C. Gould, Sterling, Ill. (assignor to himself, Elizabeth A. McCartney and Ephraim F. Brock.

I claim a medical compound composed of creasote, sulphuric acid, tincture of opium, tincture of Kino and sulphuric ether combined and prepared substantially as specified.

### 69,797.—APPARATUS FOR COOLING LIQUIDS.—Marcus Gould, New York City.

1st, I claim the channel, A, in combination with the air passages, C, either with or without the water passages, B, as and for the purposes specified.

2d, The air passages, C, and the chimney, D, when arranged and operating with the channel, A, and water passage, B, substantially as described and for the purposes specified.

### 69,798.—HEAT-RADIATING ATTACHMENT FOR STOVE PIPES.—John Grabner, Warsaw, Ind.

I claim the combination of racks, B B, pinion, P, Cap, M, flange, n, and rod, D, arranged to operate the damper cones, F G H, substantially as and for the purpose set forth.

### 69,799.—PANEL TABLE.—J. G. Greene, Port Henry, N. Y.

I claim the combination of the sliding pivoted panel, B, with the grooved frame, A, in which it works and with the top or cap, D, of the article or casing substantially as herein shown and described and for the purpose set forth.

### 69,800.—COMBINED DOOR PLATE and LETTER BOX.—J. T. Green, Marquette, Wis.

1st, I claim the door plate, C, provided with sliding panels, b b, in combination with panels, a g, substantially as and for the purpose set forth.

2d, The letter box, H, provided with the serrated guard plates D E, door, F, and inclined bottom, b, in combination with the door, i, slat, B, and plate C, all arranged and operating substantially as and for the purpose herein set forth.

3d, The combination of the door plate and register provided with the springs, c', and mail box provided with protectors all arranged combined and operating as and for the purpose set forth.

### 60,801.—CULTIVATOR.—Dan Guptail (assignor to himself and and H. N. Mosely, Elgin, Ill.

I claim the elastic or spring shovel, B, in combination with wedge or key, L, substantially as and for the purpose set forth.

### 69,802.—SELF-ACTING FLY FAN.—W. D. Harrell, and H. M. Hall, Osgood, Ind.

1st, We claim the arrangement of base, A, stud shaft, B, and revolving frame, C furnished with two distinct sets of clock work, for reciprocating and horizontally rotating motion of one or more fans either singly or combined as set forth.

2d, The provision of the hinged connections, of the fans arms for the purpose stated.

3d, In combination with the object of the first claim we claim the stops, H and Q, for arresting the rotary and vibrating motions of the fans either jointly or severally.

### 69,803.—GARDEN PLOW CULTIVATOR.—C. A. Harris, Austin, Ark.

I claim the peculiar combination of the several parts forming a valuable and efficient garden cultivator or hand plow, set forth in accompanying drawings and described in specification whether constructed of wood, metal, or any other material substantially the same or answering the same purpose.

### 69,804.—WAGON JACK.—T. S. Harris, Lockport, Ill.

I claim the peculiar and particular combination and arrangement of the parts described as and for the uses and purposes set forth.

### 69,805.—CARRIAGE TONGUE HOLDER.—Thompson Heaton, Farmington, Ill.

claim the following only viz, the metallic staple and roller or lining in upper end of leather holder with the form of the holder all in the combination and for the uses herein substantially as set forth.

### 69,806.—HOUSE FOR PRESERVING FRUITS AND OTHER ARTICLES.—N. Hellings, Philadelphia, Pa.

I claim the arrangement of the walls, floors and ventilating apparatus as above described, the use of wooden surfaces with non-conducting or poor conducting linings or blank spaces between all inner surfaces and the outer walls or the earth, the arrangement of ventilating entrances at the level of the ice floor with hatches opening down to the storage rooms and enclosed spaces to carry off bad air through the mass of ice upward when it is light air and downward out at the bottom of the entrance doors when it is carbonic acid gas, or like heavy air, as described above the light air passing through the upper space above the ice and thence out at the windows of the observatory.

And I claim the arrangement of the ice floor as described the arrangement to prevent dripping, from this floor, the open space between the joists on which the iron floor lies the copper covered narrow pitched roof to receive water from the melting ice and the suspended drip floor on which this water falls before passing off in the drainage troughs.

And I claim the combination of all these parts and devices as making up a whole all parts of which are essential to the preservation of the air pure and at the necessary low temperature and free from any excess of moisture or any deposit of moisture on the floors, walls, or any part of the storage chambers.

### 69,807.—BALING PRESS.—G. H. Hoke, and J. A. Brown, Elizabeth, Ind.

I claim the combination and arrangement of the toggle joint with arms, E E', connected by the strap, b, the beater, D, the stirrup, G, and the lever, H, constructed and operating substantially as and for the purpose herein described.

### 69,808.—METALLIC CHAIR.—A. W. Hopkins, New York city.

I claim a chair or seat formed with a back or seat of interlaced and corrugated or undulating wire and galvanized or tinned after the chair has been made as and for the purposes set forth.

### 69,809.—FARM FENCE.—D. S. Humphrey, East Townsend, Ohio.

1st, I claim the herein described fence when the wires employed in its construction are so arranged as to support the slats or pickets, in the manner substantially as set forth.

2d, The arrangement of the wires, B, and pickets, D, in combination with the posts constructed as and for the purpose set forth.

### 69,810.—WAGON JACK.—John Hunt, Jr., West Hampton Township, N. J.

I claim the box, A, hinged plate, C, lever, A1, and the ratchet prop, B, substantially as and for the purpose herein shown and described.

### 69,811.—PACKING FOR JOINTS, VALVES, ETC.—Nathaniel Jenkins, Boston, Mass.

1st, I claim the employment of pulverized mica, intimately mixed before vulcanizing, with the constituents of vulcanized rubber, as and for the purpose described.

3d, And the employment of pulverized wood charcoal, intimately mixed before vulcanizing with the constituents of vulcanized rubber, as and for the purpose described.

### 69,812.—REFRIGERATOR.—John C. Jewett, Buffalo, N. Y.

I claim constructing the ice box of refrigerators with the arched bottom, d, in combination with the legs or depressions, e e, provided with perforations, i i, and the shallow pans, J J, arranged and operating as and for the purposes set forth.

I also claim the combination of the door, G, and lid, F, with the ice box, S when constructed, arranged, and operating substantially in the manner and for the purpose specified.

### 69,813.—MANGLE.—Johan Johansen, Springfield, Ill.

1st, I claim the frame or bar, E, pivoted at its ends to the ends of the weight box of the mangle, and having an endless rack and an endless groove formed upon its side, substantially as herein shown and described and for the purpose set forth.

2d, The combination and arrangement of the pinion wheel, J, shaft, G, and adjustable slotted support or bearing, I, with the pivoted frame or bar, E, and with the slotted bar, F, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the rollers, N, with the projecting ends of the bear

ing, I, and with the frame or bar, E, substantially as herein shown and described and for the purpose set forth.

69,814.—CROSSING FOR STREET RAILWAYS.—Chas. W. Jones, (assignor to himself and Hiram W. Stout), Philadelphia, Pa.

1st, I claim a cruciform plate, E, combined with the rails of a street railway at the intersection of the same, substantially as described.

2d, The beveled ends, m m, of the treads, for the purpose specified.

69,815.—LAMP.—Anson Judson, Brooklyn, N. Y.

1st, I claim the construction of the burner of a flat-wick kerosene or coal oil lamp, with two or more stationary supports, D and F, or their equivalents, said supports being permanently attached to the burner, or forming portions of the same, and extending upward above the body thereof, substantially as and to the effect hereinabove set forth.

2d, The catch or device, G, or its equivalent, substantially as and to the effect specified.

3d, The combination of the stationary supports, D and E, and clasp, F, and burner, B, or their equivalents, as and to the effect specified.

4th, The construction of the catch, G, in one piece, with the clasp, F, substantially as herein specified.

69,816.—MACHINE FOR MAKING PATCH BOLTS.—Joseph Kaylor, Reserve Township, Pa.

I claim, in a machine for making patch bolts, the arrangement and use of a pair of recessed dies, which, when brought together, form a cylindrical cavity for the shank, and a conical cavity for the shoulder of the bolt, in combination with a swage or upsetting tool, having a cavity of polygonal cross section for shaping the head, and at the same time, upsetting the shoulder of the bolt in the conical cavity of the dies, constructed and arranged substantially in the manner and for the purposes hereinabove set forth.

69,817.—SPARK ARRESTER.—Patric Kelly, Nashville, Tenn.

I claim the combination of the spark arrester, F, cone, E, flue, D, drum, C, ... forth for the purpose specified.

69,818.—MACHINE FOR COMPRESSING CARRIAGE WHEELS.—Henry Killam, New Haven, Conn.

I claim the combination and arrangement of the jaws, B, and their guides or plates, A, with the plate, C, when constructed so as to operate substantially in the manner herein set forth.

69,819.—AXLETREE FOR WAGONS.—Geo. P. Kimball, San Francisco, Cal.

I claim the combination with a superposed wooden axle bed of the steel plate or spring axletree, A, constructed and arranged for operation substantially as herein shown and for the purposes set forth.

69,820.—HOT-AIR FURNACE.—A. Kohler, Boston, Mass.

I claim, in combination with the flame chambers, f and x, and the hot-air chambers, g and n, the arrangement of the series of flues, l, running from the chamber, x, into a flue chamber directly under the main flue, e, and over the flame chamber, f, substantially as shown and described.

69,821.—APPARATUS FOR ACCUMULATING POWER.—Jas. F. Latimer, Detroit, Mich., assignor to Eliza Ellsworth.

1st, I claim the combination and arrangement of the rods, M M, the rocker, N, the lever, R, the base, O, and the pivot, P, arranged substantially as described for the purpose designed.

