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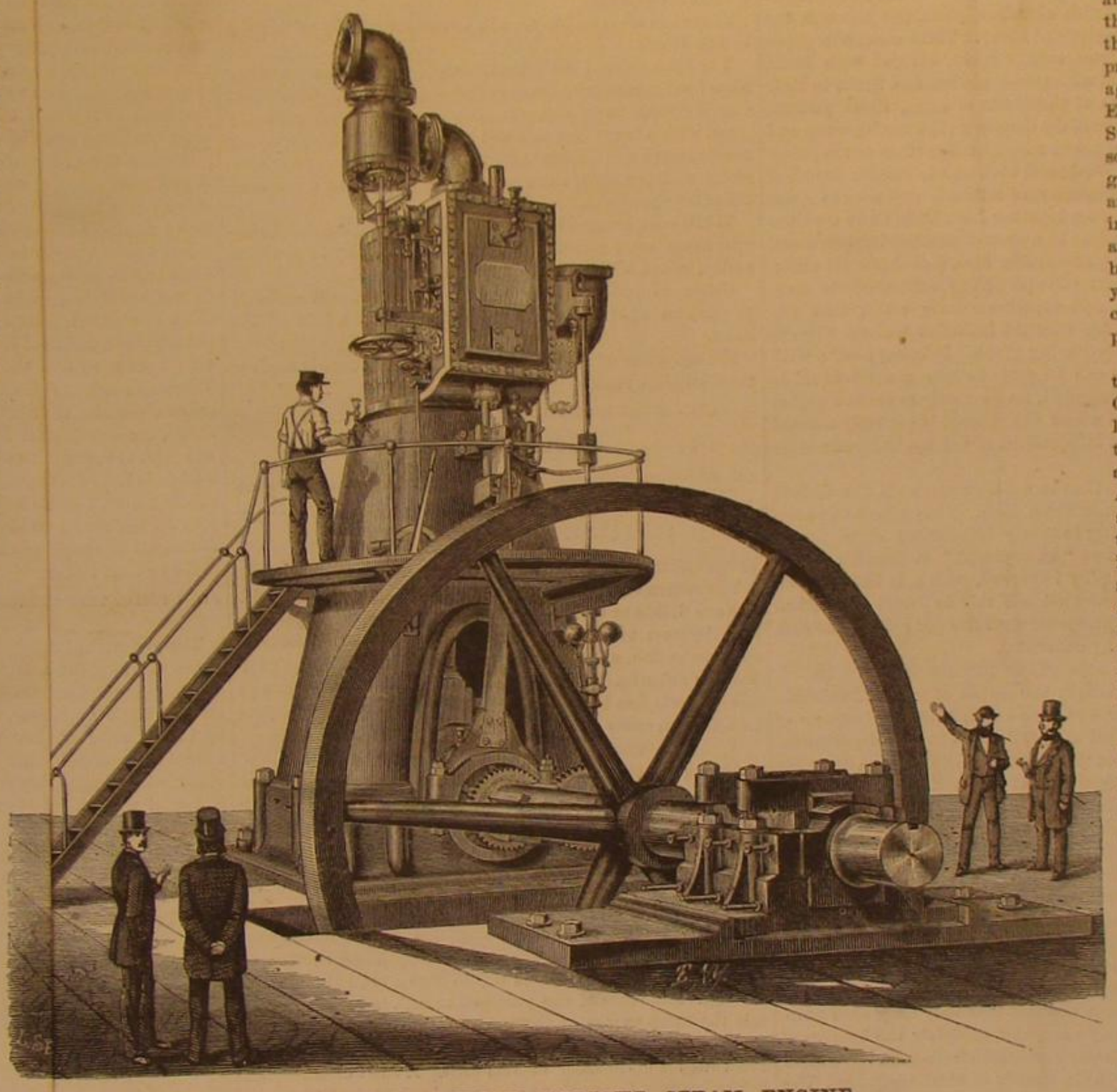
Improved Steam Engine for Rolling Mills.

The engraving is a fine perspective view of a new steam engine lately constructed at the Brooklyn Steam Engine and Boiler Works, for the Phoenix Iron Company—Messrs. Cooper, Hewitt & Co.—and now erected in their rolling mill. The machine is massive in its proportions, and presents a splendid appearance. We made, in company with a number of practical engineers, a critical examination of the engine on the occasion of its completion a few weeks ago, and the opinion then expressed was unanimous that it was a remarkably fine specimen of workmanship. It is fitted with the Babcock & Wilcox cut-off valve, of which we gave a detailed description in No. 17, Vol. XVII., first page, to which we refer our readers. The valves and connections are of course somewhat modified to suit the circumstances of the case. Those who saw the engine there described at the late fair of the American Institute will readily understand the operation of this.



THE BABCOCK & WILCOX UPRIGHT STEAM ENGINE.

An immense cast iron open pedestal sustains the cylinder, steam chest, and connections, the connecting rod and crank working inside the column near the bottom. The fly-wheel and spur-wheel are secured to the shaft by three massive feathers forged on the shaft, the intervals between which and lugs cast in the interior of the hubs are filled with hard wood wedges, intended to receive and diminish the jar and concussion to which an engine employed for driving rolls must be subjected. The fly-wheel is unusually heavy, weighing 55,000 lbs., and is 22 feet in diameter. Especial attention has been given to securing durability in the working parts, they being made as hard as will allow tool finish. The forgings are made of barrel metal, and the brasses of the best government composition. The crank-pin is lubricated by an automatic attachment acting through its center, and the slide-valve by a roller dipping in drip-cup. For the benefit of engineers we give the principal dimensions and weights:

Cylinder, 46 inches diameter by 10 inches stroke, with steam jacket and double lower valve chest, weighs, with steam chest, 10,910 lbs.; column connecting cylinder to bed-plate, 23,513 lbs.; cast iron bed-plate with outboard pillow blocks, 18,923 lbs.; eccentric, 32 inches diameter and 5 inches face; piston rod, 6 inches diameter with cross-head forged on; wrought iron crank, 2,130 lbs.; wrought iron shaft, 15 inches diameter, 16 feet 6 inches long, 17,007 lbs.; inboard journal brasses, 15 inches diameter and 15 inches long; outboard brasses, 15 inches diameter and 15 inches long. The total weight of the machine is 151,518 lbs.

The engine is calculated to make 60 revolutions per minute at a steam pressure of 80 lbs., and although so compact, of 1,200 estimated horse power which must be acknowledged as a remarkably good result when the dimensions of the machine are taken into consideration.

From the above, and the view of the engine given in the engraving, a tolerably correct idea may be formed of its massiveness, compactness and solidity.

REPORT OF THE ACTING COMMISSIONER OF AGRICULTURE.

The following selections from this public document will be found to be of general interest:

PROGRESS IN AGRICULTURE.

It is gratifying to note the evidences that are apparent even to the superficial observer of increasing interest of our people in the advancement of agricultural science—of the quickened mental activities of farmers, as shown by the widening demand for agricultural books, newspapers, and the reports of this department—of the disposition to experiment, test alleged improvements, and adopt labor-saving expedients—of the growing inclination to employ in agriculture money, business energy and active enterprise, which are so successfully employed in other departments of business.

In nothing is this intellectual activity shown to be so manifestly beneficient to the agriculture of the present era, as in the improvement of agricultural implements. In 1847, the number of agricultural patents granted was but 43; in 1863, it had increased to 390; in 1864, to 563; in 1865, to 642; while in 1866, the wonderful increase to 1,778 was made; and during ten months of the present year, the patent-office has issued no less than 1,777. Thus the number of agricultural inventions perfected yearly is now more than forty-fold greater than twenty years ago. Already has this nation surpassed all others in the excellence and variety of its agricultural machinery. Partially represented as was our agriculture in the recent world's exposition of industry, at Paris, and almost ignored officially in the national recognition of that great exhibition, our honors plucked from the field of European competition were almost exclusively industrial, and largely agricultural. So successful have been our farming implements in repeated contests on European soil, that their rapid introduction into foreign markets is only impeded by the greatly increasing demand at home. These improvements are rapidly revolutionizing the agriculture of the West, and reducing to the lowest minimum ever attained, the proportion of manual labor employed in its operations. As an instance, the reaper, first doing the labor of a half dozen, then a half a score of men, is supplemented with a self-raker, which does the work of others still; and now further to facilitate and economize the harvest work, the same machine is furnished with apparatus for instantaneous binding of the sheaves. And the further this labor-saving progresses, the higher the wages of harvest workers, the broader become the harvest fields, the greater are the profits of the farmer, and the more extensive become the garners of the world.

While adverting to these evidences of progress in American agriculture, it is proper to drop a word of dissatisfaction, and even utter a note of warning, in view of the improvidence and reckless waste which is stripping the fairest fields of their wealth of fertility, exposing them to the constant action of the elements, and subjecting them to an annual drain of the same constituents, none of which are ever returned to the soil. The department estimate of the average production of wheat in Ohio, last year, was about four bushels per acre; the State statistics, so far as returned, made the yield scarcely three bushels. None will doubt that it is more owing to bad culture and want of drainage than to the severity of the season that the product did not average twenty bushels. Every new Western State is remarkable for sounding reports of great crops of wheat, and the same States, in a very few years, are equally remarkable for reduction in yield of wheat, increase of insects, and prevalence of disease.

The freshest areas in this culture, east of California, will scarcely yield an average of twelve bushels per acre the present year. A systematic rotation, some attention to fertilization, greater care in the selection of seeds, better tillage, and more thorough culture, will alone prevent deterioration in products and real values of farm property.

This stigma upon American agriculture may be attributed in part to the cheapness of Western lands, the original price of which bears so insignificant proportion to their intrinsic value, that the owner erroneously deems it cheaper to remove to new lands than to sustain and increase the productive capacity of his present farm. One result of this fatal error, is the removal westward, year by year, of the center of wheat production, thus adding transportation and other charges to its ultimate cost, threatening to make difficult the future supply of our population, and to render export impossible.

The railroad interest has secured among other favors and franchises of the government, grants of public land, amounting to 184,000,000 acres, in aid of lines extending in all directions, to the borders of civilization, under the plea of furnishing facilities for travel and the transportation of the fruits of agriculture and the products of mines; and the results have been seen in extended settlement, and expanding cultivation: yet growing stronger, disregarding the general welfare, these monopolies have combined in their tariff of rates to discriminate unfairly against farm products, and to require much the larger portion of the value of the crops for their transportation to market. So onerous is this burden, that the cost of transportation of wheat from Chicago, and other Western centers, to the Atlantic cities, is greater than from San Francisco, via Cape Horn, to the same points. It is hoped that the attention of rural voters to this subject may ultimately correct this evil which proves so serious a drawback to their industry; but it can only be accomplished by untiring vigilance over State legislation, and by securing the enactment of laws that shall restrain these corporations from the absorption of the entire products of the farm, instead of allowing them to control the legislation of the country against the best interests of the people, and especially to the detriment of the consumer, who is made to pay tribute to this combination which breaks down a fair competition incidental to all other classes and associations in the business of life.

In this connection I desire to express the hope that Congress may devise and perfect some plan for facilitating the early construction of a ship canal for the transportation of

Western products from the lakes to the ocean, or for the building of a double track freight railway, open to all, forwarding on equal terms, and supported by an equitable system of tolls.

THE SOUTHERN STATES.

These States possess decided natural advantages over the Northern and Western sections in their ability to produce every article which may be grown in the higher latitudes, with the almost exclusive advantage of producing cotton, hemp, rice, sugar, and other products of the lower temperate zone. With longer shore-lines than any other section of the continent, facilities are furnished for coastwise and inland navigation to the whole tide-water area, which is endowed with a climate peculiarly adapted to market gardening, with forests abounding in the most valuable timber, and waters teeming with edible fishes and crustacæ. Florida is destined to be a winter garden, yielding market supplies to Northern cities without a risk of competition, and oranges, figs, and olives, and other fruits of semi-tropical climes. Between tide-water and the lower slopes of the mountains is a region producing wheat of a better quality than that of any section north of it, the entire range of farm products in great profusion, and such fruits as apples, cherries, and grapes, with certainty and success. The mountain region, almost unappropriated and unknown, at an elevation varying from 1,500 to 6,000 feet, is the great grazing section of the North America, sufficient to furnish abundant pasturage through the year to millions of cattle and sheep. These mountain slopes are generally free from surface rocks, covered with forest growths interspersed with grassy glades, and fertile to their summits. In bodies of thousands of acres, these pastoral areas await the advent of the dairyman, the wool-grower, and and the herdsman, at prices not exceeding those of the public lands of the distant West; and even on the eastern aspect of the Blue Ridge, in proximity to railroads and near to great markets, whole counties together have little more than ten per cent of their territory in a state of nominal improvement.

There are grounds for assuming, also, that this must ultimately become the great wine-producing section of the country; for observation and experience fully attest that the higher, colder, and more humid latitudes will not ripen to perfection the wine-producing grape. It being now a well-settled fact that wine can be made in this country equal to the best that can be imported, we have only to select a region of our great country where the climate is perfectly adapted to grape culture to be independent of the world for our wine supplies.

It appears that the Southern States vie with the distant West in extent of unoccupied land. They possess an area, not in farms, amounting to nearly 300,000,000 acres, nearly two-thirds as much more "unimproved" in farms, and less than 75,000,000 nominally improved, which is but thirteen per cent of the whole, and not half this in actual cultivation. It is safe to say that little more than five per cent of the area of the South is annually cultivated.

THE SEED AND PLANT DISTRIBUTION.

The distribution amongst the people of new and valuable seeds and plants appears to be one of the principal objects of Congress in the annual appropriations to the department. This has become a most delicate and difficult duty, for what is new in one country may not be valuable or useful in another; the most valuable of seeds or plants may be, in some sections of our own country, the most common varieties, yet unknown in other sections; and those which would be of the utmost value in one latitude might be worthless in another. Experience has fully shown that a change of seeds and plants from one section to another, has greatly improved the yield and quality. These results can only be attained by repeated and constant tests of the adaptation of the several varieties to soil and climate. New varieties are obtained whenever satisfactory evidence has been adduced that they have been properly tested; and the people are now enjoying the benefits of many new and valuable products which have been introduced into the country through the agency of this department. The crops of sorghum alone would more than compensate for all the money expended by the department for seed.

The total distribution of seeds for the year amounted to 1,426,637 papers. Of this number 352,000 were distributed through senators and members of the Thirty-ninth and Fortieth Congresses; 88,482 through agricultural and horticultural organizations; 164,953 to corps of statistical correspondents, in acknowledgment of valuable gratuitous services; 299,975 to individuals upon letters of members of Congress, or upon personal application, or in answer to letters from individuals; and 521,227 to the Southern States, under the special appropriation for that purpose.

The distribution of plants from the experimental and propagating gardens, from January 1 to May 6, 1867, amounted to 42,123, principally through senators and members of Congress, reaching every State and Territory in the country. The articles have consisted mainly of the smaller varieties of fruits, of which the grape has been in large proportion. The introduction of the best varieties of this valuable fruit, their adaptation to various climates, and for special purposes, has been prominently kept in view. The main purpose of the garden, that of testing the respective merits of new varieties, is still kept strictly in view, and all new varieties are procured as early as practicable, and the knowledge gained concerning them embodied in the department reports.

STATISTICS.

The work of the division of statistics has been various and laborious. A mass of ascertained facts, of foreign and domestic agriculture, with approximate estimates of current productions of the staples of the farm, will be found in the report of the statistician, condensed and systematized, with careful analyses and explanatory illustrations and comments.

For several years the estimates of production included only the Northern States, until people had become familiarized with aggregates representing the production of only a portion of the country. The incorporation of the Southern States in a grand summary of agricultural results, was doubly difficult, in view of the cessation of all regular agricultural order during the war, and its shattered and uncertain status on the return of peace. The wonderful agricultural progress of the distant Pacific States has complicated the difficulties of accurate compilation of the statistics of production. Yet, with the aid of a large corps of zealous and intelligent reporters, in all sections of the country, valuable results have been achieved in this branch of the department.

In comparison with 1860 the table of numbers and prices of farm stock exhibit a decrease of six per cent in horses, with a slight increase over the exhibit of the previous year. The heaviest loss is shown in the South; the most rapid recuperation in the West. Prices of horses have retrograded less than values of other stock during the year.

Cows appear to be increasing more rapidly than other horned cattle, as a result, in part, of the success of the associated dairy system.

Sheep, it is claimed, have nearly doubled in numbers since 1860, increasing from twenty-three to more than forty millions, and their wool from sixty to one hundred and fifteen millions of pounds.

There has been an increase in swine since 1860, principally in the West.

The farm crops of the present season, with some exceptions, have been more abundant that those of last year. The wheat crop, for three years comparatively small, has been generally good, with a large acreage and a moderate yield. Including the Southern and Pacific States, the returns, when fully complete, will probably show a total aggregate of more than 200,000,000 bushels.

While corn promised a large yield, with an increased acreage, there were serious local losses, principally in the Ohio valley, which will tend to reduce the estimates.

Cotton is yielding better than last year, and will probably produce an aggregate of more than two and a half million bales.

For estimates of the principal products reference is made to the statistical report.

Correspondence.

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

SUB-AQUEOUS AND OTHER TUNNELS.

EDITOR SCIENTIFIC AMERICAN:

The return of the inclement season when boats and vehicles are liable to be impeded by snow and ice, will probably lend interest to the consideration of additional methods of communication, especially between large cities and their immediate suburbs. The subjoined history of various tunnels and projects has been compiled with a view to call the public attention anew to the subject.

THE THAMES ARCHWAY COMPANY.

Among the earliest of the projects for sub-aqueous tunnels were those introduced under the auspices of the Thames Archway Company, of London, in the beginning of the present century. This corporation having obtained authority from Parliament, raised subscriptions to the amount of £200,000, and prepared in 1809 to construct a tunnel under the Thames river for carriages and foot passengers. The charter prohibited them from obstructing navigation, and the company started with the idea of operating wholly below the bed of the river. The first business was to bore a preliminary drift through the route of the proposed tunnel, in order to ascertain the exact nature of the soil and the difficulties, if any, that the builders would probably encounter. Richard Trevethick was the engineer of this drift. A shaft of nine-inch brickwork was first sunk on the south bank of the Thames to a depth of 76 feet below high water mark, and the drift was then extended horizontally, in a northerly direction, toward the opposite bank of the river. The drift was a temporary tunnel 5 feet high, 3 feet wide at the bottom and 2 feet 6 inches at the top. It was lined with a frame of 3-inch planks.

The drift was successfully prosecuted for a distance of 922 feet, which was further than the actual width of the river, the real width being 850 feet at high water and 649 feet at low water. The drift was purposely run out in various directions, diverging from the true line in order to test the soil, At the extreme end of the drift, before it had quite reached the opposite bank of the river, the engineer encountered a quicksand, and finally gave it as his opinion that the construction of the proposed excavated tunnel on that line was impracticable. He, however, suggested other plans for laying a tunnel which he considered entirely practicable. Other engineers were, however, of opinion that the original plan was practicable, notwithstanding the quicksand. The Directors concluded that in so novel and important an undertaking it was desirable, before adopting any plan, to endeavor to avail themselves of the best which the engineering talent of the country could suggest. They accordingly caused advertisements to be published in the newspapers, offering a premium of £200 for the best plan of construction, and a further sum of £300 when such plan had been successfully completed.

In response to this advertisement no less than fifty-four plans were submitted and were examined by two able scientific men, entirely disinterested, Dr. Hutton and Mr. William Jessop. Many of the plans had great merit, but all were, for various reasons, rejected except six; and of these the examiners finally selected as best of all, the joint project of Mr. Charles Wyatt and Mr. Hawkins.

We propose now to give a brief outline showing the nature of each of these six projects, which at that time, 1809, attracted great attention. The plans were presented anonymously to the company, and we are therefore unable to present the names of the projectors, except in some instances.

PLAN FOR A BRICK TUNNEL.

The tunnel to be of brick, a complete circle, 13 feet diameter, three bricks thick, having a carriage way 7 feet 9 inches between the curbs, a foot way on one side, lamps the other. As this tunnel would be buoyant, the projector proposed to cover and ram it six feet below the bed of the river, with clay In laying down this tunnel the projector proposed to form coffer dams of fifty feet length at a time, in the direction of the tunnel, the walls of the dam being formed by driving down piles; the spaces between the piles to be filled with prisms of wood and the whole carefully calked; the bed of the river to be then excavated and a section of the tunnel built. While this was going on another section of dam to be put down. The piles to be sawed off even with the river bed on completion of each section.

PLAN FOR A CAST-IRON TUNNEL.

This plan was by R. Trevethick, the distinguished engineer, to whom is due the credit of the high pressure steam engine. This tunnel was to be 12 feet in diameter, composed of cast iron slabs each 6 feet long, joints to be calked. The method of laying down was to excavate the bed of the river from within a set of piles driven down within a movable coffer dam. The movable dam or caisson to be 50 feet long, 18 feet wide, 40 feet deep, made of 12-inch square logs, fastened with trunnions and calked. The caisson to be provided with two water-tight compartments, to float the whole machine. A sufficient weight of ballast to be used to sink the caisson when water is admitted to the compartments. The caisson being floated to the desired position, plugs in the compartments are withdrawn, water is admitted, and the caisson sinks and its bottom rests upon the bed of the river. Guiding frames are then arranged within the ciasson, piles driven, a ditch or channel for the tunnel excavated, the tunnel plates put together, and the excavated earth rammed down upon the tunnel even with the bed of the river, as fast as completed. When as much of the tunnel is complete as the length of the caisson permits, the latter is floated and moved one length ahead, the mouth of the tunnel being first stopped with clay and piles to prevent ingress of water. The water within the caisson is to be drawn off by boring an opening down into the existing drift, described in the first part of our subject. This plan for building a tunnel was highly commended for its ease of execution, simplicity and cheapness. Brick, if preferred, could be used instead of iron.

PLAN FOR A TEMPORARY CAST-IRON AND PERMANENT BRICK TUNNEL.

The projector of this plan proposed first to lay down a tunnel of cast iron, to be laid in a ditch dredged in the bed of the river. After the iron tunnel wss completed he proposed to construct a brick tunnel by boring, the line to be deep enough to insure solid ground, below quicksands, etc. The iron tunnel he proposed to construct of separate cast plates, provided with flanges, and secured together with bolts. The laying of the tube was to be accomplished by means of capacious iron diving bells fitted with the means for convenient access of men and materials, air pipes, etc., operated by steam engines. It will be seen that the American patents granted for cast iron tunnels screwed together were anticipated in England more than fifty years ago.

GROOVED STONE TUNNEL.

This plan provided for the laying of a stone tunnel 30 feet in diameter, the edges of the stones to be tongued and grooved, and joined with water-proof cement. The stones to be carefully prepared before being brought to the river. Movable coffer dams were to be employed, within which a ditch was to be excavated and the tunnel constructed. The bottom edges of the dams were to be provided with a flexible curtain of tarpaulin, to prevent bottom leakage. The tunnel was to be two feet below the bed of the river, covered with clay, well rammed. This plan is somewhat similar to Trevethick's, before described.

A TUNNEL OF BRICK OR OTHER MATERIAL.

This plan provides for a tunnel to be laid like the foregoing in a ditch to be opened by means of a coffer dam. The tube to be covered with earth after construction and rammed so that the bed of the river directly over the tunnel will not be elevated. The chief peculiarity was in the construction of the dam, which was to be 90 feet in diameter, made up of stave logs a foot square, the bottom ends of the logs to rest on the bed of the river. Stability was to be given to the staves by means of internal hoops. After one section of the tunnel had been completed the dam was to be taken apart, moved along, and erected for the building of a new section.

PLAN FOR A WOODEN TUNNEL.

Apparently the cheapest of any of the plans, and perhaps the most easily executed was another of Trevethick's designs, for a wooded tunnel, 16 feet in diameter. The drift previously constructed by him was to be used for drainage of the wooden tunnel.

"The cut across the Thames is to be made beneath the water by a steam ballast raising engine 24 feet deep below the bottom of the river, and wide enough to receive the wooden tunnel, and with its sides sloped in an angle of about 45°. This cut is to be nearly horizontal at the middle of the river, but declining about 6 inches toward the south, for delivering the water from the road down into the drift; the remaining parts at each side are to be inclined one foot in fourteen, which is about the degree of inclination of the bottom of Holborn hill.

This slope will ascend to the surface at the south side about 100 feet south of the shaft, and at the north side about 150 feet north of Queen street, in the field adjoining to the Commercial Road; making the total length of the tunnel about 2,010 feet.

All the earth that is above low water mark may be removed with spades.

The wooden tunnel, for which this cut is to be prepared, is to be made of elm, in lengths of from 180 to 200 feet of six-inch plank, placed two in thickness, or in two layers, laid so that the joints shall be covered by the planks in the other layer, fastened together with trennels, hooped outside with iron, calked, pitched, and made water tight like a ship. The hooping to be put on in a spiral form, with the spirals two feet asunder.

The ends of each length of the tunnel are to be made to fit into each other, or to be put together with cast-iron ferrules, of 6 feet long, similar to the joints of a flute.

Each of these wooden cylinders will weigh about 200 tuns, and may be moved in water nearly as easily as a loaded barge. As many of these cylinders are to be prepared as will extend from side to side of the river above low water mark, when joined end to end, which will be about 1,340 feet. From each end of the wooden tunnel to the entrances, the passage is to be left at intervals open to the surface, to admit light, and is to have both its sides and bottom constructed of brick work 18 inches thick. This part will extend about 670 feet (at each side), and will complete the tunnel from the surface at one side of the river to that at the other. Staircases for descending into the tunnel are to be formed at each side; the interval of the tunnel between these, which will be about 876 feet, must be lighted by lamps always; the remaining 464 feet (at each side) will receive daylight through apertures made like wells from the surface, at intervals of about 30 feet from each other.

After the cut is excavated, piles are to be driven at its eastern side, about 60 or 70 feet asunder, to guide the wooden tunnel into its place. Then the wooden cylinders (which are intended to be made near the Surrey Docks) being ready, are to be rolled into the docks from the banks, and to be towed to the cut, a little before low water, when there is little or no tide, being previously loaded with rubbish sufficient to sink them, but kept buoyant by empty casks attached to them. Here they are to be placed across the river, resting against the piles above mentioned, their ends to be joined into each other and to be drawn tight together by a rope and chain put through them from end to end.

At extreme low water the lashings or cords are to be slipped from the casks, and the cylinders are to be let to sink altogether to the bottom of the cut, which is to be then filled up with strong clay, well rammed down, even with the bottom of the river. A hole is then to be bored into the bottom of the tunnel from the roof the drift (which is to be previously dug beneath the cut), to let the water down from the tunnel to the well of the steam engines.

When the tunnel is drained it will have a great tendency to float, but having an average of eight feet of clay above its top, with the weight of the road inside, its buoyancy will be overbalanced. If, after a number of years, the wooden cylinders decay, they may be easily replaced by putting cast-iron cylinders, one inch and a quarter thick inside; and if any difficulty is found in letting down the whole of the cylinders at one time, they may be put down separately, and afterward be joined together beneath the water.

ESTIMATE OF COST FOR 1,340 FEET AND THE LAYING THEREOF UNDER THE RIVER.

Cutting from low water mark to the first light well at both sides, 690 feet long, 80 feet wide at top, and 26 deep, about 45,000 tuns, at 2s.	£4,500
Cutting from said light wells to each entrance, 640 feet long, about 30 feet wide, and 12 deep, estimated at 6,500 tuns, at 1s. 6d.	487
Wooden tunnel, 1,340 feet long, 16 feet diameter from out to out, 1 foot thick, estimated 94,470 feet, of rough elm, or 2,362 loads, at £7 per load	16,534
Making, calking, and paving the tunnel, at £2 per load	4,724
Hoop iron for ditto., half-inch thick, and 3 inches wide, 150 tuns, at £30.	4,500
Covering the tunnel with 60,000 tuns of clay, at 1s. per tun	5,000
Piles and sundry other timber for the works	500
Bringing and fixing, the wooden tunnel in its place, with ropes, anchors, boats, etc.	500
Keeping the engine at work one year, attendance, agency, etc. at £50 per week	2,600
Incidental charges, 10 per cent on the whole amount	5,400
Total	£42,745

To be continued.

Oil Well Pumping.

MESSRS. EDITORS:—In your issue of December 14th, page 370, appears a communication, signed M. R. M. Robinson, Franklin, Pa., concerning oil well pumping, and his experiments and experience in that line, and which he concludes by asking for information, etc.

Allow me, through the same channel, to say that Mr. Robinson's assumptions of what constitutes a vacuum and its effects in his or any case are simply wrong and absurd, and I am surprised that your responsible editor should publish it, in its present form, without remarks or corrections, and for the reason that they are contrary to natural laws.

Mr. Robinson states, that he has, in his oil well, placed his seed bag one hundred and thirty-one feet above the bottom of his tubing, where his pump chamber is located, and assumes that the well fills up to the seed bag with water and oil, when not pumped; and that the well is air tight below the seed bag. He also asserts, that when he has pumped the water until its surface in the well has fallen, say thirty-five feet below this seed bag, that a perfect vacuum is formed; and consequently he cannot lower the water by pumping, but must have still remaining in the well, outside the tubing, the balance of this column of water and oil standing ninety-six feet above the bottom of the tubing, and that he cannot secure the oil which remains above the water in this column until he has supplied this vacuum of thirty-five feet with air or water which he admits through the half inch pipe, which pipe extends from the top of the well down, and just through the seed bag, and communicates with the well at this point below the bag. Now, this statement of facts is simply impossible, and for the same reason as first stated, and as will appear.

The offices of a pump are two-fold: the first is to lift the weight of the atmosphere from or off the column of water below it, and which is about fifteen pounds per square inch; and, secondly, to lift the superincumbent weight of water above the pump.

In thus lifting the sucker valve, a vacuum is formed beneath it by this removal of the atmospheric pressure; and if the surrounding water is open to the atmosphere with its pressure upon it, the water will thereby be forced into and up the pump, and will follow this sucker upwards until the weight of this column of water within the pump shall have attained the limit of fifteen pounds to the inch, when the column will cease to rise further, and it will remain just balancing with the atmosphere without. The sucker may be raised as much higher as one pleases, but the water will not follow it. Should the water or oil be heavier or lighter than fresh water, the hight will be more or less in the same proportion—fresh water raising about thirty-three feet at the ocean level.

Again, if the outside pressure of the atmosphere be impeded or removed, then the water within the pump will be raised less or not at all, as the case may be. Now, if by pumping his well, he can produce a vacuum, it must be the same within the pump as in the well outside the tubing; and as the water will find its own level with the same surroundings, it follows that, even with a perfect vacuum, the water or oil will flow into the pump, and fill it, so long as the surface of the water outside the tube is two feet above the bottom of tubing; and if it is but one foot above the bottom, it will stand the same hight within the pump, and the sucker in descending into the half filled pump will produce a thumping concussion, and continue to thump so long as the pump chamber is partially filled at each stroke.

If, however, the small pipe be opened, and a supply of air admitted to the well, and the pressure of the atmosphere therein restored, then the water and oil will be forced into the pump to its full capacity at each stroke, so long as there is a supply of either within the well to reach the lower end of the tubing.

