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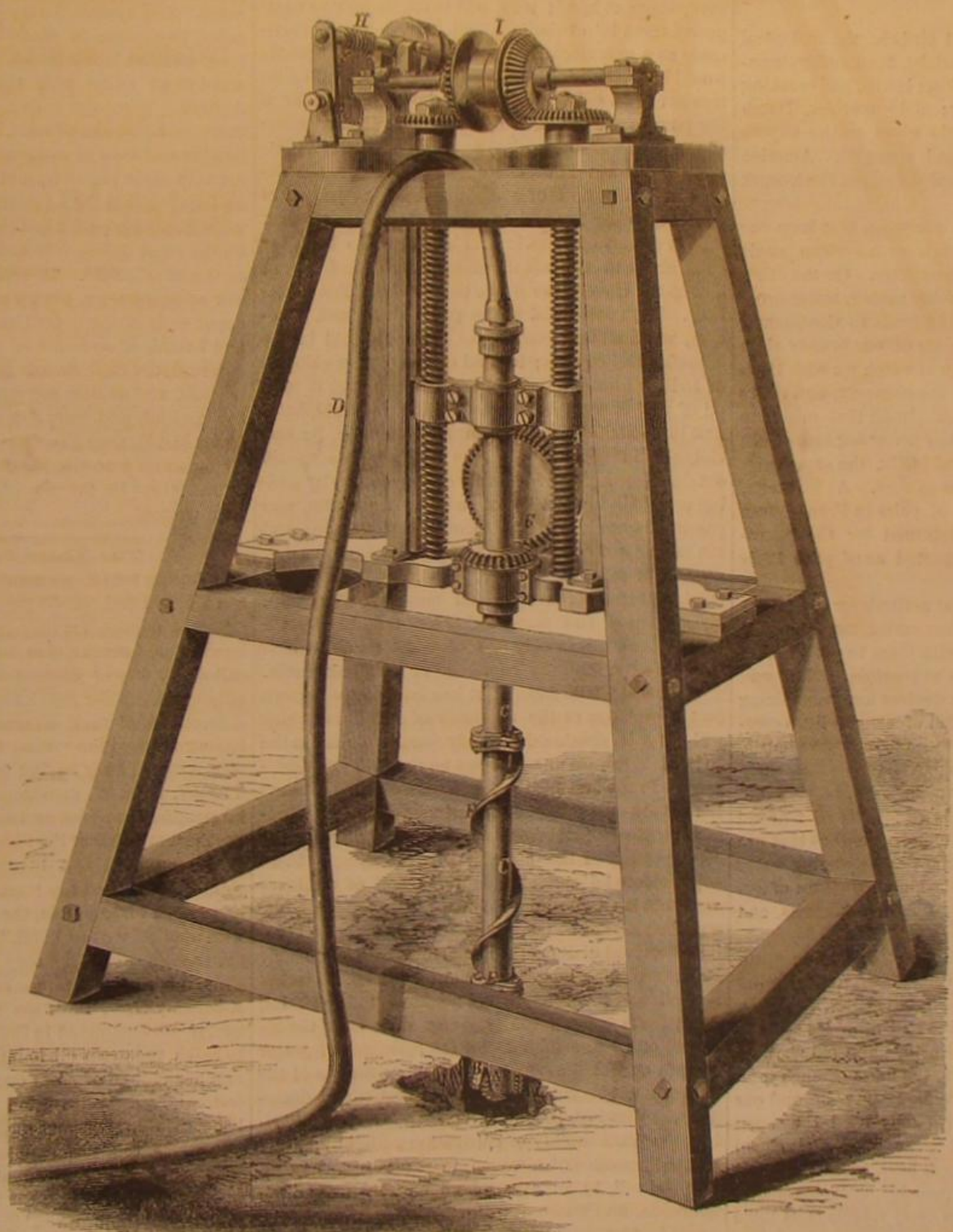
Rock Borer and Grooving Machine.

The peculiarity of this machine consists in the cutters by which the hole is bored. These cutters are in form like the domestic utensil known as a jagging iron, with which housewives ornament the edges of pastry. They are shown at A, and are four in number, one at each corner. Inside the stock, B, to which the cutters are secured are four other wheels, the center two are set obliquely with reference to their axes, so that by "wabbling," to use a common phrase, they cut over a great deal of space, acting on a small portion of the surface only at one time. By this arrangement no standing core is left and the hole is bored complete at one operation. The boring rod, C, which carries these cutters, is made hollow for the admission of water to the tools; this water is forced in through the tube, D, and serves to keep the cutters cool during their action. As the depth of the hole increases the boring rod is also lengthened, so that it would be unsteady in action unless some guide was provided. To prevent this difficulty Mr. Sweeney attaches a triangular yoke, E, to the boring stock, said yoke having three or more rollers in it. These rollers are externally just the size of the hole, so that they bear against its circumference as the cutters descend, and keep them straight. The helix, F, is to facilitate the ascent of the chips, so that the bore will not choke up.

The machinery by which the cutters is operated is not peculiar, rotation being imparted by the bevel wheels, G; attached to the shaft of these there is a pulley over which a belt passes. The feeder shown at H, and one leg of the standard which carries the worm shaft is made to raise so as to throw the worm out of gear when necessary. The pulley, I, is both fast and loose; that is to say, one of each sort, are placed side by side, and when the belt is shifted to the one or the other, the screws, which are right and left-handed, raise or lower the drill rapidly.

These features are the principal ones, and in regard to the capacity of the machine the inventor asserts that in addition to rock drilling it can be applied to sink shafts of any diameter up to twelve feet; also to drive headings in tunnels, mines, etc. It is also available in erecting light-houses or observatories; for all work in rocky bottoms where piles are to be used. It can likewise be used in submarine excavations for sinking piers for bridges and docks. Also for cutting down portions of rocks that may impede the channels of rivers, and thus render navigation dangerous and difficult. The machine is readily controlled by persons of ordinary ability, and is not complicated in detail; any of the parts can readily be repaired in an ordinary machine shop.