2d, The combination and arrangement of the frame, A A, the base, B, the pillow blocks, C C, the shaft, D, the wheels, E E, the slotted segment, F F, the eccentric levers, I I, the rods, K K K K, the shafts, L L, the rods, M M, the rocker, N, the base, O, the pivot, P, the lever, R, and the balance wheel, S, arranged substantially as described and for the purpose designed.

69,822.—JOURNAL BOX.—Edward F. Light, Worcester, Mass.

I claim the combination of the projection, D, oil hole, g, and grooves, d d and e, and inclined ways, f f, and chamber, c, with the bottom part, A, of the journal box, for the purposes stated.

69,823.—CURTAIN FIXTURE.—Henry Lovie, Philadelphia, Pa., and Albert Lovie, Prussia.

We claim the sliding screw rod, B, in combination with the pin or stud, C, and the roller, D, either fixed or revolving, substantially as shown and described.

69,824.—BUTTER DISH.—D. T. Lyon, West Meriden, Conn.

I claim the bearings of a revolving dish cover, constructed in the manner described, and so as to be attached or detached, as specified, that is to say, the slotted cylinder, a, upon each side of the dish, combined with a bearing fixed to the cover, either with or without the tumbler, f.

69,825.—EXPANSION DRILL.—Gilbert Mackinnon, Portsmouth N. H., assignor to himself and Hosea Crane, Millbury, Mass.

1st, I claim the arrangement of the cutters, E, in the recess, e, of the holder, A, and held in position between the holders and plate, B, by means of the set screws, as herein shown and described.

2d, The arrangement of the holder, A, plate, B, screw, D, wedge, C, and cutters, E, substantially as described for the purpose specified.

69,826.—IMPLEMENT FOR STRAINING BANDS ABOUT BOXES.—Samuel Marden, Newton, assignor to himself and Charles Porter, Cambridge, Mass.

I claim an implement for hooping boxes in which the lever, A, and bar, B, are combined with the yoke, c, substantially in the manner and for the purposes herein shown and described.

69,827.—MANUFACTURE OF CARRIAGE CLIPS.—Edwin Meeker, Bridgeport, Conn.

I claim dies, C and D, having recesses, d and e, and projecting punches, f, substantially as and for the purpose herein shown and described.

69,828.—WIND WHEEL.—E. W. Mills (assignor to the Empire Wind Mill Manufacturing Company), Syracuse, N. Y.

1st, I claim the sliding weights, d d, upon the rods, c, arranged to operate upon the wind wheels, B, through the medium of the bell crank, b b, and sliding collar, a, substantially as herein shown and described.

2d, The weighted lever, L, in combination with the rod, o, the connecting chains collar, a, bell cranks, b, rods, c, sliding weights, d, and wind wheels, B, substantially as described for the purpose specified.

3d, I claim the bell crank, b b, the rods, g h and i, the ball connection, n, and the rod, o and p, arranged and operating substantially as and for the purpose specified.

69,829.—ARTIFICIAL LEG.—Henry L. Mills, St. Paul, Minn.

1st, I claim the adjustable and movable leather socket, C, constructed, applied, and operating substantially as and for the purposes herein described.

Second, The combination of the iron frame, g g, secured by rivets to the ankle piece, B1, the bands, h h1, the straps, k1 k1, and the socket, C, all constructed, arranged, and operating substantially as and for the purposes set forth.

3d, The spring bar, n, pivoted to the band, h, in combination with the socket, C, arranged and operating substantially as and for the purpose specified.

4th, The plates, d d1, on the upper and lower sides of the heel of the foot, A, secured by the rivets, e e, substantially as and for the purposes described.

5th, The peg, B, and ankle piece, B1, pivoted to the plate, b, and fitted in the mortise, a, in combination with the frame, g g, and the foot, A, constructed, arranged, and operating substantially as and for the purposes herein set forth.

69,830.—BAKING PAN.—G. W. Mitchell, New York city.

1st, I claim the combination roll, cake, and bread baker, consisting of a heater, and roll or cake pan, substantially as and for the purpose as described.

2d, The heater, B, having apertures, a, in combination with the depressions, and pans, substantially as described for the purpose specified.

4d, In combination with the heaters, B, and pans, C, I claim the legs, F, as herein described for the purpose specified.

69,831.—KNEELING CASE FOR CHURCHES.—L. Mooney, Baltimore, Md.

I claim the combination of the case, c, with an umbrella rack attached, with a gutter beneath, substantially as and for the purposes set forth.

69,832.—STUMP EXTRACTOR.—Garret J. Olendorf, Middlefield, N. Y.

1st, I claim lever beam, C, supported in the center by crooked pieces or frame, operating as described for the purpose specified.

2d, I claim swivel, reel, or straight hitch-up hooks, or snibll and hook, combined with and operated by lever beam, C, as described and set forth, for the purpose specified.

3d, I claim ropes, R R, hitched to either the stump or frame going over pulleys in the beam to the axle or windlass by which the machine is operated, substantially as described and set forth for the purpose specified.

69,833.—ICE-CREAM FREEZER.—O. Paddock, Watertown, N. Y.

1st, I claim, in an ice-cream freezer, in which the cream vessel is arranged to rotate upon its axis, as described, the combination with the cream vessel of a stationary cover which constitutes the bearing in which the upper portion of said vessel is supported and moves during its rotary movement, substantially as shown and set forth.

2d, The combination in an ice-cream freezer, as described, with the cream vessel and spindle for rotating the same, of the cover for said cream vessel and cross bar, to which it is attached, under the arrangement, substantially as herein shown and specified.

3d, The combination with the stationary cream-holder cover and the stop or catch which it carries, of the frame, F, mounted upon the spindle and within the rotary cream holder, substantially in the manner and for the purposes set forth.

4th, The combination of the cross bar and the bolts or latches pivoted to it as described, with the catches mounted on the ice tub, and the slots formed in the said tub, under the arrangement and for operation substantially as set forth.

5th, The combination with the cream vessel or holder and catches or hooks upon its bottom, of the slotted center bearing upon which the said vessel is supported and pivoted, substantially as and for the purposes described.

6th, The method herein indicated of facilitating the removal of the frozen or solidified cream from the vessel in which it is contained by forming in the bottom of said vessel one or more vents or openings for the admittance of air to the interior of said vessel while the cream is passing out from the same, the said vents being closed by screw plugs or other suitable means, as set forth.

69,834.—PLOW WHEELS.—L. E. Palmer, Le Roy, La.

I claim the construction and arrangement of the wheel, A, shaft, B, and braces, D D D, and irons, E E, in connection with the wheel, C, which supports the front of the beam, as shown and described.

69,835.—WASHING MACHINE.—John Park, Joliet, Ill. Antedated Oct. 3, 1867.

I claim the conical perforated bottom, in combination with the coiled spring, h, and rollers, d, when attached to a tub, and arranged and operating in the manner described.

69,836.—CORN PLANTER.—T. H. Parker and Daniel Kellison, Parkersburg, Ill.

1st, We claim the combination with the shovel, G g1, of the arm, H, bolts, a, and chain, i, whereby said shovel is made transferable, substantially as and for the purpose set forth.

2d, The combination of the frame, A A1 A2 A3, hopper, C, and its appurtenances, roller, K, hooks, J J1, lever, D, conducting tubes, F, and shovels, G, with their accessories, G g H s I, all arranged and operating substantially as herein described and represented.

69,837.—STOVE.—Moses Pond, Boston, Mass.

I claim the combination and arrangement of one or more blocks of india-rubber, or its equivalent, with the plates and the confining bolt or bolts of a stove, the whole being substantially as and for the purpose above specified.

69,838.—HARVESTER.—K. H. C. Preston, Manlius, N. Y.

I claim the shaft, D, having bearings, C, at or near the rear of the platform, A, its arms, b, provided with eyes, a, supporting the shaft, C, having at one end the crank, E, and provided with the teeth, d and e, all arranged and operating as described for the purpose specified.

69,839.—STEAM ENGINE.—George H. Reynolds, Mystic Bridge, Conn.

1st, I claim connecting the equilibrium valve, t3, and throttle valve, t4, so that both shall be operated together, substantially in the manner and for the purpose herein set forth.

2d, I claim the within described arrangement of the condenser, L, air pump, G, and discharge pipes, V, relatively to the cylinder, A.

3d, I claim the relief valve, U, arranged as represented, and adapted to transform the engine from a complete non-condensing engine, and the reverse, substantially in the manner and for the purpose herein specified.

4th, I claim arranging the foot valve, I, on the seat which is connected with the bonnet, J, and adapted to be raised and lowered therewith, substantially as and for the purposes herein specified.

5th, I claim operating the gridiron valves, N, on the back of the main slide, M, moving across by a movement later than the movement of the main slide, substantially as and for the purposes herein specified.

6th, I claim the link, Q, arranged to act obliquely to the eccentric rod, r, by the same eccentric so as to operate the gridiron valves, N, or their equivalents by means of one of the main eccentrics, R, substantially as and for the purpose herein specified.

69,840.—SASH FASTENER.—Stephen N. Richards, Chicago, Ill.

I claim the combination and arrangement of the sliding catches, B B, knobs, C C, and springs, S S, with the exterior metallic sheath or enclosure, A, substantially as and for the purpose described.

69,841.—HANDLE FOR STOVE DOORS.—Charles H. Roberts, Troy, N. Y.

I claim the wooden knob, A, constructed as described, slotted to fit over the metal knob, a, cast on the stove door and held in position by means of the ring, B, substantially as and for the purpose specified.

69,842.—TERRASPHERE.—Eleazer Root, Terra Haute, Ind.

I claim, 1st, The arms, E, sustaining the north end of the axis of the earth, A, combined with the axis, c, and the gear connection with the axis, B, so as to preserve its vertical position throughout the revolution of the earth in her orbit, substantially as described.

2d, Hanging the index, g, at the south pole of the earth in a tubular bearing substantially as described.

69,843.—CHURN.—Eli W. Russell (assignor to S. S. Russell), Ashley, Mo.