If the letting down of water by the small pipe increases the flow of oil, it is from some other cause than that named by Mr. Robinson, and probably may be accounted for by the washing and floating down the oil from the sides of the well and from the crevices and small reservoirs which have been left full by the receding column in the last pumping; on no other hypothesis can the advantages of his "Fresh Water Washing Down" be accounted for, and on no other grounds can it be more advantageous than the admission of air, while the water makes just so much more work for the pump to lift it out again. The query which concludes his article is too inconsistent to need comment, when his statement in the same is so definite and plain.

I trust this will be acceptable, and received in the same spirit with which it is written, and that is to correct error, and to answer the communication referred to.

Albany, Dec. 10, 1867. HORACE L. EMERY.

The Warming of Cars.

MESSRS. EDITORS:—When reading the account of the terrible accident of the 18th inst., on the Lake Shore Line of railroad at Angola, it appeared to me to be the imperative duty of every newspaper of respectability to raise a voice for heating cars by hot water instead of stoves. Statistics appall one when we realize the horrors arising from fire in such cases as the accident spoken of. N. F. P.

APPLICATIONS OF ELECTRICITY AS SEEN AT THE PARIS EXPOSITION.

The following notices are from the correspondent of the *Nation*, and form an interesting group of paragraphs concerning electricity, although few of the inventions are new in this country. Most of them have been long in use here:—

THE METEOROGRAPH.—This is an apparatus destined to register meteorological phenomena, by means of graphic curves traced upon paper, the movement of which is registered by clock-work. It was invented by Father Secchi, director of the Observatory at Rome, Italy, and occupied a conspicuous place in one of the principal streets of the Palace. It was constantly at work, and was deemed worthy of a grand prize by the jury of awards. There were two prominent faces to the apparatus; one of them was surmounted by a clock, and provided with a paper tablet on which were registered automatically the indication of the barometer, the wet and dry thermometer, and the hour of rain. This roll or tablet of paper would finish its course in two days and a half, and present well developed curves, the study of which would give all of the details of the phenomena, especially the sudden changes during storms. The second face presented a tablet on which was registered the force and direction of the wind, as well as the indications of the metallic thermometer. This roll finishes its course in ten days, and its principal advantage is to present a *résumé* of the variations of the elements in the way to permit of an easy comparison. The manner in which the various instruments are connected with a galvanic battery is too complicated to admit of a detailed description without the aid of diagrams, but a general description may enable the reader to form a clear conception of the ingenious invention. A properly counterpoised piston floating on the mercury in the barometer, with pencils attached, and applied according to the parallelogram of motion, gives the curves on the tablet. The psychrometer consists of two thermometers, with dry and wet bulb. The thermometers are open at the top, and at the bottom have platinum wires fused into the bulbs to connect with the battery. Two platinum wires, supported on a frame which moves vertically, enter the capillary tubes of the thermometer, and can be plunged at any moment far enough to touch the mercury and thus establish the circuit with the battery. The clock sets in motion every quarter of an hour a little chariot, on which is a miniature Morse telegraph, and which marches back and forth recording in the neatest manner the variations between the wet and dry bulbs, and the moisture of the air. The hour of the rain is marked by the movement of a magnet attached to a wheel provided with buckets and placed on the top of the house. The quantity of the rain is measured by the indications of a float in a suitable reservoir in the basement, and is also automatic in its motions. The direction of the wind is measured by four telegraphs—the force of the wind by peculiar hemispherical wheels or capstans. The battery employed was a modification of Daniell's which only required the addition of a little water and sulphate of copper every month. A similar apparatus had been in operation for nearly seven years at the Observatory in Rome, and bound volumes of the observations taken during all that time were exhibited in Paris. The cost of the apparatus was $10,000, but it was unnecessarily luxurious in its appointments, and similar ones could be manufactured on a large scale, in a similar style, for one-fifth of that amount. It was a matter of regret among Americans in Paris that the automatic registering and printing barometer of Mr. G. W. Hough, which is in operation in the Merchants' Exchange in New York, was not sent to the exhibition, for comparison and criticism. It is now universally admitted that only by automatic instruments can we ever hope to solve the question of storms and other meteorological phenomena, and therefore all the inventions of this character must be studied and compared before we can hope to see any particular form universally adopted. Father Secchi's ingenious apparatus was pronounced by competent judges to do its work thoroughly and well, and we should be glad to see it introduced into this country.

ALARM THERMOMETER.—In the agricultural department was a self-regulating and alarm thermometer, constructed upon a plan similar to the one adopted by Secchi. A platinum wire is fused into the bulb, and a second wire inserted at the degree to which it was proposed to raise the temperature in a hot house or other building, and both wires were connected with a battery which drove a magneto-electric machine so situated that it could be seen at all times by the director of the establishment. In this way control was kept of the temperature, and any neglect on the part of servants at once noted.

ELECTRIC LIGHT FOR LIGHTHOUSE ILLUMINATION.—The English had a lighthouse of the natural size, the illumination in which was obtained from electro-magnets driven by a two-horse power engine. This light was visible at night from nearly all parts of Paris, and was of dazzling brilliancy. The value of this application for lighthouse purposes consists in the intensity of the light. The light is condensed into the smallest possible space, and, while it is not diffused enough for photographic purposes, excepting near by, its intensity exactly adapts it to be seen at great distances. An oil flame would require to be two thousand times larger to produce the same amount of light. The cost beyond the wear and tear was stated to be the fuel required to raise steam for the small engine and the carbon points used in the burners.

AN ELECTRIC PIANO.—A piano driven by electricty was certainly a novelty. The instrument was in the section of machinery, and looked exactly like an ordinary upright piano. It was provided with a key-board, and could be played upon in the ordinary way, or attached to a battery and made to work by electricity. It was the invention of a Swiss, familiar with the construction of music boxes, and was suggestive in its form of that class of instruments. There was a long metallic barrel driven by clock work, over which revolved a piece of thick pasteboard in which the musical notes were cut. Resting upon the pasteboard were teeth or copper pointers just like those in a music box, each one of which corresponded with the notes of the piano. The pointers were pressed down upon the barrel by springs, and were connected at the other end with a galvanic battery. As long as the pasteboard intervened between the end of these pointers and the revolving barrel, the current was broken and no notes are struck; but as often as the pointer came over a hole cut in the paper, it was thus brought in contact with the metal of the barrel, and the connection in the circuit was established and a note struck on the piano. By bringing these holes opposite the proper pointers, and at distances to correspond to the time of the piece, a complete tune could be played. The papers with the notes cut out looked like a pattern for weaving. Several pieces of music were performed by electricity, and the time and expression were so well imitated that any one would have supposed that the instrument was being played by hand.

MAGNETO-ELECTRO MACHINES.—There were several machines of this character, for which it was claimed that they could replace the ordinary galvanic battery in most operations, as, for example, telegraphing, electro-plating, and electric-light and it was asserted that they could be used as a motive power. For some unexplained reason, none of these machines appear to be successful. They looked well as specimens of workmanship; they were ingeniously contrived; they were theoretically correct, but in practice they do not secure the confidence of the public. The electro-magnetic company of Birmingham claimed for their motor that it could replace steam, especially where the force required was small, that the cost was the same as that of steam power, without danger of explosions. The price of a one horse power was two

hundred and fifty dollars. Some of the magneto-electric machines were so covered up that it was impossible to study their interior construction. In all of them the principle of the revolution of helices around magnets appear to obtain.

ELECTRIC ATTACHMENT TO LOOMS.—In case a thread broke in weaving, the fact was indicated by the violent ringing of a bell, and the stoppage of the machinery, all by automatic motion, and through the aid of a battery. The same attachment could have been applied to any other machine as well as to a loom.

ENGRAVING BY ELECTRICITY.—There were inventions of this character for copying in fac-simile any pattern whatsoever. One arm of a pointer moved over a picture, and the other over a lithographic stone or a metal plate, and the cutting instrument, by making or breaking the current of electricity, was made to cut or to pass over the plate, and to repeat the shading and depth of any original picture. There were several instruments of this character which apparently did their work well.

ELECTRIC CAR BRAKE.—The engineer is able to put down all of the brakes on a train of cars at the same moment, and to stop the train very suddenly by simply placing his thumb on the key which makes the connection with the battery. There were large cars with this attachment, and the whole thing worked well in the model.

ELECTRIC CAR SIGNAL.—In case the cars were broken asunder the fact would be instantly communicated to the engineer by the ringing of a bell.

ELECTRIC CLOCKS were as numerous as the ordinary timepieces—in fact all the clocks on the towers appeared to be driven by electricity, and they consequently kept uniform time.

CASSELLI'S TELEGRAPH.—This instrument was one of the greatest curiosities in the Exhibition. It represented in autograph the message of the sender. If instead of signing your name to a dispatch you were to make a skillful portrait of yourself with a peculiar kind of ink, an exact copy of the same would be sent. Writing, pictures, patterns, and autographs could be transmitted by this machine with entire accuracy, and if the apparatus was to be attached to the electric engraving machine previously mentioned, the dispatch could be engraved at the distance of a thousand miles from the original copy. A pointer moving over magnetic ink, by making and breaking the circuit, was made to repeat it in fac-simile whatever was put under it. It was all the same whether it was plain writing, a drawing, a pattern, or a picture. The electrograph of Lenoir was a modification of Casselli's, and appeared to work very well. We saw numerous pictures copied by it.

ELECTRIC SIGNALS of all kinds were exhibited. To announce that a switch was wrong, that the draw was open, that the down train had not started, that there was danger ahead, was all practically arranged. For use in the house there was no end to contrivances. If the servant did not answer the bell, the bell would keep on ringing all day and all night until it was attended to. If a burglar entered a door or window, his approach would be annonnced by a lusty ringing of bells. If the water was too low in the boiler, ding dong would go the bell. If the house was growing cold, the mercury would sink in the thermometer and again the bell would ring.

ELECTRIC GAS LIGHTING.—There were contrivances for turning on and off gas by electricity, lighting any number of burners at the same instant of time. By connecting this with the burglar alarm telegraph, the opening of a door or window would set the bells ringing and light all the burners in the house at the same instant.

THE CHRONOGRAPH.—For measuring short intervals of time no instruments have been devised at all equal to those in which electricity is employed. A most important instrument was exhibited by Professor Glassner, of Liège, for measuring the velocity of a cannon ball by recording the interval of its passage from one point to another. The ball in its flight was made to break copper wires placed on its track at measured intervals, and the breakage of the galvanic current was recorded upon a revolving cylinder in a way to indicate the smallest fraction of time. The variation in the velocity of the ball from the commencement in the cannon until it was spent was accurately measured in this way. The same instrument was adapted to the measurement of time in all other observations, the record in all cases being made by electricity.

ELECTRIC MIRRORS.—In order to attract larks in hunting it is customary to have revolving mirrors. But the machinery hitherto employed has rather served to frighten away the birds. Electric mirrors were exhibited which were claimed to be perfect in their way.

ELECTRIC SAFETY LAMP.—The danger of explosions in coal mines from the careless use of Sir Humphry Davy's safety lamp has been frequently demonstrated. It is proposed to obviate this danger by the introduction of a lamp composed of Geissler tubes properly protected by wire and driven by a small Ruhmkorf coil and battery carried in a knapsack on the back of the workman. These tubes have the air pumped out of them and the light comes from a constant stream of electricity passing from one end to the other. If the glass breaks, no fire can be communicated to the outer gases, as the connection with the battery is broken at the same instant and no spark can pass. This kind of a lantern could be used by travellers for reading at night on the railroad, as the whole apparatus can be carried in a carpet bag and can be easily suspended from a hook.

TESTING IRON BY MAGNETISM.

It is well known to engineers that it is a most difficult and often impossible thing to find out the existence of a false weld in a forging, or of a blow hole or honeycomb in an iron or steel casting. The only safe way of doing this is by carefully measuring the elongation of the piece under a given load, as with a false weld all the work is thrown on the diminished area at the defective weld, and the thicker parts are scarcely extended by the force which is perhaps rupturing the bar at the flawed spot. It need scarcely be said that there are many important cases where this process, or the equivalent, but dangerous one, of trying the effects of an impulsive force, could neither be mechanically nor commercially practicable. Every one knows that a simple method by which internal flaws and solutions of continuity in constructive details could be easily detected would be of enormous value to the world. Such a method, says the *Engineer*, has undoubtedly been discovered by Mr. S. M. Saxby, R. N., who has very judiciously been allowed by the Admiralty, during the course of this year, to experiment with it in the royal dockyards. Though comparatively new, and not yet completely worked out, the process will possibly have a yet more extended application than finding out only mechanical flaws in iron, and possibly in cast iron and steel.

The principle upon which this method is founded is so simple that it certainly seems strange that it had previously escaped notice. It has been known for nearly a century and a half, that when a bar or any mass of soft iron is placed in the position of the dipping needle, it is at once sensibly magnetic; the lower extremity being a north pole in our latitudes, and the upper extremity a south pole. In the southern hemisphere the poles are of course reversed. The same action, only weakened, takes place in a bar hanging in a vertical or any other position; only the effect is weaker the more the position of the longitudinal axis, for instance, a long bar, departs from that of the magnetic dipping needle.

When a small compass needle is slowly passed in front of a bar of very good iron, placed in an east and west direction, the needle will not be disturbed from its proper direction, which is of course at right angles to this, or north and south.

But this is true only with homogenous bars of best quality—to bars without any mechanical solutions of continuity. With internal flaws or interruptions of continuity the bar is no longer regularly magnetic. It has long been known that a good compass needle, or a good permanent magnet, must be homogeneous and without flaws in order to take and retain its maximum amount of magnetism. In a word, any mechanical solution of continuity is accompanied with a polar solution of continuity, and the given bar or mass with flaws—whether permanently magnetised or temporarily so by the inductive action of the earth—is no longer one regular magnet, but severél different magnets, with the different magnetism separated from each other. The delicately-poised magnet of a compass can thus be made to tell the presence of such solutions of continuity.

In making tests, practically, the bar is placed in the equatorial magnetic plane, or east and west. On moving the magnetic needle in a line parallel with the axis of the bar, as long as the iron is sound, the position of the needle is east and west; but on the recurrence of a flaw the latter deviates more and more until entirely reversed, when placed over the imperfect spot.

By the enlightened permission of the Admiralty Board, Mr. Saxby, as stated, has already been allowed to test his method in various ways in the royal dockyards of Sheerness and Chatham, and we will describe some of the practical results of these experiments. Amongst these were a number of very remarkable trials conducted in the presence of the master smiths, the foremen of the testing houses, and several of the chief engineers of the royal navy. Mr. Saxby, for instance, was requested to find out the weakest spots in a number of bars, and to tie a string or make a chalk mark on each spot. Immediately afterwards all these bars were put into the testing machine and broken, the prediction in every case being verified.

The smiths of the royal dockyarks seem to have properly tried Mr. Saxby's powers in almost every possible way, and most ingenious devices were sometimes resorted to for the purpose. As examples out of many, in the center of a bar of 1 inch square forged iron, was welded a piece of unmagnetised steel about 5 inches long. The needle detected a fault at about the center of the piece of steel.

A bar welded together out of a piece of bowling and a piece of common iron, had at about its middle a drilled hole, into which a magnetised steel pin had been riveted. The compass magnet soon found out the pin, the difference in quality of the two ends of the bar, and also an unsuspected fault at the end. A bar of round iron was brought to him painted over; it had been "jumped together" in three different pieces and qualities of iron—a bar worked up out of scrap of galvanised iron, another of common iron, and the third of bowling. The needle detected very unequal qualities, the verdict being that the bar was unfit for being manufactured into any article.

In another case, in which Mr. Saxby's experiments were carried out in the presence of a large number of naval chief-engineers, he put down in writing the results of his magnetic examinations, in order that they might be subsequently compared with what was known as to the actual quality of each bar. A bar, one and a quarter inch round, and three feet eleven inches long, was pronounced by the compass needle as being not of the same iron throughout, and with a south end better than the other. It was then stated by the master smith to have been made up of pieces of good and bad. A rather shorter bar was found to be good iron, but doubtful in condition; it was afterwards explained to be "uncertain," and on testing it in the machine it was stated to be "crystallised." A third piece was found to be of very good iron, but with slight irregularities; the smiths stated it to be scrap iron, and the best to be got in the shop. Two pieces of five-eighth inch manufactured iron were discovered to be not good. Another piece of one and a quarter inch bar was found to be good iron, though made of different qualities—it had been afterwards annealed. With another bar, to Mr. Saxby's written question whether it was not steel, it was answered that the bar in question was a near approach to steel, being a piece of galvanised wire rope welded up. To the remark that another bar was unfit for use he was told that it had been twisted round when at a low heat, and then hammered cold. Some singular proofs of the power of magnetic testing over the ordinary methods of determining quality and condition of iron have been shown. Pieces of iron brought for testing by most able and experienced master smiths, of such quality as would be selected for the most important work, have, on being tested, been marked at spots as defective, and on cutting have accordingly been found at those spots to be partially fibrous, partially crystallised.

The following experiment was made in order to throw light on an important practical question in smiths' work: A round bar 17½ inches long was specially worked, and had been brought to be tested without anything of its history being known to Mr. Saxby. He found that in the middle of its length it was seriously faulty, and even unfit for use. He was then told that the bar, though solid, had been "upset" in the middle of its length, and then hammered down to its original diameter at a temperature below welding heat. This will be held to confirm the opinion of good workmen that "upsetting" should be done at a temperature as near as possible below that of welding.

Mr. Saxby has not yet been successful in testing rolled plates for lamination. In these, again, the neutral, or zero lines, should run at right angles to the dip in a homogeneous plate; but the more complex structure of the plates has made the investigation more difficult. Another difficulty doubtless consists in the fact that the usual shape of a plate does not allow the magnetism to separate itself in such a marked way as in a bar, usually longer by many diameters. The investigation, with a resulting perfect method, can scarcely be said to be completed in this direction. The chief difficulty at present seems to be that the internal structure is too irregular.

Up to the present but few experiments have been made with steel, and very few with cast iron; those already made have, however, been satisfactory. Any difficulty that might be supposed to attend the presence in wrought iron of what is termed by the Astronomer Royal sub-permanent magnetism is easily overcome. A few taps on the end of a bar of wrought iron, when lying east and west, sufficient to cause vibration, would demagnetize it, and leave it in a fit state to be examined by the needle; and polarity subsequently found would indicate either a steely nature of the bar or inferior iron.

Some brief considerations will now determine the value of Mr. Saxby's invention to engineers, whether for trying new work of all kinds, or even working details in a suspicious state. In estimating the value, in the widest sense of the term, of any wrought iron forging, three qualifications may be considered as governing: (a) Its limits of elasticity, or the amounts it will yield in any given direction without taking permanent sets; (b) its ductility, or the permanent alteration it will take before actual rupture; and (c) its ultimate resistance, or the amount of the load it will stand, per original unit of cross sectional area, before actual rupture. These three qualifications, in a complete forging, are evidently—1st, The absence of defective welds, or of large solutions of continuity in the mass; 2d, the absence of smaller flaws or solutions of continuity—either due (a) to the presence of scoria or slag, causing what are termed "greys," or small flaws, either parallel or across the longitudinal axis of a bar, or (b) to cracks (often unsuspected) caused in the working when portions of the forging are too cold; or (c) to actual separations at the facets of the elongated crystals of which iron always consists, and due to loads of whatever kind beyond the elastic limit; 3d, the chemical constitution of the bar—such as its freedom from phosphorus, sulphur, arsenic, silicium, manganese, etc. (apparently everything but carbon in small quantities)—originally governing its mode of crystallization, and hence more or less its elasticity, ductility, and ultimate resistance to rupture. Now Mr. Saxby's method can detect the presence, and negatively of course the absence, of small or large solutions of continuity. It can detect false welds, smaller flaws caused by bad workmanship or wear, and, we believe, what is commonly termed "crystallization," which will, probably, once be generally acknowledged to consist in a disruption or parting of the facets of the amorphously arranged crystals of which iron is built up. It can, of course, only detect the results of the chemical constitution of iron, as evidenced in the less perfect cohesion of the crystals when alloyed, in relatively considerable quantities, with foreign bodies. There is little doubt that the magnetic method is a test of the homogeneous character of the iron and of its freedom from fissures and cracks, and so far it undoubtedly forms a test of quality. It will appear scarcely credible that a common pocket compass needle should be able—almost like the divining rod said to be used for finding out springs of water—to discover important defects in large iron bars. A mere statement of the fact does sound almost incredible until the simple means actually employed are explained.—*Engineer*.

Improvement in Sheep Shears.

The advantages of these shears over those ordinarily used are apparent at a glance. A movable cutter, A, is pivoted to the face of the stationary cutter, B, which is divided into fingers or bars, each one presenting a cutting edge to the action of the movable blade. A slot in the free end of the spring handle, and a screw in the end of the vibrating cutter, with a stop, C, on the opposite side of the plate, B, governs the throw of the blade. The forks of the plate readily enter the matted fleece, thus facilitating the operation of shearing, and the action of the blades insures a drawing cut requiring less power, and producing a cleaner cut than the ordinary shears. The form of the cutter and its throw can be regulated to suit any hand. These shears are also well adapted for shearing horses.

RALSTON'S PATENT SHEEP SHEARS.

Patented by John Ralston, June 4, 1867, who may be addressed for rights, etc., at Slippery Rock, Butler county, Pa.

THE SCIENCE OF EXTINGUISHING A FIRE.

Accounts of experiments showing that violent conflagrations may be extinguished by very small quantities of water, by means of buckets or small hand pumps. By M. Van Marum: The flame of any burning substance must cease, according to well known principles and experiments, as soon as any cause prevents the atmospheric air from touching its surface; thus, when a small quantity of water is thrown upon a body in a state of violent conflagration, this water is at first partly reduced to vapor, which, rising from the surface of the burning substance, repels the atmospheric air, and consequently represses the flame, which, for the same reason, cannot again appear whilst the production of the vapor continues.

From experiment it appears that the art of extinguishing a violent conflagration with very little water consists in throwing it where the fire is most powerful, so that the production of vapor from the water, by which the flames are smothered, may be as abundant as possible; and in proceeding to throw the water on the nearest inflamed part, as soon as the fire ceases in that where you began, till you have gone over all the burning parts as expeditiously as possible. In thus regularly following the flames with the water, they may be everywhere extinguished before the part where you began has entirely lost, by evaporation, the water with which it was wetted, which is frequently necessary, to prevent the parts from taking fire again; after the flames of a burning body are extinguished, it cannot again take fire, for the above-mentioned reason, till all the water thrown upon it be evaporated.

Being convinced that very little water may suffice for extinguishing ordinary conflagrations, particularly at their commencement, I have endeavored to convince many of my fellow citizens of it by repeated experiments; and I have advised the procuring of small portable engines to be used in cases of necessity. One experiment was the following, a small hand pump being used: I constructed a shed of dry wood, forming a room twenty-four feet long, twenty wide, and fourteen high, having two doors on one side, and two windows on the other. This shed was provided with the wood-work of a roof, but was not covered, and stood about six inches from the ground, that there might be a thorough current of air to increase the fierceness of the flames when the building should be set on fire. The inside of it was completely covered with pitch, and lined with straw, which was likewise pitched. To this straw lining I fastened wood shavings, and cotton dipped in oil of turpentine, to set fire to the whole inside of the shed at once. Soon after the fire was applied, the flames, being increased by the wind, were every where so violent that all the spectators thought they could not possibly be extinguished. I however succeeded, in about four minutes, by the method already described, with five buckets of water, part of which was wasted through the fault of those who assisted me, as the following experiment proved.

I invited but very few to be present at this first experiment on the 8th of May, but on the 11th I repeated it in the presence of a very numerous company, after repairing and restoring the shed to its original state. The fire was not less violent than in the preceding experiment. I then directed the water myself, without any assistance, and effectually extinguished the fire in three minutes, having used only three buckets of water, each containg about four gallons and a half.

Another experiment was made at Gotha, where a shed of old and perfectly dry wood was erected, under the direction of M. Van Marum, in front of the duchess's garden. Its dimensions were in every respect equal to that which served for the same experiment at Harlem, being twenty-four feet long, twenty wide, and fourteen in hight. There were two doors on the northeast side, and two large apertures, in the form of windows, on the northwest side. The top was quite open to give the flames a free passage.

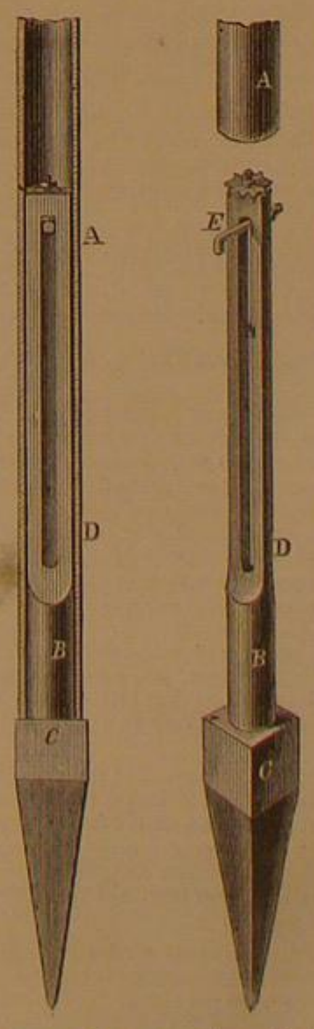
The inside of this shed was covered with pitch, and afterwards with straw mats, plentifully besmeared with melted pitch. To the bottom of these straw mats were fastened cotton wicks, dipped in spirits of turpentine, that the place might take fire in every part at once. In consequence, the fire, being considerably increased by the wind, was at first so powerful, and the flames, enveloped in thick clouds of smoke, rose with such violence to the hight of several feet above the opening of the roof, that the nearest spectators were obliged to retire precipitately, and many of them declared that it would be impossible to extinguish the conflagration, and that the shed would be entirely reduced to ashes. When the straw mats were completely consumed, the wood of the shed was soon in flames in every part. The circumstances under which this experiment was made were highly unfavorable; for the wind drove the flame exactly out at the doors on the northeast side, at which the water for extinguishing it was to be introduced. But notwithstanding this, M. Van Marum placed a small portable engine before the door, nearest the southeast side, without regard to the fears and opposition of his assistants, and ordered it to be worked there, stationing himself as near as the heat of the fire would permit him; he first directed the water to the southeast side, as near the door as possible, and as soon as the flame was extinguished in one part he guided the water to another. He then directed it along the north east side, so that in a few minutes the flames were completely extinguished on those two sides. The engine was then placed before one of the apertures made in the form of windows, on the northwest side. He in a very short time extinguished the southeast side, and then coming to the middle of the shed, which was still on fire in several places in the crevices of the planks and the holes made by the nails, he completely extinguished the fire, which from time to time broke out again in small flames, and this terrible conflagration was entirely got under. According to the calculation of several of the spectators, the fire was extinguished in three minutes at most, after the engine began to work, three buckets of water being used.

From what has been stated, it results, that to stop the most violent flame it is necessary only to wet the surface of the burning substance where the flame appears, and for this purpose only a small quantity of water is required, if it be applied with judgment to the burning part.

BENNETT'S DEVICE FOR SINKING WELL TUBES.

The practice of procuring water by simply sinking or driving iron tubes to the water deposit, instead of digging and walling wells, is now quite common, and to facilitate the formation of such wells is the object of the contrivance herewith illustrated.

A represents the tubing, which is driven into the earth by positive force. In this is fitted the shank, B, of the opening point, C. The point is made square in cross section or pyramidal in form, instead of round, as usual, the advantage of which is that it retains its position and preserves its direction better in driving and holds better in place when the tubing is partially raised to admit water. For a certain distance above the shoulder of the point the shank is cylindrical, fitting quite closely the caliber of the tubing. Above this point, D, it is beveled or chamfered, forming, above that point, a flat bar having a longitudinal slot, through which is passed a bolt, E, that also passes through the sides of the pipe. At the top of the shank is a star-shaped diaphragm, which cuts off the passage in the center of the tube, and compels the contents to pass up around the outside of the diaphragm through the radial openings. This device serves as a check to the sand in the center of the tubing, where the current is strongest, and precipitates it down on the outside next the sides of the pipe where the friction will tend to prevent its ascension. Testing can be done at any time during the progress of the work. It is done by raising the tube just above the point, D, enough to admit the water. It will be noticed that by securing the diaphragm to the top of the shank it will always stand at the same hight above the water, no matter how much the tubing itself may be adjusted up or down. This prevents the deposits of sand near the induction point.



Patented Oct. 20, 1867, by R. N. Bennett of Branchport, N. Y. Territorial rights for sale by him, or by John Schanck, Pittsford, Monroe Co., N. Y.

Death by Lightning.

The effects of a shock of artificial lightning on a gentleman of our acquaintance, who is very sensitive to the electric discharge, may be here described. Under ordinary circumstances, the discharge from a small Leyden jar is exceedingly unpleasant to him. Some time ago he happened to stand in the presence of a numerous audience with a battery of fifteen large Leyden jars charged beside him. Through some awkwardness on his part he touched a wire which he had no right to touch, and the discharge of the battery went through his body. Here life was absolutely blotted out for a very sensible interval without a trace of pain. In a second or two consciousness returned; the recipient of the shock saw himself in the presence of his audience and apparatus, and, by the help of these external facts, immediately concluded that he had received the battery discharge. His intellectual consciousness of his position was restored with exceeding rapidity, but not so his optical consciousness. To prevent the audience from being alarmed, he observed that it had often been his desire to receive accidentally such a shock, and that his wish had at length been fulfilled. But while making this remark the appearance which his body presented to him was that of a number of separate pieces. The arms, for example, were detached from the trunk, and seemed suspended in the air. In fact, memory and the power of reasoning appeared to be complete long before the optic nerve was restored to healthy action. But what we wish chiefly to dwell upon here is, the absolute painlessness of the shock; and there cannot be a doubt that to a person struck dead by lightning, the passage from life to death occurs without consciousness being in the least degree implicated. It is an abrupt stoppage of sensation, unaccompanied by a pang.—*Harpers.*

Manufacture of Iron.

From a paper read by Mr. Frederick Smith, and published in the Transactions of the Institution of Mechanical Engineers, we extract the following notice of the processes gone through in producing the different kinds of iron made at the Round Oak Works, England, and known as "common," "best," "best best," and "best best best:"—"'Common' iron is made from puddle bars from hot-blast mine pig, cut, piled, and heated with best coal for about an hour and a half in one of the bar mill furnaces, and rolled in the bar mill to the section required. 'Best' iron is made from a mixture of cold and hot blast pigs, but the top and bottom of the pile are of puddled iron that has been worked over twice at the hammer and forge rolls, so that all 'best' iron is worked over at least twice, while the upper and lower parts of the pile are worked over at least three times. 'Best best' iron also consists of a mixture of cold and hot blast pig, and is treated nearly the same as 'best,' only that the whole pile is worked over thrice at the hammer and forge rolls. 'Best best best' iron is made entirely of cold blast mine-pig, and rolled out into 3½x⅝-inch bars. They are sheared into small snippings, and then run in barrows to the ball furnace, where they are worked together into a ball of about one cwt. in the course of a few moments. The ball is hammered and reheated in the furnace; hammered again, and then put through the forge rolls; the bars produced by these rolls are then cut up and piled, heated at a bar mill furnace, and rolled in the bar mill. In this process, to form 'best best best' iron it is heated five times, hammered three times, and rolled three times."—*Bulletin of American Steel and Iron Association.*

What Advertisers Say.