A patent is now pending on it through the Scientific American Patent Agency. Peter Sweeney, of New York City, is the inventor, and for further information address J. F. Flanagan, No. 80 Broadway, New York City.



SWEENEY'S ROTARY ROCK BORER AND TUNNELING MACHINE.

SHOW OF POULTRY.—A great poultry show will open at Barnum's Museum on the 24th inst.

Glass Trade at the West.

There are fifteen bottle and vial factories fifteen window glass factories, and fifteen flint glass works in Pittsburgh, being forty-five glass works in all, an increase of forty per cent in number in eight years. There are in addition three flint glass works at Wheeling, and one at Stubenville. Also, three window glass works in the neighborhood of Brownsville, sixty miles from Pittsburgh. To the east of the Allegheny mountains, there are in New Jersey nine window-glass works, and twelve in the State of New York; six flint-glass works in Massachusetts, two in Brooklyn, one in Jersey City, two in Philadelphia, being eleven in all making flint glass, and twenty-one making window and other glass.

The fifteen window-glass works, located immediately at Pittsburgh, have a capacity to make 520,000 boxes of glass a year, but their average yield is about 400,000 boxes, whose entire value, at the present time, is $2,600,000. The fifteen green or vial works produce annually about 420,000 gross, or 60,480,900 of vials and bottles, worth, at present rates, $2,100,000. The pressure upon these works is best shown by the fact, that although only customary to run them for ten months in the year, yet many of them have ran twenty-one months without stopping.

The fifteen flint-glass works in operation at Pittsburgh, produce, at the present time, about 4,200 tuns of glassware, worth at present rates, in round numbers, two millions of dollars. Their capacity is, however, double the amount produced, or about 8,000 tuns. The quality of flint glass made in these fifteen works it is not necessary to note here, beyond the simple statement, that it is admitted by the trade, that the handsomest and best glassware in the United States is made at Pittsburgh.

PROTECTION FOR FIREMEN.—Rev. Benjamin I. Lane, a Baptist clergyman at South Farmington, Mass., has invented a jacket and mask to protect firemen from the smoke and flame of a burning building while pursuing their arduous duties. The apparatus has had several trials in Boston and works well.

THEY have a factory in Danbury where they put springs into hat rims—hoop skirt them.

The Work of Different Countries.

An English journal of late date has the following:—

"Industry has many curious local attachments, and clings with feline fondness to particular spots. Thus, watches are made cheaply in Switzerland, where the men and women of fifty villages together are all busy on toothed wheels, mainsprings, and jeweled holes. Soap and cheap perfumes, nasty as well as cheap, are best compounded in central Germany. The Tyrol and the Black Forest have three resources for the long winter evenings, when the soil is frozen stiff, and the snow is heavy on the pine boughs—clocks, straw hats, and toys. All over Middle Europe you see the Black Forest clocks, made by peasants round the cottage hearth, as plentiful as Mr. Samuel Slick's lacquered time-pieces in Canada. Baden competes with Italy in straw-plaiting; while for toys, old Deutschland bears the bell.

"It is a curious thing that the toys which English children love so dearly, and which they break, maltreat, and demolish so vivaciously, should all be foreign. Here and there, perhaps, a rocking-horse, or a straight-legged spotted steed with his harness nailed to his body, may be the work of an English artisan, but not often.

"The wooden beasts and birds in the zoological collections, the puzzles, the bricks, the gaudily-dressed Turks and hussars, squeaking lambs, and creaking cards, come from Germany; so do marbles, Dutch dolls, and baby-houses. Paris gives us the superb waxen doll, in her satin and spangles. America sends over the gutta-percha uglinesses and clock-work mice.

"Quite two-thirds of the overshoes that keep our feet from wet bear the French or American eagle boastfully embossed upon their soles. On the other hand, England sells India-rubber tubing, water-proof cloth, and gutta-percha in fifty forms to Continental nations. The French buy more of our brandy than we do of theirs—an exchange of which we wish them joy; while our silks continue the cheapest, and theirs the richest and most tasteful. In all that relates to calico they own our merit; they perfer our broadcloth to their own, but declare, and justly, the superiority of their scarlet-dyed woollens to ours. As for boots, they are cut out by millions of pairs in France, sent to England to be closed, returned for the operation of 'cliching,' and re-exported as of pure Paris make.

"The Americans have great aptitude for the manufacture of small, delicate, labor-saving machines. It has always been an object with them to get through their work with as few hands as possible, and we owe to them all manner of dainty devices for economizing manual power. London is full of elegant little complications of steel rods no bigger than a wine bottle, devised for stitching all stitchable materials, for punching, drilling, and cutting, for metallurgy, and agriculture. Our own machinery is commonly of a grand and solid character—great massive engines that are to be found at work all over the world pumping water out of mines in the Andes, lashing the waves of far-off oceans into foam, crushing quartz in Victoria, and dragging burdens in Brazil.

"We cannot, perhaps, quite beat Prague in turning out stained glass and colored services glowing with the deep pure tints of enormous rubies, emeralds, and topazes; nor are our tubes and alembics so fit to go through fire as the Bohemian. The old ware of China, the old Japanese jars, the finest French and German porcelain, have a fragile beauty beyond our imitations. But our potteries only need the 'open sesame' of free trade to set their good and cheap products—plates that can bear heat, glass fairly cut into sharp facets, and vases modeled on choice shapes from Greece and Etruria—on every middle class table abroad. French housewives who store away their preserves in jars coated with poisonous white lead, and dare not heat the plates lest they should fly into fragments, and whose clumsy coffee-cups are an inch thick, are not slow to appreciate the merits of Mr. Gladstone's treaty of commerce."