I claim the combination of the shaft, a, having the pulley, F, fly wheel, G, and crank, e1, secured thereto, with the shaft, b, having the pulley, E, and crank, e, when arranged so as to have the pitman, h, and crank, d, applied to either at will, substantially as and for the purposes herein described.

69,844.—COMPOUND PROTRACTOR.—William Rutherford, Athens, Ga.

1st, I claim the solid, base, B, projecting at right angles to the plane of the graduated semi-circle, so as to slide along the edge of the drawing board, considered as a meridian line, in combination therewith, and with the graduated rule, constructed as herein described.

2d, I claim, also, the fixed vernier, b, and the sliding vernier, c, in combination with the scale rule, C, and the protractor, A, arranged and applied as and for the purposes herein specified.

69,845.—TATTING SHUTTLE.—S. Schofield, Plainville, Mass.

I claim, 1st, A tatting shuttle provided with a detachable handle or holder, B, substantially as and for the purpose specified.

2d, A tatting shuttle provided with mechanical means for winding the thread upon it, substantially as herein shown and described.

3d, In combination with the scuttle, A, the holder, B, crank, C, and the crank bolt, f, the whole arranged substantially as and for the purpose specified.

69,846.—COMPOSITION FOR INK.—J. Shaw, Bridgeport, Conn.

I claim an ink compound, of the ingredients herein above named, and mixed together in the manner and in or about the several proportions, substantially as specified.

69,847.—VENTILATING ATTACHMENT FOR RAILROAD CARS.—J. Shaw, Bridgeport, Conn.

I claim the ventilator constructed as described, consisting of the box, B, having the pivoted lids, D, in the ends, C, opening inward against the ends of the inclined partition plates, H, the sides, F, provided with the funnel shaped or tubular openings, E, in which the pivoted inward projecting partitions, G, work, all arranged and operated as herein shown and described, for the purpose specified.

69,848.—SEEDING MACHINE.—B. A. Shearer, Crown Point Center, N. Y.

I claim the roller, G, provided with the grooves, d, and adjustable bars, e, in combination with the seed hopper, K, and chute, L, all arranged to operate substantially in the manner and for the purpose set forth.

I also claim the harrow or covering teeth, h, attached to the bars, M, which are fitted on the rod, N, in combination with the transverse bar, N', arranged and connected to the lever, P, to operate in the manner substantially as and for the purpose specified.

69,849.—COTTON BALE TIE.—J. L. Sheppard, Charleston, S. C.

I claim a tie or lock for metal bale hoops, composed of a metal plate perforated as shown at a, provided with loop, b, slots, a' a', and bent portion of the plate, C, to admit of the attachment of the ends of the hoop as shown, and the turning up or down of the tie or lock, while one end of the hoop is passed through its loop, b, and drawing up or down of the tie or lock, parallel with the side of the bale, under the expansion of the same, when relieved of the pressure, substantially as set forth.

69,850.—FOLDING SEAT.—George Sherwood, Chicago, Ill.

I claim the combination and arrangement of the lugs, c c', slots, d d', axle, b, hub or cup, e, and screw or nut, l, with the standard, a, and arm, D, substantially as and for the purposes specified.

69,851.—TOY PISTOL.—W. J. Shipman, Portsmouth, Ohio.

I claim a toy pistol, constructed and arranged to operate in connection with a ball, substantially as described, for the purpose specified.

69,852.—MINERAL PAINT.—Jacob R. Smith, Keyport, N. J.

I claim a paint composed of the ingredients herein named, in the proportions and in the manner substantially as described.

69,853.—MACHINE FOR CUTTING TOBACCO.—Jared W. Smith, New Haven, Conn. Antedated October 3, 1867.

I claim, 1st, The beam or frame, F, arranged to revolve, and provided with one or more revolving circular knives, G, substantially as described, for the purpose specified.

2d, The scraper, H, in combination with the revolving circular knives, G, substantially as and for the purpose described.

3d, The sharpening rollers, J, in combination with the knives, G, substantially as and for the purpose specified.

69,854.—MACHINE FOR MOLDING PIPE.—Wm. Smith, Pittsburgh, Pa.

I claim, 1st, A revolving packer, g', tapering at or toward its upper end, and provided on the face or faces of such taper with grooves, i,' or projecting flukes in lieu thereof, constructed and operated substantially as and for the purposes hereinbefore set forth.

2d, The revolving hollow shaft, g, carrying a packer, g', in combination with the guiding shaft, b, and flask, B, arranged and operating substantially as and for the purposes above set forth.

3d, The drums, f, ropes, h', and cross bars, h, in combination with the collar, o', for the purpose of elevating the hollow shaft, q, while the mold is being formed, substantially as above set forth.

4th, The gear wheel, c, bored in the line of its axis for a seat for the guiding frame shaft, b, and keyed thereto in combination with drums, f and the apparatus, h and h', to engage the collar, o', for the purpose of imparting to the shaft, b, revolving and vertical motions, substantially as set forth.

5th, The vertically moving slide, n, with its converging grooves, n', in combination with the laterally moving clamps, m, having lugs, m', arranged and operated substantially as described.

69,855.—CHURN.—J. H. Spelman, Bazetta, Ohio.

I claim the special construction of the dasher, C, with slanting arms, I, and beaters, G F, when arranged so as to describe unequal circles, one within the other, in combination with the case, A, in the manner as and for the purpose set forth.

69,856.—AUTOMATIC RAILROAD SWITCH.—George W. Starr, Clarksburg, West Va.

I claim, 1st, The lever, G, in combination with the slotted arm, i, and spring, v'', when arranged to operate in connection with the rail, A, the connecting rods, j and l, and spring, k, as described, and for the purpose set forth.

2d, The lever, F, in combination with the spring in the case, d, the rest, f, and rail, A, when arranged to operate as described, and for the purpose set forth.

3d, The trippers, t t', in combination with the bars, n, and o, when arranged to operate the lever, F, for releasing the rail, A, as described, and for the purpose set forth.

4th, An automatic railroad switch, with the devices for locking and releasing the rails, A A', when arranged to operate as described, and for the purposes set forth.

69,857.—HORSE HAY FORK.—B. F. Stewart, Freeport, Ohio.

I claim the curved prongs, B B, pivoted at one end to the handle, A, and connected by the link, a, pivoted at one end to one prong, and working at the other end, to the other prong, constructed and operating substantially as and for the purpose herein described.

68,858.—FARM FENCE.—Edwin Stiles, Cleveland, Ohio.

I claim the special construction and arrangement of a fence as herein specified.

69,859.—FAUCET.—Septimus C. Stokes, Manchester, N. H.

I claim the above specified combination, as well as the arrangement of the gib, D, and the screws, E, with the plug and body of the faucet.

I also claim its head, constructed as described, and applied to the body and plug of the faucet in manner as explained.

69,860.—FLOODGATE.—John B. Stoner, Lacon, Ill. Antedated October 1, 1867.

I claim a floodgate with escapes, reaching below, and with solid front above the escapes, and swung upon the cross beam by means of staples hinges placed in the edge or slide of the beam, a, facing the source of the stream, the gate resting at an inclination upon the bearings, at f f'.

69,861.—PORTABLE FLOOD FENCE.—John B. Stoner, Lacon, Ill. Antedated September 27, 1867.

I claim the post, a, box, b, rail, c, blocks, d d', and pins, e e', arranged, combined, constructed, and operating substantially as described.

69,862.—CORN PLANTER.—L. Study, Plum Hollow, Iowa.

I claim, 1st, The application directly to the axle, B', of seed droppers, C, which are provided with valves, i, in combination with cams, h, upon the seed tubes, g, and openers, f, upon the main frame, substantially as and for the purposes described.

2d, The chambered and radially grooved dropping devices, C C, provided with valves, c c, and adapted for the purpose substantially as described.

3d, The combination of a seed slide, d, which is moved by axle, B1, through the medium of spring, B3, the seed hoppers, E, the seed tubes, g, and the rotating droppers, C, constructed to operate substantially as described.

4th, The double acting clutches, b, applied on the axle, B', in such manner as to lock this axle to its frame, when the driving wheels, B, one or both are free to turn around said axle, substantially in the manner and for the purposes described.

69,863.—DEVICE FOR CAPPING SCREWS.—Orvin W. Swift, New Haven, Conn.

I claim the tubular die, D, with the rod, E, fitted within it, and provided with the blade, d, in combination with the bolster, A, for receiving the screw, B, and the set screw, C, or its equivalent, for holding screw, B, in position, while being capped, all constructed and arranged to operate substantially in the manner as and for the purpose specified.

69,864.—WASH BOARD.—James Thompson, Vevay, Ind.

I claim a washboard, A B, whose individual corrugations, b, and the whole or greater portion of the entire series, B, collectively, are curved concavities as and for the purpose specified.

69,865.—HORSE POWER.—Zacharias Tobias, Covington, Ohio.

I claim, 1st, The combination of the frame or frames, N S, line shaft, B, and center shaft, L, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the ropes or chains, W, and shaft or windlass, Y, with the frame, N, and its attachments, and with the frame, D, substantially as herein shown and described, and for the purpose set forth.

3d, Permanently attaching the power to the bolsters or axles of a wagon, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the timbers, T, and braces A', with the wheels, A, and frame, D, of the machine, substantially as herein shown and described, and for the purpose set forth.

69,866.—CLIP CIRCLE.—Isaac N. Topliff, Adrian, Mich. Antedated September 28, 1867.

I claim the construction of a clip circle, for carriages, etc., in the form and manner described, with the spur, B, for the purpose substantially as set forth.

69,867.—PLOW.—James Vaudegrift, Princeton, Ill.

I claim the combination with the beam, d, of the flange, g', or its described equivalent, the braces, e, arm j, adjustable collar, k, and screw, m, constructed and arranged in the manner herein shown and described, and employed, to adapt the plow for either light or heavy draft, in the manner set forth.