LAWRENCE, MASS., Dec. 24th, 1867.

MUNN & Co., SCIENTIFIC AMERICAN, New York:

DEAR SIRS:—Your favor is received, announcing increased rates for advertising. You will please continue our advertisement until forbid. Were we to curtail our advertising, the SCIENTIFIC is the last that we should withdraw from.

We are yours, truly, J. C. HOADLEY & Co.

191 BROADWAY, NEW YORK, Dec. 24th, 1867.

MESSRS. MUNN & Co.:

GENTLEMEN:—Yours at hand announcing advance terms for advertising. Please insert inclosed advertisement on your outside page until otherwise ordered. Even at your new prices this is the most profitable advertising I can do. I know it from the fact that I have expended $12,000 in the leading journals, and no one has brought me the same profitable harvest as the SCIENTIFIC AMERICAN. May you always prosper. Yours truly, GEO. E. WOODWARD.

USE OF A GRINDSTONE.—Mechanics who value a good condition of their tools and other appliances for doing work, should never allow their grindstones to be used by strangers indiscriminately without some restrictions as to the manner of using. Every stone for grinding tools should be provided with a rest and the men taught how to use it.. We have seen the face of a stone gouged so as to require a thorough razing by ten minutes' injudicious grinding. Such accommodations are costly.

CORRECTION.—In acknowledging a fine list of subscribers from Castleton, Vt., two weeks ago, we stated that the club was made up by Mr. H. O. Osborn. The credit should have been given to H. O. Brown. A gentleman from the place, calling our attention to the mistake of name, states that Mr. Brown is too modest to call our attention to the error, and adds that when the seventy men in his mill become better acquainted with our paper another large list of subscribers will be forthcoming.

Labor the Basis of Republican Institutions.

If, as has been said, idleness is the mother of mischief, occupation and industry are the progenitors of virtue and good order. The universal haste for wealth, coupled with unwillingness to toil for its acquisition, is fruitful of crime and destructive of business integrity. Throughout the whole country the cities and towns are thronged with idle Micawbers, waiting for something to turn up by which they may become possessed of a fortune and pass their lives in luxurious ease. Such men are the bane of society. They seem to believe that labor is degrading, and think nothing more honorable than sumptuous dependence. And yet society is filled with them. Not a reader of this paragraph but can point to those within his immediate acquaintance.

The folly of the present age is its want of appreciation of true manliness. He is not the best type of American nobility who apes the foreign aristocracy and considers honest labor degrading and unworthy. The genius of our democracy is the exaltation of labor and the laborer; and its triumph is the vindication of toil from the contempt of an effete nobility that clings with the tenacity of life to ancient ideas and obsolete distinctions. We are a great and a progressive nation because we are shaping out our own destiny by the iron hand of labor. We have been singularly successful in our experiment of self-goverment because we made it the first principle of conduct to depend upon ourselves for results, and not to hope for anything from ancestral title or inherited wealth. The founders of the American republic were men of independence. When they landed on these shores they shook off the trammels of European customs, they laid aside forever the pride of family that had enervated the youth of their native land, and with an unswerving fidelity to the great principles of Democracy, laid the foundations of a government whose corner-stone was respect for honest industry.

It was the law among the ancient Jews, that every man should learn a trade. He was not bound by any obligation to follow it, for if his inclinations prompted him to afterward seek another profession, he was at liberty to do so. The wisdom of this law commends itself to every mind. If, in adverse times, misfortune should lay its hand upon them, and they should be compelled to leave their chosen pursuits, they were provided with an occupation which was a safeguard against extreme poverty or want. If such a law existed in this country it would prevent many of the evils that now prevail, and render our people more prosperous and happy. However true to the principles of democracy our fathers may have been, we are fast leaving them behind. Instead of honoring labor we are attempting to degrade it. Parents, ambitious for their children, often express the hope that their lot will not be so arduous or toilsome as their own has been, forgetting that by their labor the country has been blessed, and because of the industry of their sons, generations yet to come will be grateful that they were born in republican America.

It is the first duty of parents to instil into the minds of their children the necessity and the dignity of labor. To be useful in any sphere of life should be the ambition of our youth. Our vast fields of enterprise invite competition and promise satisfactory rewards. The producer is he whose loss is most felt by society. Success in mechanic art is as honorable as professional eminence; agricultural industry is far more profitable to the nation than ambitious statesmanship. The watchwords of democracy are that all honest labor is honorable. It is not what one does, but the manner of doing it, that dignifies the man. Nothing can be more degrading than a quack in medicine, a pettifogger in law, or a blockhead in priestly garments—no one can be more honorable than an industrious and skillful artisan or a faithful and intelligent tiller of the soil.

It is a mean and worthless spirit that despises the garb of the laborer and scorns to welcome him to places of equity. Nothing can be more false that our usual idea and definition of a gentleman. It is not the dress, it is not the employment that permits this appelation. It is the kindly heart, the industrious virtuous life that makes the gentleman. A career of idleness is generally a career of crime. It is not family or wealth that entitles one to honor. It is the intelligent manhood that entitles him to respect. We honor those who have risen from humble spheres of life to places of trust and usefulness, not because of the riches they possess, not because of the position they occupy, but because of the energy and industry which they manifested in the attainment of what they have. Fortune smiles on some while she frowns on others, but her favorite is no more entitled to honor than he who with equal industry strove to win her regard. The world's distinctions are often wrong. It is dilligent, patient labor that is to be honored by the true friends of republican institutions. The drone in society, whether possessed of millions or dependent upon public charity, should be despised and avoided by every honest man. We, as a nation, must change our ideas of nobility, or we shall decline in prosperity. He is only noble who uses to the best advantage the powers of body and mind with which his Creator has endowed him. Any claim not founded on this is false and pernicious. When the people of any nation cease to give to labor its true dignity and affect to despise the laborer, their own dishonor is assured, and the doom of national prosperity is pronounced.—*Erie Dispatch.*

Foreign Recognition of American Surgery.

One of the most competent of French surgeons, M. Bouvier, lately, in the most flattering terms, commended to the notice of the Academy of Medicine two forms of apparatus invented by Dr. C. F. Taylor, of 1,303 Broadway, New York City, and designed, the one for the correction of vertebral deviations consequent upon Pott's disease, and the other for the treatment of hip-joint diseases. The peculiar beauty of this apparatus is that it combines all the advantages of horizontal position, as if the patient were reclining upon a bed, while at the same time the privilege is granted him of exercise and fresh air. In form, the apparatus is a simple lever which raises the superior part of the spinal column by using the transverse processes as a fulcrum, so that while safely increasing pressure on the articulations of the transverse processes, pressure on the bodies of the diseased vertebræ is considerably diminished. The instrument is hinged and acts as a supplementary vertebral column. Its arrangement is such that the degree of force employed may be modified at the discretion of the attending physician, and hence the treatment may be rendered constantly and regularly progressive.

Doctor Taylor is one of the most skillful practitioners, in the specialty in which he treats, in this country. For spinal and hip diseases, contraction of limbs, and kindred complaints, he manifests wonderful skill. His apparatus for straightening contracted muscles, and manipulating his patients by the use of the many mechanical contrivances he has invented and put in use at his rooms, are very ingenious. Instead of requiring his patients to conform to a special exercising chair or extending frame, or whatever other contrivance it may be necessary to use, he makes new applications to meet the form, size, and necessities of his patients, and from this source alone greater comfort as well as benefit, is administered to the afflicted, than is possible where a set of mechanical contrivances are made to perform the same office on various-sized persons, although the maladies may be the same. Every case of malformation or disease of bone or muscle must be treated differently at certain stages, and Doctor Taylor has the requisite mechanical genius to make his own implements, and the skill and judgment requisite for their most favorable application. Doctor Taylor has published an illustrated work on the diseases of which he treats, which will interest the afflicted.

At the late Exposition, Dr. Taylor's apparatus was the most noticeable feature in the section of orthopœdy, and in their official report the Imperial Commissioners incorporated the communication in full of M. Bouvier to the French Academy, as noted above, thus paying a marked compliment to his opinion, and making a double endorsement, in the most emphatic terms, of the merits of Dr. Taylor's inventions.

Hints to Public Speakers and Singers.

When singing, writes Dion Boucicault, in the *Pall Mall Gazette*, the vowels are principally used because it is necessary to dwell upon a note, and we cannot prolong a consonant. In speaking, on the contrary, we depend for articulation on the consonants, but their short percussive sound does not travel. When we shout, or in open air speaking, which partakes of shouting, we prolong the vowels, drawing the syllable at each word, but what we gain in sound is lost in clearness of articulation; expression is lost in monotony; because its fineness depends on the infinite variety of which the consonant is capable and bestows on the vowel. Two thousand voices singing or speaking together, travel no further than one voice. They may fill a certain area more completely with that intricacy of waves which, when very troublesome, we call a din, but each voice exerts its own influence on the air according to its power, and dies away within certain limits. A second voice acts independently, and produces its own separate effect, not fortifying the first but distinct from it; and so with any number of voices—say ten thousand—shouting together, if a single trumpeter were placed among them, the notes of his trumpet would be heard clearly at a distance where the Babel of voices would have expired in a murmur. Yet among the din produced by the ten thousand notes the trumpet would be inaudible. To illustrate this theory more clearly, it is plain that two thousand persons cannot throw stones further than one person. It is true that the air within certain limits will be more full of stones, but they will all come to the ground within a limited area.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The existence of the gold fields of Nova Scotia is probably known to but few of our readers, yet a report,—a little rose-colored, perhaps,—which has been sent us while recording progress and results, claims that compared to the extent of gold producing area, the quantity of quartz mined, or the number of men employed, these fields are by far the most productive in the world. In 1866 the yield of gold was 25,454 ounces; for this year, according to every indication, it will exceed 30,000 ounces, the gross value being $600,000, or one half the value of their great staple, the coal yield. During the six years since gold was first discovered here, about 4½ tons of the precious metal has been found. The average amount to each miner last year was 57 grains per day; its value, about $2.50. There are less than 800 persons engaged in the mines. The future prospect for these mines is cheering, both American and Canadian capitalists are investing in them, and means are being taken to work them on a larger scale and system, insuring larger returns and less waste.

At the last conference of the associated North German railways, resolutions were passed looking to the promotion of the comforts of the traveling public. Among others, it was decided to warm the passenger cars by circulating a continuous current of hot water in pipes through the whole train. The heating apparatus occupies a special car, which is placed next the locomotive, and short lengths of India-rubber pipe will form connections between the cars.

Canadian railroads carried two and a half million passengers last year, and killed only seventy-seven of them. Their receipts were eleven millions, or less than ten per cent of the cost. Nearly nine thousand persons are employed, of whom almost two thirds belong to the Grand Trunk road alone.

California has found a new source of wealth in her iron deposits. It is claimed that there is scarcely a county in the State in which the mineral is not found in greater or less value. The Coast Range, though never thoroughly explored for iron ore, has many and extensive surface deposits, which indicate considerable richness.

We learn from good authority that Mr. E. A. Stevens, of Hoboken, is about to engage in the enterprise of constructing horse railroads in the streets of Paris, and has engaged the engineering services of Gen. G. B. McClellan. London, also, may soon be supplied with these democratic traveling conveniences, the Metropolitan Tramway company having given notice of intended application to Parliament to lay down rails for six different roads.

Two tuns, or 16,000 yards of wadding, is the daily product of one establishment in Pawtucket, R. I. In addition to this amount, the works turn out nearly three tuns daily of cotton waste, for use in cleaning machinery.

We have noticed in many of our exchanges the astounding announcemen that a Canadian inventor has constructed an arrangement for coupling cars automatically. Let him come to our Patent office and we will show him a hundred such contrivances, and the exhibition might be repeated every month with an entirely new stock, fully equal in variety and ingenuity to those now on hand. The number of these self-couplers annually patented is astonishing, but railroad companies seem reluctant to adopt them.

NEW PUBLICATIONS.

DICKENS' WORKS.

T. B. Peterson & Brothers, Philadelphia, are issuing an edition of Dickens works so cheap that almost every one can afford a complete set of this entertaining author's writings. Martin Chuzzlewit, Dombey & Son, Nicholas Nickelby, and Christmas Stories are the three works already reproduced in this cheap form. Price 25 cents each.

THE BROADWAY.

Geo. Routledge & Son, London, and 416 Broome street, New York. Price $3 a year; 25c., single numbers. This new monthly is one of the most entertaining of the many magazines now publishing. The illustrations are well done, and the subjects generally partake of the humorous, and vividly portray incidents in the stories in which they appear.

Recent American and Foreign Patents.

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

MACHINE FOR MAKING MOLDS FOR STEREOTYPING.—John McNair, New Orleans, La.—This invention relates to a new and improved device whereby letter types may be pressed directly into a plastic substance and a stereotype mold obtained direct, or without the trouble of first "setting up" the type and then taking a cast from them, as is now practiced.

LOCK.—H. Jackson, New York city.—This invention consists of an expanding stump arranged in relation with tumblers and a slide bolt of peculiar construction, whereby a greater security than hitherto is obtained against the picking of the lock; and the invention further consists in corrugating or notching one edge of the tumblers and having a pin on a slide to engage with the notches and prevent the tumblers being moved or tampered with by a pick when brought in contact with the stump, which arrangement also serves as a safeguard against picking. The invention also consists in a novel manner of attaching the springs to the tumblers, and also in a step for the tumblers.

GRAVER.—Ralph S. Mershon, Zanesville, Ohio.—The principal object of this invention is to so construct a graver that it can be readily adjusted and set in use upon a surface, whether more or less concave or hollow.

SEED PLANTER.—Joseph R. Frantz, Goodville, Pa.—This invention consists of seed hoppers supported upon a carrying or supporting frame, the sides of said hopper being operated by gearing from the driving wheel, and of covering shoes also operated by said frame, by means of which the seeds are planted and covered at the same time.

CHURN.—Thomas Payne, Grand Rapids, Mich.—This invention relates to a new and improved churn of that class in which a rotary dasher is employed, and it consists in a novel manner of constructing the dasher, whereby it is believed that the cream is acted upon in a more favorable manner than hitherto for the expeditious production of superior butter.

EXTENSION LADDER.—Hosea Barnes, Somers, Wis.—This invention consists in connecting together several sections or lengths of a ladder (three, more or less) in such a manner that the sections may be rigidly connected so as to form one continuous length when required, and admit of the lengths being folded when not required for use, and also adjusted so as to form a step ladder when required.

GLOBE VALVE.—John B. Lowell, Baltimore, Md.—In this invention a new device is employed for grinding the valve to its seat without removing the valve.

BURNING CULM AND OTHER FUEL.—Alfred Dart, Carbondale, Pa.—In this invention the stove is so constructed that the fuel will be burned in their strata, in order that oxygen may pass freely through it, and thereby better keep up combustion.

FIELD ROLLER.—S. B. Mann, Indianapolis, Ind.—In this invention the roller is a hollow cylinder in which are placed heavy metallic balls, for the purpose of increasing the weight without changing the bulk of the apparatus. The spring that supports the seat is also arranged in a novel manner.

AUTOMATIC GATE.—Charles F. Mawbey, Woodbridge, N. J.—In this invention a platform is arranged on each side of the gates, and connected with them by a peculiar and exceedingly simple and effective device. When a horse or other weight comes upon either platform the gates fly open from him. As the horse passes through and steps upon the other platform, the latter operates to hold the gates open till the carriage has passed, when they swing together and latch by their own weight.

COMBINED PLANTER AND CULTIVATOR.—John Vaughn, College Grove, Tenn.—This invention consists in a new combination of the planter, cultivator, revolving hoe, plow, scraper, and revolving rake, by means of which every operation required in raising cotton can be performed with one instrument, and fifty per cent of the time and labor required by the old methods can be saved.

LANTERN.—J. H. Richardson, Philadelphia, Pa.—This invention relates to a new and improved lantern, designed more especially for ship and railroad lanterns. The invention consists in feeding the flame with oxygen from the top of the lantern, a direct draft upward from the bottom through the top of the same being avoided, whereby the flame will not be liable to be extinguished by gusts of wind or the swinging of the lantern, as is now the case with those which have a draft of air passing through them from the bottom upward and are exposed to or carried in the open air.

FENCE.—H. A. Kephart, Fletcher, Ohio.—This invention relates to a new and improved fence for farm purposes, and of that class which are commonly termed portable, and it consists in a novel manner of applying the stakes to the panels, whereby the fence may be firmly supported in position with the bottoms of its panels above the surface of the ground.

IMPROVEMENT IN DRYING AND SEASONING LUMBER.—E. C. Bender, York, Pa., and Wm. Steffe, Philadelphia, Pa.—This invention relates to a new and improved process of treating lumber, for the purpose of drying and seasoning it, and is designed to remedy serious defects in processes heretofore adopted for that purpose, which is most effectually accomplished, by the use of a close chamber, or kiln, provided with proper flues and dampers, for controlling and regulating the temperature and discharging the moisture, by which means the pores of the wood are kept open a sufficient length of time to allow of the absorption and carrying off of the moisture from the interior as well as the exterior, thus seasoning without injury by checking or otherwise, and with less attention, labor, and fuel than by any other process Patented Dec. 17th; see claim in last issue.

HORSE AND WAGON BRAKE.—G. Haberland, Pontiac, Ill.—This invention relates to a new device for preventing horses from running away, and consists in arranging straps around the horses' legs, which are connected by suitable lines or cords, with a drum fitted to the front part of the wagon. By revolving the drum, the lines will be wound around it, and the horses feet will be drawn together, preventing the horse from running.

ROAD SCRAPER.—L. W. T. Lodge, Petersburg, Ky.—This invention relates to an improvement in the construction of scrapers for excavating road beds and other similar purposes.

CAR COUPLING.—Robert Goole, Abingdon, Ill.—This invention relates to a new and improved method of coupling or connecting the cars of a railroad train.

HAND TRUCK FOR MOVING BARRELS.—T. W. Kennedy, Avon, Ill.—This invention relates to a new and useful improvement in the construction of a hand truck for moving barrels about from place to place in an upright position.

SHARPENING HORSESHOE CALKS.—N. Hays, Wm. Duncan and E. A. Bowen, Vinton, Iowa.—This invention relates to an improved tool for sharpening the calks on horseshoes, and consists in the combination of a hand lever, clamp and a circular rasp or cutter operated with a crank by which the calks on a horseshoe are rapidly and effectually sharpened on the horse's foot.

CULTIVATOR.—Charles E. Storrs, William E. Keyes and David W. Jones, Grandville, Mich.—This invention consists in forming a cultivator plow with its sides curved upward resembling a scoop and provided with a cutting edge to facilitate its passage through the soil, the whole attached to a frame.

FEED MOTION FOR HEAD BLOCKS OF SAW MILLS.—M. C. Lewis, Glasgow, Mo.—This invention relates to an improvement in the feed motion device of the head blocks of a saw mill each lever being so arranged that both the head blocks may move simultaneously or work separately.

OVENS.—John Adam Kinkele, Sacramento City, Cal.—This invention relates to a new and improved method of constructing ovens for baking bread and other articles, and it consists principally in a revolving hearth or bottom and in hot and cold-air flues in connection therewith.

GATE.—John Shartle, Lima, Ind.—This invention relates to an improvement in gates and consists in so constructing and hanging the gate that it can be raised and lowered in position for overcoming obstacles, such as snow, mud, etc.

ANIMAL TRAP.—W. H. Davis, Lexington, Ind.—This invention relates to an improved animal trap, and consists of a box the floor or trap door of which is pivoted in the walls. A crank shaft having its bearings in the walls of the box and operated by a spring or weight is connected with said floor by a connecting rod or pitman attached to the floor by a staple.

MEANS FOR SECURING JIG OR MULEY SAWS TO THEIR SLIDES.—Wm. Inman, Middletown, N.Y.—This invention relates to a new and improved means for securing jig or muley saws to their slides, whereby the saw may be very readily secured to and detached from their slides, and when secured to them firmly held, without the possibility of becoming detached.

INDICATOR FOR STEAM BOILERS, ETC.—James Slater, Philadelphia, Pa.—This invention relates to an improved and novel construction of a valve, or indicator for steam and other boilers, etc., and in the manner of suspending a weight thereon, whereby many important advantages are secured.

FENCE.—Augustin Ellis and Oliver Albertson, Salem, Ind.—This invention relates to a new and improved portable fence, such as is designed to be readily put up and taken down. The invention consists in a novel application of braces, or supports to the fence, and the manner of constructing the panels together, whereby a firm and substantial straight fence is obtained, and the "worm" or zigzag fence avoided.

TOOL HOLDER FOR SLIDE RESTS.—Israel F. Brown, New Lonndon, Conn.—This invention relates to a new and improved tool holder for slide rests and other machines, and it consists in the employment or use of a V-shaped gib, or key, in connection with notches in the tool and a slot in the tool holder, all being arranged in such a manner that the tool may be held firmly in position in the tool holder, and at the same time be capable of being readily fitted in and removed therefrom.

FILTER.—George W. W. Goodwyn, New Orleans, La.—This invention consists in a novel arrangement of a filtering machine, with a water vessel and a vessel to receive the filtered water, whereby a very portable combination of a filter and water chamber is obtained, and in connection with a cooler if desired.

APPARATUS FOR PAPER MAKING MACHINES AND OTHER MACHINES HAVING TRAVELING WEBS AND FABRICS.—F. Thiry, Huy, Belgium.—The object of this invention is to restore the endless cloth or wire on which the pulp or paper travels (in the manufacture of paper and the webs or fabrics in other manufactures) to its true course, when from any cause it has a tendency to depart therefrom.

LAMP BURNER.—Charles W. Russell and Niel Clifford, New York city.—This invention relates to a new and improved lamp burner, designed for burning coal oil and other similar volatile hydro-carbons. The invention consists in a novel form or shape of draught chimney, in connection with a cone or deflector arranged in such relation with each other that the flame of the burner will be supplied with a requisite amount of oxygen to support combustion and produce a brilliant illuminating flame.

COPY HOLDER.—Herman A. Tremper, Hammonton, N. J.—This invention relates to a copy holder, intended for the use of compositors, and also for the use of proof readers, book keepers, lawyers and copyists, by substituting a change of support, so as to allow of its being used on a table or desk.

COMBINED THERMOMETER AND CANES.—James L. Reber, Philadelphia, Pa. This invention relates to a new and improved method of using thermometers, whereby the same are rendered much more convenient for reference than they have hitherto been, and consists in constructing the index-plate of a proper form and attaching the thermometer permanently, or enclosing it in the wood or other material of walking canes, umbrellas, parasols, looking-glasses, etc.

MACHINE FOR BORING POST-HOLES.—Wm. R. Iles, Lancaster, Ohio.—This invention relates to a new and improved machine for boring post-holes in the earth, and consists in operating an earth auger, by an upright shaft, by cranks and gearing.

MACHINE FOR BENDING HOOKS.—R. B. Sears, Providence, R. I.—This invention relates to a new machine for bending wrought iron, or other hooks into the required shape, and consists in the use of a stationary die, to which the lower end of the bar, which is to be bent into a hook, is held by means of a follower, carrying a pin, that fits through an eye formed in the lower end of the hook-bar.

TRACK AND STREET CLEANER.—Ernest Abbiati, New York city.—This invention relates to a new device for cleaning railroad tracks and streets from snow, and consists in the use of a revolving, horizontal disk, carrying oscillating wings, which are drawn in and out by the action of crank shafts, revolved by means of gear-wheels from the shaft to which the disk is secured. This shaft is secured to the front part of a truck, which moves in front of the locomotive or car, or to the front part of a wagon or car, and receives rotary motion from one of the wheels of the locomotive, car, or wagon, or from any other suitable device.

CORN PLANTER.—Hans J. Johnson, St. Peter, Minn.—This invention has for its object to furnish an improved machine for planting corn, cotton, sugar cane, and other seeds, in hills which shall be easily operated, and accurate in operation.

STEREOSCOPE.—Oscar Goerke, Brooklyn, N. Y.—This invention has for its object to simplify and improve the construction of stereoscopes so as to make them less expensive in construction, and more effective and convenient in operation.

HAY FORK.—L. N. Tinkham, Sylvania, Penn.—This invention has for its object to furnish an improved horse hay fork, simple in construction, easily operated, and effective in operation.

TIRE-SHRINKING MACHINE.—Jacob Gettemy, Donigal, Penn.—This invention relates to an adjustable tire shrinker, which can be set to bend the tires to fit different wheels, and which is so arranged that it will require but very little power to bend tires of great strength and thickness.

FOLDING MACHINE.—Leroy A. Gleason, Southington, Conn.—The object of this invention is to construct a machine for bending sheet metal so that with one folding bar, either sharp or round bends can be made thereon, and that it can be adjusted for any thickness of metal, and for any desired length of overlap.

SYRINGE VALVE.—Nathan Lawrence, Taunton, Mass.—This invention relates to a new manner of securing the valves in the metal valve cylinder of a syringe, so that the said valve cannot drop out of its place. The invention consists in securely arranging a pin across the metal cylinder in which the valve is held, whereby the aforesaid object will be attained.

GATE AND BARN DOOR FASTENING.—W. W. Peck, Cassapolis, Mich.—This invention relates to a new fastening for gates and barn doors, which is so constructed that the gate or door can be opened from the inside and outside, or from the former only, as may be desired, and so that the same cannot be raised and opened by hogs and other animals.

FOLDING GATE.—Robert Gidley, Lagrange, N. Y.—This invention relates to a new folding gate, which can be easily opened or closed by persons in a carriage or on horseback. It consists of a picket gate, pivoted to a bar, which is suspended in a post, so that, when the said bar is swung back by means of suitable levers, the gate will also be swung back with the bar.

REFLECTOR.—Wm. Ulrich, Newark, N. J.—This invention relates to a new reflector, which is so arranged that it can be easily attached to or detached from gas burners or lamps of suitable description, and that it can be revolved around the same, so as to throw the light or shade to any desired spot, and which can be folded out of the way if desired.

HOOP-SAWING MACHINE.—George H. Shearer, Bay city, Mich.—This invention relates to a new manner of arranging the bearings for the axles of the feed rollers and saw of a gang sawing machine for cutting laths and hoops, and consists in so casting a bearing for each end of all the axles of a sawing machine, that those, or any one of those of the feed rollers can be removed whenever desired.

BANJOS.—Jerome Mayberger, New York city.—This invention relates to a new manner of arranging the sound board of a banjo, and consists in the use of an annular drum or box, which is covered by a board having S-shaped holes similar to those in the sound board of violins. The parchment head is secured to a ring, which is fitted upon the sound board, enough above the same to permit the escape of the vibrating air between the said head and the drum, while the circular open space in the center of the drum serves as a channel for a new supply of air.

VALVE.—Alfred Crossley, Brooklyn, N.Y.—This invention relates to a new valve for steam and water pipes, and consists in so arranging the parts that the packing is below the screw thread, by which the stem is moved in the bonnet, so that the water will not come in contact with the screw thread; the invention also consists in arranging a recess or chamber within the upper part of the bonnet, around the valve stem, said recess being above the screw thread.

TRUSS.—J. R. Blake and J. L. Jarrell, Dyer Station, Tenn.—This invention consists of a band or belt, adapted to embracing the body, around the bowels, to an under strap of which belt the hernia pad is applied by a loop, in such manner as to be susceptible of adjustment within a vertical and horizontal or lateral plane, and in either plane independent of the other.

PURIFYING TRAY.—B. E. Chollar, Leavenworth, Kansas.—This invention consists of pectinated bars, of any desired form, forming the ends of the tray. In the spaces between the teeth grate bars are placed, and the same are held in position by other bars or clamps, which said clamps are bolted down upon said grate bars.

ANIMAL TRAP.—Augustine Ellis and Oliver Albertson, Salem Co., Ind.—This invention consists in a novel construction and arrangement of the trap, whereby many important advantages and features are secured.

NAIL MACHINE.—Adrian Shaw, Westford, Mass.—This invention consists principally in hanging the hammer or hammers to the outer ends of a revolving beam or cross-arm, in such a manner that as such beam revolves the hammers will be thereby swung down and upon the anvil-block, which at the same time being moved upward then recedes or moves down again at the same time as the hammer draws up from the anvil-block, from the continued rotation of the helve or beam carrying the same.

WHEEL CASTER.—Jos. White, Providence, R. I.—This invention consists of a solid disk, secured to the spindle, provided with a groove in the under side of the same to receive metallic balls, on which the under plate, to which the wheel is attached, rests, whereby the supporting arms of the wheel move more freely and with less friction around the spindle.

HARNESS PAD.—John Maclure, Newark, N. J.—The object of this invention is to so construct a pad plate for a harness pad that the mountings or trimmings can be easily changed without destroying, or in anywise impairing the the beauty or utility of the pad, and also so that the cheapest as well as the most expensive kinds of pads may be made on the plate.

MACHINE FOR MAKING PLUG TOBACCO.—J. E. Withers, Toronto, C. W.—This invention relates to a machine for making plug tobacco, and consists of a series of rollers pressing the tobacco in troughs, running on flange rollers, a large wheel revolving in a transverse direction, shifts the troughs on to a series of rollers, revolving in the opposite direction, by which they are carried back to the end from which they started. An inclined knife removes the tobacco from the troughs when sufficiently pressed.

MACHINE FOR FORMING TUBULAR BEADS ON SHEET METAL GUTTERS FOR ROOFS.—O. W. Stow, Plantsville, Conn.—Sheet metal gutters for roofs are constructed of thin metal plates (most generally termed sheet iron,) bent in semi-circular shape, with a tubular bead formed on the center edge in order to stiffen the gutter and keep it in proper shape. This invention relates to a new and improved machine whereby a very simple and portable device is obtained; one which may be constructed at a small cost, and operated with the greatest facility.

SEED PLANTER AND CULTIVATOR.—M. R. Snodgrass, Jamestown, Ohio.—This invention relates to a new and improved seed planter and cultivator combined, and it consists in a peculiar construction and arrangement of the several parts, whereby the machine may be made to work in either of the above named capacities in a perfect manner.

PROCESS FOR REMOVING BURRS AND OTHER VEGETABLE MATTER FROM WOOL.—Wm. Sykes, Newton Lower Falls, Mass.—This invention relates to a modification and improvement of a process for removing burrs and vegetable matter or substances from wool, for which Letters Patent were granted to this inventor bearing date July 10, 1866.

SKATE.—George Brownlee, Princeton, Ind.—The present invention consists, 1st. In transversely dividing the foot rest or support to the skate at a point between its toe and heel, and where the ball of the foot will rest upon the same, into two parts or sections that are hinged together, in combination with the runner or blade, also similarly divided, but so formed at their joint that as they are opened, as it were, by the action of the pressure by the foot upon the support or rest of the skate, the runner will present an unbroken and continuous surface of edge to the ice or other ground on which the skate is used. 2d, In arranging upon the under side of the foot-rest or support, a driving jaw or claw or claws, in such manner that by the movement of the foot-rest or support, in the act of skating such claws will operate upon the ice or other surface, in a manner to propel or to assist the skater forward; the arrangement of the jaws being such as to be susceptible of adjustment at pleasure, and as may be found necessary. 3d, In securing to the side of the runner blade to a skate and along its length a parallel edge, by means of which the direction of the skater is turned, as he leans over upon the side corresponding with such edge.