Paraffine.

The uses of paraffine are truly astonishing. Several refineries are required to furnish enough to make chewing gum, which is highly recommended for constant use in ladies' sewing circles, and among gossipping neighbors, etc. A story is told of a Cincinnati refiner who had several tuns of paraffine on hand, nicely deodorized, and the demand was light. He sent a man through the towns of Ohio, and bought all the beeswax he could get, paying about forty cents. To one hundred pounds of beeswax he adds five hundred pounds of paraffine, same color and consistence and general appearance, but worth five cents a pound. Now they may detect the odor, he thought; so he put it up in oil barrels, putting the brand "Star Refinery," Cincinnati, Ohio, (the name, of course, is suppressed.) He anoints the barrels outside with petroleum, ships to New York to several merchants a hundred tuns of pure beeswax, with this blinder at one end of each invoice: "Boxes are scarce, and I send the wax in refined oil barrels; you can sell the barrels." The wax opens well—fine lot—very uniform—smells of the barrels a *little*—sells at eighty-eight cents per pound. Imagine the profits—five-sixths paraffine, one-sixth beeswax.

Production of Ammonia.

Shall we ever be able to produce ammonia on the great scale artificially? In the nitrogen of the atmosphere and the hydrogen of water, its elements are everywhere at hand; who will teach us how to compound them into volatile alkali, by a method practicable as a manufacturing process? Cheap ammonia would be a great boon to the agriculturist, and by no means to him only. Could this body be had for a few pounds per tun it would entirely revolutionize one of the chemical industries, and by far the most important of them all. There is a saying that the degree of civilization of a country may be judged of by the quantity of sulphuric acid which it consumes. This is because sulphuric acid has hitherto been the chief agent in the alkali manufacture, and has so lain at the base of the whole edifice of applied chemistry. With ammonia, at the price suggested, however, we should no longer use sulphuric acid in the manufacture of soda; instead of converting chloride of sodium into sulphate of soda by heating it with oil of vitriol, and then transforming this sulphate, first into sulphide and then into carbonate, by calcining it in contact with lime and coal, we should obtain bicarbonate of soda at one operation by adding ammonia to chloride of sodium, in solution, and passing carbonic acid gas through the mixture; and the saying just quoted would thus cease to be valid. What is of more importance, soda would be cheapened, and cheaper soda would mean cheaper soap, cheaper glass, and many other less tangible advantages. And this is only one of many results which would accrue from the command of cheap ammonia.

Well, some little fresh light has lately been thrown on the question of the synthesis of ammonia, which will never be obtainable cheaply enough for use in the soda manufacture unless it can be produced synthetically. In the first place, M. Decharme has published the results of a series of experiments on "the production of ammonia from air and water under the sole influence of the porosity of the soil." In these experiments he carefully deprived soil of whatever ammonia it might already contain, then moistened it, and then passed through it currents of air, also carefully deprived of its natural ammonia. After the air had passed for a longer or a shorter period, he tested the soil, and invariably found ammonia in it, proving that porous soil has the property of causing the nitrogen of air to combine with the hydrogen of water to form one of the most important elements of the food of plants. Hence "the good effect of airy drainage and plowing, the improvement of land by fallowing, the practicability of cultivation without manure, and the presence of nitrogen in plants grown in an artificial soil, in an atmosphere entirely freed from ammonia, and watered with chemically pure water." Second, At a recent meeting of the Chemical Society, Mr. Buckton, in exhibiting a specimen of the mineral *boussingaulite*, found in the neighborhood of the Soffioni of Tuscany, and containing eighty per cent of sulphate of ammonia, explained, by way of suggesting how this mineral was formed, that he had obtained sulphate of ammonia artificially by passing a mixture of sulphuretted hydrogen, air and steam through a heated earthenware tube. Under these circumstances, both the sulphuretted hydrogen and the steam are decomposed; the sulphur of the sulphuretted hydrogen uniting with the oxygen of the steam and of the air to form sulphuric acid, and the hydrogen both of the sulphuretted hydrogen and of the steam uniting with the nitrogen of the air to form ammonia. Lastly, this statement of Mr. Buckton's has led Mr. Wentworth L. Scott to publish the fact that he has found that ammonia is always produced when "deammoniated air is passed over small nodules of pumice stone, about 0·1 to 0·2 inch in diameter, and moistened with either pure water or dilute solutions of certain salts." Mr. Scott states that he has been engaged in researches in this direction for several years past, and promises to publish by-and-bye a full account of his experiments and their results. We are clearly making progress toward an end, the accomplishment of which would be as great an achievement as any of this age.—*Mechanics' Magazine*.

Rebel Abatis at Petersburg.

A war correspondent says:—Passing through our line of earthworks, no longer swarming with their garrison, and crossing the trench just beyond which sheltered our outer pickets, I found myself in the rebel rifle pits. A devious covered way led me to their abatis. Their manner of constructing this defence is very different from that of the Union engineers. Our system is very simple, consisting of stout poles, two inches in diameter and ten or fifteen feet long, planted firmly in the earth and inclining outward at an angle with the ground of about thirty degrees. The outer ends are sharpened, and beneath them, lying on the ground, are placed the bristling boughs and tops of evergreen trees. The poles are set very close together, and it seems as if it must be an impossibility for an enemy to break through them without a long pause and the aid of axes. The abatis on the rebel defences is most unlike this, in appearance and principle. It resembles somewhat a long row of saw-horses, set up together endwise, with the upper ends of the outer limbs sharpened to a point—and I think of no terms in which I can more clearly describe it. Each one of these saw-horses is distinct in itself, and as they are not very deeply imbedded in the ground, and may be easily pushed around by forces inside, they afford no obstacle to the egress of a column on a sortie, although they are formidable interruptions to the advance of an attacking party from without.

The Three Sand Rocks.