69,868.—ADJUSTABLE ROLLER FRAME FOR ELEVATOR PLATFORMS.—R. M. Van Sickler, New York city.

I claim the sides, a a, bearing the roller, C, when such sides are connected together by means of the cross bars, a2, having the downward projections, B, for receiving the frame upon the platform of the elevator, to prevent slipping, and longitudinal movement, as herein shown and described.

69,869.—PIPE FOR THE TRANSMISSION OF FLUIDS.—Ethan P. Vaux, Washington, D. C.

I claim, 1st, A pipe constructed and arranged for the transmission of fluids, having a hermetically sealed air chamber surrounding it, substantially as described.

2d, In combination therewith, the intermediate braces, whether consisting of disks or other radial supports, or supports of horizontal pipes, substantially as described.

3d, A two-fold pipe, the interior being a conduit for fluids, and the outer forming a hermetically sealed air chamber, when united at its curves or angles, substantially as described.

69,870.—COTTON BALE TIE.—Charles W. Wailey, New Orleans, La.

I claim, 1st, Constructing a cotton bale tie, with a projecting lip, C, and roller, G, substantially as described.

2d, Constructing a cotton bale tie with a projecting lip, C, and curved ridge, D, substantially as described.

3d, Constructing a cotton bale tie with a projecting lip, C, roller, G, and curved ridge, D, when the same are arranged substantially as described, and for the purpose set forth.

4th, Securing a cotton bale tie, having a curved projecting lip to the hoop, by means of the roller, G, loop, H, and rivet, I, when the same are so constructed as to form a hinge joint, substantially as described.

69,871.—ELEVATOR.—Joshua Walker, Kansas city, Mo.

I claim, 1st, In combination with the car tracks, laid at different hights, a movable section, C, arranged and applied in such a manner as to admit of being raised and lowered from one track to the other, and carry the car from one track to the other, substantially as set forth.

2d, The hinged rails or ways, I I, arranged with the arms, J J, and windlass, M, to operate in connection with the adjustable section, C, substantially as and for the purpose specified.

3d, The arrangement as shown of the arms, D D', and E, with the windlass, G, for the purpose of raising and lowering the section, C, for the purpose set forth.

69,872.—CONSTRUCTION OF FAGOT FOR BEAM.—George Walters and Thomas Shaffer, Phœnixville, Pa.

We claim a pile or fagot for wrought iron beams, girders, etc., composed of one or more bars for the web, and any desired number of bars for the flange or flanges, when the said bars are arranged and permanently secured together by bolts or rivets, as and for the purpose herein set forth.

69,873.—TOY ENGINE.—James L. Warren, New York city.

I claim the combination of the boiler, A, cord, b, and swivel joint, c, with the lamp, B, substantially as and for the purpose herein shown and described.

69,874.—PLOW.—Franklin Watson, Harrison, Ill.

I claim, 1st, The mold board, F, of shape described, and share, M, when combined as set forth.

2d, The springs, h and i, when combined and operated as described.

3d, The plow foot, D, mold board, F, share, M, support, G, standard, E, and springs, h and i, when combined and arranged substantially as described.

69,875.—EXTENSION LADDER.—T. Watson and C. Perry, Brooklyn, N. Y.

I claim, 1st, The manner of connecting the two trucks together, and the arrangement of the slides thereon, substantially as and for the purpose described.

2d, The arrangement of bar, J, for the slides to rest upon, substantially as and for the purposes described.

3d, The arrangement of the windlass for elevating the slides, between the base of the said slides and the axle of the rear truck, substantially as and for the purpose described.

4th, The employment in an extension ladder of guys, in combination with a windlass, substantially as and for the purpose described.

5th, The hub of the rear trunk constructed in the manner and for the purpose substantially as described.

6th, The arrangement upon the top of the ladder of a skeleton adjustable platform, constructed substantially as described.

69,876.—CORN DROPPER.—Lewis Weaver, Canton, Ohio.

I claim, 1st, The piece, f, having flanges, e e, thereon, attached to the box, E, in the manner and for the purpose specified.

2d, The spring, d, having the lip, p, thereon, and attached to the hopper, B, in the manner and for the purpose specified.

3d, The valve, K, having the hole, X, therein, and the lower parts, a and b, arranged in the manner and for the purpose specified.

69,877.—INDICATOR FOR PUNCHING MACHINE.—Wm. Welch (assignor to himself and Mathew Diamond), Bridgeport, Conn.

I claim, 1st, Providing an indicator which registers the strokes of devices making regular reciprocating movements, and of reciprocating gates, that are operated by eccentrically moving boxes, B, or their equivalents, substantially as set forth.

2d, The slotted sliding rod, F, when provided with pins, b b, and with a spring, h, and when combined with the pawl, i, ratchet wheel, H, and hand, e, and with the box, B, substantially as and for the purpose set forth.

3d, The manner herein shown and described of throwing the indicating apparatus out of gear, by means of the eccentric pin, j, fitting through an eye on the rod, i, substantially as herein shown and described.

4th, The arrangement of the pivoted plate, L, having an eccentric slot and fitting around the pin, n, and connected with the pawl, m, for the purpose of indicating the revolution of the lower disk on the hand of the disk above, as set forth.

69,878.—ANIMAL TRAP.—John Westcott, Patchogue, N. Y.

I claim the mole trap constructed as described, consisting of the iron forks, A A, formed at right angles upon the cross bars of the handles, the latter being pivoted together at a, and clamping between them the spring, B, said forks held open by means of the notched dog, C, between the cross bars, as herein set forth for the purpose specified.

69,879.—GRATE FOR COOKING STOVES.—Wm. H. Whitehead, Chicago, Ill.

I claim, 1st, The changeable revolving grate, E, in combination with the end plates, G and H, and front grate, P Q, for the purpose of changing the fire box from an open to a close grate, substantially as specified.

2d, The projection or lock, c, attached to the end plate, G, substantially as and for the purposes set forth.

3d, The back plate, B B' and C, when constructed substantially as described, and so located that the upper portion, C, will incline toward the front, the middle portion, B, incline backward, and the lower, B', remain vertical, so as to admit of a change in position of the grate, E, substantially as specified.

4th, The combination and arrangement of the front grate, P Q, back plate, B B' C, and the end plates, G and H, with an adjustable revolving bottom grate, E, constructed and operating substantially as specified.

69,880.—ELECTRO-MAGNETIC ENGINE.—Wm. Wickersham, Boston, Mass.

I claim, 1st, So forming metallic conductors in electro-magnetic engines that in their extension from one end to the other of said engine, they shall pass nearly round one or more electro magnets, and so arranging them that when an electric current passes through said conducting bars it shall produce magnetic polarity in the said electro-magnets, substantially as described.

2d, In combination with said metallic conductors, the arrangement of the receptacle, b, substantially as and for the purpose described.

3d, So forming the electro-magnet in an electro-magnetic engine that it may become a part of the rim of a fly wheel, and so arranging it on the outer edge of a disk, in connection with the shaft, that when said rim revolves the shaft will revolve also as described.

4th, The cut-off arranged and constructed as described, in combination with the said metallic conductors, playing over the interrupted parts of said cut-off, as described.

5th, Adjusting in electro magnetic engines while they are in motion, the relation of the circuits to the magnets substantially as described, and for this purpose I claim the spiral slotted tube, k, arranged and operated substantially as described.

6th, In combination with said metallic conductors and magnetic fly wheel, the arrangement of two or any desirable number of said fly wheels on the same shaft, all operating together in the manner described.

7th, Arranging the conducting bars in groups around the shaft, and securing each group in its proper position, independently of the others, as described.

8th, Having the spaces between the groups of conducting bars filled with blocks of the same form of said spaces and having said blocks secured in their places by a metallic ring, K, as described.

9th, Making said metallic conductors in a thin ribbon-like form, having one edge near the said electro magnet and the other edge from said magnet, all substantially as described and for the purpose set forth.

69,881.—HAY RAKER AND LOADER.—Hosea Willard, Vergennes, Vt.

I claim, 1st, The supplementary yielding pulleys, e e, attached to the axle, A, and at such points that the rake teeth of the endless elevator may yield or conform to the inequalities of the surface over which they may pass, or to obstructions which may be in their path, substantially as and for the purpose specified.

3d, The oval wirers or clearers, h, placed on the shaft, G, of the endless elevator, substantially as and for the purpose set forth.

3d, The springs, K, for connecting the oblique rake wings to the frame, C, arranged as described for the purpose specified.

4th, The endless belts, P P, applied to the rake wings, substantially in the manner as and for the purpose set forth.

69,882.—OIL CUP.—Charles Williams, Vineland, N. J., assignor by mesne assignments to himself.

I claim the elastic tube, C, in combination with the nozzle, B, and of such length that the perforated ball, D, upon its lower end, shall reach either the top, side, or bottom of the can, A, as herein described, for the purpose specified.

69,883.—JAW FOR LATHE DOGS AND BENCH VISES.—Nathaniel Wilton, Groton, N. H.

I claim the combination in a lathe dog or the semi-cylindrical self-adjusting pieces or jaws, D, with the jaws, A and B, and screws, C, or their equivalents, substantially as herein shown and described and for the purpose set forth.

69,884.—BROOM HEAD.—J. Wisner, Aurora, and T. Rose, Cortlandville, N. Y.

We claim the combination of the screw bolt, g, with thumb screw upon each end, and the side or conical pins, d d, with the metal cap or case for holding the brush or corn as above described, and for the purpose set forth.

69,885.—CARRIAGE AND BUGGIE TOP BOW IRONS.—G. & A. Woeber, Davenport, Iowa.

1st, I claim providing sockets for receiving and fastening the ends of the bows of buggie and carriage tops, substantially in the manner and for the purposes as herein described.

2d, The construction and arrangement of flanges on the sockets, substantially in the manner and for the purpose as herein described.