EXTENSION NOTICES.

Ambrose Nicholson, of Poland, N. Y., having petitioned for the extension of a patent granted to him the 21st day of March, 1854, for an improvement in self-fastening shutter hinges, for seven years from the expiration of said patent, which takes place on the 21st day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of March next.

Marilda Starks, of Genoa, N. Y., administratrix of the estate of Isaac Starks, deceased, and Lyman Perrigo, of Groton, N. Y., having petitioned for the extension of a patent granted to the said Isaac Starks and Lyman Perrigo the 13th day of June, 1854, for an improvement in device for holding pieces in spoke machines, for seven years from the expiration of said patent, which takes place on the 13th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day May next.

Horace Smith and D. B. Wesson, of Springfield, Mass., having petitioned for the extension of a patent granted to them the 8th day of August, 1854, for an improvement in cartridges, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 22d day of June next.

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.*

C. F. R., of Conn., claims to have a recipe for a paint—the principal ingredient of which is coal tar—admirably adapted to preserving the bottoms of ships. He has also a plan for rendering wood fire-proof, but neither gives the recipes nor offers to sell the preparations. He says: "Perhaps your readers would be pleased to obtain them on the same terms as those of water-proof fine fabrics: well, let them, I have no objections." Which must be very satisfactory to the "readers."

J. F., of La.—Concrete for foundations is made usually of one part hydraulic cement and two parts clean sharp sand, into which as mixed, is thrown five parts broken stone, the whole to be deposited at once in place. No amount of water, whether salt or fresh, can impair it.

P. S., of N. J.—Horn is merely a generic term applied to several widely differing animal substances. The horns of the stag, moose, antelope, etc., are very different from those of the genus *bos*, as domestic cattle, and that of the rhinoceros differs from both. Treatment for one of these qualities of so-called horn in manufacturing will not do for others.

G. W. S., of Mass.—Gutta-percha is a perfect non-conductor of electricity and is used because of this quality for submarine and underground telegrrphic wires. Its non-conducting quality is not surpassed by any known material.

J. J. D.—Microcosmic salt, Syn: with phosphorus salt, salt urinal nativum is the triphosphate of soda and ammonia and is found in certain kinds of guano. Still it is not extracted from them, but prepared directly in heating 6 parts of phosphate of ammonia, 1 part of sal ammonia and 2 parts of water in a porcelain vessel, when in cooling it will be obtained in colorless needles. In recrystallizing them, having previously added some ammonia, the salt is obtained perfectly pure. As far as we know, it is only applied as a flux in blow pipe analysis.

W. E. L.—Common rosin melted with a little gallipoli oil and spirits of turpentine has been found to answer very well for preserving polished ironwork bright. The proportions should be such as to form a coating which will adhere firmly, not chip off and yet admit of being easily detached by cautious scraping.

H. B.—The following is a recipe for the preparation of yeast given us by a brewer: 72 lbs. of unkilned malt together with a handful of hops are gradually stirred in a clean tub containing 7 gallons of water of 170° Fah., and to this 5½ gallons of water of 200° are added. The tub is then covered tightly and left quiet for one hour. Supposing this to be done at 6 P.M., the whole is left undisturbed till 7 A.M., when it must be cooled rapidly, which is done by setting in cans filled with cold water. When the temperature of the mash has reached 70°, the tub is covered again and left during the day till 6 P.M.; at this time 1½ gallons of fresh beer yeast are to be stirred in. In 12 hours pierce a hole in the layer formed by the husks of the malt and dip 3½ gallons of the liquor beneath, then stir the whole up and dip 1¾ gallons from it (husks and liquor). This is your mother-barm from which you can generate yeast all the year round in using it in the way described instead of the ordinary beer leaven. To the remainder in the tub add 5 gallons of wort of 90°, and make use of it within two hours. The mother yeast also must be used the same day for fermenting another portion.

H. M., of Hawksville, asks: "Can you tell me the reason why a wrought-iron plow runs easier than a cast-iron one and yet a cast-iron sleigh shoe easier than a wrought-iron shoe?" 1. The closer the grain of the metal employed for mold boards in plows the less friction. 2. Our correspondent will have to furnish us with better proof than the mere statement that sleighs shod with cast iron run with less friction than those shod with wrought iron before we can answer his question.

W. S. R., of Pa., asks for the recipe of a good writing ink. 135 parts of logwood are exhausted by a boiling with 1,000 parts of water, and to the strained decoction one part of bichromate of potassa in solution is added; the ink thus obtained will not give any precipitate nor become moldy.

R. C., of Ill., asks for the means to restore stoves which turn red from use. Apply the ordinary stove polish once or twice a week and your stove will not change to that rusty red of which you complain. . . . The application of provence oil to the head will remove dandruff.

C. I. H., of N. Y.—Rubber or gutta-percha would not be injured by illuminating gas.

Business and Personal.

The charge for insertion under this head is one dollar a line.

ALVORD'S ELASTIC HORSE COLLAR.

In the annexed engraving is shown an improvement in horse collars, patented Aug. 28th, 1866 by Clark Alvord, of Westford, Dodge county, Wis. It consists of an elastic coupling at the top of the collar, as shown at A. The first advantage resulting from such coupling is that the collar can be easily put over the horse's head when harnessing, and as easily taken off, no unbuckling to be done. Second, the coupling being elastic and fastened a short distance below the top of the collar, the bearing upon the neck is a spring which keeps the collar up to the lower part of the neck, yet not so rigidly as to choke the horse when drawing.

The top being open renders the collar adjustable, so that the movements of the shoulders of the horse when traveling do not cause the bearing of the collar to twist about upon, and when trotting, pound his neck. Hence no sore necks, as often happens with collars of the usual make.

For further information address the patentee, at Westford, Dodge county, Wis. See advertisement on another page.

THE ANTIQUITY OF MAN.

The New York Lyceum of Natural History were addressed at a late meeting by Prof. J. H. McChesney, of the University of Chicago, formerly United States Consul at Newcastle, Eng., who, just returning from a visit to the different European localities where evidences of great antiquity of the human race have chiefly been found, was enabled from personal investigation to present some new and interesting facts relative to this subject.

After referring to the flint implements found in the drift at Kempston and Biddenham, England, at St. Acheul, near Amiens, France, he spoke at some length of a locality in Italy not so well known as the preceding, but which furnishes almost indisputable proof of the presence of man upon the earth long ages anterior to the six thousand years which has generally been considered as limiting the period of his existence here. The evidence is the recurrence, in the drift stratification on the banks of the river Tiber, of flint arrow heads and implements which could only have been modeled by the hand of man. Now this accumulation of boulders and pebbles forming the drift is derived entirely from the Appenine mountains, and no trace exists in it of the Latin mountains, a chain now lying intermediate between the Tiber and the Appenines, but which is thus proved to be of later origin. Far above the drift is a layer of volcanic tufa derived from the latter chain, and this forms the foundation for towns which existed long before the building of Rome. Dating now from the latter event: from the known rate of disintegration of the rock forming this foundation, an approximate calculation can be made as to the period which has elapsed since the formation of the Latin hills, and it must be admitted that six thousand years is by far too limited a period to ascribe to the time of man's continuance on this mundane sphere.

In the discussion which followed the highly interesting remarks of Prof. McChesney—of which we have given above but the crudest summary—Prof. Hitchcock spoke of several cases which had come under his observation where so-called antiquarian traces might be easily explained away. The President replied that proof in the subject under consideration was cumulative; that while isolated cases might perhaps be explained, when the evidence is found in widely separated regions and under different conditions, it is but reasonable to acknowledge some connection existing between them.

Prof. Seeley called attention to the relation which this subject of man's great antiquity bore to the most important question of the age, *i. e.*, the unity or diversity in origin of the human family. The early relics of the "stone age" are found in both Americas, Europe and Asia, but their rude form proves that they were fashioned by tribes not excelling in either ingenuity or skill, and it may well be questioned whether—supposing we admit the claims for the plateaus of Central Asia as the birth place of the race—they were possessed of sufficient enterprise to traverse Europe, or, on the other hand, to scatter through Asia and reach the New World by the perilous passage of Behring's straits.

FRANKFURTH'S FUNNEL HEAT RADIATOR AND DAMPER.

With all the improvements in the construction of stoves, furnaces and other heating apparatus, much of the heat is wasted by passing off through the chimney. When a rapid draft is desired probably this waste, or a portion of it, is unavoidable, but devices are in use which retard the passing off of the products of combustion and yield a portion of the heat which otherwise escapes. Of the many contrived the engraving accompanying this description represents one of which the patentee says that 1,400 have been sold and not one returned as not having given perfect satisfaction.

Fig. 1.

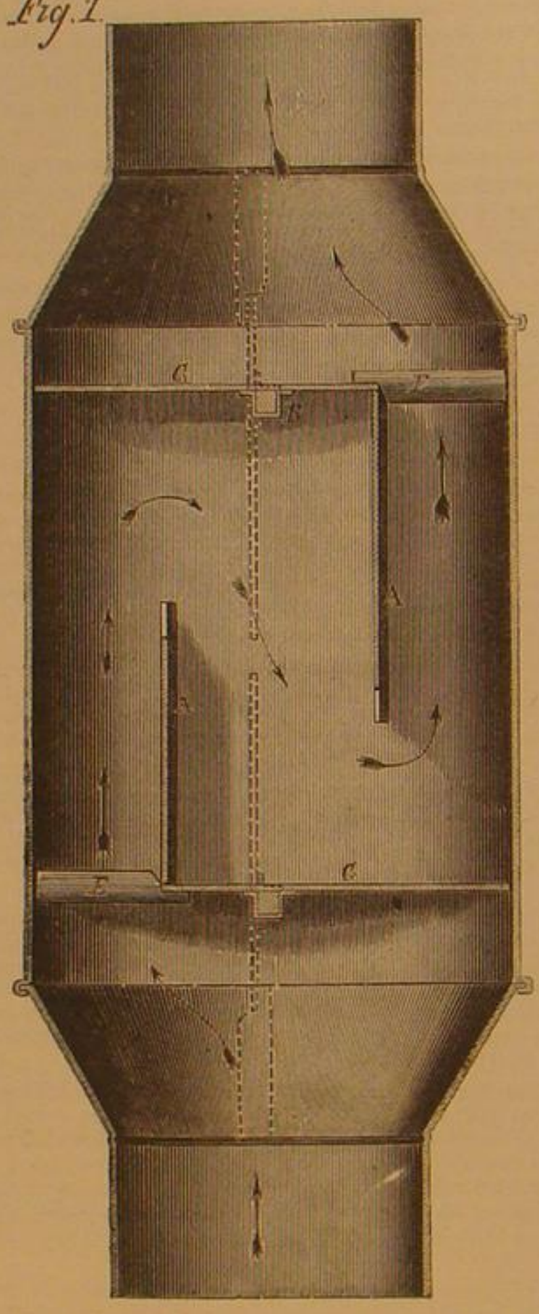
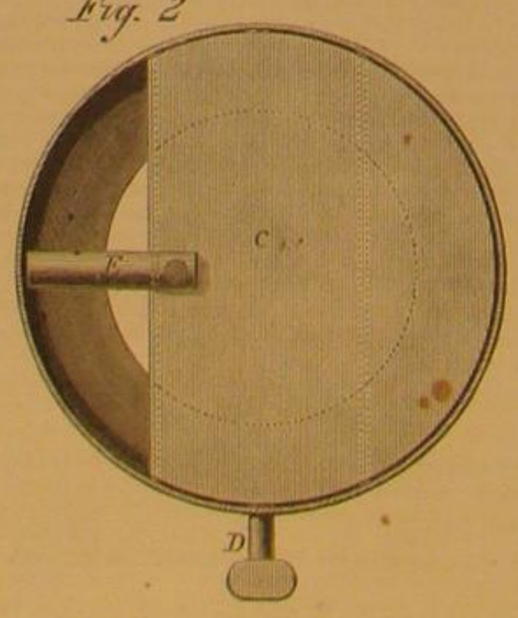


Fig. 1 is a vertical section of the drum containing the radiating partitions and dampers, Fig. 2 is a plan view of one of the dampers closed. The drum may be considered an enlargement of the stove funnel having longitudinal partitions, A, fixed midway between the axis of the drum and its exterior. B are shafts of the dampers, C, turned by the handles—one shown at D, Fig. 2. It will be seen that the dampers are

Fig. 2

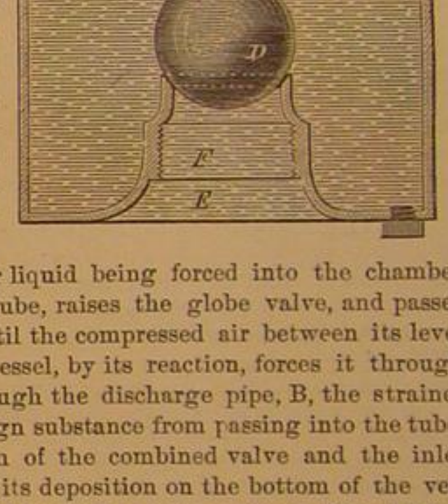


segments of a circle, the uncovered or open portion having attached a weighted bar, E—both figures—as a balance. When the dampers are closed as in Fig. 1, a space between the rim of the damper and the inside of the cylinder is free or open. The dotted lines in Fig. 1 show the position of the dampers when turned to give ample room for the escape of the gases, and those in Fig. 2 show the position of the permanent partitions. The arrows in Fig. 1 give the course of the up-rising gases.

When a fire is started in a stove or furnace to which this device is attached, the dampers, C, are opened to give the fullest draft. When the fire is well under way the dampers are closed and the gaseous products of combustion follow the direction of the arrows, and impinge on the inner surface of the drum, imparting their heat through this medium to the room. This device was patented through the Scientific American Patent Agency. January 24, 1865. All orders or communications relative to it should be addressed to Wm. Frankfurth, 306 Chestnut street Milwaukee, Wis.

HILTON'S IMPROVED AIR CHAMBER FOR PUMPS.

The object of the device exhibited in the engraving is to provide a method of procuring a steady and uniform current, and of straining the water from foreign matters held in solution or sedimentary deposits. The engraving presents a central vertical section of an air chamber showing the arrangement of the parts.



A represents the shell of the air chamber, and B an interior tube attached to the top of the chamber by an air-tight connection, C. The end of the tube is perforated, forming a concave strainer directly over the ball valve, D, which has its seat on the conical chamber, E. The lower tube of the pump is connected to the section of pipe, F. The annular space around the conical chamber, E, is a place of deposit for the sediment, which may be removed at the screw plug.

The water or other liquid being forced into the chamber through the lower tube, raises the globe valve, and passes into the chamber until the compressed air between its level and the top of the vessel, by its reaction, forces it through the strainer out through the discharge pipe, B, the strainer preventing any foreign substance from passing into the tube, and the conical form of the combined valve and the inlet chamber facilitating its deposition on the bottom of the vessel. The concave bottom of the strainer secures the return of the globe valve to its seat after having been raised.

This patent was obtained through the Scientific American Patent agency, November 19, 1867, by Richard H. Hilton, assignor to Mitchell, Allen & Co., who may be addressed relative to the invention, at Newbern, N. C.

Protection of Life in Public Buildings.

A suggestion from the dramatist, Dion Bourcicault, in regard to the protection of life and property from fire in places of public entertainment, which we find in one of our city exchanges, is worthy of notice. He proposes a plan like this:—Above the stage, and co-extensive with it, there is a gridiron floor, from which hangs the pendent scenery. Let the timbers of this floor, which is open work, be laid on their under-face with lines of small iron pipe, forming a gridiron pricked at every inch with holes; let this system be in communication with the water main. Let one lever which turns on the water be against the wall of the stage on the inside, another corresnonding lever contiguous but on the outside, so that the water may be turned on by a person either outside or inside the building. The effect of this operation would be to let fall a continuous and even deluge, more effectual in checking fire than the jet from the hose, because it not only addresses itself to the seat of the fire, but to adjacent material. A similar gridiron process should be introduced underneath the stage; another on the rafters over the auditorium, and a fourth in all available places around the ceiling, so placed that the rain from such would fall or be projected on the wood-work of the boxes and stalls. Each of these systems should have a separate main, so that each could be brought into operation separately; yet the whole might be under the operation of one master main, by turning on which the whole theater, from the back of the gallery to the rear of the stage, could be deluged in a moment.

MESSRS. C. A. STEVENS & Co's., jewelry establishment on Union Square, this city is one of the most elegant and complete houses of the kind in the city. It is the pioneer establishment of that portion of the town, and is well stocked with fine jewels, plate, bronzes, etc. The firm have associated with them Mr. Emile E. Evers, well known from his former connection with Messrs. Ball, Black & Co.

IN annealing hard cast iron or steel oxide of iron is useful. The scales of the forge should be saved for this purpose.

Scientific American.

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VOL. XVIII., No. 2....[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, SATURDAY, JANUARY 11, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

RAILROAD ACCIDENTS---IS THERE A REMEDY?

Whether the notion that boiler explosions, shipwrecks, railway collisions, and other moving incidents by fire or flood, are the results of an epidemic, the causes of which are beyond our ken and control, is true or not, it is certain that the past two or three months have been prolific in at least one class of these appalling catastrophes—that of railroad accidents. It would be a useless harrowing-up of the sensibilities of our readers to relate the particulars, which they have probably read in other journals; but it may be well to refer to some of the circumstances attending these lamentable occurrences, with a view to discover some remedy which may be employed to mitigate the horrors, if not to prevent the repetition of such accidents.

The throwing of cars from the rail, and their after precipitation down a steep incline, appears, if we may judge from the accounts of such accidents, to be due to a number of causes, among which we shall not reckon the breakage of axles, etc., except merely to refer to them, as these depend mainly on the carefulness and good judgment of the iron-worker, or are of a character to be detected, by the employés of the road, in season to prevent serious consequences. But according to varying statements in regard to the late accident at Angola, N. Y., on the Lake Shore road, by which about forty persons met a miserable death, the last car of the train was thrown from the track at a "frog," because of a break in the flange of one of the wheels, or because of the spreading of the track, or because of the improper position of the wheels for the track, the car being known as a "compromise" car, adapted or intended to run on tracks varying in width between the rails. Perhaps some of our readers will not understand what a compromise car, or a compromise truck, is. It is simply a truck which is intended to run on a track of either four feet eight inches or of four feet ten inches spread, these being the varying gages of the New York Central and Lake Shore roads. The compromise car wheels are made wider than common car wheels on the tread, and allow, of course, a "play" or lateral motion of three-quarters of an inch. Possibly we may never know the real cause of this accident, which precipitated two passenger cars down a steep embankment, killing half a hundred, and maiming or wounding as many more.

The soundness of car wheels is tested generally by an expert passing along by a train at stations, and tapping the wheels with a hammer, by the sound of which he judges of their condition. Probably experience will enable the operator to detect any flaw or crack in the body of the wheel, but hardly the fact of a piece being broken out of the flange, which portion may be hidden by the rail, so as to be invisible. According to the testimony taken before the coroner's jury, the track at Angola was in good condition, and perhaps the use of the compromise trucks may, after all, have been the real cause of the accident. Either of the conjectured causes are measurably within the power of man to remove; the latter certainly is.

But if the throwing of a car from the track cannot be certainly prevented, the splintering and demolition of the car and the burning of its inmates are preventable. As long ago as 1851, we published, on page 388, a description, with illustrations, of an iron passenger car, contrived by Mr. T. E. Warren, of Troy, N. Y., made either of plain or corrugated wrought-iron. It was elegant in appearance, light, substantial, and safe; but, after struggling for years, and spending his substance to procure its introduction, Mr. Warren became discouraged, left Troy, and, we believe, has since died. The New York and New Haven railroad has adopted for one car on a train a method of heating, entirely safe, and infinitely better every way than that by means of stoves burning wood fuel. It is a single coal stove, provided with a water-back and pipes, a single coil passing under each seat and returning to the leading pipe. By this means a constant circulation of hot water is kept up. A small stove is used, which can be rigidly secured to the car, and no easily-opening door or cover be left to discharge the coals among the passengers, in case the car was thrown down the embankment. In Germany a boiler-car has been attached to a train, with pipes leading through every car. This, as well as a proposition from a correspondent to use steam direct from the locomotive, has objections which will likely prevent its introduction. The plan of the New York and New Haven road appears to be the most feasible we have seen tried or heard suggested.

There would appear to be no adequate reason for adhering to the use of kerosene or other inflammable and explosive fluids for lighting the cars of a train. The horrors of the Angola accident were doubtless enhanced by the ignition of the oil contained in the lamps; and the burning of four ladies —sisters—and one man in a car near Cincinnati, and the destruction of a mail car in Jersey City by the overturning of a kerosene lamp, are fresh in the minds of all. Gas, condensed in receivers attached to each car, and replenished at each end of a route, or at intermediate stations, would prevent the addition of fury to the flames of a burning car. It would seem that the adoption of such obviously effective preventatives might save the passengers of an overturned car from the additional horrors of a death by fire.

It is stated that after the car leaped the track at Angola, and after the signal to "down brakes" was given, the train moved from 1,000 to 2,500 feet with one, and—a part of the distance—two cars off the track before its headway was stopped. All accounts agree that if the train could have been stopped ten seconds sooner, the accident would have been comparatively trifling in its consequences. On pages 78 and 102, Vol. XVII., we gave accounts of trials on the New Jersey Central railroad of a steam brake, invented by Mr. William Loughridge, of Paterson, N. J. By reference to page 102, last volume, it will be seen that the steam brake brought the train to a stand-still from a speed of 50 miles per hour, in a distance of 721 feet, while the same train, at the same speed, required 1,817 feet to be stopped by hand brakes. Many otherwise disastrous accidents might be wholly prevented by the use of such a device. Frequently the danger if ahead, is not descried in time to bring the train to a halt before the locomotive has arrived at the point, especially if the track is slippery, the train on a down grade, or running at full speed.

The Norwalk, Conn., accident, some years ago, occasioned by an open draw at a bridge, has been followed, from time to time, by others, caused by misplaced switches and open draws. The carelessness or inattention of switchmen or draw-tenders seemed to be beyond remedy; but this carelessness is now without excuse, as may be seen by referring to page 277 of Vol. XVI. of the SCIENTIFIC AMERICAN. The magnetic switch signal and alarm there described and illustrated, appears to be effectual in preventing accidents from these causes. It is the invention of Mr. Thomas S. Hall, of Stamford, Conn., and is in daily and hourly use on the New York and New Haven road. At Stamford it has been employed for the past six or eight months at the depot, where there is a constant succession of trains and a frequent use of the sidings, yet it has never failed to exhibit the danger signal and give an alarm whenever the switch was moved from the main track. Its mechanism is so simple as to be almost impossible to get out of order, and its first cost and subsequent expense is trifling. For a description we refer our readers to the article mentioned above; the utility of the device is shown in its successful use where introduced.

From the above it appears evident that it is from no lack of devices, intended to guard against railway accidents, that they are of so frequent occurrence—from no lack of contrivances, the value of which has been determined by repeated experiments—yet the slaughter of human life and the destruction of valuable property still goes on, apparently unchecked. It may be asked: "Why are not these appliances and improvements adopted?" The answer must be made by railroad managers; we are unable to give a reason. It is certain, however, that the inventor has to seek and beg, as a favor, that test of his improvement which should be made as a right, which the safety of the public, if not the interest of the inventor, demands. Inventors of appliances for saving human life on railroads, and preserving railroad property, are too often treated by railroad corporations as swindlers having a design upon the corporation treasury; and even after proving the usefulness and value of their inventions, they are refused the adoption of their improvements and the consequent compensation. Indeed it is rumored that a number of our railroad companies in the New England and other States have combined to contribute a fund, ostensibly to defend themselves against malicious and vexatious prosecutions by inventors claiming improvements in use on the roads, but which is used to embarrass and "worry out" in litigation those whose brains, talents, and time have been employed in this direction.

The only resort appears to be legislation. This only has proved effectual in the use of appliances calculated to deprive railroad travel of some of its dangers. There are some honorable exceptions, two of which are mentioned above, but it is probable that nothing short of legislative enactment will render travel on our railroads free from the constant fear of death or maiming.

THE COMMISSIONERSHIP OF PATENTS.

We learn that Hon. W. D. Bishop, formerly Member of Congress from Connecticut, and also Commissioner of Patents for a while, is likely to be nominated as Commissioner of Patents again. He is now President of the N. Y. and N. H. Railroad, and has had large business experience. He formerly held the office of Commissioner of Patents and his administration was characterized by marked ability. Mr. Bishop's appointment would give general satisfaction. The name of Mr. Alfred B. Ely, was largely mixed up with that position last week, but we believe he has retired from the field. The name of Mr. Fox, of the Interior Department, has been suggested; also, ex-Gov. Farwell, who is now an examiner in the Patent Office. Governor Farwell is able and experienced. We should be glad to see him in the Commissioner's chair.

COMMUNICATION BETWEEN NEW YORK, BROOKLYN AND JERSEY CITY.

We publish in another column accounts, furnished by a correspondent, concerning the construction of sub-aqueous tunnels, with a view of showing the feasibility of establishing this means of communication between New York, Brooklyn and Jersey City. From these accounts it would seem to be no very difficult or expensive work to connect these great cities by a single tunnel which, although of small dimensions, would have an immense carrying capacity for passengers. Indeed through the proposed eight-foot tunnel it is stated that twice as many passengers can be conveyed as are now carried on all the combined Brooklyn ferries, and there would never be any interruption of travel by snow, ice, fog or collision. The proposed tunnel would be about the same in cross section as the Croton aqueduct which is 53½ feet. This great tube is over forty miles long, and was built in five years' time at an expense, including right of way, land, dams, bridges, reservoirs, and other large extraneous expenses, of about sixty dollars per running foot. The actual expense of constructing the tunnel proper did not probably exceed twenty dollars per running foot. We should be glad to receive information upon this point.

The area of the proposed sub-aqueous railroad tunnel as described by our correspondent is sufficient to take in cars of about the same interior accommodations as ordinary railway cars.

It is well known that the beds of the North and East Rivers are of such a nature as to present no serious obstacle to the laying down of tunnels. Undoubtedly the quickest and best way would be to dredge a ditch deep enough to contain the eight-foot tube and sink the same below the bed of the river; the construction and laying being executed on the plans of Trevethick and other distinguished engineers.

Between Brooklyn and New York the sub-aqueous portion of the tunnel needs to be only 2,000 feet in length, and an enterprising corporation might readily put it down and have it in operation in six months' time.

It is surprising that an intelligent legislature like that of the great State of New York should be disposed rather to hinder than to encourage its citizens in the construction of important public works like this. But it is a fact that the last legislature actually rejected the petition of the applicants for a tunnel charter, and granted charters to two companies for the erection of immense bridges between New York and Brooklyn. Only one of these bridges has been closely figured upon, so far as we are informed, and the cost of its construction is ascertained to be seven millions of dollars, and the time required for erection between four and five years.

A tunnel could be laid down and put in operation four years in advance of this bridge, the construction of both being commenced simultaneously. During these four years the stockholders of the tunnel would probably receive back their capital, two or three times over, in the shape of dividends.

The bridge will cost fourteen times more than the tunnel; consequently, in order to pay the same interest on its cost as the tunnel, the bridge must yield to its stockholders an income fourteen times greater than the tunnel.

It seems absurd to expend seven millions on a bridge when a tunnel costing one-fourteenth part of that sum will be able fully to accommodate the public. We learn from credible sources that the bridge project has been suspended for the present, owing to the difficulty of obtaining subscriptions.

BESSEMER STEEL---IS ITS SUPERIORITY ESTABLISHED?

A late number of the *Engineer* in a cautious article concerning Bessemer steel, assumes that although that, or steel of some kind, has been claimed to be superior to iron for ship construction, guns, armor plates, shot, girders, locomotives, and rails, the proof has yet to be produced. "The use of steel for shipbuilding purposes continues to be very limited indeed; steel guns are things of the past, Herr Krupp's doings to the contrary notwithstanding. We have little to hope from steel in the shape of armor plates. Girders, boilers, and locomotives continue, and apparently will continue to be made of iron, though steel has been fairly tried." The article goes on to show that in the use of steel for rails we are without sufficient data to warrant the change from iron rails which is so strongly urged by the advocates of the former; and cites as an instance of the possible unreliability of steel for this purpose the breaking of a Bessemer rail into three pieces, something which could not possibly have occurred to an iron rail under similar circumstances. The *Engineer* believes that the tests already made in regard to the comparative merits of Bessemer steel and iron lack, for the former the convincing proof which time and use only can supply.

So far as Bessemer steel as applied to railroads is concerned we are not prepared to take issue with the *Engineer*. It is certain that Bessemer rails have not been so thoroughly tested either in this country or England as to warrant a wholesale rejection of good iron rails and the adoption of steel by any cautious engineer. Perhaps too much stress has been placed upon the effect continual vibration and concussion exerts upon iron and steel, but it is certainly undeniable that in time they will more or less change the condition of the

material. Too many instances of the change by these causes of a fibrous texture to a crystalline structure are well authenticated to leave any doubt upon the subject. Not only do railway axles made of the toughest wrought iron invariably show a crystalline character when fractured, but even the axles of public carriages, subjected only to the jar of stone paved streets, present a similar appearance when broken. Whether this effect is often produced in iron rails, at least as laid in this country, where we allow "give" or spring and use wooden sleepers, we cannot say; every break we have ever seen appearing to be due to an original defect in the rail or to the inferiority of material. Still every forger knows that it is comparatively easy to make the toughest steel brittle by cold hammering. While an iron rail might retain its fibrous character until so worn on the face as to require replacement, the Bessemer steel rail might, from its superior resistance to wear, even if not from its inferior resistance to the crystallizing process, be in an unsafe condition internally while presenting a fair external appearance.

Under these circumstances it would seem that good management and discretion require that the substitution of steel for iron rails should be at present limited, and they be placed at such points on the road that while they could be exposed to the most thorough trials of frequent and heavy trains they could be examined daily and their condition be constantly known. The superiority of Bessemer steel over wrought iron in tensile strength, weight for weight, as it comes from the manufactory, may not be a matter of doubt; indeed all experiments seem to prove it beyond a peradventure, but the life of Bessemer rails and the changes they may undergo while being used on the road are to be ascertained only by time.

We think, however, that the *Engineer* goes too far in asserting that for other purposes Bessemer steel has failed to meet the expectations of its advocates. According to trials made at Manchester, Woolwich Arsenal, and the statements of such authorities as Fairbairn, Templeton, Scott Russell, and others, Bessemer steel has proved superior to the best cast steel and toughest wrought iron in tensile strength, the Bessemer requiring a breaking weight of 162,970 pounds, while Sheffield cast steel, ranking next in tenacity, broke with 130,000, and Swedish iron with 72,000. Thus it would seem that for permanent structures as bridges, buildings, ships, etc., not subjected to concussion and where lightness is a favorable if not a necessary quality, Bessemer steel deserves a foremost place in engineering material.