In boring for oil, no man expects to find it until he has reached and passed through a whitish sand rock, lying at depths varying from seventy-five to two hundred and seventy-five feet in the valleys. This is called, by way of distinction, the "first sand rock," although the borer may have passed through a dozen different sand rock, alternating with shales, before having reached the "sand rock." Very generally, a well, stopped after having penetrated this rock, yields a heavy, thick oil, considered specially valuable for lubricating purposes, and commanding nearly double the market value of the light oils. From one hundred to two hundred feet below this lies another, very similar, and called the "second sand rock." Having penetrated through this, the borer is usually rewarded with another "show of oil." This, too, is a very heavy oil, though not commonly so heavy as the former. From this rock is produced nearly all the oil along the Allegheny river, while the wells on French creek are nearly all completed in the "first sand rock." But, to reach the great oil fountains, the drill must make another plunge of from one hundred to two hundred feet, when a "third sand rock" is reached. From beneath this rock out gushes the pure, limpid, light oil. Here, too, are reached most, not all, the great "flowing," or rather spouting wells; some of them having deluged the land at first with 3,000 barrels per day—the "Empire well" for instance. The wells of Oil Creek are mostly in this rock.

The English Lock-out.

The Birmingham correspondent of the London *Engineer*, of March 24th, says:—

"The only change in the position of affairs relative to the lock-out, as compared with last week, is that an attempt is to be made to obtain a supply of non-unionists to go from South Staffordshire into the north of that county and start the furnaces which the men on strike refuse to work. A person who is well accredited has come forward and offered to obtain 500 men within a week, if he and his volunteers can be

protected from violence. At a meeting of the committee of the Ironmasters' Association held in Wolverhampton on Wednesday, the offer was accepted, and an application was made to the Lord Lieutenant of the county for the needed protection. At the same meeting, the committee expressed themselves as altogether unable to give the Brierley Hill executive credit for their sincerity in their professed discountenancing of the North Staffordshire puddlers, facts having been brought to the knowledge of the committee which led them to conclude that, to say the least, the executive are winking at assistance being rendered. Very little more confidence was expressed in the Gateshead union; but the mill-men were spoken of in terms approaching to confidence in the sincerity of their motives relative to the North Staffordshire men. To show that the masters in South Staffordshire are equally willing with those in the North of England to come to terms with their men, the committee recommended the North Staffordshire masters to see a number of their men, to ascertain of what they complain and why they refuse to go to work. But no great confidence is expressed in the business result of the interview, for it is believed that the men will demand the wages for which they have struck, whilst their masters will certainly refuse to give it. All hope in the termination of the lock-out within a reasonable time is centered in the result of the scheme for introducing non-unionists into North Staffordshird. The masters continue to confine their attention to the question which brought about the lock-out—that of wages—and refuse to entertain any project for breaking up the union. They have no objection to their men having a union, if that union will only confine itself to legitimate business and not make itself intolerable by interference with the management of works."

A New Kind of Electrifying Machine.

The electro-magnetic coil has, in a great measure, superseded the electrifying machine; the latter, however, will never cease to be an object of interest; and, it is probable, will always be preferred for some purposes. The expense and difficulty of managing large plates and cylinders of glass have hitherto been obstacles to the use of large electrifying machines. These obstacles appear now removed—glass being rendered unnecessary by the discovery of a far more convenient and effective material. M. Edmond Bequerel exhibited to the Academy of Sciences on a recent occasion an electrifying machine, the plate of which was made of indurated red sulphur, the invention of a civil engineer. It was eighty centimetres in diameter, and afforded a spark fourteen centimetres in length. No amalgamated cushions were required with it, the skin of a cat being quite sufficient to produce every desired effect. Sulphur undergoes extraordinary changes by successive fusions; becoming extremely hard and tenacious. After the third fusion it no longer acts on metals, or possesses its characteristic odor. The plate used by M. Bequerel was formed by fusing the sulphur three times in a cast-iron vessel, at a temperature between 250° and 300° Cent., and allowing it, after each fusion, to cool thoroughly. After the first and second fusions it was crushed to a coarse powder; and, after the third, it was poured into a plaster mold. Plates four metres in diameter may easily be made in this way; they cost extremely little; and, besides being more efficient, are far less hygrometric than glass.—*Intellectual Observer.*

Aluminum Bronze for Coins.

During the past year, says the Director of the U. S. mint, some interesting experiments were made with aluminum as an alloy for coins; not with a view to displace the bronze coinage, but to propose a system of tokens for five and ten cents. More than two years ago experiments were made in aluminum alloys to try their fitness for medals. Information was received from Paris that the introduction of only one per cent of aluminum into fine silver would resist the sulphuretted tarnish which is so apt to attack that metal in certain exposures. The experiments made here did not confirm that statement; on the contrary a slip of this alloy (99 silver to 1 aluminum) suffered more discoloration from the vapor of sulphuretted hydrogen than a slip of fine silver. The alloy was also much harder. An alloy of thirteen parts copper with one of aluminum was then tried, and another of nineteen parts copper to one of aluminum. The former gave a pale gold color, the latter the color of standard gold coin—both beautiful but too nearly resembling that precious metal. Under the press, however, they were both found to be so hard and stubborn, in spite of repeated blows, as to be quite impracticable. The question, however, was still open, whether a different proportion, and the low relief used for coin, would not give a satisfactory result. In fact, we had specimens of aluminum bronze coinage, effected by European manufacturers of aluminum, which proved that the striking was at least practicable, if not easy.

The Cornish Engine Deteriorating.