3d, The hinges as constructed with plate, A, having pivots, a a a a, with holes in the pivots for screws, and plate, B, attached by screws, substantially in the manner and for the purposes as herein described.

4th, The sockets with flanges and the hinges with pivots, as constructed and arranged in combination with the bows, and bow irons, substantially in the manner and for the purposes as herein described.

69,886.—WAGON BRAKE.—L. E. Woodard, Owasso, Mich.

1st, I claim the brake bar, B, connected by pins, b, working in the slots, c, in the ends of the cross bar, a, all constructed and arranged as described, for the purpose specified.

2d, The slotted metallic slide piece, D, upon the wagon reach, connected at one end to the bar, B, and in which the friction roller, k, is pivoted, constructed as described and operated by means of the eccentric piece, E, as herein set forth, for the purpose specified.

69,887.—COTTON PRESS AND FEEDER.—Henry Zellner, Columbia, Tenn.

1st, I claim the triangular chamber, B, situated between the shute, A, and the press, arranged as and for the purpose above described.

2d, I claim the arrangement of the foraminated cover, B', in connection with the chamber, B, and shute, A, in a hay or cotton press, substantially as and for the purpose described.

3d, I claim the combination of the shaft, I, cords or chains, H H', and toggle joint lever, F, with the pulleys, I I, working at the end of the fixed beam, K, substantially as and for the purpose specified.

4th, I claim the use of the pawls, o o o, substantially as and for the purpose described.

5th, I claim the arrangement of the shute, A, chamber, B, rollers, C C', lever, E, block, G, tube, D, and pawls, o o o, substantially as and for the purpose set forth.

69,888.—BURGLAR ALARM.—G. S. Acker, Kalamazoo, Mich.

1st, I claim connecting the spring alarm with the tripping wire, W, by the arrangement and combination of the pallet lever, H, with the toothed quadrant, I J, pawl, P, and tension spring, S, substantially as and for the purpose specified.

2d, I claim in combination with the spring alarm and tripping arrangement aforesaid, the geared levers, L L, when the same are connected to the window panes and operated by the window sashes of a building, substantially in the manner and for the uses set forth.

69,889.—ROOFING COMPOSITION.—C. B. Allen, St. Louis, Mo.

I claim the within described composition, composed of the articles herein set forth and used for the purposes specified.

69,890.—BOILER.—Henry Adler, Yellow Springs, Ohio.

1st, I claim the arrrangement, substantially as described, of the hot water jacket, A B K, steam chamber, E e, digester, G H I M, and stopper, L, as and for the purpose specified.

2d, In combination with the elements of the preceding clause, I claim the rotatable loops, C c C' c', serving the double purpose of handles and catches.

69,891.—MANUFACTURE OF MATCHES.—Emery Andrews, Portland, Me.

I claim uniting match splints in the form of a card, substantially in the manner and for the purpose specified.

69,892.—CAR BRAKE.—John L. Barnes, Etna Green, Ind.

I claim the swinging frame, G, with its shafts, E and R, wheels, J J, gears, H and I, used in combination with wheels, M M, upon the driving axle, and cords, C, rods, D D, and lever, R, for operating the carriage brakes by means of the lever, F, roller, d, and cord, a, when arranged in the manner and used substantially as and for the purposes specified.

69,893.—BRIDLE.—W. R. Beans, Brownsburg, Pa.

I claim the headstalls constructed with extensions rearwardly from the forehead strap having loops, b', at their rear ends for the retention of the safety reins in the desired position on the horse's neck, substantially as shown and described.

69,894.—APPARATUS FOR PROVING GAS PIPES.—A. C. Beardslee, Brooklyn, N. Y.

I claim, 1st, The combination of the bell, A, base piece, B, with its passages F H, diaphragm, C, spring borne graduated rod, D, and check valve, J, all for operation together substantially as and for the purpose herein set forth.

2d, The arrangement in connection with a diaphragm indicator substantially of the character specified, of an ether box, essentially as and for the purpose or purposes herein set forth.

69,895.—APPARATUS FOR DAMPING AND GUMMING LABELS.—Joseph Benn, Goat near Cockermouth, England, and George O. Luckman, Manchester, England.

We claim the apparatus described consisting of a reservoir connected to a damping chamber provided with a perforated plate or any combination of similar parts answering the same purposes and for effecting the same objects.

69,896.—COMBINED HOSE TONGS, CLAMP, WINCH AND PICK.—Harry Bitter, Philadelphia, Pa.

I claim the combination of the facing ring, D, wrenches, d and e, and pick f, with a hose clamp, substantially as described and for the purposes specified.

69,897.—APPARATUS FOR RENDERING LARD AND TALLOW.—Amos Broadnax, New York City.

I claim, 1st, Rendering fat with a dry fire heat either in an open or a close tank by inclosing said tank in a heating chamber so made and arranged as to entirely surround the same, substantially as described.

2d, Combining a dry rendering apparatus in a dry heating chamber made of metal and placing said dry metal heating chamber in a brick chamber over the fire or furnace and so arranged as to leave a flue around the metal chamber, substantially as described.

3d, The use of the intervening plate, S, either with or without the fire brick or clay facing between the furnace and the tank by which the fire can be entirely excluded from the tank.

4th, Arranging an open rendering tank in a heating chamber made to entirely inclose it and arranged to allow the gas and vapor to escape in the chimney under a furnace, substantially as described.

5th, In combination with a rendering tank the use of a thermometer arranged in a tube in said tank filled with mercury, substantially as described.

6th, The use of a ventilator in combination with a rendering tank inclosed in a heating chamber for the purpose of reducing the temperature in said chamber, substantially as described.

7th, Making an intervening flue between the tank and the fire flue to aid in regulating the application of heat to the tank, substantially as described.

69,898.—BED CLOTHES HOLDER.—M. D. Brooks, Albany, N. Y.

I claim the combination of the rolls, E E, with the arms, A A and B B, and spiral springs, C C, arranged on a bedstead for holding the clothes of the bed, substantially as described.

69,899.—ROWLOCK FOR BOATS.—C. C. Burrows, Mystic River, Conn.

1st, I claim the slotted plate, A, Figs. 3 and 4, in combination with a reversible cap, C, hinged thereto and revolving thole permanently attached to the cap, substantially as set forth.

2c, In combination with the plate, A, having a longitudinal slot, A', the reversible cap, C, and thole and a button for securing the part rigidly when in use, arranged substantially as set forth.

69,900.—HAT VENTILATOR.—C. H. Coffin, San Francisco, Cal.

I claim as a new article of manufacture a hat ventilator provided with a slide or valve to close the openings and a flange of flexible metal teeth for fastening it to the hat.

69,901.—FOUNTAIN BRUSH.—Julius Davis, McLean, N. Y.

1st, I claim the revolving hollow cylinder, G, having its entire curved sides pierced with orifices, e, and covered with cloth, c, to allow the paint or white wash within it to escape gradually and spread itself evenly over the surface to be covered as the cylinder is rolled over it, substantially as and for the purpose described.

2d, The combination and arrangement of the revolving hollow cylinder, G, and brushes, B, when the cylinder and brushes are constructed and used substantially as and for the purpose hereinbefore particularly described.

3d, The combination and arrangement of the revolving hollow cylinder, G, brushes, B, and cup, A, when the cylinder, brushes and cup are constructed and used substantially as and for the purpose set forth and described.

4th, The combination and arrangement of the revolving hollow cylinder, G, brushes, B, cup, A, frame support, b C and C', socket, D, and handle, E, when the whole are constructed and used substantially as and for the purpose described.

69,902.—COOKING STOVE.—W. C. Davis, Cincinnati, Ohio.

I claim the base or pedestal, B, forming a completely inclosed closet or chamber having one or more doors, J, a floor, E, and interlocking flanges, D, and being adapted to take the place of the customary leg or feet of an ordinary cast cooking stove, as set forth.

69,903.—GRINDING MILL.—John Donaldson, Rockford, Ill.

1st, I claim the arrangement of the slots, I I, in wheel, E, with the pins adjustable in said slots and the feed levers, a and b, and discharge lever, a', operating in connection with the feed and discharge valves and the hulling machinery, substantially as described and for the purpose set forth.

2d, The arrangement and construction of the feed valve, P, and groove, R, in hopper, S, substantially as described.

69,904.—MODE OF COATING WROUGHT IRON WITH CAST STEEL.—Josiah W. Ellis, Pittsburgh, Pa.

I claim as a new and merchantable article of manufacture slabs, sheets, plates, bars and rods of wrought iron having a uniform coating, face or surface of cast steel, applied as hereinbefore set forth on any one or more or on all sides of the same and of any required degree of thickness.

69,905.—KNIFE CLEANER.—John A. Ewins, South Boston, Mass.

I claim the combination and arrangement of the polishing or cleaning cylinder and its operative mechanism with the self-adjusting presser and the guard, the whole being applied to a frame so as to operate as described.

69,906.—TWEER.—Frederick Fisher, Gloucester, Mass.

I claim the water tight vessel or reservoir, I J, surrounding or partially inclosing the main air tube, H, and the tubes, K K, in combination with the pipes, F and G, and the reservoir, E, substantially as and for the purpose specified.

69,907.—TENTER BARS FOR STRETCHING CLOTH.—J. Force and G. W. Renwick, Elgin, Ill.

We claim the combination of bars, H and H", friction wheels, t and t', screw, N, rod, L, and levers, e e, substantially as and for the purpose described.

69,908.—HARVESTER.—John Fox, Baltimore, Md.

I claim the broken or interrupted surface of the cam groove on the inner face of the driving wheel for actuating the roller and lever, substantially as herein recited.

69,909.—BRICK MOLD.—Francis M. Franklin, O. H. McIntire and William Whitely, Springfield, Ohio.

We claim the plunger with projecting centers on their inner faces to receive and support the packing and packing plates around them, as and for the purpose herein described.