LOCOMOTIVE ENGINEERS—THEIR RESPONSIBILITIES AND ESTIMATION.

It may be doubted if any class of mechanics are so inadequately appreciated as locomotive engineers. Few others have responsibilities equal to theirs and none have more arduous and dangerous duties. The terms of their qualifications for the positions they hold are rigidly exacting. Generally they must serve a novitiate in the locomotive building or repair shop, and then a year—perhaps more—in the position of fireman or "greaser" before a machine is entrusted to their care. They are expected to have gained a sufficient practical knowledge of the locomotive engine, not only to run it and keep it in order, but to make at least temporary repairs in an emergency.

It might be supposed, under these circumstances, that their work would be appreciated by the public generally, or at least by their employers; yet it is seldom we hear of any recognition of their services, and presentations of merit by railroad companies to engineers are so few that it is difficult to recall an instance. Yet recorded occurrences of rare heroism on the part of locomotive engineers show that they are a noble class of men, and many cases of heroic self sacrifice have occurred which have never been publicly noticed. Instances of engineers sticking to the foot-board and throttle even in the plain and immediate view of almost certain death are not unknown; choosing rather to achieve a posthumous reputation for courage than to retain a life saved at the expense of honor.

The employment of the locomotive engineer is one of continually recurring perils. He stands as Uriah in the "fore front of the battle;" if there is danger ahead he is the first to see it and must be the first to meet it. If death comes to any it must come probably to him. And frequently he is without any warning as to what danger may be before him, and without signal or guide to avert it. In the darkest nights, when the fog may be "cut with a knife," he must drive his unpitying steed, over tressel work, bridge, and culvert, either of which may have been undermined by torrents or storms or burned by sparks from the locomotive of a preceding train, even if the evil passions of men have not combined to provide the means for a catastrophe. Miles away from the habitations of men, he may have no assurance that kindly hearts will prompt to timely warning. He cannot rest, cannot relax for a moment the vigilance which is the price of safety for himself as well as the hundreds of human lives behind him. Overlooking his fireman, noting the hight of the water in his boiler and the pressure of the steam, keeping his eyes directed ahead and his hand on the throttle valve or reversing lever, he must be continually wide awake and watchful while on the road. Such labor is exhausting; it affects the mental as well as the physical powers.

The jars and jolts of the locomotive are believed to tend greatly to the impairment of the engineer's health. The violence and extent of these shocks can be understood only by those who have ridden the iron horse. The passengers in the upholstered cars conceive but a faint idea of the movements of the locomotive from the easy swinging of the cars. At times the whole machine, with its tuns of moving weight appears to leap from the track; it jerks from side to side of the road as if a sentient organism in spasms, and shakes the engineer and fireman in every fiber of their bodies. With all this the engineer must not allow his attention to be diverted from his duty. He gets to learn the present condition of his machine even by the noise it makes as it echoes through cuts or tunnels or spins hummingly along the open track. If a single thing is wrong his educated ear detects in the darkest night what his obscured sight fails to discover.

The perpetual strain upon the mind—the sense of never mitigated responsibility—and the continual facing of possible death or disaster more or less affects the mental character of the locomotive engineer. He partakes of the character of his machine—of which he becomes insensibly a part—and is sometimes rough, perhaps, in manner, always ready, and blunt in his communications with others. But from his position and the demands of his office he seldom speaks—never converses—when on the engine. Thus he becomes in time taciturn, in manner, although not in reality. This brusqueness and reticence if not a part of his duty becomes a part of his character, and even if time permits, he seldom allows himself to unbend in social life. With such responsibilities as he bears levity soon becomes gravity, and light heartedness, seriousness.

It is not too much to say that the locomotive engineer, rather than the conductor, is the real manager of a train. The latter mingles with the passengers, and being ostensibly what his title imports, he receives the credit for a favorable issue out of a threatened danger, which more properly, in many cases, belongs to that isolated individual, the locomotive engineer.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 24, 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
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72,439.—TRACK-CLEARER.—Ernesto Abbiati (assignor to himself and John N. Longhi), New York city.

I claim, 1st, The application to a track and street cleaner, of oscillating wings, H H, operated by means of crank shafts, E E, to which planetary motion is imparted, substantially as herein shown and described, and for the purpose specified.

2d, The oscillating wings, H, when arranged upon and operating in combination with a revolving disk, D, all made and operating substantially as herein shown and described.

3d, The track cleaner, when consisting of the revolving disk, D, carrying the oscillating wings, H, in combination with the brushes, I I, all made and operating substantially as and for the purpose specified.

72,440.—MORTAR MILL.—Alfred A. Anderson, Galesburg, Ill.

I claim a mortar-mixing machine, consisting of the case, A, provided with a hopper, B, detachable end piece, A', and the gear wheels, b c, arranged to operate a grinding or mixing cylinder placed within the hopper, the whole constructed and mounted on a carriage, substantially as described.

72,441.—CAR COUPLING.—Cyrus P. Bachelder, Franklin, N. H., assignor to himself, Daniel Barnard, and Stephen Kenrick.

I claim the apparatus for raising links, consisting of the cross bar, a, with its handles, a', and brackets, b, in combination with the rods, d, spiral springs, h, and cross piece, c, all operating substantially as and for the purpose described.

72,442.—DEVICE FOR ATTACHING POSTAGE AND REVENUE STAMPS, ETC.—Charles H. Bacon, Springfield, Ohio.

I claim the case, A, having knives, G, with inclined edges projecting from its interior faces, in combination with the follower, B, substantially as and for the purpose set forth.

72,443.—CARPENTERS' PLANE.—L. Bailey, Boston, Mass.

I claim the auxiliary point of impact between the cap and the thin plane iron, at the point or portion thereof where the thin steel tends to buckle under the pressure of the cap upon the projecting edge of the plane iron, substantially in the manner described.

72,444.—EXTENSION LADDER.—Hosea Barns, Somers, Wis.

I claim the hooks, D, attached to the shie pieces, a, of the sections or lengths, B C, when the latter are connected together by the rounds, c, passing through oblong slots, d, in the side pieces, a, and the lower ends of the latter are provided with notches, b, to fit over rounds, e, all arranged in the manner substantially as shown and described.

72,445.—TRUSS.—John Randolph Blake, and John Lewis Jarrell, Dyer Station, Tenn.

We claim, 1st, The pads, when applied to the under strap of a body belt, substantially as and for the purpose described.

2d, The side straps, H, in combination with the above, substantially as described, for the purpose specified.

72,446.—FLY TRAP.—Almeron Bristol, Constantine, Mich.

I claim, 1st, A bell glass or erect glass cylinder, closed at the top, and having the lower edge turned up inside, to form a trough, as described, and for the purpose specified.

2d, And in combination with the bell glass or cylinder described, the standard, provided with a screw and nuts, to adjust the hight of the glass.

72,447.—TOOL-HOLDER FOR SLIDE REST.—Israel F. Brown, New London, Conn.

I claim the notches, d x, in the tool, in connection with the wire, e, or its equivalent, in the V groove, in the gib or key, substantially as and for the purpose set forth.

72,448.—SKATE.—George Brownlee, Princeton, Ind.

I claim, 1st, The foot rest or support, and runner or blade, of a skate, when transversely divided, substantially as and for the purpose described.

2d, A foot rest or support to the skate, when provided with a driving jaw or jaws, substantially as described, for the purpose specified.

3d, The edge or strip applied to the runner or blade of a skate, substantially as and for the purpose described.

72,449.—DOOR SPRING.—Charles Burnham, Philadelphia, Pa.

I claim, 1st, In combination with a rod or torsion door spring, the screw-threaded cam or worm, G, or an equivalent thereof, as described, engaging with the notched burr or wheel, D, on the end of the said torsion rod, for the purpose of graduating the tension thereof, substantially as described.

2d, In combination with the above, the double socket or receiver, E, for supporting the notched wheel, D, substantially as described.

72,450.—GUIDE FOR WATER WHEELS.—Nathan F. Burnham, York, Pa.

I claim the guide constructed with a bevelled surface, as at y, such bevelled surface forming one side of the entire throat, formed by the respective pairs of guides, substantially in the manner and for the purpose described.

72,451.—WASHING MACHINE.—Jacob B. Byers, Geneseo, Ill.

I claim a washing machine, having the stationary inclined corrugated board, C, and the swinging beaters, D, suspended and pivoted within the box, A, with the inclined bottom, B, all arranged as shown and described.

72,452.—MUSKETO AND FLY NET.—Eben O. Carrington, Philadelphia, Pa.

I claim the polygonal bars, c, with end spring sections, in combination with the tapes or strips, e, and fold, f, as and for the purposes specified.

72,453.—BASIN FAUCET.—James Chambers, Boston, Mass.

I claim the combination as well as the arrangement of the two valves, F G, their seats, h i, the passage, k, the valve chambers, b c, the standard, A, and the stem, E, provided with operative screws, o, as specified.

Also the combination as well as the arrangement of the nozzle, B, the standard, A, the stem, E, its operative screws, o, the valves, F G, their seats h i, and chambers, b c and the passage, k.

Also the combination of the tube, e, the flange, f, and the two elastic annuli, h i; also their arrangement with respect to the screw joint, a, of the parts, A C, as described.

Also the combination of one of the valves, F G, with its stem, by means whereby one may be adjusted thereon, with reference to the other, for the purpose of terminating the movement of the nozzle, as described.

72,454.—WATER WHEEL.—Rockwell Chapman, Buchanan, Mich.

I claim a water wheel consisting of a radially projecting hub, B, having the buckets, a, formed therein alternately on opposite sides, each bucket extending half way across the face of B, as shown in Fig. 2, and having the discharge passages formed on the sides by the overlapping plates, l, applied as described.

72,455.—TRAY FOR GAS PURIFIERS.—B. E. Chollar, Leavenworth, Kansas.

I claim, 1st, A purifying tray substantially as shown and described and for the purpose set forth.

2d, The grate bars, a, in combination with the pectinated bars, A, and the binders or clamps, B, substantially as shown and described and for the purpose set forth.

72,456.—DOUBLE CULTIVATOR PLOW.—Philip Coonrod, Keithsburg, Ill.

I claim the cultivator consisting of two separate gangs of plows, G G, each gang constructed of curved iron bars, g g, as described, and adjusted by means of clevis, H, and box, C, both constructed and operating substantially as herein set forth, in combination with axletree, A, constructed as described, boxes, D D, and draft rod, E, substantially as set forth.

72,457.—SHUTTLE.—George Crompton, Worcester, Mass.

I claim, in combination with the bobbin spindle, the spring, f, and strut, k arranged to operate substantially as set forth.

Also the hinge latch plate, l, the spring, s, and the stop pin, t, when combined and arranged together, and relatively to the bobbin spindle, substantially as set forth.

72,458.—STEAM ENGINE GLOBE VALVE.—Alfred Crossley, Brooklyn, N. Y.

I claim, 1st, The chamber, c, in the upper part of the bonnet, E, above the screw thread by which the valve stem is raised and lowered, so that the smooth upper part of the valve stem will not come in contact with the screw thread in the bonnet, substantially as herein described.

2d, The arrangement of the packing, F, bonnet, E, and its recess, c, whereby to exclude water or steam from the screw thread in the interior of the bonnet, substantially as herein shown and described.

72,459.—BURGLAR ALARM.—Benj. F. Cunningham and Jeff. F. Cunningham, Flora, Ill.

We claim the arrangement of lever wire, D, in combination with wire, E, for the purpose herein specified.

72,460.—ARTIFICIAL FUEL.—Aaron M. Daniels, Hartford, Conn., assignor to himself and Benjamin Benett.

I claim a compound for artificial fuel substantially as described.

72,461.—ANIMAL TRAP.—W. H. Davis (assignor to Joseph Harlan), Lexington, Ind.

I claim, 1st, The crank shaft, C, operated by the spring, d, or its equivalent, in combination with the trap door, B, substantially as above set forth and described.

2d, The bars, G, in combination with the trap door, B, substantially as specified.

3d, The trigger, F, substantially as described, in combination with crank shaft, C, and trap door, B, substantially as above set forth and described.

72,462.—HARNESS SNAP.—Wm. F. Davison, Oliver A. Bates, Samuel M. Wilson, and Alva P. Russell, Janesville, Wis.

We claim, 1st, Ring, b, when constructed with a gain or flattened portion to receive and to be operated by spring, c, substantially as and for the purposes described.

2d, Hook, a, ring, b, and spring, c, when all constructed, connected together, and used substantially as and for the purposes described.

72,463.—SCREW DRIVER.—Otis Dean (assignor to Dr. R. W. Young), Richmond, Va.

I claim, 1st, A screw driver capable of being varied in length substantially in the manner set forth.

2d, Also the combination of the notched blade, B, and locking spring, C, constructed and arranged to operate as and for the purpose specified.

72,464.—TOOL FOR OPENING CANS.—Geo. A. Dickson, Woodcock Township, Pa.

I claim the cutting tool, constructed as shown at fig. 3, when the same is in combination with the cylinder, D, and the india-rubber packing, B C C, and the collar, E E, constructed as described, for the purposes set forth.

72,465.—MACHINE FOR BORING ROCKS.—Frederick Bernard Dœring, London, Eng.

I claim, 1st, Constructing engines or machinery for boring or working in rock or other mineral, in which the pistons of the small cylinders are operated by motive fluid, distributed by the main cylinder, without having been previously utilized in the main cylinder, as herein described.

2d, Constructing engines or machinery for boring or working in rocks, or other mineral, in which the main cylinder itself distributes the motive fluid at distinct portions of the stroke to other cylinders, as in the arrrngements herein described.

3d, Constructing engines or machinery for boring or working in rock or other mineral, in which the piston of the main cylinder, with the tool, has the required rotary motion imparted to it by a twisted bar, or equivalent, in combination with other parts, as herein described.

72,466.—STAND FOR ROCK-DRILLING ENGINE.—Frederick Bernard Dœring, London, Eng.

I claim, 1st, The combination of parts, substantially as herein described, and shown, in such manner that the bearing pieces for wedges or other fixing arrangements may have more than one point of support, and the carriage be therefore prevented turning round the carrying column, as shown in the drawings annexed.

2d, The combination of parts, in frames or stands, for boring or cutting engines, of a pivoted saddle or bow, with collars, columns and arms, with their clamping arrangements and moving gear for allowing the engine to be moved into any required position, substantially as and for the purpose herein described, and shown in the figures.

3d, The combination, with frames or stands for boring engines, of reservoirs and a tank for water, having the necessary inlets and outlets, substantially as and for the purpose herein described, and shown in figs. 1 and 8.

4th, The combination of parts of frames or stands, to be employed in sinking vertical shafts, substantially as herein described with reference to figs. 6 and 7.

72,467.—HEAD REST.—A. Dunlap, Clyde, Ohio.

I claim the section, A, consisting of the wire frame, C, and cushion, D, as arranged in combination with sections, B B', when constructed with sleeves or sockets, F, and cushions, E and H, in the manner and for the purpose substantially as set forth.

72,468.—LATHE TOOL HOLDER.—Jacob Edson, Boston, Mass.

I claim the arrangement of the clamp-holding projection, a, and the clamp, B, with the shank, A, and one or two cutters, C C', applied thereto, as specified.

Also, the holder shank, A, as made with the auxiliary projection, d, arranged with it and its clamp projection, as specified.

Also, the holder, as made with one or more notched or toothed grooves constructed in its head or front end to receive one or more tools or cutters held against such notches, as explained.

Also, the arrangement and combination of the two separate cutters or tools with the single holder and its clamp, as specified.

Also, the holder, as made with each of its grooves curved longitudinally, as and for the purpose above specified.

Also, the yoke of the clamp, as formed with the cap or cover, to extend over the projection, a, and that part of the screw of such clamp which extends within the projection receiving recess of the clamp.

72,469.—FENCE.—Augustin Ellis and Oliver Albertson, Salem, Ind.

We claim the obliquely projecting bars or bases, D, attached to the panels, A A, substantially in the manner as and for the purpose set forth.

72,470.—ANIMAL TRAP.—Augustin Ellis and Oliver Albertson, Salem, Ind.

We claim, 1st, The combination of the lids, D E, to the bait-box, A, tilting platform, L, wicket door, M, between said bait-box and the chamber, B, lever-stop, N, bar, P, lever, S, rod, T, crank-arms, I, crank-shaft, H, spring, J, and bait-hook and frame, U V, substantially as described for the purpose specified.

2d, The wicket door or doors to the communicating passage, C, provided with a flange piece or strip, or its equivalent, substantially as described for the purpose specified.

72,471.—FRUIT DRYER.—M. W. Florer, Bracken County, Ky.

I claim the box or chest, C, fruit holder, B, and pipe, E, when used in connection with the ordinary farmer's or cooking kettle for generating steam, substantially as and for the purpose described.

72,472.—SEED PLANTER.—Jos. K. Frantz, Goodville, Pa.

I claim, 1st, The plow blades, B2, and covering shares, F2, adjusted by means of the thumb screws, D2, in the beams, E2, and uprights, C2, secured to the carrying beams, Z, and by the lever, I2, attached to the cross rod, H2, at the rear of the machine, as herein described for the purpose specified.

2d, The brush, U, in the hopper, L, adjusted by means of the thumb screw, W, and guide posts, V, as herein described for the purpose specified.

3d, The hand lever, Y, and lever, I2, in combination with the shaft, F, for throwing the pinion, E, in and out of gear with the crown wheel, D, as herein described for the purpose specified.

72,473.—RAIL FENCE.—Ambrose Frayer, Ripley, Ohio

I claim the herein described fence, when constructed and arranged in the manner substantially as described, consisting of the side braces, F, so arranged that the yoke, E, embraces their upper ends, thereby holding them securely in connection with the posts, C, at the same time binding said posts together, whereby the rails are supported and kept in position between said post and upon the sills, B.

72,474.—APPARATUS FOR VENTILATING MILLSTONES.—Williston K. Fuller, Modena, Ill.

I claim the millstone, G, provided with the scroll wing, A, and tube, B, so arranged that the tube will pass down the eye of the stone a certain portion of its length, and through the corner at an angle, so as to open on the face of the stone a short distance from the eye, constructed and operating substantially as herein indicated.

72,475.—CHURN.—J. C. Gaston, Cincinnati, Ohio.

I claim the construction and arrangement of two perforated dasher heads, secured one above the other to the dasher handle, and having an equal number of perforations, and so placed that the perforations in one head shall be opposite the solid part of the other, substantially as and for the purpose described.

Also, in combination with the above, providing the cover with the air tube, c, with a semi-cylindrical shaped cap, e, as and for the purpose set forth.

72,476.—TIRE BENDING AND SHRINKING MACHINE.—Jacob Gettemy, Donegal, Pa.

I claim, 1st, The device for operating the rollers, E E, so that they may be moved in the desired direction, said device consisting of the crank shaft, C, in combination with the connecting rods, e e, sliding frames, D D, and grooves

or guides, f, in frame, A, all made and operating substantially as herein shown and described.

2d, The device set forth in the foregoing claim, in combination with the indicator, I, on shaft, C, the same being made as set forth.

3d, The indicating device, I, in combination with the roller, B, arranged as set forth.

4th, The roller, B, when corrugated as set forth, in combination with the rollers, E E, the latter traveling on inclined planes, substantially as and for the purpose herein shown and described.

72,477.—GATE.—Robert Gridley, Lagrange, N. Y.

I claim, 1st, A self closing gate, when arranged so that it is brought through the slotted post, B, and into an inclined position, when opened, substantially as herein shown and described.

2d, The gate, E, when consisting of horizontal bars, b b, pivoted to pickets, c, and when pivoted to a suspended bar, F, in combination with the shaft, G, having the crank, g, and the handles, f f', all made and operating substantially as herein shown and described.

3d, The above in combination with the locking levers, H H, connected by a rod, i, substantially as herein shown and described.

72,478.—MACHINE FOR FOLDING SHEET METAL.—Leroy A. Gleason, Southington, Conn.

I claim, 1st, The combination of the folding bars, F G, disk, c c', frame, D, rod, R, cam, I, and arms, K, operating as described, for the purpose of making a round or sharp bend, substantially as herein set forth.

2d, The combination of the folding bar, F, hinged arms, K, hinged frame, D, upright rods, e, secured to the plate, E, rod, R, cams, I, and arm, o, all operating as described for the purpose of clamping the metal to be folded, as and for the purpose specified.

72,479.—COTTON CULTIVATOR.—E. H. Goelet and E. B. Goelet, Goldsborough, Tenn.

We claim, 1st, The arrangement of vibrating knives or hoes, g g, between the scrapers, H H, and the sliding plows, J J, in a two wheel machine, substantially as and for the purposes described.

2d, The right and left hand knives, g g, formed on or applied to shanks, e e, secured together and applied to a rock shaft, G, substantially as described.

72,480.—STEREOSCOPE.—Oscar Georke, Brooklyn, N. Y.

I claim, 1st, The picture holder, C, constructed as described, consisting of the end wires, c', in the bars, c3, their upper ends bent to form a horizontal loop for the ends of the pictures, and the central pin, c2, as herein shown and described.

2d, The combination of the octagonal rollers, D E, endless belt, B, picture holder, C, sliding bar, F, guides, G, cord, H, and pin, I, all arranged and operating as herein described for the purpose specified.

3d, The combination of the set or adjusting screws, I, cords, H, sliding bars, F, and flanges or keepers, G, with each other, and with the shaft or cylinder, E, and box, A, substantially as herein shown and described, and for the purpose set forth.

72,481.—FILTER.—Geo. W. W. Goodwyn, New Orleans, La.

I claim the combination of the exterior vessel, A, with the inner vessel, C, provided at its lower end with a filter chamber, E, all constructed and arranged substantially as and for the purpose set forth.

72,482.—CAR COUPLING.—Robert Goole, Abingdon, Ill.

I claim, 1st, The bar, g, upon the shaft, F, provided with the slotted arm, l, fitting over the head of the set screw, J, in the inner end of the pivoted hook, D, in combination with the lever, K, and chain, l, as herein described, for the purposes specified.

2d, The arm, h, in combination with the hooks, d, and shaft, F, as herein described for the purpose specified.

3d, The car coupling constructed as described, consisting of the hooks, D, and links, C, upon each side of the draw heads, B, rock shafts, F, bar, g, arms, h, slotted arm, i, set screw, J, chain, l, and lever, K, all constructed and arranged to operate as herein shown and described.

72,483.—SKATE.—Ferdinand Haase and Wm. Rost, Proviso, Ill.

We claim a skate frame provided with the laterlly adjustable toe clamps, E, the adjustable sliding clip, G, made to embrace the shank, t, and being held in place by the spring, g', engaging in the notches in shank, I, and the heel clip, H, operated by the screw, S, all arranged to operate substantially as shown and described.

72,484.—COMBINED HORSE AND WAGON BRAKE.—G. Haberland, Pontiac, Ill.

I claim, 1st, A horse brake consisting of the front-leg straps, G G, hind-leg straps, I I, and cords or lines, J and J', the latter fitted over pulleys, l, and all combined with the drum, D, arranged in the front part of the wagon, substantially as herein shown and described.

2d, The above, in combination with the wagon brake, f f, connected with the drum by means of a cord or line, h, provided with the lever, I, substantially as herein shown and described.

72,485.—HORSESHOE.—Patrick Hanley, New York city.

I claim the bevel, a, in the horseshoe, the plates, B G, and their connections, substantially as and for the purposes described and set forth.

72,486.—NUT FASTENING.—William Harris, Rush Run, Ohio.

I claim a nut which is provided with a perforated locking cam, substantially in as described.

72,487.—TAPPING NUTS.—H. C. Hart and J. R. Blakeslee (assignors to Hubert C. Hart and Luther T. Moses), Unionville, Conn.

We claim, 1st, The combination of the shaft, c, cam, h, lever, h', and drill spindle, I, substantially as described.

2d, Also, the employment of the tooth wheel, k, rack, k', nut box, m, conductor, m', belts, s s, to introduce the nuts to the action of the tapping tool, i, substantially as and for the purpose described.

3d, Also, the belt shifter, g, constructed substantially as described, in combination with the drill and drill spindle, all arranged and operating substantially as set forth.

4th, Also, the improved machine for tapping nuts, constructed and operating substantially as set forth.

72,488.—METHOD OF LINING HOSE.—Howard Hartley, Pittsburgh, Pa.

I claim the herein-described method of inserting and attaching spiral metallic lining to hose.

72,489.—STEAM GENERATOR.—J. M. Harvey, Buchanan, Va.

I claim the construction and arrangement of the within-described steam generator, in a manner substantially as shown.

72,490.—MACHINE FOR THREADING SCREWS.—Harvey J. Harwood and William H. Mickle (assignors to Harvey J. Harwood and John F. Seymour), Utica, N. Y.

We claim, 1st, The combination of the reciprocating dies, A and B, and guides, k l and m.

2d, Also, the construction of the curved part of the threads on the die that forms the point of the screw of increased pitch, as described.

3d, Also, the channels, v v v, in the dies, A and B, that extend beyond the part of the die that forms the point of the screw.

4th, Also, the general arrangement of the parts whereby the dies are enabled to operate upon two screws during each revolution of the crank, E.

5th, Also, the opening and closing of the guides, k l and m, in the manner and by means substantially as described.

6th, Also, the guides, k and l, and their arms, o and n, arranged in the manner and for the purpose described.

72,491.—TOOL FOR SHARPENING HORSESHOE CALKS.—Nathan Hays, William Duncan, and E. H. Bowen, Vinton, Iowa.

We claim the combination of the lever, A, with the jaw, a, the pivoted dog, B, the forked lever, C, and the rotary cutter, d, constructed, arranged, and operating substantially as and for the purpose described.

72,492.—MACHINE FOR PUNCHING RUBBER INNER SOLES.—Edwin A Hill, Quincy, Mass.

I claim the machine, substantially as described, as composed of the die plate, C, the punches, c, the clearer, F, the centralizers, i, the depressers, m, and their screws, o, constructed, arranged, and combined together, and with a frame, A, and mechanism for giving vertical motions to the punches, centralizers, carrier, and depressers, as specified.

72,493.—DOOR PLATE AND LETTER BOX.—Edward A. Hopkins, Minneapolis, Minn.

I claim, 1st, The construction of an ordinary metallic and glass door plate, with a double frame, A and B, and the arrangement of B within A, so as to form a letter-box lid.

2d, The combination, with B, of the spring, C, and hammer, D, for the purpose of striking the bell, E, as the lid falls, all substantially as and for the purpose set forth.

72,494.—COMBINED TIME AND PERCUSSION FUSE FOR EXPLOSIVE SHELLS.—B. B. Hotchkiss, New York city.

I claim, 1st, The employment, in an explosive projectile, of a quantity of quick-burning material, L, permanently attached and protruded beyond the front and directly exposed to the contact of flame on all sides, in combination with the surrounding borman, C, substantially as and for the purpose herein described.

2d, The magazine, G, of quick powder, arranged in direct contact with the borman, and adapted to be ignited at the proper time thereby, and to increase the force with which flame is thrown into the shell, substantially in the manner herein described.

3d, In the cavity magazine, G, arranged as represented, the use of powder, in one or more large grains, in combination with the contraction, g, smaller than said grains, and arranged to operate therewith and retain the powder but discharge the flame therefrom, substantially in the manner and for the purpose herein set forth.

72,495.—GATE.—H. Hunt, Delavan, Wis.

I claim the arrangement and combination of pulleys, J K, attached to bracket, H, with cords, n and m m, used for operating gate, L, on places, F F, the latter having a curve, Z, substantially as set forth.

72,496.—WELL REFRIGERATOR.—Daniel Hyre, Union, Ohio.

I claim the combination and arrangement, in a well refrigerator, of the several parts, viz., platform, B, with doors, C, frame, A, cupboard, D, roller, E, wheels, K and L, crank, M, cords, n n, pawl, h, and friction block, F, substantially as described and for the purpose set forth.

72,497.—MACHINE FOR BORING POSTHOLES.—Wm. R. Hes, West Rushville, Ohio.

I claim, 1st, The bracket, D, suspended on the journals, f f, in combination with the gear wheels, substantially as described.

2d, The hinged valves or wings, G', in combination with the cutting bits, substantially as shown and described.

72,498.—SAW MILL.—Wm. Inman, Middletown, N. Y.

I claim the securing of jig or muley saws to their slides by means of clamps, B, composed each of a yoke or frame, with an eccentric fitted therein, and attached to the saw slides, substantially as shown and described.

72,499.—DOOR LOCK.—Henry Jackson, New York city.

I claim, 1st, The bolt, B, composed of the two parts, a b, the former, a, having the tumblers, D, attached, and the latter, b, provided with the pin, j, to act against the tumblers in order to force them back, and with them the bolt, substantially as shown and described.

2d, The notches at edges of the tumblers, D, against which the pin, j, bears, in order to lock the tumblers after their slots, i, have been adjusted in line with the stamp, C, substantially as shown and described.

3d, The expanding stump, C, in combination with the slide, b, of the bolt, provided with the slot, k, for compressing the stump in order that the slots I, may receive it, substantially as set forth.

72,500.—BLEACHING AND SCOURING HEMP, FLAX, AND OTHER FIBERS.—Léon Jarosson, Lille, France.

I claim, 1st, The apparatus represented in fig. 1, for scouring the hanks of threads by means of dry steam.

2d, The arrangements relating to the whole of the successive cream coloring and bleaching of the threads, as illustrated in figs. 1, 2, 3, 4, 5, 6, 7.

3d, The drier for said threads, represented in figs. 8 and 9.

4th, The drier for fabrics, as represented at figs. 10 and 11.

72,501.—CORN PLANTER.—Hans J. Johnson, St. Peter, Minn.

I claim, 1st, The combination of the bent lever, H, pivoted bar or plate, G, connecting rods, F, rings, E, and toothed clutch wheels, D, with each other and with the frame, A, axle, B, and hubs of the wheels, C, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the pivoted catches, J, levers, K, and bent lever, L, with the toothed clutch wheels, D, frame, A, and suspended bars or plates, M, substantially as herein shown and described and for the purpose set forth.

3d, The dropping spout, N, and bar or plate, M, constructed as described, in combination with each other and with the bent lever, L, substantially as and for the purpose herein set forth.

4th, The sliding frame, R, and adjustable bars, T, in combination with the slide, P, hopper, O, and double incline, m', upon the bar, M, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the arms, S, with the sliding frame, R, and with the double incline, m', formed upon the bar, M, substantially as herein shown and described, and for the purpose set forth.

6th, The combination of the spring, W, with the dropping spout, N, substantially as herein shown and described and for the purpose set forth.

7th, The combination of the adjustable stops, X, with the dropping spouts, N, substantially as herein shown and described, and for the purpose set forth.

8th, The combination of the bent lever, Y, with the levers, L, for the purpose of raising and holding the dropping device away from the ground, substantially as herein shown and described.

72,502.—LEVER LOCK FOR WAGON BRAKE.—Wm. K. Johnson, Cordova, Ill.

I claim, 1st, The combination of a pivoted self-locking lever, J, and segment E, with the vibrating hand-lever, G, substantially as described.

2d, The fixed segment, E, passing through both the hand-lever, G, and its pivoted spring-locking lever, J, substantially as described.