It appears from a report in the London *Mining Journal*, that the Cornish engine is failing to work as economically as in former years. This deterioration is probably as the authority in question says from want of care and proper attendance. We quote:—

"In the year 1811 Mr. Joel Lean began to report the performances of the Cornish engines, and during that year, it is said, issued his first engine report. In the year 1827 an eminent engineer, Capt. Samuel Grose, commenced to improve the duty of steam engines at Great Wheel Towan. It is believed that practical experience has done more than scientific researches in procuring the high economy of fuel, which has been the result, and that this has been principally effected by the use of high pressure steam expansively employed, and using Mr. Trevithick's boilers, and clothing the steam pipes and cylinders with a non-conducting material, together with great attention of the enginemen to the fires, so as to make the best of every bushel of coals consumed, as some enginemen are now doing on the railways.

"In 1843 the average duty for 94 lbs. of coal was 60,000,000 lbs., while in 1856 it had steadily decreased to 47,000,000 lbs., for the same fuel. It is to be deeply regretted that the duty of our steam engines is decreasing, and that many of the important lessons taught by Capt. Grose appear to be forgotton; whilst we are brought familiar with the rapid improvements of locomotive and marine engines, we have to deplore a retrograde movement of the stationary engines in our Cornish mines. With the present low price of minerals, and reduced dividends, we certainly ought to try to bring up the duty of our steam engines to where it was in 1843. The number of pumping engines reported for January is 37. They have consumed 2846 tuns of coal, and lifted 22·3 million tuns of water ten frames high. The average duty of the whole is, therefore, 52,800,000 lbs. lifted one foot high, by the consumption of 112 lbs. of coal."

Solution of India-rubber.

A solution of caoutchouc or india-rubber, for repairing india-rubber shoes, is prepared in the following manner:—Cut two pounds of caoutchouc into thin, small slices; put them in a vessel of tinned sheet-iron, and pour over twelve to fourteen pounds of sulphide of carbon. For the promotion of solution place the vessel in another containing water previously heated up to about 86° Fahrenheit. The solution will take place promptly; but the fluid will thicken very soon, and thus render the application difficult if not impossible. In order to prevent this thickening and difficulty, a solution of caoutchouc and rosin (colophony) in spirits of turpentine must be added to the solution of caoutchouc in sulphide of carbon, and in such quantity that the mixture obtains the consistency of a thin paste. The solution of caoutchouc and rosin in spirits of turpentine should be prepared as follows:—Cut one pound of caoutchouc into thin, small slices; heat them in a suitable vessel over a moderate coal fire until the caoutchouc becomes fluid, then add one-half pound of powdered rosin, and melt both materials at a moderate heat. When these materials are perfectly fluid, then gradually add three or four pounds of spirits of turpentine in small portions, and stir well. By the addition of this last solution, the rapid thickening and hardening of the compound will be prevented, and a mixture obtained fully answering the purpose of gluing together rubber surfaces, etc.—*American Drug Circular.*

For a good no-chimney lamp see the advertisement of the New York Lamp Company, in another column.

Directions for Making Blacking.

Liquid.—Ivory black, in fine powder, 1 lb.; molasses, 3-4 lb.; sweet oil, 2 oz.; beer and vinegar, of each, 1 pint. Rub together the first three until the oil be perfectly "killed," then add the beer and vinegar. Ivory-black and treacle, of each 1 lb.; sweet oil and oil of vitriol, of each 1-4 lb. Mix the first three as before, then gradually add the vitriol, diluted with thrice its weight of water; mix well, and let it stand for 3 hours, when it may be reduced to a proper consistence with water or sour beer.

Paste.—Molasses, 1 lb.; ivory-black 1 1-4 lbs.; sweet oil, 2 oz.; rub together as before, then add a little lemon juice or strong vinegar. Ivory black, 2 lbs.; molasses, 1 lb.: olive oil and oil of vitriol, of each 1-4 lb.; water q. s., as before.

The manipulations required for paste and liquid blacking are the same, the difference in the two being the quantity of liquid added. Thus, by diluting paste blacking with water or beer bottoms, it may be converted into liquid blacking of a similar quality, and, by using less fluid matter, the ingredients of liquid blacking will produce paste blacking. One thing must, however, be observed, and that is, that the ivory-black used for liquid blacking must be reduced to a much finer powder than for paste blacking, as, if this be not attended to, it will settle to the bottom, and be with difficulty diffused again through the liquid. For those persons who do not like the use of blacking containing oil of vitriol, the first of the above forms, either for paste or liquid, may be adopted. The vitriol, however, greatly contributes to promote the shining properties of the blacking, and in small quantities is not so injurious to the leather as has been falsely represented, as it wholly unites itself to the lime of the phosphate contained in the ivory-black, and is thus partly neutralized. This is the reason why lamp-black should never be employed for blacking, as it has no earthy base to absorb or neutralize the acid, which would then prove very hurtful to the leather. Oil of vitriol is now employed in the manufacture of all the most celebrated shining blackings. The addition of white of eggs, isinglass, gum arabic, and similar articles to blacking, always proves injurious, as they tend to stiffen the leather and to make it crack.—*Cooley.*

A Curious Clock.

A number of Union mechanics from the rebel prisons, now at the hospital of the Union Volunteer Refreshment Saloon, Phil., brought with them from Dixie a piece of their handiwork, well worth special mention. It consists of a clock, made to wile away their weary hours at Salisbury, N. C., during their imprisonment last winter. The main spring is made from the blade of a saber which once belonged to Stonewall Jackson. The hair-spring and balance-wheel were taken from the telegraph office timepiece, Andersonville, Ga. The hands are made of a toasting-fork from the kitchen of Vice-President Stephens. The wheels are made from the mountings of carriages, &c., of prominent southerners. The pillars which connect the frame are made of a ramrod, and nearly all the parts are taken from something picked up in the confederacy, and have more or less romance attached to them. A saw used in constructing this interesting little piece of mechanism was made of a table-knife; and files, jack-knives, &c., used in making rings, were often called into requisition by the anxious workmen.

Plants From Cuttings.