Constructing the plunger of a brick press with packing and packing plates and tightening screws to permit the tightening of the upper and lower packing and packing plates at the same time while they may be separate from each other and the packing kept tight in the mold above and below, substantially as herein described and in combination with the above covering the face of the plunger with leather or some similar substance, as and for the purpose set forth.

The plunger of a brick press constructed with a suitable reservoir for oil or other substance to lubricate the inner surface of the mold, substantially as and for the purpose set forth and in combination with the above an opening in or across the plates inside of the mold to carry and supply the inside of the mold and edges of the packing constantly with oil so that the brick is kept from sticking to the mold and the packing from wearing, substantially as herein described.

Saturating with oil the leather or other material covering the face of the plunger by means of ducts passing through the plunger and communicating with the oil reservoir, substantially as set forth.

The cut-off which allows all of the surplus mortar to escape from the mold and stops that escape just in time to secure the mold being uniformly filled, substantially as herein described.

69,910.—BRIDLE BIT.—Joseph P. Gates, Lincoln, Ill.

I claim, 1st, The shape and construction of the bit bar, A, as herein described and for the purposes set forth.

2d, The double cheek disks, B B, constructed with the shuttle keys, H, studs, J, circular recess, N, and stop recesses, P Q R S, when arranged, combined and operated as herein described and for the purposes set forth.

69,911.—WRENCH.—Dennis Harrigan, Charlestown, Mass.

I claim my improved wrench as made not only with one of its jaws stationary with respect to and projecting from its rotary segmental plate and with the other jaw movable upon a bar parallel with the chord of such plate and projecting from the stationary jaw but as having a screw and a screw rack applied to the movable jaw and its supporting bar, the whole being arranged substantially in manner and so as to operate as specified.

Also the combination of such a wrench and means substantially as described (viz: the bolt holes, b b b, and the spring bolt, H), whereby its segmental plate may be fixed in position so as to cause it to move with the handle when moved in either direction that is forward or backward while the jaws may be hold of an object.

69,912.—RAILROAD CROSSING.—G. W. Harris and George Elliot, Aurora, Ind.

We claim, 1st, A railroad crossing formed by prolonging two rails of each track in opposite directions beyond the intersecting rails and having gains, B, and gaps, B', as and for the purpose set forth.

2d, In combination with such gained and intersecting rails we claim the knees, D, applied as herein made known.

69,913.—HORSE RAKE.—A. L. Haskell, Amity, Pa.

1st, I claim the combination of the main frame, S, the vibrating rake frame, A C, the rocking frame, m, and the lever, p, when all these parts are constructed and arranged for joint operation as and for the purpose described.

2d, The combination in a two-wheeled horse rake of rigid shafts projecting from the axle, a driver's seat mounted on the front cross bar near the left shaft, a vertically vibrating frame hinged to the rear of the axle and carrying a revolving rake, a rocking frame pivoted to the vibrating frame and carrying springs to control the rake and a lever pivoted on the vibrating frame linked to the rocking frame and carrying a hook taking into an eye on a standard in front of the axle by which to fasten the rake when lifted, up all constructed, arranged and operating as described

69,914.—GATE.—L. Hermance, Hudson, N. Y.

1st, I claim the box, E, with its disk, F, and wheel, G, constructed and used with the gate as and for the purpose set forth.

2d, The metallic loop, a, used with the gate for keeping its forward end down or supporting substantially as herein represented.

3d, I claim the metallic plate, H, with its arm when connected to the lower side of the gate post to prevent the gate from swinging out of position as specified.

69,915.—STRAW CUTTER.—Nelson Holmes, Laona, N. Y.

1st, The compound lever handle, I E, and the connected adjustable supports, K J and H, all constructed and arranged substantially in the manner and for the purposes specified.

Also the supporting bar, n, when placed in the cutting machine for the purpose set forth.

69,916.—BENDING MACHINE.—Gideon Huntington, Norwichville, Canada West.

1st, The flanged keys, A A, in combination with the grooved journal boxes and mortices in the upright when constructed and arranged to operate as described.

2d, In combination with the above and with the rolls, I claim the stationary and adjustable guides when arranged and operating substantially as described.

69,917.—ROOFING COMPOSITION.—A. P. Jackson, (assignor to himself and Otis Pratt, Warsaw, Ind.

I claim the composition above described, when compounded and used substantially as and for the purposes specified.

69,918.—DUMPING SLED.—J. L. Knoll, Hummelstown, Pa.

I claim the dumping apparatus, constructed and operating substantially as and for the purpose herein specified.

69,919.—SAFETY GUN LOCK.—W. F. Kussmaul, Baltimore, Md.

I claim the spring, E, having the bolt, H, in combination with the vertical slide, F, the mainspring, B, and the shoulder, G, substantially as and for the purpose specified.

69,920.—ATTACHMENT TO STIRRUPS.—Israel L. Landis, Lancaster, Pa.

I claim the detachable india rubber foot pad, a, when provided with side flaps, C, which are secured to the sides of the stirrup by means of button and button holes or their equivalents in the manner and for the purposes as herein set forth.

69,921.—HAT.—W. B. Lodge, Danbury, Conn.

I claim a hat made of wool-felt, having incorporated with it, after the hat is formed, or during the process of felting, fur-dust, substantially as herein set forth.

69,922.—MANUFACTURE OF TEA AND COFFEE POTS.—W. W. Lyman, (assignor to the Meriden Brittania Co.,) West Meriden, Conn.

I claim uniting a hard metal bottom with a soft metal or brittania body of a tea or coffee pot, substantially as described.

I claim a tea or coffee pot substantially as described.

69,923.—BUTTER WORKING AND PRINTING MACHINE.—A. S. and S. B. McDowell, Philadelphia, Pa.

1st, We claim the construction and arrangement of the mold, F, the adjustable bottom, E, the piston printer, D, the levers, B and C, the prop, L, the swinging hook, K, and the supporting stand, A, the same operating together substantially as and for the purpose described.

2d, In combination with a butter printing apparatus constructed and operating as described, we claim the fluted roller, G, turning loosely upon its axis, g', which is jointed to the post, a", as described and the sector shaped tray, H, grooved and perforated as described the same operating together as and for the purpose described.

69,924.—APPARATUS FOR PRESERVING FRUITS, MEATS, ETC.—John G. McMillan, Baltimore, Md.

1st, I claim the arrangement of water, steam and vent pipes, with a spherical condenser when the said condenser is encased in a water tank for the purpose of alternately producing a vacuum, as herein specified.

2d, I claim the can receiver, K, cover, I, air tube, J, and connecting pipe, H, as constructed in combination with the condenser, D, operating in the manner as and for the purposes herein set forth.

3d, I claim the apparatus described by which the process of exhausting the atmosphere from cans, jars, or other vessels, containing fruits, vegetables, meats, or other substances without heating the cans or contents, substantially as herein set forth.

69,925.—SHEEP SHED AND RACK.—Gabriel McWilliams, Fostoria, Ohio.

I claim the herein described shed, and rack constructed in the manner and for the purpose substantially as set forth.

69,926.—COMPOSITION FOR PRODUCING ELASTIC FORMS FOR PRINTING.—Isaac L. Miles, Philidelphia, Pa.

I claim a composition for elastic printing forms consisting of the within described ingredients in combination with arsenic or its equivalent.

69,927.—CAR COUPLING.—Jacob Miller, Carrollton, Ohio.

1st, I claim the pivoted coupling piece, C C', and pin, c, adapted by vibration to disengage the coupling link, F, substantially as and for the purpose set forth.

2d, I claim the movable piece, G, in combination with the spring, H, substantially as and for the purpose specified.

3d, I claim the combination of the pivoted catch, C, pin, c, hook, B, spring plunger, D, and lever, F, all arranged and operating, substantially as and for the purpose specified.

4th, I claim the movable frame, G G', flange, G2, and spring plunger, H, arranged and employed, substantially as and for the purpose set forth.

69,928.—HOE AND POTATO DIGGER.—E. F. Morris and R. J. Green, Cicero, N. Y.

We claim the swinging beams, B, and shares or wings, F, connected with yielding links, f f, in connection with plows, D d, frame, A, and braces, g, all constructed arranged and operating as herein shown and for the purpose set forth.

69,929.—MECHANICAL MOVEMENT.—Julius Niebergall, New York City.

1st, I claim the combination with the shafts, a b, and the connecting rod, f, of the arm, k, and crank, j, substantially as set forth.

2d, The method substantially as herein shown of transmitting continuous rotary motion to a driven shaft through a connecting rod extending from the driving shaft by keeping the said rod at all times in a position parallel with a straight line extending from the driving to the driven shaft.

69,930.—APPARATUS FOR COOLING MALT LIQUORS.—Wm. Partington, Philadelphia, Pa.

1st, I claim the box, A, having a compartment bounded by sieves, a a1 and a2, and inlet and outlet pipes, all arranged substantially as and for the purpose herein set forth.

2d, The cooling box, B, containing the vessels, C and C1, and pipes or troughs, d d, the whole being constructed and arranged substantially as and for the purpose specified.

3d, The tubes, d d and f f1, in combination with the vessels, C and C1, of the box, B, or with the vessels, F F1, of the box, D.

4th, The combination of the boxes, A B and D, with the contents described, or their equivalents, and with the regulating faucets specified.

69,931.—SPARK ARRESTER.—Andrew Pearsall, Atlanta, Ga.

I claim the arrangement of the pipe, B, with its flange, E, and disk, G, as constructed in combination with pipe, A, having flange, D, formed as described, to project beneath flange, E, having outlet into chamber, C, as set forth and for the purposes described.

69,932.—WATER WHEEL.—P. D. Pike, Stowe, Vt.

I claim the cylindrical water wheel, A, with its center partition, E, having two apertures, G G, and two adjustable gates, B B, regulated by the lever, C, when constructed, combined, and operating as herein described and for the purpose set forth.