3d, The stationary frame, F F, in combination with hand lever, G, locking lever, J, spring, b, and a connecting rod, a, constructed and operating substantially as described.

72,503.—HAND TRUCK FOR MOVING BARRELS, ETC.—T. W. Kennedy (assignor to himself and Thatcher Nickerson), Avon, Ill.

I claim the bent lever handles, d d, and the hooks, h h, in combination with the truck, A, constructed and operating substantially as and for the purpose herein described.

72,504.—FARM FENCE.—H. A. Kephart, Fletcher, Ohio.

I claim the bars or buttons, C, pivoted to the stakes, B, and applied to the panels, A, in the manner substantially as shown and described.

72,505.—BUNG CUTTER.—Josiah Kirby, Cincinnati, Ohio.

I claim, 1st, The chisel or cutter, D, with cylindrical cavity, in combination with the plunger, c, and feeding bar, i, constructed and arranged substantially as described, for the purpose of cutting bung blanks from separate square blocks of wood.

2d, The combination of feeding slide bar, i, feed box, C, guides, o o, and spring o', for feeding successively one of a series or pile of bung blocks forward in exact line with the cutting edge of the chisel of a bung machine, operating substantially as described.

3d, The cutter, D, feeding slide bar, i, and plunger, c, so arranged relatively to each other, as that the cutter or chisel shall, when cutting, have at least two blocks or blanks in line with its cutting edge, and that, at each stroke of the machine, the cutter shall finish cutting one block or blank, and enter and partly cut a second blank, instead of cutting a single blank at each stroke, substantially as and for the purpose hereinbefore described.

4th, The cutter and feeding device of a bung-cutting machine, arranged, substantially as hereinbefore described, as that each block, as it is fed into the machine shall serve as a cutting board for the next preceding block.

The use of the hinged bar, m, in the slot of the sliding feed bar, i, in combination with the vibrating shaft, h', whereby, by raising the bar, m, the motion of the feed bar, i, is suddenly arrested, without stopping the motion of other parts of the machine.

72,506.—CANDLE HOLDER.—Chas. Kirchhof, Newark, N. J.

I claim, as a new article of manufacture, the hook, a b, in combination with rod, d, ball, f, and holder, c, or any equivalent, when constructed and arranged in the manner described, and for the purpose specified.

72,507.—STAIRS.—John Koch, Brookline, Mass.

I claim the combination and arrangement of the plate of cork with the stair step, the whole being as and for the purpose hereinbefore specified.

72,508.—SYRINGE VALVE.—Nathan Lawrence, Taunton, Mass.

I claim the syringe valve, B, when placed within the metallic cylinder, A, with its stem extending into the smaller portion of the cylinder, and prevented from falling out by means of transverse rod, D, or projections, a, as herein shown and described.

72,509.—CARD-GRINDING CYLINDER.—J. O. Lewis, Worcester, Mass.

I claim making the rim or metal part, B, with a series of teeth, a, substantially as shown and described.

72,510.—HEAD BLOCK.—M. C. Lewis, Glasgow, Mo.

I claim the double hand levers, a a', connected separately with the head blocks, B B', by the rods, d d', operating in such a manner that, when the levers are connected together, both head blocks are moved simultaneously, and, when disconnected, each lever moves a different head block, as herein described, for the purpose specified.

72,511.—ROAD SCRAPER.—L. W. T. Lodge, Petersburg, Ky.

I claim the arrangement of the scraper, D, hinged to the broad heel plate, a, the double catch, b, pivoted on the stock, A, and held by the spring, c, and the side springs, d d, pivoted to the beam, B, and the upper corners of the scraper, all combined and operating as herein described.

72,512.—MACHINE FOR ROLLING CLEVIS BLANKS.—Michael Loughran, Pittsburg, Pa.

I claim one or more grooves, c, in the periphery of one of a pair of cylindrical rolls, with one or more notches or depressions, i, in the bottom of each such groove, all of the form substantially as described, in combination with the notched or mortised guides, n, for the purposes above set forth.

72,513.—APPARATUS FOR DIGGING PEAT.—James B. Lyons, Litchfield, Conn.

I claim, 1st, The clasping fork or scoop, H, as constructed, for digging and elevating peat from the bed.

2d, Also, the boom, D, supported on a truck, d, and circular rail, E, for the purpose of raising peat and delivering it, so as to be easily removed for use.

3d, Also, the peat-digging apparatus, as attached to the vertical shaft, in combination with the boom, derrick, rope, or chain, pulleys and windlass, operating substantially as herein specified.

4th, Also, the arrangement and combination of the eccentric cam, k, rod, n, bell crank, m, and handle, l, for controlling the digging and delivering apparatus, substantially as and for the purposes set forth.

72,514.—HARNESS PAD.—John Maclure, Newark, N. J.

I claim, 1st, The main plate, A, constructed substantially as shown and described, for the purposes set forth.

2d, The sub-plate, B, in combination with the plate, A, substantially as and for the purposes described.

3d, The lugs, b and c, on the sub-plate, B, substantially as and for the purposes described.

4th, The double-inclined planes, l, the slot holes and grooves, J, on the main plate, A, substantially as described and for the purposes set forth.

72,515.—MACHINE FOR PRODUCING STEREOTYPE MOLD.—John Mac Nair, New Orleans, La.

I claim, 1st, A series of disks, B, provided with two sets of types, and arranged with cords, d, pins, e, and weights, Q, to operate in connection with an index plate, K, substantially in the manner as and for the purpose set forth.

2d, The method, herein shown and described, of justifying or spacing and correcting the types, J, composing a word or sentence, and clamping the disks, B, as set forth.

3d, Releasing the pins, e, from the perforations in the plate, K, by swinging down said plate, or by any equivalent means, as herein shown and described.

72,516.—WINDOW-SASH LOCK.—Nathan F. Mathewson, Barrington, assignor to himself and Wm. C. Green, Providence, R. I.

I claim, 1st, The combination of the toothed sector and gear, provided with a key socket, or its equivalent, with the radial swing-bolt, applied to a case, as specified.

2d, Also, the combination and arrangement of the spring-dog, g, with the radial swing-bolt, its toothed sector, and the operative gear thereof, as provided with a key socket, or its equivalent, as set forth.

3d, Also, the arrangement of the radial spring-bolt, and its operative mechanism and receiving socket, with the two bars, I k, of the two sashes, in manner as specified.

72,517.—BANJO.—Jerome Mayberger, New York city.

I claim, 1st, The annular drum, B, when provided with a perforated sound board, a, substantially as and for the purpose set forth.

2d, The head, C, when constructed as described, and when provided with supports, g, in combination with the annular drum, B, the same having a perforated sound board, as set forth.

72,518.—POST DRIVER.—Silas McCullough and Alexander Robins, Buffalo, Ohio.

We claim, 1st, A post or pile driver, constructed with longitudinal beams, A A, resting on rockers, C C, which act in conjunction with the slots, d, all constructed and combined substantially as described, and for the purposes set forth.

2d, In a post or pile driver thus constructed, the hinged posts, B B, provided with braces, D D, constructed and operated as described, and for the purposes set forth.

3d, In like combination, the adjustable inclines, h h, as and for the purposes set forth.

72,519.—RAILROAD SWITCH.—S. C. Megill, Newark, N. J.

I claim the construction and arrangement of the bent lever, E, pivoted to the tie, F, its inner arm, a, connected to the bent lever, H, by the jointed rod, G, its outer arm, c, connected to the angular lever, J, by the bent rod, I, and its arm, d, pivoted to the transverse rod, e, bearing the switch rails, C, all operating as described, for the purpose specified.

72,520.—HOT AIR FURNACE.—Geo. F. Merkles, N. Y. city.

I claim, 1st, The combination, in an air-heating furnace, of the plate, G, constructed substantially as described, with the air passages, I I I I I, and annular flue, b, for the purpose as set forth.

2d, The combination, in an air-heating furnace, of the dome, e, air passages, I I I I I, and annular flue, b, with the cylinder, J J, or its equivalent, substantially as and for the purpose set forth.

72,521.—GRAVER.—Ralph S. Mershon, Zanesville, O.

I claim, 1st, A graver, so connected to its handle or holder that its cutting edge can be adjusted substantially as and for the purpose described.

2d, Also, a graver having a short base, a, and continuous face-line, b, substantially as and for the purposes specified.

72,522.—COMPOSITION FOR TEMPERING STEEL SPRINGS.—Wm. A. Meyer, Indianapolis, Ind.

I claim a compound of prussiate of potassa, muriate of ammonia, borax, resin, and crude lubricating coal oil, mixed in proportions as before stated, for the purpose of tempering steel springs.

72,523.—HARVESTER DROPPER.—Jacob Miller, Canton, O.

I claim so uniting the dropper by means of rods and levers to the hand lever, l or h, and to the foot lever, m, as that the driver in his seat, by means of a long lever extending up thereto, may work the dropper by his hand, or by his foot, through a separate connection, or by both together, under an arrangement of parts, substantially as herein described.

72,524.—PUTTING UP BLUEING AND OTHER DYES.—Edward L. Molineux, New York city.

I claim the method of preparing and packing soluble dyes or colors, substantially as herein described, and for the purpose set forth.

72,525.—CORN PLANTER.—R. W. Moran, Chicago, Ill.

I claim, 1st, The drums, F F, applied upon the axle, B, of a two-wheel frame, and provided with hoppers, E E, guards or aprons, G G, and plungers, b b, which latter are applied in the cells, a a, and caused to press the grains of corn into the ground, substantially as described.

2d, Applying both drums, F F, upon the turning axle, B, in such manner that said drums can be stopped or started at pleasure while the machine is being moved along, in combination with devices applied to the cells of said drums, which will automatically force the corn into the ground, substantially as described.

3d, Providing the movable plungers, b b, with levers, c, guides, c, and spring pieces a, substantially in the manner and for the purposes described.

4th, The markers, J, applied to adjustable drums, F, in lines with the seed cells thereof, substantially as described.

72,526.—BREECH-LOADING FIRE-ARM.—Wm. Morgenstern, Hartford, Conn., assignor to himself and Charles Herold.

I claim the double acting rotating and swinging breech-piece, d, hung upon the extractor hinge-piece, e, with the spring, e', arranged and operating substantially as described.

72,527.—RAILROAD TRACK LIFTER.—John Morton, Winchester, Ind.

I claim, 1st, The combination of the levers, A, for raising railroad tracks, with the chain or cord, C, and the mechanism for actuating the same, substantially as set forth.

2d, The arrangement of the mechanism for actuating the track-lifting levers, A, said mechanism consisting of the parts, C, D, E, F, G, and H, substantially as described.

3d, The combination of the pedestal, K, post, L, braces, B, and track-lifting levers, A, arranged to operate substantially as and for the purpose set forth.

72,528.—WATCH.—Don J. Mozart, New York city.

I claim, 1st, An escapement for watch or other time or other similar movements, in which are combined a cut-out staff and a cut-out eccentric detent, or their respective equivalents, connected together through a trip lever or other suitable device or devices, when both are constructed and arranged together for operation by the escape wheel, substantially in the manner and for the purpose described.

2d, A cut-out staff, a cut-out eccentric detent, and a trip lever, having one or more side arms, with its working faces curved or circular in shape, or any equivalent therefor, respectively, in combination with the escape wheel of a watch or other time or other similar movements, substantially as described, for the purpose set forth.

72,529.—VALVE FOR STEAM AND OTHER ENGINERY.—George Murray (assignor to himself and J. C. Chapman), Cambridgeport, Mass.

I claim the hollow expansion plug, B, made in two or more parts, with the spring, e, and provided with a direct passage, f, and an additional opening, g, for the entrance of the steam or water when the valve is closed, substantially as and for the purpose described.

72,530.—STEAM GENERATOR.—A. W. Newell, Bradford, Pa.

I claim, 1st, The apertures, F F F, etc., between the sections, for the purpose set forth.

2d, The combination and arrangement of the sections, A A, etc., the lugs, B B, etc., or their equivalents, the steam pipes, C C, etc., provided with expansion joints, D D, etc., or their equivalents, and the apertures or openings, F F, etc., when constructed substantially as and for the purposes described.

72,531.—STEPS FOR SPINDLES.—G. H. Noble, Lowell, Mass.

I claim the spindle, k, with its cap, j, receiving holes, i i, and distributing holes, e e, and case, a, the whole constructed, arranged, and combined substantially as and for the purpose herein specified.

72,532.—SLEIGH.—Harvey D. Palmer and James H. Beard, Leonidas, Mich.

We claim, 1st, The employment of the wheels attached to the arms, E E E E, and working in the slotted braces, C C C C, substantially as shown, for the purposes and uses expressed.

2d, The actuating lever, K, connecting piece, G, and slotted levers, F F, all as shown for the purposes described.

72,533.—MACHINE FOR REMOVING MOLDED FORMS FROM PRESS.—George Patten, Chester, Pa.

I claim, 1st, The adjustable palms, P P, in combination with the [illegible] and vibrating lever plate, D, or their equivalents, automatically operate to grasp a molded form with the pressure requisite for removal, substantially as set forth.

2d, Automatically grasping and releasing molded forms by the action of the conveying mechanism, substantially as set forth.

3d, The combination of the feed-arm with the conveyor and receiver, substantially as set forth.

4th, The plate, F, or its equivalent, constructed and operating substantially as set forth.

72,534.—ICE CREEPER.—Wm. P. Patton (assignor to Wm. A. Middleton), Harrisburg, Pa.

I claim the peculiar combination of a pivoted or folding screw, a, with the disk, A, constructed and operating substantially as herein set forth and for the purpose described.

72,535.—CHURN.—Thomas Payne, Grand Rapids, Mich.

I claim the oblique beaters, H, attached to the rotating shaft, C, in the cream receptacle, substantially in the manner as and for the purpose herein set forth.

72,536.—GATE AND BARN DOOR FASTENING.—W. W. Peck, Cassapolis, Mich.

I claim, 1st, The removable extension handle, F, in combination with the spring latch, D, box, E, and catch, b, substantially as herein described, for the purpose specified.

2d, The box, E, when provided with a tongue, c, the spring, d, and the catch, D, the latter being provided with projections, f, and catch, b, in combination with each other, and with the lever, F, all made and operating substantially as herein shown and described.

72,537.—ROTARY STEAM ENGINE.—Rufus D. Pettit, Baldwinsville, N. Y.

I claim the combination of the cylinder, A, exhausts, K K k k, inductions, L L l l, abutments, E E, disk, B, and sliding pistons, F, with actuating steam chambers and conduits, G H h, valves, I, and packing rings, M M', all constructed, arranged, and operating substantially as and for the purpose specified.

72,538.—CARRIAGE WHEEL.—John Raddin, Lynn, Mass.

I claim, in the construction of carriage wheels, making the felly or rim thereof of wrought metal tube, the outer surface of which is flattened and surfaced by a tire, substantially as and for the purposes set forth.

Also, in combination with such tubular felly, the elastic cushions, arranged to operate substantially as described.

72,539.—CANE AND THERMOMETER COMBINED.—James L. Reber, Philadelphia, Pa.

I claim the combination of a thermometer, with a walking cane, substantially as described, for the purpose specified.

72,540.—HORSE HAY FORK.—Cullin W. Reed, Chagrin Falls, Ohio.

I claim the tines, B and C, bars, A, latch, D, and cords, E and F, when the same are combined and arranged substantially as described, and for the purpose set forth.

72,541.—ARTIFICIAL TEETH.—William Reynolds, Columbia, S. C.

I claim, 1st, The bar, a, formed of gold or other suitable metal, apapted for the prevention of fractures in the anterior and lateral portions of the plates, and as an attachment for the teeth, substantially as described.

2d, The thinned extension, b, of the backing, of form and mode of adaptation to the bar, as herein described and shown.

72,542.—LANTERN.—Joseph H. Richardson, Philadelphia, Pa.

I claim, 1st, The perforated cap, C, in combination with a lamp, F, fitted within or upon the base, A, of a lantern, substantially as and for the purpose specified.

2d, Also, The double walls, a a, when filled in with suitable material to form an air-tight joint, in combination with the globe or chimney, B, and ring, c, encircling the base of the same, substantially as herein shown and described.

3d, Also, the tube, G, and plate, e, in combination with globe, B, and an air-tight joint around the lamp, F, substantially as and for the purpose set forth.

72,543.—WEATHER STRIP.—Horace A. Robinson, Cleveland, Ohio.

I claim the combination of the strips, B and C, united by the rubber strip, c, running the entire length of the strips, B and C, the spring, f, and the rubber strip, g, all constructed in the manner as and for the purpose set forth.

72,544.—EARTH CONVEYER.—Niram Russell, Harrison, O.

I claim, 1st, The arrangement of the jointed frame, A A', B B', C C', endless carrier, I, and pivoted flap, f', as herein described, and for the purposes set forth.

2d, In combination with the above parts, the adjustable bar, H, and adjustable carrier, K, as and for the purpose set forth.

72,545.—GAS BURNER.—John Scholl, London, England.

I claim the application and use to and in gas burners, substantially as hereinbefore shown and described, of a narrow and thin strip of platinum, for the purpose set forth.

72,546.—PROCESS OF MANUFACTURING HATS.—Thomas Sealy, Newark, N. J.

I claim the process of manufacturing an inlaid hat by inserting the colored pattern yarn transversely through the hat body of a different color, previous to the completion of the felting, and then felting the said body, and finishing it without dyeing it, substantially as hereinbefore set forth.

72,547.—MACHINE FOR BENDING HOOKS.—R. B. Sears, Providence, R. I.

I claim, 1st, The arrangement of the crank shaft, I, arms, h, shaft, H, cranks, g, shaft, c, and gear wheels, I and j, all made and operating so as to impart a double oscillating motion to the cam, G, substantially as set forth.

2d, Making the die or inside former, D, of two parts, substantially as and for the purpose herein shown and described.

3d, In combination with the above, the die, D, made in two parts, and the follower, E, all constructed, arranged, and operating substantially as described and represented.

4th, Also, the combination of the cavity, f, die, D, pin, e, and follower, E, as and for the purpose described.

5th, Also, the combination of the follower, E, crank-shaft, F, and pin, e, substantially as described and represented.

72,548.—VALVE STOPPER FOR JARS, BOTTLES, ETC.—Samuel F. Shadbolt, Huntington, N. Y.

I claim a valve stopple for bottles, composed of rubber, or its equivalent, attached to a shaft, substantially as described, and for the purpose set forth.

72,549.—GATE.—John Shartle, Lima, Ind.

I claim the bar, or rail, F', pivoted at one end to a gate, and at the other hung to a gate post, A, in combination with the windlass drum, I, hung to the gate, and connected to said rail, F' by the cord, H, substantially as above set forth and described.

72,550.—MACHINE FOR MAKING HORSE SHOE NAILS.—Adrian Shaw, Westford, Mass.

I claim the side hammers, N, connecting rod, P, and slide bars, Q, in combination with each other, and with the cams, M, levers, R L, and springs, T, substantially as and for the purpose specified.

72,551.—SAWING MACHINE FOR BARREL HOOPS.—George H. Shearer, Bay City, Mich.

I claim the metallic frame, F, constructed as described, provided with the journal boxes, a b, one above the other, holding the arbor, G, above or below the board to be sawed, and also provided with the open bearings upon each side of the arbor, G, for the removable shafts, I K, all arranged as described for the purpose specified.

72,552.—POTATO-DIGGER.—Thomas W. Shepard, Hennepin, Ill.

I claim, 1st, The plow, E, when constructed with the horizontal sharp edge, the convex upper surface, the bars, e e e, and the supporting rods, F F, the main portion of the plow consisting of a steel plate of the crescent form shown and described, when all the parts of said plow are constructed, combined and arranged substantially as and for the purpose set forth.

2d, The device, consisting of the arms, N N, teeth, n n, cross bar, O, or its equivalent, and chain, P, for the purposes above set forth.

3d, The method of regulating and adjusting the plow, E, as above described, by combining the plow, the rear axle, the swinging reach, G, and the lever, substantially in the manner set forth.

72,553.—METHOD OF FORMING DESIGNS UPON METALS, IVORY, ETC.—Thomas Skinner, Pittsburg, Pa.

I claim the herein-described method of preparing the design upon the article to be operated on, preparatory to the etching process, by the means of transfers, substantially as set forth.

72,554.—STEAM SAFETY VALVE.—James Slater, Philadelphia, Pa.

I claim a valve or indicator, constructed and arranged in its parts, substantially as and for the purpose described.

72,555.—AXLE FOR WAGONS.—Alfred E. Smith, Bronxville, N. Y.

I claim the D-shaped washer, J, in combination with the screw cap, H, and diaphragm, F, made and operating substantially as hereinbefore set forth.

72,556.—SEED-PLANTER AND CULTIVATOR.—Milo R. Snodgrass, Jamestown, Ohio.

I claim, 1st, The grooves, c, in the upper surface of the slide, F, in combination with the holes, b, in said slide, and the holes, a, in the plate, E, all arranged substantially as and for the purpose set forth.

2d, The chambers, d, on the plates, to receive the cut-off brushes, e, in combination with the holes, b, in slide, F, and the holes, a, in plate, E, for the purpose specified.

3d, The valves, J, in the spouts I, when operated from the slide, F, substantially in the manner as and for the purpose set forth.

4th, The adjustable beams, M', arranged so as to be operated through the medium of the crank shaft, P, and lever, R, when said parts are used in connection with the upright, T, provided with catches or projections, k k, all arranged substantially as and for the purpose specified.

5th, The adjustable beams, M' M', applied to the frame, A, and operated through the medium of the treadle, U, and pendent rods, u u, all arranged substantially as and for the purpose specified.

6th, The adjustable axles, V V, of the wheels, B B, arranged substantially as and for the purpose specified.

72,557.—BUILDING BLOCK.—J. S. Stewart, Homer, N. Y.

I claim a building block constructed with corrugated side and vertical and horizontal openings, substantially as and for the purpose described.

72,558.—INSTRUMENT FOR DYEING THE HAIR.—Lucius S. Stimson (assignor to himself and Jerome B. Melvin), Lowell, Mass.

I claim coating or covering the teeth of a comb, or the bristles or the wires of a bristle or a wire brush, with coloring matter as described, that the hair may be dyed or permanently colored by using said prepared comb or brush, substantially as specified.

72,559.—GAS FIXTURE.—William Mont Storm, N. Y. city.

I claim the sliding "hood" and rod, e, in combination with the burner, and operating simultaneously with the cock, the whole acting substantially in the manner and for the purposes set forth.

72,560.—CULTIVATOR.—Charles E. Storrs, William E. Keyes, and David W. Jones, Grandville, Mich.

We claim, 1st, The scoop-shaped plows, D, for cultivators, substantially as and for the purpose shown and described.

2d, A scoop-shaped cultivator plow, D, secured to and forming part of a colter or cutting edge, C', substantially as and for the purpose shown and described.

3d, The plows, D, in combination with the V-shaped frame, substantially as and for the purposes shown and described.

72,561.—MACHINE FOR FOLDING TINNED PLATES.—O. W. Stow, Plantsville, Conn.

I claim, 1st, The slide, L, in combination with the folding bar, D, cams, E, bed, F, and adjustable bearings, C, operating as described, whereby the bar, in the progress of its revolution, may be raised or moved to form an open or close lock or fold, substantially as described, for the purpose specified.

2d, The cams, J E, pin, K, and folding bar, D, in combination with the arms I, slide, L, bed, F, and fixed bearing, H, all operating as described, whereby the metal plate, Gx, is held securely in position while being folded, substantially as described, for the purpose specified.

72,562.—FOLDING TABLE.—Joseph Sutter, New York city.

I claim a table in which the bottoms of the X-folding legs are sufficiently spread to support the table when folded, and the upper ends of said legs are connected to the bed of the table in the manner specified.

Also, a folding table with the marble top cemented into a recess in the wooden bed, as and for the purposes specified.

72,563.—MODE OF REMOVING BURRS FROM WOOL.—William Sykes, Newton Lower Falls, Mass.

I claim the immediate dyeing of the wool after the same is taken from the acidulous solution, and either previous to or after the drying of the wool, substantially as set forth.

72,564.—APPARATUS FOR CONTROLLING THE MOTION OF TRAVELING WEBS IN PAPER MACHINES, ETC.—F. Thiry, Huy, Belgium, assignor to Warner Miller, Herkimer, N. Y.

I claim the rule, D, provided with the plates, F F, and connected to the levers, E E', in connection with the screw, K, double toothed wheel, J, curved lever, I, lever, H, and crank, G, on one of the journals of the conducting roller, A, all arranged to operate in the manner substantially as and for the purpose herein set forth.

72,565.—HOSE COUPLING.—Nathan Thompson, Brooklyn, N. Y.

I claim the combination of a locking piece pivoted upon the member of a coupling, with a guard or protector attached to or making part of the other member thereof, the combination being substantially as described.

72,566.—PIPE COUPLING.—Nathan Thompson, Brooklyn, N. Y.

I claim in combination with two flanges making part of a coupling, ears, and a locking piece which can be disconnected from and connected to the said lugs or ears, the construction of the parts being substantially such as specified.

Also in combination with two flanges making part of a coupling, and a locking piece capable of removal and replacement, a socket attached to one of the flanges and substantially surrounding the other, as described, the combination being substantially such as hereinbefore set forth.

72,567.—HORSE HAY FORK.—L. N. Tinkham, Sylvania, Pa.

I claim the combination of the lever, G, or its substantial equivalent, with the slide, C, connecting bar, D, and tines, B, substantially as herein shown and described and for the purpose set forth.

72,568.—PLOW.—William Titus, Brooklyn, N. Y.

I claim, 1st, The malleable iron mold board, b, and share, S, in one piece.

2d, Also the grooves, 1, 2, 3, 4, in the adjustable colter, c, and the adjustable gage wheel, d, substantially as described and for the purpose set forth.

72,569.—COPY HOLDER.—H. A. Tremper, Hammonton, N. J.

I claim, 1st, The use of two rollers, A A, and the arrangement for securing the copy to them, consisting of the bars, B B, the ferrules, C C, and the movable ferrules, D D, all combined and arranged substantially as described and for the purposes set forth.

2d, The spring guide, G, with the slotted projections, H H, substantially as described and for the purposes set forth.

3d, Also the method of arresting the motion of the rollers by means of the movable end piece or roller support, J, and the screw and thumb nut, K, substantially as described and for the purpose set forth.

4th, Also providing the rod, L, with both a clamp arm or rod, O, and a stand, for the purpose of supporting the copy holder under different conditions, as set forth.

72,570.—REFLECTOR.—Wm. Ulrich (assignor to himself, C. M. Theberath, and J. H. Theberath), Newark, N. J.

I claim, 1st, The revolving and folding reflector made and operating substantially as herein shown and described.

2d, Hinging a reflector, A, to a bar, B, which carries a ring, sleeve, or clamp, by means of which it can be secured to a burner or lamp, substantially as set forth.

3d, Providing a revolving and folding reflector with a handle, d, substantially as set forth.

72,571.—COOKING STOVE.—Chas. Van de Mark, Phelps, N. Y.

I claim the partition plate, G, between the fire chamber, A, and heating chamber, B, provided, with one or more upper and one or more under valves h h and i i, substantially as and for the purpose herein specified.

Also the boiler-hole plate or plates, D, and inclosing side plate or plates, E, arranged in combination with partition valves, h i, so that the heat may be directed against the bottom part of a boiler or boilers, i, only, or both against the bottom and around the sides thereof, substantially as and for the purposes herein specified.

72,572.—BEEHIVE.—A. C. Varela, Washington, D. C.

I claim, 1st, The arrangement of the two similar cubic boxes, A and B, one inserted partly into the other in a direction parallel to the diagonals of a cube, and suspended in such manner that only one of their corners points upward, substantially in the manner shown and set forth.

2d, The arrangement of a weather-proof cap, d, of metal or any other suitable material, to cover the aperture, e, that admits the bees into the upper or honey box, as shown and described.

72,573.—MACHINE FOR MAKING PEAT FUEL.—Gustavus Wiesenborn, New York city.

I claim, 1st, The construction of the frames of the machine solid or in two parts, so as to join them at or about the center of the shaft, and cast or bolt the lower half, A2, to the bed plate, and to make the upper frames, A A, and lower frames, A2 A2, of wrought iron, or make the upper alone of wrought iron, substantially the same as described.

2d, Also the surrounding steam, hot air, or vacuum chambers, V V, of the pressing cylinder, A5, to use one as a hot air chamber, and the other as a vacuum chamber, or both as a vacuum or steam chamber for oily or water vapors, in combination or separately with the perforated pressing cylinders, substantially the same as herein set forth.

3d, Also the combination of one, two, or more receivers, A12, with the horizontal feeders, E3 E3, and vacuum and feeding chambers, A10 A19 and A9 A9, the same as herein described.

4th, Also the direct application of an eccentric, with or without a loose ring on its circumference, acting directly, or with an intermediate movable or stationary steel or composition plate upon the pressing plungers, C15 and C14, and cross head C4 C4, substantially the same as herein described.

5th, Also the application of the cross heads, C4 C4, to operate in opposite directions, connected by four braces, or moving independent of each other, substantially the same as herein set forth.

6th, Also the arrangement for giving an independent motion to the pressing plungers C14 and D6, by which to move either the hollow or solid plunger C14, or the pressing plunger with the cross head, once, twice, or more strokes while the main eccentric makes one revolution, for the purpose of feeding the pressing box with peat dust, substantially the same as described.

7th, Also the perforated or grooved pressing boxes, with tapered holes, gradually enlarged toward the outside, for the purpose as herein set forth.

8th, Also the construction of the pressing boxes, A3 A3, in such a manner that the same are bolted from the inside or outside to the side of the frames A and A2, or to the bed plate, substantially the same as described.

9th, Also the adjusting and regulating of the supply of peat dust by means of adjusting the blades, F4 F4, in combination with the spur wheels, F3 F3, and lever, F, substantially as described.

10th, Also dividing the motion of the main eccentric, with the pressing box or chamber for horizontal or upright action, so that a portion of the motion may be transferred through the medium of two eccentrics or cams on the main shaft, at the outside of the frames, for the purpose of saving power and receiving larger blocks, substantially the same as described.

11th, Also the combined upright or horizontal action of the eccentric, C1, without an intermediate connecting link or rod, operating the pressing plungers, substantially the same as herein set forth.

12th, Also the process of compressing dry pulverized peat under a full or partial vacuum, arranged in such a manner as herein set forth.

13th, Also the process of feeding wet pulverized peat, and drying it, while passing through the pressing cylinders of the press through its own pressure, in pressing and drawing the water from it through the medium of an air pump connected with the pipes, A8 A8, so that the blocks are perfectly dry when discharged from the press, substantially the same as described.

14th, Also connecting an oil vessel with the vacuum chamber of the press, substantially the same as herein described.

15th, Also, for an upright machine, in placing the main eccentric or eccentrics on the top or bottom, between two frames, with one, two, or more plungers, substantially the same as set forth.

72,574.—SEWING MACHINE.—Wm. Weitling, New York city.

I claim, 1st, The combination of a hook-pointed lever with the thread carrier, piercing needle, and shuttle of a sewing machine, and operating substantially as and for the purposes described.