Peter Henderson, of Jersey City, a noted propagator, gives a simple mode of raising plants from cuttings, such as roses, verbenas, carnations etc., adapted to inexperienced cultivators, although not the mode used on an extended scale. A common flower-pot saucer, or even a common kitchen saucer or other dish, is filled with sand and the cuttings inserted thickly in it. It is then watered until it becomes about as liquid as mud.

The cuttings should, of course, be of green or unripened wood, three or four inches long, placed in a strong light in a room or green house, kept in a temperature of fifty to eighty degrees, best at seventy to seventy-five degrees, allowed to remain from ten to twenty days, till rooted, and the sand kept constantly in this semi-fluid state, for if they become partly dry they are ruined.

THE OIL REGIONS OF PENNSYLVANIA.

[For the Scientific American.]

GEOLOGICAL FORMATION.

That section of Western Pennsylvania known as the Oil Regions, is exceedingly simple in its geological composition. Like much of Western Virginia, Eastern and Southern Ohio, Southern Indiana, and Northern Kentucky, its surface was once a nearly level table-land, at least 400 feet higher than its principal river beds are to-day. In the course of ages, however, these rivers and their tributaries wore their channels down to the present depth, leaving the country on each side cut up into ridges or steep hills, with more or less extensive plateaus on their summits. Near the Ohio, as it passes between West Virginia and the State of Ohio, the stratification is almost horizontal, indicating that the hills have not been upheaved by the internal forces of the earth, but left exposed by the action of water. Further, it is noticeable at numerous points on both sides, that near the river the summits are narrowed almost to a ridge, while further inland they grow broader; the action of tributary streams being there less powerful in the work of erosion or denudation. The valleys and bottoms are also less deep and wide as we recede rom the banks of the great river.

The general course of the Alleghany lies nearly 100 miles more to the eastward than that of the Ohio in the section referred to. In the former case the rocks have an inclination of a few degrees (never exceeding ten) to the westward. There is this further difference between the two States. In West Virginia, the principal rocks are *clay shales* of different colors, alternating with coal-beds, some of these being above and others below the river level. In Western Pennsylvania the formations consist of *shales* and *sand-stones*, arranged in alternate layers, with boulder drift deposited pretty generally over the surface of the country. This drift consists of water-worn blocks of gneiss, quartz, and other primitive rocks, none of which belong to the hills or mountains in that part of the country.

Passing through the drift, the first layer of rocks consists of sandstone, rather coarse in texture, sparkling, of a grey or nearly white color, and falling from the summits to the bases of the hills in huge quadrangular blocks, exceedingly tempting to the eye of the practical man. These lapses of the upper rocks are caused by the soft shales underneath being carried away by the action of wind and water, so as to undermine the overhanging crags, whose threatening aspect imparts a degree of sublimity to much of the scenery of the Alleghany.

The sandstone is known as the Vergent or Portage variety, though said to differ slightly from that stone as found in the State of New York. Like the shales it contains numerous fossiliferous remains, the imprints of stems, leaves, bark and berries of trees, casts of the shells of various marine creatures, chiefly bivalves. The writer has observed the faces of many of the slabs of rock thus covered, and traces of such remains are said to become still more frequent as one descends the terraces leading from the Alleghany valley to Lake Erie. On the border of French Creek, above these fossil-beds, is a layer of a coarse yellow sandstone, used for building purposes. The vergent sandstone contains more or less lime in its composition. The shales also contain abundant organic remains, and are known to be highly butuminous in places. The soil formed from the decomposition of these rocks is a stiff clay, but probably more productive than it has received credit for being, the difficulty in cultivating it arising from the number of huge boulders of grey sandstone covering the slopes.

It will thus be seen that the sandstones ordinarily spoken of by well-diggers as first, second, third, and fourth, are really the second, third, fourth, and fifth. These men make no account of the layer of each lying above the valley, having got the impression that the heights were formed by upheaval.

FIRST DISCOVERY.

The first discoveries of oil were made in the bed of sandstone commonly termed the first rock. To reach this deposit, less than 100 feet had to be bored; but the yield, through pretty abundant at first, soon began to show symptoms of exhaustion, and ultimately the wells ran dry. At this time a hue and cry was propagated all over the country that the oil discovery was an egregious humbug, if not a swindle. In 1860 and 1861 several wells were carried down to the second (really the third) sand-rock, the borings being usually made from 250 to 300 feet in depth. This layer yielded better than the former, the springs holding out from six months to two years. Even a few of those wells are still paying expenses, though having decreased decidedly from their former products.

In 1863 and last year, attempts were made to reach the third sandstone, at various depths, from 450 to 550 feet, according to elevation. The success which attended works that had been run down to that depth on Oil Creek has led to a pretty general movement in the same direction this spring, on the part of those owners of wells which had given out. Some hundreds of them are now being bored and reamed out to the depth of 550 feet in the bottoms, and 600 to 750 on upper ravines and hill-sides. Along the Alleghany, for some miles above Oil City, this experiment has proved a failure in almost every instance, while on Oil Creek it is as commonly successful.

DEEPENING THE WELLS.

Near Titusville a well is now being deepened, the design, it is understood, being to run it through the *fourth* sand-rock to the depth of 1200 or even 1500 feet, so as to reach the tempting liquid anyhow. The world will regard the results of this experiment with much interest.

There is a general *upward* movement, as well as a downward one, the present season. All the ravines entering Oil Creek, Pithole Creek, Cherry Run, &c., are being punctured by the borers; even derricks are erecting on the precipitous hill-sides and the table-lands above. In some cases oil has been reached, and even good springs been tapped there, but those in the second rock will probably be found to resemble the springs found in the first rock (so called) in the summer of 1859.

The belief is now very general among oil men, that the uplands will yield as freely as the river-bottoms, provided the veins are struck, which, so far, is rather a matter of *luck* than the result of scientific research. If the theory laid down above, as to the formation of the hills, be accepted, there will appear every reason short of actual experiments to suppose that as good results can be brought about in one locality as in another.