69,933.—WEIGHING SCALES.—J. P. Pope and J. T. Whipple, Chicago, Ill.

1st, We claim platform, C, suspended from platform, B, of the scales above, substantially as and for the purpose set forth.

2d, Rack, D, and balancing beam, m", substantially as and for the purpose described.

3d, The combination of rods, o o", jointed levers, s s", lever, W, and holding or stop rod, t, substantially as described.

69,934.—CHURN.—Edward Porter, Tallmadge, Ohio.

I claim the special arrangement of the radial arms, F, and shaft, D, in combination with the pail, A, in the manner as and for the purpose described.

69,935.—REIN HOLDER.—A. W. Potter and J. A. Barling, Monroe, Wis.

We claim the spring, A, when bent in the form, as shown, in combination with the board, B, substantially in the manner and for the purpose specified.

69,936.—MACHINE FOR BENDING METALS.—Robert Potts, Chatham, N. Y.

I claim the adjustable frame, D, arranged as specified, in combination with the sweep, A, substantially as and for the purpose described.

69,937.—EXTENSION TABLE.—A. E. Preston, Battle Creek, Mich.

I claim the combination of the revolving top, E, pivot, D, and receptacle, F, with the adjustable sliding srames, B and B', the whole constructed and operating substantially as described, and for the purposes set forth.

69,938.—RAILWAY CAR SEAT.—S. H. Rhoades and W. Carroll, Clyde, Ohio.

1st, We claim the extension links, C, when constructed with a sleeve, D, slide, E, and disk, F, as arranged and pivoted to the back, B, and seat, A, in the manner and for the purpose substantially as set forth.

2d, The disk, F, provided with a circular ratchet in combination with the spring, G, and back, constructed and arranged in relation to each other for the purpose and in the manner substantially as set forth.

3d, The adjustable head rest or section, K, spring, E, stay bars, M, and rod, O, as arranged in combination with the back, B, in the manner as and for the purpose set forth.

69,939.—BAKING FRAME.—T. C. Riddell, Wilmington, Del.

I claim providing the ordinary baking pan with a wooden frame and stirrups for holding it in place for the purpose of evenly baking bread or cakes in the manner herein before described.

69,940.—SUBMARINE VESSEL.—E. C. B Rick, Hermann, Mo.

I claim the arrangement of a series of crank shafts, a, carrying pins, c, and connected by a rod, d, in combination with the adjusting screw, a, and vessel, A, constructed and operating substantially as and for the purpose set forth.

69,941.—BREECH-LOADING FIRE ARMS.—Angelina Snider, Philadelphia, Pa. Administratrix of the estate of Jacob Snider Jr., deceased. (Assignor to John Vaughan Snider)

1st I claim the breech piece, C, having a projection, a', adapted to a recess, a, at the rear of the barrel, when the said breech piece is hinged to and arranged to slide on a pin, D, for the purpose of extracting the cartridge all substantially as set forth.

2d. The combination of the breech piece, C, sleeve, E, pin, D, and extractor e, attached to the sleeve.

3d, The sleeve and its notched enlargement, d, in respect to the edge, g, of the frame.

69,942.—MOP WRINGER.—R. W. Soper, (assignor to himself, and Frank Richards), Janesville, Wis.

1st, I claim the arrangement of the supporting levers, D and D', with the cam piece, E, the former being provided with the cam grooves, f, and the latter with the cam pins, h, in such a manner that the vertical movement of the cam-piece shall operate the wringing rolls, C and C', substantially as described.

2d, The construction of the cam-piece, E, and guide, F, with the rectangular guide pin, i, and vertical groove or mortise, e, substantially as and for the purpose described.

3d, The arrangement of the treadle, G, pivoted on the ends of the yoke, I, with the cam, E, operating levers, D D', and spring, M, when the whole are constructed and used substantially as described.

69,943.—PLOW.—Geo. Spiehlman, Strasburgh, Pa.

1st, I claim the construction of the flattened and enlarged head, b, with its curved slot, of the standart, B, in combination with the application and arrangement of the hinge pieces, M N, forming the joint, J, of the beam and handle when all made in the manner and for the purpose specified.

2d, I claim the slotted wedge, K, in combination with the flanged and sunken tale piece of the point, E, constructed in the manner and for the purpose set forth.

3d, I also claim the mode of constructing and applying the sole piece, G, by ears and bolts to the base of the land side arranged as shown for the purpose specified.

4th, I also claim the extra heel piece, I, in combination with the mold board, D, when made and arranged in the manner set forth.

5th, I claim the combination and arrangement of the hinged beam, A, with the handle, C, the sole piece, G, heel, I, wedge, K, flanged point, E, and mold board, D, when all are made and arranged in the manner shown for the purpose specified.

69,944.—DRAWING AND TWISTING HEAD FOR SPINNING.—Ferdinand Spineux, Liége, Belgium.

I claim the roller, D, and its guide, e, for directing the course of the thread thereon in combination with the hollow spindles, A I, substantially as shown and described.

69,945.—RAILWAY SWITCH.—W. H. Staats, Cresent, N. Y.

1st, I claim the laterally sliding connecting bars, E E', actuated on lines perpendicular to the course of the main track, to retain the train on the main track or divert it, to the siding, substantially in the manner set forth.

2d, The combination of the rails, A A1 A2 A3, with the shifting bar, H, blocks, D and D', and connecting bars, E, E' substantially as and for the purpose set forth.

3d, The rails, A A1 A2 A3, permanently fixed in combination with connecting bars, E E', sliding between the rails to connect alternately with the main track or siding, substantially in the manner set forth.

69,946.—RUFFLER FOR SEWING MACHINE.—A. Stewart, Plano, Ill.

I claim the spring plate, A B, constructed as described combined with the presser and arranged to operate in connection with the feeding apparatus, as and for the purposes described.

69,947.—LAYING TELEGRAPH WIRES ON RAILROADS.—D. W. Strong, Dutch Flat, Cal.

I claim the slotted brackets or holder, for retaining and protecting the wire, substantially as described.

69,948.—RULE AND LETTER SCALES.—T. G. Taylor, Lawrenceville, N. Y.

1st, I claim the rule, A, adapted as a letter scale, when constructed and operating substantially as described.

2d, The slide, C, spring, E and plate, B, in combination with the rule, A, substantially as described for the purpose specified.

69,949.—CLAMP FOR TRAVELING TRUNK.—John W. Thorne, Brooklyn, N. Y.

I claim a trunk clamp, in which the metal at the angle is strengthened by the interior filling piece, i, rendering the same thicker, as and for the purposes set forth.

And in combination therewith, I claim the knuckle or angle brace, a, applied to the metal clamp for trunks, as and for the purposes set forth.

69,950.—MACHINE FOR IRONING HATS.—John T. Waring, Yonkers, N. Y.

1st I claim the lever, E, working in a universal joint, and made adjustable longitudinally and vertically, by means substantially as herein described, in combination with the smoothing iron, D, substantially as and for the purpose specified.

2d, The combination of the weight, h, and cord, c, with the chimney, d, pivoted to the smoothing iron, substantially as and for the purpose specified.

3d, The screw, m, in combination with the lever, E, and the smoothing iron pivoted thereto, substantially as and for the purpose specified.

69,951.—TOP PLATE OF COOKING STOVE.—John B. Crowley (assignor to Chamberlain & Co.), Cincinnati, Ohio.

1st, I claim an extended top plate of a cooking stove, formed with the pit, D, cast in one piece therewith, as and for the object explained.

2d, The arrangement of extended top, A, pit, D, and deflecting plate, E, as and for the purpose set forth.

69,952.—WINDOW SASH ELEVATOR.—John Le Ferre, Charleston, Mass.

I claim the arrangement of the angular plates, C, and screws, f, provided with loops, g, in combination with the pulley, F, and block, G, connected to the window frame, and operated by the cord, D, in the manner and for the purposes specified.

69,953.—CALIPER GAGE.—John Richards, Cincinnati, Ohio.

I claim a fixed caliper gage, when constructed as herein specified, the outline being arcs of true circles, substantially as described.

69,954.—STANDARD GAGE.—John Richards, Cincinnati, O.

1st. I claim a standard gage constructed in the form of pyramidal cone, in the manner and for the purposes specified.

2d, I also claim the pedestal, b, or equivalent means of supporting the gag e

in an inclined position, substantially in the manner and for the objects specified.

69,955.—APPARATUS FOR COOLING, FREEZING, AND HEATING.—Daniel E. Somes, Washington, D. C.

1st, I claim the combination of the vacuum and compressing chambers or their equivalents with the pumps or their equivalents.

2d, Atomizing tubes in combination with a vacuum or partial vacuum.

3d, Minute holes through the walls of the vacuum chamber for the admission of liquid, air, gas, or vapor.

4th, Tube with an atomizing lip or projection, in combination with a vacuum or partial vacuum.

5th, Closed air spaces, or non-conducting material, or refrigerating substance, or compounds, surrounding a vacuum or partial vacuum.

6th, A vacuum chamber constructed substantially as and for the purpose set forth.

7th, A compressing chamber with atomizing tubes or holes, substantially as and for the purpose set forth.

8th, Compressing and vacuum chambers with a safety valve between, as and for the purpose set forth and for other purposes.

9th, Pipes and cock, G, as and for the purpose described.

10th, Non-conducting spaces or substances between the compressing and vacuum chambers, substantially as and for the purpose set forth.

11th, The cases, D, in combination with a compressing chamber or with a vacuum or partial vacuum chamber.

12th, Tubes or channels extending through the compressing or vacuum chamber, substantially as and for the purpose set forth.

13th, Apartments or vessels constructed substantially as herein described, to prevent conduction of heat or cold, in connection with apparatus for rarefying or expanding air, gas, or other volatile substance.

14th, Chemical substances herein named, or others which may volatilize, singly or in combination, when used in a vacuum or partial vacuum in the form of mist or spray.