2d, The application to sewing machines of a thread winding apparatus, constructed and operated as described.

3d, Giving motion to the thread leading lever of a winding apparatus attached to a sewing machine, by making the rim of the driving wheel cam shaped, to operate said lever, substantially in the manner and for the purposes set forth.

4th, In combination with the thread winding device herein described, the adjustable guide pulley, V, for adjusting the tension of the cord, r, by which the thread winding apparatus is operated, substantially in the manner herein described.

72,575.—CASTER.—Joseph White, Providence, R. I.

I claim as a new article of manufacture a furniture caster consisting of the grooved plates, B C, spindle, A, balls, a, arms, a', wheel, w, and nut, n, all constructed, arranged, and operating as and for the purpose described.

72,576.—CHURN.—Leman Wiard and Wm. H. Nelson, Spring Township, Pa.

We claim the two dashers, D C', constructed and operated as described, when the same are in the aforesaid combination, for the purposes set forth.

72,577.—JACK.—Thomas Wiles, Indianapolis, Ind.

I claim the combination of the box, A, with the lever, B, fulcrum, C, jack, D, and check, E, applied to a lever jack.

72,578.—MACHINE FOR MAKING PLUG TOBACCO.—J. E. Withers, Toronto, Canada West.

I claim, 1st, The flange rollers, E E E, revolving in the same direction, in combination with the rollers, G G G, in manner substantially as and for the purposes described.

2d, The inclined knife, K, removing the tobacco or other substance from, and in combination with the troughs, F, to the platform, H, or other place of deposit, substantially as described.

3d, The flange rollers, E E E, revolving in the same direction, in combination with the wheel, N, revolving in a transverse direction, substantially as and for the purposes described.

4th, The flange rollers, E E E, revolving in the same direction, in combination with the rollers, M M, revolving in a reverse direction, in manner and for the purposes substantially as herein shown and described.

72,579.—MANUFACTURE OF IRON AND STEEL.—Henry K. York, Cardiff, Great Britain.

I claim a new mode of decarbonizing cast iron, the making of cast steel by the mixing of particles of cast iron decarbonized with certain proportions of a compound consisting of iron, carbon, and manganese, such compound being found in white cast, iron, known by the name of "Spiegeleisen;" or by the mixing of particles of cast iron, decarbonized, as before described, with the same cast iron not decarbonized, or other cast iron containing carbon, in the manner hereinbefore set forth.

72,580.—COAL STOVE.—Federal C. Adams and Joseph Peckover, Cincinnati, Ohio.

We claim, 1st, The air heating chamber, G G, at the base of the stove surrounding the ash box, but not communicating therewith, with the openings, H, for admitting fresh air, as described.

2d, The pipe or chamber, A, admitting, air, through the fuel to the cap, C, in combination with a concentrating plate, D, at the top of the fire box, substantially as described.

3d, One or more flues, F F F, for conducting air from the base chamber to a point just below the plate, D, as shown and described.

4th, The adjustable concentrating plate, D D', with the sliding doors, E E', substantially as described

5th, The chamber formed by plates, I and L, and conical pots, K and M, and forming a descending flue for the purpose of conducting air downward to the top of the fire basket, substantially as described.

6th, The adjustable diaphragm, L, in combination with the bottom of the conical pot, K, substantially as described.

7th, The flue, Q, in combination with the plate or diaphragm, T, substantially as described.

8th, The feeding pipes, R R or S, in combination with flue, Q, substantially as described.

9th, The plate, V, with the openings at the front and back, substantially as and for the purpose described.

10th, The plate, V, with the opening in front only, in combination with square or circular coal stoves, substantially as described.

11th, The plate, V, in combination with the regulating dampers, Z1 Z2, substantially as and for the purposes described.

72,581.—BOX FOR GAGING SHINGLES.—John Wesley Alesworth, Santa Cruz, Cal.

I claim a gaging box for shingles, constructed with the sides, B, with their graduating steps, b b b' b', together with the movable box, D, and bar, F, substantially as and for the purpose described.

72,582.—HAND SAW.—John F. Allen, New York city.

I claim turning a portion of the blade of a band saw to form an angle with the other portion of the blade of said saw, in the manner and for the purpose substantially as described.

72,583.—DRYING APPARATUS.—R. N. Allen, Pittsford, Vt.

I claim, 1st, The cylinder, A, with an annular chamber revolving upon tubular journals so arranged that the said journals and annular chamber shall form an avenue for the passage of waste heat from the flue of the fireplace to the chimney, and at the same time utilize said heat in its transit, substantially as and for the purpose set forth.

2d, The revolving cylinder, A, having an interior chamber, H, and hollow journals, B B', in combination with the flue of the boiler and stack, arranged and operating for the purpose substantially as set forth.

3d, The apron, L, rollers, K, in combination with the cylinder, A, arranged to receive the waste heat through one journal and discharge the same through the other into the chimney or stack, substantially as and for the purpose set forth.

72,584.—CAR AXLE.—Joseph Anthony, Greenbush, N. Y.

I claim an axle with an enlarged boss and shoulder, substantially as and for the purpose set forth.

72,585.—APPARATUS FOR WASHING SHEEP SKINS.—E. H. Ashcroft, Lynn, Mass.

I claim an apparatus for washing sheep skins with the wool on, constructed and operated in the manner substantially as shown and described.

72,586.—FLASK FOR FORMING CORES.—Emmet R. Austin, Norwalk, Ct.

I claim the combination of the hinged flask, A and A, with the pipes, E E, and adjustable steady pins, D D, all constructed and arranged substantially as described.

72,587.—MILLSTONE.—Wm. Bahme, New Media, Pa.

I claim, 1st, The stone, H, adapted and employed to sink or grind out the central portion of millstones, substantially as and for the purposes set forth.

2d, The shaft, G g, and driving apparatus, D E F, in the described combination with the stone, H, for the purpose specified.

3d, The upright shaft, I, constructed as described, in combination with the spindle, C, and stone, H, substantially as and for the purpose specified.

72,588.—CHURN.—Henry B. Barber, Scott, N. Y.

I claim the arrangement of the dasher staffs, C C, and their arms, with the oscillating lever, F, arm, J, shaft, H, with its inclined wheel, I, and the bevel wheels, a and K, substantially as and for the purpose set forth.

72,589.—LANTERN.—Henry Beebe, Hudson, N. J.

I claim, 1st, The metallic top, E*, furnished with openings, b', and lined with reticulated material, c, in combination with the glass body, C, substantially as and for the purpose specified.

2d, The base, D, of the body, C, constructed with the annular shield, E, and openings, a', in combination with the reticulated top plate, b, and the openings, a, of the sides of the burner, substantially as and for the purpose specified.

3d, The combination of the metallic perforated top, E*, furnished with a reticulated lining, c, the glass body, C, and the base, D, formed with openings, a', and furnished with the annular shield, E, substantially as and for the purpose specified.

72,590.—MATERIALS FOR PUMP PISTONS, ENGINES, ETC.—Dana Bickford, Boston, Mass.

I claim manufacturing of these different articles in the various ways described and set forth, also the strengthening in the ways and for the different purposes described.

72,591.—BRACING THE SOUNDING BOARDS OF GUITARS.—Jos. E. Bini, Mount Vernon, N. Y., assignor to James E. Jouett and Charles H. Cushman.

I claim the braces of the sound board of a guitar, arranged, constructed and connected substantially as described and for the purpose specified.

72,592.—WASHING MACHINE.—W. E. Bird, West Bridgewater, Mass.

I claim, 1st, The combination of the clamps, B, the joint, D, and lever, H substantially as described, and for the purpose set forth.

2d, The adjustable shield, M, in combination with the handle, R, and lever H, substantially as described and for the purpose set forth.

72,593.—BALANCE.—Ira Bisbee, Richmond, Mo.

I claim, 1st, A scale consisting of the eccentric disk, C, having graduations on both sides, registering with each other, the equipoise, E, firmly secured thereto, and the suspended basins or plates, D, substantially as represented and described.

2d, The disk, C, having graduations on both sides, registering with each other, whereby they can be viewed simultaneously, as represented and described.

3d, A scale having the following characteristics, viz., graduations for troy, apothecaries', and avoirdupois weights, for letters and for American and foreign coins, substantially as represented and described.

72,594.—HORSESHOE.—Thomas B. Bishop, Baltimore, Md.

I claim the fastening of the leather, cut in suitable manner, C D, between the two shoes, A B, by means of rivets, and the fastening of the shoe thus made on to the horse's hoof by means of the straps, b b', and c c, substantially in the manner and for the purpose set forth.

72,595.—STEAM GAGE.—Morris Botticher, Newark, N. J.

I claim the arrangement of the adjustable screw, J, with cap, F, of the gage substantially as herein described.

72,596.—MANUFACTURE OF PLOW HANDLES.—T. E. C. Brinley, Louisville, Ky.

I claim the mode of manufacturing the handles of plows, of different lengths and irregular curvatures, by the use of the table, A, gage-block, C, and pins, D, so as to secure the proper alignment of the brace holes, substantially as set forth.

72,597.—ATTACHING DOORKNOBS TO SPINDLES.—Chas. B. Bristol, New Haven, Conn.

I claim the use of the inclined plane, c, when formed on the corner of the spindle, E, in combination with the binding screw, b, and the neck, C, of the knob, A, and the whole is constructed and made to secure the knob, A, in its desired position without making holes in or putting washers on the spindle substantially as herein described and set forth.

72,598.—CULTIVATOR.—J. E. Brooks, Gooding's Grove, Ill.

I claim, 1st, The arrangement of rods, U, with the frame of the machine and the plow beams, E E, substantially in the manner and for the purposes set forth.

2d, Also, the arrangement of the draft cord, b, sheaves, a a, and pivoted hangers, C C, so as to operate substantially as and for the purposes described.

3d, Also, the combination and arrangement of the plow beams, E, rods, d e, lever, L, cord, K, rod, J, and lever, I, substantially as and for the purposes specified.

4th, Also, the combination of the suspended plow beams, E, rods, U, and levers, W, arranged and operating as and for the purposes shown and set forth.

5th, Also, the peculiar arrangement of and mode of attaching the bow, V, to the rear part of the plow beams, herein shown and specified.

72,599.—HARVESTER RAKE.—Robert D. Brown, Covington, Ind.

I claim, 1st, The combination of the toggle-frame pulley and guide rod, upon the end of the main axle, for keeping the driving and reel pulleys in line, when the reel post is arranged upon the drag bar, and remote from and in a different plane from that of the axle, and thus preventing the belt from being thrown off, or from slipping or binding, whilst the platform and driving wheels accommodate themselves to the inequalities of the ground over which they are passing, as described.

2d, Also, in combination with a rake, moving on the rod, n, by the endless belt, z, the projection rearward of said rake, as shown at 7, and the slots, 4, 10, and shoulder, 13, for the purpose of guiding, holding, and turning the rake by the means of the ways herein described and represented.

3d, Also, in combination with the projection on the rake plate or hinge, and its shoulder, 13, the spring way or guide, 14, for holding up, guiding and controlling the rake just before its projection takes the straight groove or way, 15, and until the button on the belt moves around to cause it to return for the next gavel, substantially as described.

72,600.—BOLT FOR SHUTTER.—P. Burke, Philadelphia, Pa.

I claim a bolt, having its two separating parts, A A', provided with the slides, B B', and the sockets, C C', constructed and arranged to operate together substantially as set forth and described for the purpose specified.

72,601.—COATING AND METALLIZING FABRICS.—Rufina Noggerath, Paris, France.

I claim the new process, as described, of hardening, ornamenting, metallizing, or galvanizing fabrics, and other materials, so as to produce, by the various operations herein described, and especially claimed, articles having the appearance, or being really completely transformed into open-work metal.

The same articles, which may be only diversified in colors, and left unmetallized, as being especially applicable to various purposes, such as articles of dress, furniture, to hangings, tapestry, to artistic objects, etc.

Likewise, ornamenting, metallizing papers, plaster, and other articles, by the same processes as described.

72,602.—CARRIAGE SEAT.—Edwin Chamberlin, Lansingburg, N. Y.

I claim securing an extra bottom, C, with all the top irons attached thereto, to the seat bottom, B, by means of the double or single bars, e e', furnished with the keys, k k, or their equivalents, and operated either from the upper or lower side of the seat, and working into the hook catches, a a, or their equivalents, which hook catches are permanently attached to either the extra bottom, C, or the bottom, B, and the whole in combination, substantially as and for the purpose set forth and described.

72,603.—HINGE FOR WINDOW SHUTTERS.—Pascal P. Child, (assignor to S. B. Fox Manufacturing Co.,) St. Louis, Mo.

I claim the lip, A', upon the other half of the hinge, A B, projecting over or under the flange, b', as the case may be, in such manner as to come in contact with and act as a stop for the flange, b', when the blind is inadvertently raised, as shown and described.

72,604.—BREAST PUMP.—James Cole, Brooklyn, N. Y.

I claim a breast pump, constructed substantially as described.

72,605.—BED BOTTOM.—Homer Cook and Chas. E. Simmons, Waukegan, Ill.

We claim the combination of the short bars, C C C C, with the horizontal bar, D, for the purpose of equalizing the pressure upon the upper frame, so that all parts of it shall settle alike. Also, the application of two sets of these bars to the same end or side of the bed bottom, to stay the upper frame and prevent all swaying, all constructed, combined, and applied substantially as and for the purposes described.

72,606.—LABELLING BOTTLE CORKS.—Frederick W. Copcutt, New York city.

I claim the combination of the metallic label, c, with the holding clamp, B, bottle, A, and cork, C, substantially as and for the purpose specified.

72,607.—AUTOMATICALLY-OPERATED SEWING MACHINE.—Gustavus Cuppers, New York city.

I claim, 1st, The method, herein described, of operating sewing machines and other machinery, automatically, by means of a spring or springs composed of one or more bands of vulcanized rubber, combined with the driving shaft of the mechanism for operating said machinery, substantially in such manner that the contractile power of said rubber spring or springs, when stretched and wound upon the driving shaft, shall cause the rotation of said shaft, as and for the purposes set forth.

2d, The combination with the main or driving shaft, A, of the rubber spring band or belt and spirally grooved conical barrel, upon which said band is wound, substantially as and for the purposes set forth.

3d, The combination with the main shaft and the ratchet wheel, s', of the barrel, G', and pawl for engaging with said ratchet, under the arrangement and for operation as set forth.

4th, The combination of the lever, E, and the spring pawl which it carries, with the ratchet wheel, b, and stop or projections formed in rear of said wheel, substantially in the manner and for the purposes set forth.

5th, The combination of the driving shaft and its conical barrel with the lever, pawl, and ratchet wheel, and gearing for effecting the revolution of said shaft, under the arrangement and for operation as set forth.

6th, The combination of the rubber band, applied to its conical barrel as described, of the pulleys or wheels upon which said band is stretched, mounted on the frame of the machine, substantially as and for the purposes set forth.

7th, The combination with the driving shaft, revolved by means of a rubber spring band or belt, as described, of the shaft, F, and gearing, through the medium of which the said shaft is caused to rotate, arranged and operating as herein specified.

8th, The combination with the wheel for actuating the sewing or other machine, of the friction brake, constructed and applied to said wheel in the manner as set forth.

72,608.—MECHANICAL MOVEMENT.—Caleb M. Currey, Pontiac, Mich.

I claim the combination and arrangement of the crank shaft, B, lever, F, and connecting rod, G, with their described accessories, C D E, as and for the purposes set forth.

72,609.—BLIND CATCH.—Joseph Currier, Portland, Me.

I claim the combination of the lever, k, connected with the stud, 2, as described and employed, as and for the purposes set forth.

72,610.—COAL STOVE.—Alfred Dart, Carbondale, Pa.

I claim the central cone, I, when provided with the wings, i i, and attached to the grate, substantially as and for the purpose specified.

72,611.—BRIDGE GIRDER.—Joseph Davenport, Massillon, O.

I claim, 1st, The arch, composed of the string pieces, A and B, shoes, h h, tension bolts, a a, main braces, c c, and counter braces, d d, the several parts being arranged in the manner and for the purpose herein specified.

2d, The hollow cylindrical tubes for braces in the construction of a truss, when said braces are so arranged as to take only a compressive strain, and cannot be subjected to a tensile strain, substantially as herein shown.

3d, The peculiar arrangement and combination of the arch shoes, E, chord, C, lower string piece, B, angle iron, F, bolts, m and f, upper string piece, A, and bolts, e, the whole being arranged as shown, and for the purpose specified.

72,612.—PLANETARIUM.—John Davis, Allegheny city, Pa.

I claim, 1st, Representing the axial motion of the planets and the orbital motions of the satellites by imparting motion to gearing placed on the outer ends of arms radiating from a series of concentric shafts, said gearing consisting of wheels, 1 and 2, and a series of concentric disks, 1 2 3, and 4, rotated by a single pinion, 3, constructed and arranged substantially as described.

2d, Pivoting the earth, E, at one pole, so that by its own weight or gravity its axis will be constantly inclined at the desired angle to the plane of its orbit, substantially as herein described, and for the purpose set forth.

72,613.—PROCESS OF FUMIGATION FOR DESTROYING INSECTS ON ROSE VINES AND OTHER PLANTS.—John Deane, Conneaut, Ohio.

I claim the mode of destroying insects by fumigation with the smoke evolv

ed by burning a mixture compounded substantially as set forth, in proximity to hop or grape vines.

72,614.—PAINT.—William J. Dodge (assignor to himself, James L. Humphrey, and Daniel D. Smith), Syracuse, N. Y.

I claim the improved paint, prepared or compounded substantially as herein specified, and for the purpose set forth.

72,615.—WEIGHING SCALE.—Laben Eddy, Taunton, Mass.

I claim the combination as well as the arrangement of one or two weighted arms, F G, and a curved arch or limb, B, with the diametric lever, C, and the scale pan, E, or its equivalent, supported thereon, substantially as set forth, and this, whether the limb be affixed to the diametric lever, or to the stand thereof, as explained.

Also, the combination and arrangement of the twine-holder, L, with the stand or case, A, and the weighing mechanism thereof, as specified.

72,616.—LIGHTING AND EXTINGUISHING GAS.—Moses G. Farmer, Salem, Mass.

I claim the combination of a straight, electro-magnetic bar, with its pole situated between the poles of two bent or U-shaped permanent magnets, which permanent magnets may be either simple or compound.

Also, for use in combination with the gas burner of a street gas lamp, a box or gas chamber, containing an electric spark-generating mechanism, and mechanism as described, for opening with the current in one direction, and closing with the current in the opposite direction, a valve, said box containing gas, and being arranged to be located at or near to the burner, and in a circuit, substantially as set forth.

Also, giving motion to gas valves, or other mechanism, by means of the above-described combination of electro and permanent magnets, whether the arrangement be such that the permanent magnets, or the electro-magnetic bar be moved by the reversal of the current.

Also, the arrangement of the burner, the igniting points or wires, the gas valve, the primary and secondary coils, and the electro and permanent magnets, substantially as shown and described.

72,617.—VARNISH PAINT.—W. B. Finch (assignor to himself, Thomas S. Ferguson, and N. B. Boyden), Chicago, Ill.

I claim a paint, composed of indi:-rubber, linseed oil, rosin, gum shellac, and benzole.

72,618.—PLANING MACHINE.—Benaiah Fitts, Newark, N. J.

I claim the arms, s and i, when constructed to support the gear wheel, h, and arranged to operate with wheels, e and f, substantially in the manner and for the purposes described.

72,619.—PLANING MACHINE.—Benaiah Fitts, Newark, N. J.

I claim forming recesses, E E, in frame, a, and extending the line, h, far enough, and for the purpose of transferring the vertical cylinders, e and f, beyond lines drawn from the ends of the cylinder, c, perpendicular to its axis, substantially as shown and described.

72,620.—PUMP.—G. R. Forsyth, Pemberton, Ohio.

I claim the combination of the bellows with the pump, substantially as and for the purpose set forth.

72,621.—INK FOR PAPER RULING.—Lewis Francis, New York city, assignor to W. O. Hickok, Harrisburg, Pa.

I claim making machine ruling ink substantially as herein described.

72,622.—CULTIVATOR.—J. T. Frankeberger, Hensly, Ill.

I claim, 1st, The combination of the beams, G G, when hinged at their front ends to the bar, A, substantially in the manner set forth.

2d, The beams, F G, when combined with the standards, H, the handles, R, and bars, F and A, the whole constructed and operating substantially as herein described.

72,623.—HARROW.—J. T. Frankeberger, Hensly, Ill.

I claim the harrow, A, the supplemental harrow, D, and the handle, J, the whole combined and operating substantially as herein specified.

72,624.—HAY SPREADER.—C. R. Frink, Norwich, N. Y.

I claim, 1st, The driving wheel rim, A, the friction wheels, B B B, in connection with the spokes, C C C, when applied to and for the purpose described.

2d, The coiled fork tines, A, cross head, b, set screws, e e, in connection with rods, D D, substantially as and for the purposes set forth.

72,625.—PROCESS FOR MANUFACTURING ALBUMEN.—Jean Michel Fuchs, New York city.

I claim the process substantially as herein described of manufacturing or extracting albumen from blood

72,626.—AMALGAMATOR FOR ORES OF GOLD AND SILVER.—Willard M. Fuller, Chicago, Ill.

I claim, 1st, The application of a siphon to an amalgamator for producing a continuous current through the mercury, substantially as specified.

2d, The siphon or pipe, D, in combination with the cylinder, A, substantially as and for the purposes specified.

3d, The shaft, E, in combination with two or more plates, F and G, substantially as specified.

4th, The combination and arrangement of the shaft, E, collar, H, cone, G', and mouth, O, or end of pipe, C, substantially as described.

5th, The pipe, L, when attached to the pipe, D, substantially as and for the purposes described.

6th, The tub, B, pipe, C, and cylinder, A, in combination with the pipe, D, substantially as specified.

72,627.—PHOTOGRAPHIC CAMERA.—Franklin B. Gage, St. Johnsbury, Vt.

I claim in combination with a camera, either one or two shutters or cut-offs, made movable or adjustable up and down therein, substantially as and for the purpose or purposes as specified.

Also the construction of each of the cut-offs, viz., so as to be capable of being either contracted or expanded in length, substantially as specified.

Also the combination and arrangement of the indicator and divided limb, or the equivalents thereof, with the camera and each of the cut-offs, as set forth.

Also the combination of the friction apparatus, or its equivalent, with the camera and each cut-off, or with the same and the indicator and its limb, or their equivalents.

72,628.—VOLTAIC PILE.—Alfred C. Garratt, Boston, Mass.

I claim as my invention the improved voltaic pile or battery composed of the two different metals, in the form of bars, arranged with a strip of cloth between each two pairs of them, and with a space between the bars of each pair, such bars being connected at their ends as set forth, the whole being held in place by a frame, substantially as described.

Also in a battery of such kind, the arrangement and combination of metallic pins or tacks, n, and solder, e, with the two zinc and brass or copper bars, b z, the whole being as specified.

72,629.—BOOK FOR BOOKKEEPING.—J. H. Gleim, St. Louis, Mo.

I claim, 1st, The combination of the alternate cash journals, 1 and 2, paged respectively with odd and even numbers, substantially as and for the purposes set forth.

2d, The combination of the balance column, 6, with columns, 1, 2, 3, substantially as and for the purposes set forth.

3d, The combination and arrangement of columns, 7 and 8, with columns, 1 and 6, substantially as and for the purpose set forth.

4th, The combination and arrangement of the ledger column, 9, with columns, 1 and 3, substantially as and for the purposes set forth.

72,630.—TASSEL CLAMP FOR WINDOW CURTAINS.—Joseph Gottlieb, Boston, Mass.

I claim the clasp made as described, viz., with the clamp wire bent and arranged and combined with the two jaws in manner as explained.

72,631.—MEDICAL VACUUM APPARATUS.—John G. Hadfield, Cincinnati, Ohio.

I claim, 1st, A medical vacuum chamber, A, having the elevated neck, I, with face opening, i, and an open rear, closed by a door, C, and fastening devices, substantially as set forth.

2d, The chair, L, capable of being swung out or into the case, in the manner and for the purpose set forth.

3d, Such a chair, when adjustable in hight upon its axis, substantially as set forth.

4th, In combination with the element of claim first, the parts, D E F F' G G' H H', or their equivalents, by which the door is made to bear with an equal and air tight pressure at every part.

5th, In the described combination, the adjustable foot rest, N, and notched post, P, as set forth.

6th, In this connection, the arrangement of the manifold, S, two or more faucets, T T', and coupling neck, S', provided with an outwardly opening valve, s, as and for the purpose set forth.

7th, The limb receptacles, U u, when combined with the adjustable hand rest X X' x Y.

72,632.—STRINGING BOW DRILL STOCK.—D. Frank Hartford, Boston, Mass.

I claim combining and arranging the four strings, H H' H'' H''', with the pulleys, A B, when said pulleys work substantially as described, and for the purpose set forth.

72,633.—WOOD SCREW.—Hayward A. Harvey, Orange, N. J.

I claim a screw, constructed in the ordinary manner, with the exception that the thread is cut deeper on the under side than on the upper, substantially as and for the purpose set forth.

72,634.—WOODEN CHAIR-SEAT.—Levi Heywood (assignor to Heywood Brothers and Company), Gardner, Mass.

I claim a wooden chair seat, provided with a strip, a, whose grain crosses that of the seat itself, substantially as and for the purpose set forth.

72,635.—SOCKET FOR REVOLVING CHAIR.—Levi Heywood (assignor to Heywood Brothers and Company), Gardner, Mass.

I claim the within described socket, B, for receiving the upper ends of the legs of chairs, substantially as set forth.

72,636.—APPARATUS FOR GRINDING AND POLISHING CYLINDRICAL CONCAVE SURFACES.—Wm. C. Hicks, New York city.

I claim the method of finishing up concave surfaces, substantially as hereinbefore escribed, that is to say, by means of rotary tools running in contact with the surface being operated upon, while the said tools and surface are moved (by any suitable mechanism) relatively to each other, in the manner set forth.

72,637.—MANUFACTURE OF MATCHES.—Edward J. Hill, Milwaukee, Wis.

I claim, 1st, The discovery of the quality or property of the mass or paste usually employed to produce ignition in matches, tapers, lamp, cigar, or gas lighters, which permits the same to be cut without friction or percussion, especially when spread in thin sheets of suitable material, after the same has become dry.

2d, The use of twine, or yarn, or thread, or equivalents, in the manufacture of friction or percussion matches.

3d, The peculiar manner of placing the twine, yarn, or thread for dipping, as herein described.

4th, The particular combinations to produce the results respectively herein described, or in any other substantially the same, as shown by each of the specimens accompanying this specification.

5th, The putting up and packing matches, tapers and lighters, in friction wrappers, cases, or holders, or otherwise, so as to unite the match, taper, or lighter with the case or wrapper, making the same go hand in hand with each other in the various combinations herewith presented, and all permutations thereof.

6th, The application of varnish after dipping, as herein described, or otherwise.

7th, Also, paper for matches, as herein specified, in the combinations set forth.

8th, The protection of the pasted ends of the matches, tapers or lighters, in manner and form, by folded paper or other suitable material, as in this application described.

72,638.—SCYTHE.—Charles M. Hodges, Mansfield, Mass., assignor to himself, Wm. O. Capron and Nathaniel Whitmore.

I claim the combination as well as the arrangement of the back piece, C, with the blade, A, and the cap piece, B, arranged and applied with respect to each other as set forth.

72,639.—MACHINE FOR SAWING BARREL HEADING.—Calvin J. Holman, Chicago, Ill.

Reclaim, 1st, The combination of the adjustable bed, F, planing cylinder, G, and saw, S, constructed and arranged to operate substantially as and for the purposes specified.

2d, The combination of the bed, F, planing cylinder, G, carriage, C, and saw, S, constructed and arranged to operate in the manner and for the purposes set forth.

72,640.—STAVE MACHINE.—Wm. E. Hopkins, Parkman, O.

I claim the adjustable feed or saw table, for regulating the degree of curvature of the staves to conform to the diameter of the cask or vessel for which they are to be used, in combination with the narrow endless belt saw, arranged and operating as described.

72,641.—STEM WINDING WATCHES.—Edwin B. Horn, Boston, Mass.

I claim, 1st, Attaching to and placing within the ring-gear, B, the main spring of a watch, said ring-gear being recessed into the face-plate, and being made to wind up the main spring by means of a small pinion attached to a winding stem.

2d, The ratchet wheel, E, and pawl, F, in combination with the ring-gear, B, when the said ring-gear is used for winding up the main-spring, the whole being made substantially as described, and for the purpose set forth.

3d, The combination and arrangement of the levers, L L' L'', the pinions, P' P'', and the ring-gear, B, substantially as described, and for the purpose set forth.

72,642.—LAP-SEAM GUIDE FOR SEWING MACHINES.—Otis W. Horr, Chicopee, Mass.

I claim a lap seam guide for sewing machines composed of two pairs of guiding plates said plates being arranged with reference to each other and also ridged, grooved and provided with stops, t and o, and the ear piece, v, all constructed and operating substantially as and in the manner herein set forth.

72,643.—GAS REGULATOR.—H. G. Hubert, New York city.

I claim, 1st, The use of a metallic diaphragm.

2d, The combination of the diaphragm, G, link, F, lever, L, and valve, V, arranged substantially in the manner set forth.

3d, Making the fulcrum of the lever, L, adjustable from outside the instrument by means of a screw, D, arranged as described, or any mode substantially the same.

4th, The use of a lever for multiplying the sensitiveness of a gas regulator by increasing the throw of the valve thereof.

72,644.—HARVESTER RAKE.—W. B. Johns, Cumberland, Md.

I claim, 1st, The bevel gear, E, centrally placed on the main axle and when used directly for driving the cutters and the rake both, substantially as described.

2d, Also in combination with the cutters and reel for laying the grain upon the platform or grain table a rake revolving at right angles to the forward movement of the machine for raking off and delivering the grain in gavels at the side of the machine, as set forth and described.

72,645.—REVOLVING OVEN.—John A. Kinkele, Sacramento City, Cal.

I claim, 1st, The oven constructed as described consisting of the inner wall, B, placed between the outer case, A', having cold-air openings, a, and the oven, C, all supported by an annular plate upon the foundation, A, the hot and cold annular air chambers, H H', communicating with the common flue, J', the revolving hearth, E, of the oven supported upon the plate, E', by a pivot and operated by means of the gear wheel, L, as herein described for the purpose specified.

2d, The rotary hearth, E, when constructed of tile or fire brick, in combination with the oven, C, concentric wall, B, and casing, A', as herein described for the purpose specified.

72,646.—TABLE.—George Kuhlman, New York city.

I claim the application to tables of the arrangement of the cords, g g, etc., pulleys, h h, etc., and spring catches, shown by Fig. 4, all used for extending vertically and supporting when extended the leaves, f and k, as hereinbefore described.

72,647.—CLOTH WASHING, RINSING AND SQUEEZING MACHINE.—James Lee, Jr., Charlestown, Mass.

I claim, 1st, The combination of the rollers, E and B, the rack, D, rollers, F F, the tub or tank, A, with the heavy roller, G, all arranged and operating as and for the purpose specified.