Per contra, the discovery of oil on the *hills* will call for the introduction of heavier machinery to pump it from the bottom of the deeper wells which must be constructed. The sinking of these, too, will require not only a heavier outlay in itself, but relatively in proportion to the greater depth reached. Some experts consider that *flowing* wells need not be expected at elevations of 300 or 400 feet above the river-beds; though this seems only matter of conjecture rather than of knowledge based upon ascertained facts.

FUTURE PROSPECTS.

But one of two things is certain, namely; either a cessation finally in that natural product, or such an extension of it, by means of new wells and discoveries of oil in other localities, as to reduce the boring for it to a level common with all branches of industry. Before that time it is likely enough to undergo depressions as well as elevations—to experience conditions in which the article will be called a drug, and those engaged in producing it *fools*, by the outside world. Persons who visit the oil regions, especially the numerous creeks and rivers which discharge their waters into the Alleghany, Oil Creek, French Creek, &c., are struck with the immense number of derricks arising in all directions this year. They stand along the headwaters of Cherry Run like the masts of vessels, as closely by each other in places as they can be erected and find room to stand. It is no difficult matter to stand in one's step, and count from 50 to 100 within half a mile. On one farm near the head of Pithole Creek, at least 250 feet above the Alleghany, the writer was informed that a single company had engaged to sink 25 wells the present season.

INTERFERENCE.

The mutual effect upon each other of wells so closely sunk, cannot be calculated in advance. The great Philips well, which at one time yielded nearly 4000 barrels per day, was weakened and finally overcome as a flowing well, by the sinking of another within 75 feet. The theory usually entertained is, that the force of the gas being spent in two directions, it is unable to give due effect to either, and resort must be had to the pumps. In other cases, it is said that the sound of gas and water escaping through a well has been heard in an adjoining one, proving that both had tapped a common source. At the same time this rule is not universal. The writer was informed by an experienced borer, that his flowing spring of 200 barrels a day was sought to be reached by a neighbor at two points, the first eleven, and the second only seventeen feet from his own well. Numbers two and three were sunk fully as deep as number one, but the former failed to get a drop of oil, while the latter was rewarded with only one barrel per day, and both wells were abandoned.

MACHINERY AND COST.

In accordance with the changes taking place in and about the wells this spring, more powerful machinery is being introduced. The engines used to bore and pump were at first contemptibly small, the boilers being barely 24 inches in diameter, and 5 or 6 feet in length, with a capacity of 7 or 8 horse-power; no boilers of less than 30 inches diameter are now called for, and those of 35 inches are largely in demand, with from 12 to 15 horse-power. The derricks are mostly erected 50 feet high, or 15 feet taller than formerly, an upper story being added to many of the old ones.

The cost of boring wells has done more than keep pace with the greater depth reached and heavier machinery used. At first about $1,500 sufficed to erect the derrick, pay for the engine and fixtures, together with the labor of doing the work. No individual or company need *now* expect to put down a well in the bottoms for less than $7,500, unless using an engine already working on the ground, while on the uplands the cost will run up to $10,000, according to situation. A good-sized engine delivered on the ground costs about $2,500.

EFFECT OF BLOWERS.

To cooperate with nature in raising oil, the *blower* has recently been introduced with good success in some wells, which had not only ceased to flow, but given out under the pumps. This arrangement is very simple. It consists of a long iron pipe, usually about one inch in diameter, made in sections and screwed together, after which it is let down into the well. The lower end is made to turn *upward*. Through this pipe a strong current of air is forced down, which, on reaching the bottom, assists materially the gas in forcing up the oil and water. The famous old Sherman-well, which used to flow 600 barrels of oil daily, and more recently yielded one-third of that quantity in obedience to the pump, now gives between 60 and 70 barrels with the aid of the "blower," after having been several months dry. Among others, the Noble well, directly across Oil Creek, having also dried up, is being refitted with a blower, from which good results are expected.

FARMING IN THE OIL REGION.

There is no likelihood of any agricultural operations going on this season in the oil regions. Farmers prefer to pocket from $2,000 to $5,000 per acre for their fields and migrate elsewhere, to plowing, and sowing, and reaping, among the boulders covering the surface of their grounds. To the writer it has long appeared certain, that by boring distances of from 12 to 18 inches with a *plow-share*, a very large flow of oil could certainly be reached, through potatoes, turnips, cabbages, beans, peas, and other garden products. One thousand gardeners at the East, some of whom can hardly make ends meet there, could enrich themselves by raising "truck" and even milk in Petrolia. The only obstacle would arise from the difficulty of leasing land, but this could be overcome.

MECHANICS IN DEMAND.

Blacksmiths, wood-choppers, and engineers are still in demand; the first to sharpen tools. Their wages vary from $2 per day up to twice that figure, with board and lodging; but he who goes out to Oildom in such capacity, must make up his mind to forego most of the comforts and enjoyments of civilized life, excepting a brisk appetite and good digestion, for Petrolia is eminently a healthy country, in spite of the coarse fare, indifferent shelter, and (often) lack of cleanliness prevailing among its population. All other visitors must expect with terrible

roads, plain fare, hard beds, and extravagant charges. Such is Petrolia.

UTILIZATION OF THE GAS.

Of *economy*, as usually practised in older countries, Petrolia has as yet known little. Until wood commanded from $10 to $12 per cord, and coal more than $20 per ton (it is now about $28), no attempt was made to convert the columns of gas escaping from the wells into an agent for driving the engines. This has, however, at last been accomplished with the most complete success on the Watson flats, below Titusville, where half a dozen pumps are driven by gas. The writer has heard no complaints about the capturing of this (hitherto) fugitive slave interfering with the productiveness of any of the wells. All visitors, as well as the men concerned about these works, expressed their admiration at this beautiful arrangement, so simple and economical in itself. Of the still superfluous carbureted hydrogen, one well manager, or proprietor, took sufficient from it to heat up his premises, by letting it into the stove and using it for culinary purposes.