15th, Materials for lining the compressing and vacuum chambers, for the purposes set forth.

16th, A chamber containing liquid, air, gas, food, or any substance to be cooled, with channels tubes or spaces in, through, or around the same for passing, forcing, or drawing spray formed by atomizing a liquid or liquids.

## REISSUES.

2,776.—WORKING BUTTER.—J. P. Corbin, Whitney's Point, N. Y., assignee by mesne assignments of Joseph Seymour. Patented December 20, 1859.

1st, I claim a vibrating rod, F, handle, G, and butter worker, H, combined and arranged to operate as shown, or in an equivalent manner, for the purpose set forth.

2d, The combination of the tray, B, with the butter working apparatus, arranged for joint operation, substantially as shown and described.

3d, The manner of tipping the tray or bowl to drain off the fluids, also of securing it to the table or frame for the purpose set forth.

2,777.—VOLUTE SPRING.—Joseph Hobart, Waltham, Mass., assignee of Daniel G. Rollin. Patented February 26, 1858.

1st, A double volute spring, having the bearing ends symmetrical, and playing endwise in the same line.

2d, A double volute spring, composed of a single plate, operating substantially as described.

2,778.—CLEANSING ANIMAL CHARCOAL.—The Union Sugar Refinery, Charlestown, Mass., assignees of Gustavus A. Jasper. Patented March 27, 1866.

I claim the new or improved process substantially as hereinbefore described, for treating charcoal, either after or before its use, in a filter, for the cleansing of a saccharine or other liquid, the same consisting in boiling the charcoal in an acid solution, and washing it, the whole being essentially as specified.

I also claim, as the invention of the said Jasper, for removal from the charcoal of the gummy and other matter, except the lime or alkaline matter, the treatment or process of treating the charcoal without the use of acid, the same consisting in boiling the charcoal in water, or so boiling it and washing it, the charcoal being subsequently dried as set forth.

2,779.—MACHINE FOR MAKING NEEDLES.—C. P. S. Wardwell, Lake Village, N. H., assignee by mesne assignments of Frederick Plant. Patented June 19, 1860.

1st, I claim the combination of the traveling nippers or gripe, and stationary wire holder, or equivalent feeding device, cutting off shears, or device, and eye or groove punch or die, substantially as and for the purposes specified.

2d, I also claim the combination of the traveling nippers, or gripe, and stationary wire holder or equivalent feeding device, an eye or groove punch or die, and a tube or tubes, c, or equivalent wire or needle blank holder, substantially as and for the purposes herein set forth.

3d, I also claim the combination of the traveling nippers or gripe, and stationary wire holder, or equivalent feeding device, cutting-off shears or device, and one or more tubes or equivalent wire or needle holder, substantially as and for the purposes specified.

4th, I also claim the combination of one or more tube, or equivalent wire or needler holder, and the wire or needle carrier, substantially as herein described, or equivalent device, for moving the wire or needle blanks, to the action of the operative devices, substantially as and for the purposes herein set forth.

5th, I also claim the combination of the cutting-off shears, or device, eye or groove, punch or die, one or both, and wire or needle carrier, or equivalent mover, substantially as and for the purposes herein set forth.

6th, I also claim the combination of the wire or needle carrier, or equivalent mover, one or more, pointing or reducing cutters, and a bed or block to keep or rest the needle blanks against, substantially as and for the purposes herein specified.

7th, I also claim one or more revolving tubes, c c, for holding the needle blanks, or wires, constructed and operating substantially as and for the purposes herein described.

8th, I also claim the combination of the cutting-off shears or device, eye or groove, punch or die, singly or together, and wire or needle carrier or equivalent mover, with the cutting or grinding wheel, n, for flattening or "slabbing" the needle wire, or blanks, substantially as and for the purposes set forth.

9th, I also claim the combination of the wire or needle carrier, or equivalent mover, the flattening wheel, and the adjustable bed or block, to keep the needle blanks or wires to the flattening wheel, substantially as and for the purposes set forth.

10th, I also claim the combination of the wire or needle carrier, or equivalent mover, polishing wheel, and spring rest, for the purposes specified.

11th, I also claim the combination of the wire or needle carrier, or equivalent mover, and the barb bending mechanism, substantially as herein specified.

12th, I also claim a combination of mechanical devices, as described, or equivalents thereof, by which needles are automatically made from the wire, either including or not the bending of the barbs and the polishing of the needles.

2,780.—ROTARY HARROW.—O. D. Barret, Washington, D. C.

I claim causing two harrows jointed together, to rotate in opposite directions, by attaching the draught either above or below the plane, passing through the joint, D, parallel to the line of draught, substantially as specified.

## DESIGNS.

2,800.—STOVE DOOR.—T. A. Dorgan, Baltimore, Md.

2,801.—FLOOR CLOTH PATTERN.—A. E. Powers (assignor to himself and Deborah Powers, and Nathaniel B. Powers), Lansingburgh, N. Y.

2,802.—PILASTER AND CENTER PIECE OF HEATER.—Charles J. Shepard, Brooklyn, N. Y.

2,803.—STOVE.—James Spear, 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.*

46,699.—PICTUTE CARD FRAME.—Garrett P. Bergen, Brooklyn, N. Y., assignee of R. W. Potter, New York City. Dated March 7, 1865. Application for reissue received and filed Oct. 9, 1867.

1st, A card frame for a picture formed with an opening embossed around its edges, substantially as set forth.

2d, Cutting a hole and simultaneously embossing the border in a picture frame, substantially as specified.

21,879.—SELF-HOISTING HOOK.—The Middletown Tool Company Middletown, Conn., assignees by mesne assignments of J. A. Henshaw. Dated Oct. 26, 1858. Reissue No. 2,166. Dated Feb. 6, 1866. Application for reissue received and filed Sept. 28, 1867.

The combination and arrangement of the hook proper, eye, spring bar spring and checks to protect the spring, substantially as before set forth.

66,035.—BOOT CRIMPER.—De Witt C Mourey, Milford, Mass. Dated June 25, 1867. Application for reissue received and filed Sept. 13, 1867.

I claim so combining the auxilliary jaws with the spreader, D, and clasp, A, that when such spreader is lowered between such jaws their lower ends shall approach each other and recede from the jaws of the clasp, substantially as and for the purpose as described.

I also claim the application of the auxilliary jaws to the clasp by means substantially as described, viz.: by the arms provided with ears and by the slot having the supports arranged as set forth.

26,637.—STRAW CUTTER.—Franklin B. Hurst, Richmond, Ind., assignee by mesne assignments of himself. Dated Dec. 27, 1859. Application for reissue received and filed Oct. 5, 1867.

1st, The horizontally sliding adjustable bar against which a rotary knife cuts, said bar being held down on its bed piece or bearings by vertical bolts or screws, substantially as shown.

2d, Combining in one piece the bed piece, R, to the adjustable bar, T, and the side pieces, V V, substantially as shown and described.

3d, The combination in a feed cutter of a single cylindrical knife and an adjustable bar, against which the knife cuts, said bar being held down to its bed by vertical bolts, substantially as set forth.

4th, The plate, Y, for the purpose of covering the joint between the adjustable bar, T, against which the knife cuts, and the bed piece, R, in manner substantially as shown.

5th, A feed roller whose shaft moves up and down in combination with a single cylindrical knife.

6th, The link bearing, M, attached to the shaft, D, and carrying the feed roll, Q, in combination with the spring, W, in such manner that as the roller rises it shortens the operative length of the springs and thereby gives the greatest pressure to the roll when most needed, in manner substantially as shown.

7th, Combining a revolving cutter knife with a fly wheel in such manner that when the knife is in rapid motion and meets with an obstruction the knife may be suddenly arrested and the fly wheel continue to revolve and expend its momentum independently of the rotation of the knife and thereby preserving the knife and other parts of the machine from injury by the sudden stoppage of said knife.

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CHAP. II. The Boiler—Marine boilers, distinguished from land boilers, gear connected with boilers, the tubular boiler, the number of boilers in each steam vessel, the steam chest, the fire bridge, ash pits, gunboat boilers, feed or donkey engine, boiler hand pumps, the safety valve, etc., etc.
CHAP. III. The Engine—Definition of steam engine, discoveries of Watt, single-acting engine, double acting engine, high pressure or non-condensing engine, marine steam engine, side-lever marine engine, paddle wheels, feathering paddles, reefing the padules, disconnecting the wheels, methods of disconnecting paddle wheels, immersion of paddle wheels, paddle wheel brakes, the screw propeller; definition—length of screw; definition—angle of screw, pitch of screw, slip of screw, area of screw, thread of screw, diameter of screw, disconnecting the screw, methods of raising the screw, governors in screw ships, etc., etc.
CHAP. IV. Direct-action engines, gorgon engines, Fairbairn's engines, Maudslay's double-cylinder engines, Boulton and Watt's direct engines, Messrs. Miller and Ravenhill's direct engines, oscillating engines, engines for working the screw propeller, direct acting screw engines, direct-acting geared engines, oscillating horizontal engines, trunk engines, double-acting air-pump, Maudslay and Field's return connecting-rod engine, Humphrey's engine.
CHAP. V. Getting up the steam fully described.
CHAP. VI. Duties to machinery when under steam—particular directions.
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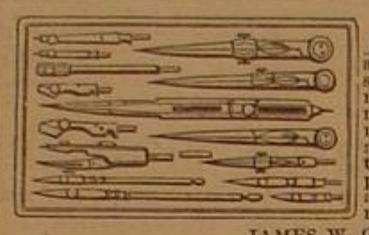

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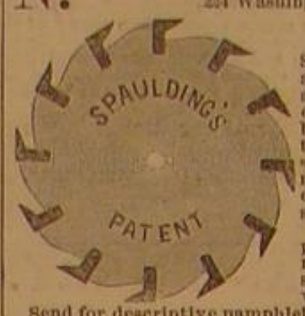


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