2d, The combination of the rollers, E and F, with the heavy roller, G, all arranged and operating substantially as described.

72,648.—STAVE MACHINE.—Dixon Lewers (assignors to Ferguson & Lewers), Louisville, Ky.

I claim the stave pusher or driver, B, when operated by the wheel, D, head, E, revolving slotted arm, F, shaft, I', arm, G, and pitman, I, or their equivalents, substantially as and for the purpose set forth.

72,649.—MACHINE FOR CHANNELING ROCKS, ETC.—R. W. Love and Albert Ball, Windsor, Vt.

We claim, 1st, In a rock-channeling machine constructed substantially as described the wheels, O and N, on the shaft, S, operating in connection with the wheels or gears which rotate or revolve the drills or cutters, substantially as shown and set forth.

2d, In a rock-channeling machine having rotating cutters the devices for stopping and also for reversing the feed apparatus either automatically or by hand, substantially as described and for the purpose set forth.

3d, In combination with the yoke and drills the anti-friction rollers, constructed and applied as set forth.

4th, Also the devices for moving and fixing the carriage or machine when constructed with stops for giving limited and regulated motion to the carriage, substantially as set forth.

72,650.—STEAM ENGINE GLOBE VALVE.—J. B. Lowell, Baltimore, Md.

I claim the combination of the hand wheel constructed with the clutch, v, and the square opening as described with the sleeve, e, and valve stem, C, the latter being constructed as set forth and all the parts operating together substantially in the manner and for the purpose specified.

72,651.—BEEHIVE.—J. J. Lower, Tennessee, Ill.

I claim, 1st, The moth chamber, A, with its entrances, a, breeding spiles, a', door, a'', and perforated plate, a''', substantially as described.

2d, The movable sashes, b'', with projections, b''', and pins, b'''', when combined with rods, b', sockets, y, and holes x, substantially as described.

72,652.—GUARD FOR CIRCULAR SAWS.—John Madden, Cleveland, Ohio.

I claim the herein-described adjustable circular guard, F, so arranged in relation to the saw, B, that the said guard and saw shall turn on one common center and in the same plane so that the said guard will cover or expose more or less of the saw teeth upon one side only of the saw, substantially as and for the purpose specified.

72,653.—LAND ROLLER.—S. B. Mann, Indianapolis, Ind.

I claim the combination and arrangement of the hollow cylindrical rollers, G G', with the metallic balls, H H H, as and for the purpose specified.

72,654.—TOOL HOLDER.—J. P. Manton, Providence, R. I.

I claim the combination in a tool holder of the wedge clamp, D, with the flexible jaws, b b', arranged to co-operate in gripping an independent cutting tool, C, substantially as herein described.

72,655.—NAIL DRAWER.—Samuel Marden, Newton, Mass.

I claim a cam, c, acting as a fulcrum to a lever, d, and as a lever to a jaw, b, substantially as described.

72,656.—STAMP WETTING AND PEN CLEANING INSTRUMENT.—Thomas P. Marshall, Trenton, N. J.

I claim, 1st, The two rollers, h and h', combined with a trough, D, substantantially as described.

2d, The rollers, h and h', on spindles caused to turn in a frame having an opening, x, through which an envelope or other article can be introduced to the said rollers, as set forth.

3d, The said spindles, d and d', each having a cylinder made of sponge, cloth or other absorbent material the cylinders being free from contact with each other and the lower cylinder being arranged to revolve in a trough containing water, all substantially as set forth.

72,657.—GATE.—C. F. Mawley, Woodbridge, N. J.

I claim, 1st, The combination of the gates, G, arms, c, pivoted rods, D, when constructed as shown and arranged so as to operate by the platforms, A A', substantially in the manner and for the purpose set forth.

2d, The platforms, A A', when pivoted at their inner edges under the gates, G G, and operating the gates, substantially in the manner and for the purposes specified.

3d, The hinged plank, F, when attached to the outer edge of the platforms and operating substantially in the manner and for the purposes specified.

4th, The combination of the latch, I, springs, i i', platforms, A A', and gates, G G, substantially as and for the purpose set forth.

5th, The movable prop, M, or its equivalent, in combination with the platform, A A, when so constructed and arranged that when thrown out of position it will allow the platform, A A, to descend.

6th, The combination of the lever, L, prop, M, rod, O, and bar, D, operating in the manner and for the purposes specified.

72,658.—COMPOSITION FOR OILING WOOL.—James McCabe, Lewiston, Me.

I claim, as a substitute for oil in preparing wool for carding and spinning, a composition made up of the ingredients, substantially as described.

72,659.—LAMP BURNER.—William McCaine (assignor to himself, David McCaine and Daniel McCaine), Groton, Mass.

I claim my improved air deflector as made with its parts, b b, arranged above the rest of the ring and with respect to the tube, a, so as when in use to contract the flame widthwise at its base, as set forth.

72,660.—PRINTING PRESS.—J. W. McDonald, Osgood, Ind.

I claim the slides, L L, the sleeve, N N', and strips, l l, with the inking roller, O, combined and operating substantially as set forth with the platen, F.

72,661.—MILL SPINDLE.—J. H. McMinn, Logansport, Ind. (Theodore J. McMinn, administrator.)

I claim the mode of gradually starting or stopping millstones, substantially as set forth, by means of the following combination of parts, viz.: the spindle, a, cone, F, pinion, e, ring, g, tempering lever, h, clutch, c, and lever, d.

72,662.—SCHOOL DESK.—H. S. McRae, Muncie, Ind.

I claim the book holder located in the back part of the lid of the desk, constructed, arranged and operated as herein recited.

72,663.—MODE OF SECURING FELLEYS.—M. J. Mellyn, Roxbury, Mass.

I claim the metallic plate, B, having a bolt, C, and ribs, a a, when constructed and used in the manner and for the purposes set forth.

72,664.—CAR COUPLING.—W. J. Millar, McKeesport, Pa.

I claim two coupling bars attached by bolts one to each of two opposite draw heads, each coupling bar having an arrow-shaped head and hook in combination with the hopper-shaped or conical bull nose, b, and pins or bolts over which the hooks slide and couple, for the purpose of forming a self-connecting and disconnecting car coupling, substantially in the manner hereinbefore set forth.

72,665.—CAR COUPLING.—Simeon Mills, Madison, Wis.

I claim the bar, I, jointed at x, so that it can be turned down and out of the way of door, L, and provided with a notch and an eye or hook when used in combination with an open-spring catch, J, and the hooked and pivoted coupling, C, as and for the purposes set forth.

72,666.—FASTENING FOR CARRIAGE CURTAINS.—Thomas A. Mitchell, Washington, D. C.

I claim the elastic strap, A, in combination with the metal tip, B, when the latter is provided with a buttonhole, substantially as described.

72,667.—HINGED FISHING ROD.—J. H. Montrose, N. Y. city.

I claim a sectional fishing pole having the several sections, A B C, etc., permanently connected by hinged joints, constructed and arranged relatively to the sections and to each other, substantially as and so as to fold in the manner herein described.

72,668.—ROCKING CHAIR.—C. J. Nelson, Rockford, Ill.

I claim the spring shoes, a a, in combination with the chair, A, substantially as described.

72,669.—MACHINE FOR BENDING METALS.—John Noland, Philadelphia, Pa.

I claim the former, A, on the edge of which are two curves, the reverse of but meeting each other, in combination with the levers, C and F, carrying rollers, or their equivalents, and so hung that the said rollers can be moved that of one lever in the arc of a circle concentric with that of one curve and the other in the arc of a circle concentric with that of the other curve on the edge of the frame, all as set forth for the purpose specified.

72,670.—CONSTRUCTION OF CHECKERS.—Henry Nott, New York city.

I claim, 1st, The flange or rim, B, around the upper edge of the checker, as and for the purpose set forth.

2d, The checker made in the form of an inverted truncated cone, substantially as and for the purpose set forth.

72,671.—DRAG HOOK.—James Parish (assignor to himself and Joseph Creote), Chicago, Ill.

I claim, 1st, The rollers, D D, in combination with the stock, A, constructed substantially as and for the purposes specified.

2d, The combination of the guards or floats, C C, with the flukes, B B, constructed substantially as and for the purposes set forth.

3d, The combination and arrangement of the stock, A, flattened flukes, B, and buoy line shackle, e, with the floats, C C, substantially as and for the purposes specified.

4th, A grapnel or drag hook, constructed substantially as and for the purposes specified.

72,672.—FIRE ALARM.—I. T. Pease, Thompsonville, Conn.

I claim, 1st, The curved expansion bar, B, composed of two metals of different rates of expansion by heat and the adjustable screw, S, when constructed and arranged substantially as herein described for the purpose of a fire alarm.

2d, The combination of the bar, B, the screw, S, the alarm movement, G, the lever, J, the levers, K and I, or their equivalents, substantially as herein described.

72,673.—CHURN.—John Pelsor, Brooklyn, Ill.

I claim, 1st, The staffs, E E, furnished with dasher boards, g, so constructed that the lower half of the boards on one staff will pass the upper half of the board, g, on the other without impinging.

2d, The box, A, the top, B, the staffs, E E, the arms, C, and pulleys, m and n, the whole combined, constructed and operating substantially as described.

72,674.—SHEEP SHEARING TABLE.—Oliver Perry and Clark Perry, Ortonville, Mich.

We claim the sill or bar, G, and strap, H, used upon the table, B', substantially as and for the purpose set forth.

72,675.—THRASHING MACHINE.—M. E. Phillips, Lena, Ill., assignor to himself and George Wetzel.

I claim, 1st, The combination as described with the thrashing cylinder, D, and stationary slats, e, of the rotating rakes, E, having their shafts connected at each end with the same gear wheels which drive the thrashing cylinder.

2d, The combination substantially in the manner described of the thrashing cylinder, D, the parallel slats, e, the rotating rakes, E, the longitudinally-vibrating screen, F, and the shaking shoe, H, with the fan, K, for the purpose set forth.

3d, The combination as described of the thrashing cylinder, D, with the hulling cylinder, M, whereby both are driven at each end from the same gear wheels.

4th, The combination as described of the spiral rasped surface beaters of the hulling cylinder, M, with the yielding concave, m.

5th, The combination of the closed fan case, k, with the adjustable regulating valve, s, controlled by the spring detent, s2, as set forth.

6th, The combination substantially as described of the thrashing cylinder, D, the rotating rakes, E, the vibrating screen, F, the shaking shoe, H, and the hulling cylinder, M, whereby they are all driven by the same counter shaft.

7th, The combination with the hulling cylinder, M, of the vibrating screen, F, and elevator, I, all arranged and operating as described.

8th, The combination with the hulling cylinder, M, of the elevator, O, the shaking shoe, H, the fan, K, and the revolving screen, J, all arranged and operating as described.

72,676.—OPERATING FEED WHEELS IN SEWING MACHINES.—G. W. Powers, Boston, Mass.

I claim the combination of the lever, friction pawl, and entering wedge or pin together and with the feed wheel and rocker plate, when the whole are constructed and arranged to operate substantially as set forth.

72,677.—BRUSH AND MOP HEAD.—T. T. Prosser, Chicago, Ill.

I claim, 1st, The combination of the movable ferrule with the pins in the handle of the mop, all as for the purposes set forth.

2d, The combination with the handle of a brush and mop holder of a ferrule provided with screw threads upon its interior surface and with lugs on the outside, all as for the purposes set forth.

3d, The combination of the ferrule, b b, provided with lugs, c c, and the lever, d d, all as for the purposes set forth.

4th, The lever beam, d d, with movable fulcrum serving to hold the brush at one end and also to operate the wire that holds the mop, all as for the purposes set forth.

72,678.—HARVESTER.—Abraham Quick, W. S. Opie and A. J. Farrand, Raritan, N. J.

We claim, 1st, The combination substantially in the manner described of a finger beam with the main frame of a harvester by means of three joints, h h', and i, arranged in the same vertical plane, or nearly so, when two of said joints have a vertical and the third an axial movement on their pivots for the purpose of allowing the cutting apparatus both a vertical and an axial movement.

2d, The combination with a harvester of an odometer, arranged and operating substantially as and for the purpose described.

3d, The chain carrier arranged on the drag bar, as described.

72,679.—RAILWAY CARRIAGE.—B. L. Randall, Roxbury, Mass.

I claim, 1st, The combination as well as the arrangement of the levers, E E, and the springs, I, with the platform and truck frame.

2d, Also the combination as well as the arrangement of the levers, E F, the springs, I, and the springs, G, with the platform and truck frame.

3d, Also the combination as well as the arrangement of the levers, E F the springs, I, and the springs, H, with the platform and truck frame.

4th, Also the combination as well as the arrangement of the levers, E F and the springs, I G H, with the platform and the truck frame.

72,680.—WATER WHEEL.—James Raney, New Castle, Pa.

I claim the buckets, B B, slightly curved and having bottoms which taper in width and thickness as shown and described when connected between the plate and circular metallic rim, E, all constructed and used as and for the purposes specified.

72,681.—HAY PRESS.—A. C. Richard, Point Lookout, Tenn.

I claim the combination of the platen, e, the bars, g1 and g2, the links, h and k, or their equivalents, the toothed rack, j, and levers, m, all arranged and operating substantially as set forth.

72,682.—CHURN.—John Risher, Delaware, Ohio.

I claim the dasher, B, with its arms, C C C, constructed as herein described and used in the box, A, in the manner and for the purposes described.

72,683.—LAMP.—C. W. Russell and Neil Clifford, N. Y. city.

I claim the deflector, B, when its cap, a, supported upon metal strip, b, is surrounded by the supplemental glass cylinder, c, having a contracted top and resting upon the burner, A, between the rows of perforations, d h, said cylinder being also surrounded by the base, e, of the chimney, C, as herein described for the purpose specified.

72,684.—PEN AND PENCIL CASE.—R. H. Ryne (assignor to W. S. Hicks), New York city.

I claim a combined pen and pencil case consisting of the case, A' and the reversible pen holder, C, having a screw pencil point, a, arranged therein substantially as shown and described.

72,685.—CLOTH PLAITING MACHINE.—J. F. Sachse, Philadelphia, Pa.

I claim an adjustable blade, C, arranged to operate in combination with an adjustable bar, b, substantially as and for the purpose described.

72,686.—BELT SHIPPER FOR MULES.—W. H. Saltmarsh, Waltham, Mass.

I claim the combination and arrangement of the swinging bar, M, with the link, N, the rod, D E', and the shipper, E F, substantially as described and for the purpose set forth.

72,687.—SOLAR AND TRANSIT INSTRUMENT.—Wm. Schmolz, San Francisco, Cal.

I claim the hour-circle, N, fastened upon the base, P' A', with a solar apparatus attached upon the axis, P, in combination with a surveyor's transit, substantially as described and for the purposes set forth.

72,688.—MACHINE FOR MAKING RINGS.—William Serviss, Sidney, Ohio.

I claim, 1st, The interchangeable mandrels formed with a hole near one end, in combination with the shaft furnished with a crank, substantially as and for the purpose specified.

2d, The arrangement of the mandrel upon the shaft, C, with reference to the anvil, B, furnished with grooves, a, in its upper surface, substantially as and for the purpose specified.

3d, The supplemental flat-faced anvils, A* B* C*, arranged in relation with the main anvil, B, and the mandrel on the shaft, C, substantially as and for the purpose specified.

72,689.—STEAM GENERATOR.—Geo. V. Sheffield, Worcester, Mass.

I claim, 1st, The combination, with the boiler or steam generator and fire-chamber, of a fire-injector and steam superheater, under the arrangement described, whereby the flame and heated gases shall be taken from the fire-chamber, and forced or driven, under pressure, into the boiler or steam generator, substantially as herein shown and set forth.

2d, The combination, with the cylinder, F, and fire-chamber G, of the

hamber, c, piston, H, fire-pipes, I and f, substantially as and for the purposes set forth.

72,690.—BELT-FASTENING.—George V. Sheffield and Byron Whitcomb, Worcester, Mass.

I claim, 1st, A belt-fastening, constructed substantially as shown and described.

2d, Making one half or a part of the shanks of the hooks, a, longer than the others, for the purposes stated.

72,691.—CLEANING COTTON.—Thomas Shapard, Haywood county, Tenn.

I claim the lint-room, as above described, made of slats, allowing the dust and dirt to escape, in lieu of the ordinary close lint-room, which does not allow the dust and dirt to escape.

72,692.—SASH LOCK.—Amos M. Smith, Chicago, Ill.

I claim, 1st, The combination of the lifter, L, jaws, D, and levers, E, arranged and operating substantially as and for the purposes specified.

2d, In combination with the above, the arrangement of the bolt, H, operating as shown and described.

3d, The arrangement of the springs, h h in combination with said levers, E, and bolt, H, substantially as and operating as set forth.

72,693.—FENCE.—D. N. Smith, Salem, and E. F. Olds, Lyon, Mich.

We claim the continuous rider, G, as arranged, in combination with the braces, E, stakes, C, and rails, B, in the manner as and for the purpose set forth.

72,694.—HEATING POTTERY OVENS AND OTHER LIKE FURNACES.—Henry Speeler, Trenton, N. J.

I claim a steam-pipe, in combination with a "fire-mouth," for heating pottery ovens, kilns, and for other like ovens, substantially as described.

72,695.—PARASOL.—Cornelius St. John, Charlestown, Mass.

I claim, as a new or improved article of manufacture, and as my invention, the sun-shade, as composed of the stick, A, the corrugated paper body, B, and the metallic expander, C, made and arranged substantially in manner and so as to operate as described.

Also, the expander, C, made as explained, that is, of a single piece of wire, first bent in a circle, and next downward from the circle, at an acute angle to its plane, and afterwards in a helix, the whole being as shown in the drawings.

72,696.—GRAIN-SEPARATOR.—F. Swift, Hudson, Mich., assignor to himself and Horace Wilson.

I claim, 1st, The fan-shaft, C, provided with two sets of wings, secured on in different positions, and with a pulley between them, as and for the purpose set forth.

2d, In combination with the fan, as herein constructed, the shaft, J, band, H, pulleys, D K, screens, G I, with springs, L L, and bar, N, all constructed, arranged and operating substantially as specified.

72,697.—GASOLINE LOCOMOTIVE HEAD-LIGHT.—J. B. Terry, Hartford, Conn.

I claim, 1st, A locomotive head-light or lantern, consisting of the combination of a vessel to hold the gasoline or other similar hydrocarbon liquid with an internal or external heater to vaporize such liquid for the direct production therefrom of illuminating gas, as set forth.

2d, The combination, with a hydrocarbon liquid-holding vessel, provided with one or more burners, of an internal coil or surrounding jacket, admitting steam from the locomotive boiler to heat the liquid within the vessel, as shown and described.

3d, The combination, with the hydrocarbon vessel, of an elastic diaphragm and stopper or valve, operating in connection with the steam-admission pipe, substantially as described, so as to regulate the flow of steam and pressure in the vessel, as set forth.

4th, In an apparatus, substantially as described, the combination, with the hydrocarbon vessel, of wood shavings, or their equivalent, to prevent the swash or agitation of the liquid within the vessel, substantially as and for the purposes set forth.

72,698.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, A measuring-can, so constructed and operating as that, after the measuring-chamber has been filled with fluid, a surplus will so load the can as to cause it to tilt, and empty its contents, in such a manner as that the measured quantity or volume, and the surplus or unmeasured quantity, will be discharged into different receivers, substantially as specified.

2d, The combination of a measuring-can and weighing-can or cans, separate and distinct from each other, so that the several operations of these devices will give the specific gravity of the fluid by weight and measure.

3d, In a spirit-meter, the use of a plurality of weighing and measuring-cans, arranged and operating in such manner as that a fixed quantity of spirit, apart from the aggregate passing through the meter, is measured and weighed for determining the proof, essentially as herein set forth.

4th, In combination with a measuring-can, an extra or separate weighing-can, for weighing the surplus or overflow not passed through the measuring-can, substantially as specified.

5th, The combination, with a primary receiver, A, of an overflow-pipe, or its equivalent, arranged to conduct the surplus supply from said receiver to the surplus weighing-can, or receiver connected therewith, essentially as herein set forth.

72,699.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, A measuring-can, provided with a discharging siphon or siphons, operating or having flow through them established by the tilting of the can, substantially as specified.

2d, A diaphragm measuring-can, forming distinct measuring and surplus chambers, in combination with siphonic discharge pipes, essentially as shown and described.

3d, A diaphragm measuring-can, operating substantially as described, in combination with a weighing-can or device for ascertaining the proof by weight and quantity, as specified.

4th, Providing the measuring-can and weighing-can, or either, with air-dash pots or cushioning devices, essentially as herein set forth.

5th, The combination of the floats, F F', and catches, H H', or the equivalents of these devices, and tilting-hopper, with a measuring can, having a siphonic discharge, substantially as specified.

72,700.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, The combination, in a spirit meter, of a weighing-can and can for determining volume, receiving in a given time or times an equal or proportionate supply with the weighing-can, for ascertaining the specific gravity of the fluid.

2d, The combination of a float or piston with the can-determining volume for a given weight, to actuate in any suitable manner a registering device, substantially as specified.

3d, Controlling the filling and discharge of the can, which determines volume for a given weight, by the action of the weighing-can, essentially as herein set forth.

4th, In combination with the devices for determining specific gravities, the hopper, A, divided as at b, and furnished with separate discharge pipes, D and E, substantially as specified.

5th, The combination of a weighing-can or device, volume-determining cylinder or can, H, with its piston, I, valve, L, operated by the weighing-can and gear, g J, essentially as described.

72,701.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim, 1st, The combination, with a spirit meter, or weighing and measuring-cans thereof, of a thermo-compensating device or attachment, operating automatically to control the quantity of the spirit weighed, or weighed and measured, in its passage through the meter, substantially as specified.

2d, Regulating, in an automatic manner, the action or discharge from the weighing-can of a spirit meter, by the varying specific gravity of the fluid, essentially as herein set forth.

3d, The combination, in a spirit meter, of devices automatically operating, by the varying densities and temperature of the fluid passing through the meter, to regulate the action of the weighing-can, substantially as specified.

4th, The combination of the toe, l, on the weighing-can shaft, and rods, k k, with a device operated by the temperature of the spirit, for adjustment of weight on said rods, to regulate the action of the weighing-can, substantially as specified.

5th, The toggle-joint, I, rods, k k, and toe, l, in combination with a float, operated by the specific gravity of the spirit, essentially as and for the purpose herein set forth.

72,702.—SPIRIT METER.—Isaac P. Tice, New York city.

I claim registering the specific gravity or strength of the spirit passing through the meter by means of weighing cans, so arranged and operating as that the overflow or surplus of the one can is weighed and recorded by the second, while the main contents of such first can are diverted from passing through the second or lower can, substantially as specified.

72,703.—COMBINED PLANTER AND CULTIVATOR.—John Vaughn, College Grove, Tenn.

I claim, 1st, The triangular frame, t, bearing the small ploughs, p p, when used in connection with a cotton-cultivator, substantially in the manner and for the purposes set forth.

2d, The combination of the draw-beam, A, wings, B B, ploughs, p p P, opening plough, S, frame, F, wheels, D D', shaft, C, seed-box, i, conductor, b, and covering plough, d, substantially as shown and described.

3d, The covering-plough, d, when hung loosely between two guides, g g, so as to have a free vertical, but no lateral motion, substantially as described.

4th, The frame, F, when constructed with hooks, h h, which operate, in connection with eyes, e e, to hold the frame to the wings, B B, when used in connection with a cotton-planter and cultivator, substantially in the manner and for the purposes specified.

72,704.—EXTENSION BED-LOUNGE.—Charles F. Vollmer, Harrisburg, Pa.

I claim, 1st, An improved extension-lounge, formed by the combination of the following parts: An ordinary top, consisting of a seat, a, arm-rest, c, and back, b, firmly secured to each other; the extension, D, the extension armrest or pillow, G, the base, B, having bottom, a', and the automatic closing and opening legs, F, all as herein described.

2d, The combination of top, a b c, base, b, extension, D, legs, f, and pillow, G, substantially as and for the purpose described.

72,705.—MACHINE FOR MAKING PAPER COLLARS.—Oscar F. Washburn, Bridgewater, Vt.

I claim, 1st, A collar-formed die for cutting out a collar, when provided with an embossing device situated within the cutting edge of the die, substantially as described.

2d, A collar-formed die for cutting out a collar, when provided with an embossing device and an indentation for folding a collar, substantially as described.

3d, A collar-formed die for cutting out collars, when provided with an embossing device and indentations for button holing, substantially as described.

4th, A collar-formed die for cutting out a collar, when provided with an indentation or crease for folding, substantially as described.

5th, A movable platen, in combination with a collar-formed die, having inside its cutting edge an embossing device, substantially as described.

6th, A movable platen provided with cutters, in combination with a collar-formed die, having an embossing device and indentations for button-holing, all operating together substantially as described.

7th, A collar-formed die, having an embossing device, a crease for folding, and indentations for button-holing, in combination with a movable platen provided with cutters, and with a folding-knife, substantially as described.

8th, A roller-feeding mechanism, and a collar-cutting and embossing mechanism, substantially such as described, in combination.

9th, A roller-feeding mechanism, and a collar-cutting and embossing and a button-holing mechanism, such as described, in combination.

10th, A roller-feeding mechanism, a collar-cutting and embossing, a button-holing and a folding mechanism, substantially such as described in combination.

11th, A roller-feeding mechanism, a collar-cutting and folding mechanism, substantially such as described, in combination.

12th, The combination of geared feeding-rollers, E, with toothed arm, J, and lever, O, constructed and operating as and for the purpose described.

13th, The combination of shaft, F, eccentrics, K M, rods, L M2, movable platen, I, slide, N, and folding-knife, H, substantially as and for the purpose described.

14th, The machine herein described, when constructed, combined, and operating to cut, emboss, button-hole, and crease a collar to be folded at a single operation or revolution of the main shaft, all as set forth.

72,706.—SPOON BLANK.—Le Roy S. White, Waterbury, Conn.

I claim the spoon blanks, of such form and so cut or stamped out of the bar or plate without intervening scrap, substantially as specified.

72,707.—STEAM ENGINE SLIDE VALVE.—Charles Whittier, Roxbury, Mass., assignor to "Union Steam Valve Company."

I claim the arrangement of the balance slide valves, in relation to the steam chest and cylinder, as and for the purpose set forth.

72,708.—SLED BRAKE.—J. W. Wight, Chicago, Ill.

I claim the brakes, C, in combination with a sled, A, when constructed and operating substantially as and for the purposes herein described.

72,709.—BREAD CUTTER.—G. D. Williams, Chicopee, Mass.

I claim the device consisting of the shelf, A, guide-frame, C, knife, B, and adjustable bar, F, combined and arranged substantially as and for the purpose shown.

72,710.—ABDOMINAL SUPPORTER.—Wm. M. Young, M. D., Trempealeau county, Wis.

I claim the form or shape of the abdominal plate, and the form and construction of the body band.

REISSUES.

36,503, dated September 23, 1862; reissue 2,819.—SKATE.—Phineas Smith, New York city, assignee of Oliver G. Brady.

I claim, 1st, In skates, the side clamps, J J, arranged near the toe of the skate, and the tightening means, L, adapted to draw the same forcibly together, all combined and arranged as and for the purposes herein set forth.

2d, Also, in skates, the set screws, k k, arranged as specified, in combination with the tightening means, L, and side clamps, J J, so as not only to allow the side clamps to be drawn forcibly together, to seize the boot, but also to allow the foot to be adjusted, either centrally upon the skate, or to any extent one side or the other, to suit the wearer, and be held firmly against shaking in any position, all as and for the purposes herein set forth.

3d, Also, the arrangement of the shank-piece, D, and heel-plate, B, with the shank of the boot, runner, A, and adjustable tightening hook, E, as herein shown and described.

68,398, dated September 3, 1867; reissue 2,820.—OVER-SHOE.—Henry G. Tyer, Andover, Mass.

I claim a boot or shoe constructed with an elastic gore or gores of vulcanizable material, when the said gore is inserted into the shoe before vulcanization, and during the process of construction, and the whole completed by the vulcanization, substantially as set forth.

NOTE.—FIFTY-SEVEN patents in the above list were solicited through the Scientific American Patent Agency.

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.*

61,250.—MACHINE FOR SCOURING LEATHER.—Jas. Terwilliger, and others, assignees of Ira W. Prey and Edward Fitzhewry, Portland, Oregon. Dated Jan. 15, 1867. Application for reissue received and filed Sept. 13, 1867.

1st, A mechanism by which by which dually-arranged sets of rubbers or scrapers, L, in a machine for finishing leather, may alternately be brought into action by the reciprocating motion of a crank, substantially in the manner set forth.

2d, In combination with the crank, N, and pitman, N', we claim the frame, A, pivoted, substantially in a manner and for the purpose set forth.

3d, The combination of the hinged arms, H, with or without the arms I, with the spring, K, the parts being constructed and arranged for use, substantially as set forth.

4th, The spring, K, pivoted cross-pieces, K', and levers, O, in combination with hinged arms, H I, substantially as set forth and for the purpose set forth.

5th, In combination with table, G, we claim the roller, E, adjustably suspended by the rods, E, and cross bar, P, substantially as and for the purpose set forth.

6th, We also claim the combination of a reciprocating tool carriage to operate, and provided with leather and hide scouring, or finishing, or dressing tools, as described, with a movable table, tablet, or platform, so supported as to be capable of being moved in any direction in one plane underneath such tool carriage and its tools, the same being to enable any and all parts of the upper surface of a side of leather, when on such table, tablet, or platform, to be readily brought into a position, or into positions, to be acted on by scouring or finishing tools, while with their carriage they may be in movement, as specified.

43,483.—WASHING MACHINE.—William M. Doty, New York city. Dated July 12, 1864. Application for reissue received and filed Dec. 18, 1867.

1st, The combination with the corrugated washing board and swinging brackets to which it is attached, of a lever or levers, to operate the same under the arrangement, substantially as herein described, so that the said board may be oscillated horizontally, or back and forth, by a vibratory up and down movement of the levers.

2d, The combination of the oscillating washboard and swinging brackets with a removable hand lever or levers, operating in the manner substantially as herein shown and described.

3d, The formation, in swinging brackets, to which the corrugated washboard is attached, of sockets, or the mechanical equivalents thereof, for the ready insertion and removal of the operating lever, substantially as and for the purposes herein shown and described.

4th, The combination with an oscillatory washboard and stationary wash tub, of a hook and eye, or the mechanical equivalent thereof, for rendering the said washboard stationary within the tub at the pleasure of the operator.

☞ 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.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A positive answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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Preliminary Examination.—In order to obtain a Preliminary Examination, make out a written description of the invention in your own words, and a rough pencil or pen-and-ink sketch. Send these with the fee of $5 by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. The Preliminary Examination consists of a special search, which we make with great care, among the models and patents at Washington to ascertain whether the improvement presented is patentable.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Address MUNN & CO., 37 Park Row, for full particulars.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

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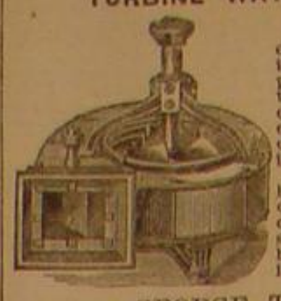

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