On the other hand, the same experiment made last winter at one of the wells ("the Yankee"), on Cherry Run, is said to have resulted in reducing its productive power nearly two-thirds, or from about 60 to 25 barrels per day, by checking the escape of gas from the tube, and thus weakening its power to expel the oil. So seriously was this felt that the attempt was abandoned, and the flow of oil returned to its former amount. The owners of that well have leased a large number of lots to other interests, and since that trial they have made it a point to insert a clause in every lease, prohibiting the lessees from thus appropriating the gas on the premises.

Other discoveries, and recent changes made in the oil regions, the writer proposes to point out in another article.

FACTS ABOUT PEAT.

We have received from Messrs. Leavitt & Hunnewell, of 49 Congress street, Boston, Mass., a large pamphlet of 120 pages, which is a compilation of facts in relation to peat as an article of fuel. The following selections will give a good idea of the contents, and may interest some of our readers:—

FORMATION OF PEAT BOGS.

It is found, on examination, to be composed of vegetal matters; generally mosses, and species of aquatic plants in different stages of decomposition: and from this circumstance, as well as from the general appearance of the localities where peat abounds, its formation is generally accounted for somewhat as follows:—

Where pools of water collect, the soil under which is retentive, the water, not being absorbed, stagnates, and, provided the surface evaporation is not great, forms a pond. Around the borders of this pond various kinds of aquatic plants—sedges, rushes, &c.—soon make their appearance, and, by reproduction, gradually creep in towards the center, until the whole surface becomes covered. In process of time, when several races of these have succeeded one another, and mud and slime have accumulated at the roots and around the decaying stems, a spongy mass results, which is well calculated for the propagation of mosses.

Under a constant supply of moisture, these various species thrive, continue to luxuriate, and, by progressive growth, ultimately give rise to a composition in every respect similar to that constituting the various peat-bogs.

That some such natural process has been the cause of the production of heat, appears from its composition, and the localities in which it is found. These are chiefly in the temperate zones, where evaporation is slow, and the atmosphere is generally more or less saturated with humidity.

It may be conceived, that, in the origin of these formations, the retention of the water, whether from rain or springs, in extensive basins, led at first to the development of vegetal growth in the manner above indicated; and that, the necessary moisture being supplied in abundance, the accumulation became so rapid, that ultimately the surface assumed the appearance of land; and, as decomposition proceeded, a degree of solidity was given to the mass, equal to the support of denser bodies, such as shrubby plants.

It would appear that this organic growth was rarely restricted to the original basin, but that, as it accumulated, it spread over adjacent land, which in time became a morass.

Evidence conclusive of this exists in the fact, that whole forests of almost every description, such as oaks, firs, ash, birch, yew, willow, &c., have been overwhelmed in its gradual but steady advancement, and are found in all positions at the bottom of peat-bogs.

Generally this formation is met with in climates of a moist nature, in level countries, where imperfect natural drainage exists; although it is found in considerable beds in upland districts.

In mountainous districts, in addition to the imperviousness of the rock to the moisture, the constant formation of clouds upon those elevated regions favors the growth of the mosses and plants, the decomposition of which contributes to the increase annually of these deposits.

In America, peat is rarely found in these elevated positions, and then only in small quantities: but in Great Britain, and on the Continent, the deposits are numerous and extensive; and, as a general thing, they are esteemed of superior quality for fuel. Instances of this kind are frequent in Ireland, Scotland, Northern Germany and Holland, while others are found high up the Alps, in the Vosges and in the Jura.

METHODS OF PREPARATION FOR FUEL.

Where peat-bogs abound, and the inhabitants make use of it as fuel for domestic purposes, the process of preparation is very simple, and has varied little, if any, for ages.

The surface layer, or turf, which contains the living plants and their roots in the natural state, is stripped off to the depth of six, nine, or twelve inches.

The material is then cut with a kind of spade known as the slane, which has a blade about eighteen inches long by six inches broad, with a wing on the side, bent upwards at right angles to the blade, so as to form, with the latter, two sides of a square.

With this the peat is cut in long square masses, and laid upon the sward, where it spontaneously loses its water, partly by infiltration into the soil, and partly by evaporation.

After these blocks are partially dried, having been turned at intervals so as to expose the different sides to the sun and air, they are found to be reduced very materially both in size and weight, and to have acquired a good degree of consistency. They are then piled or cobbled up in heaps on the sward, care being taken to dispose them in such manner as will admit of a free circulation of air through the mass; and, after remaining exposed in this manner for some weeks, they are generally removed to some airy place of shelter, where the process of drying may continue, and the fuel be convenient of access when the season arrives for its consumption.

Such is the mode generally adopted, both in this and other countries, when the peat is of sufficient density and elasticity to bear being so handled without breaking.

When, however, the material is brittle, and will not admit of being used in this way, it is dug out with ordinary spades and shovels, and all roots, sticks, stones, and such like bodies, picked out. It is then spread upon the greensward, or, in some cases, upon suitable ground covered with a layer of straw or hay, in a mass, to the depth of eight to eighteen inches, with a breadth of about four or five feet, and to such lengths as may suit the convenience of the laborers. In this condition it is brought to a homogeneous mixture by harrowing, raking, working over with hoes, spades, or other tools, or by the treading of men or animals, until it is of about the consistency of stiff mortar, when the surface and sides are smoothed, and it is left in this state to drain and dry.

After remaining for one, two, or three days, according to the weather, and acquiring a somewhat greater degree of consistency, it is rendered still more compact by beating the surface with shovels, spades, or paddles adapted for the purpose; and in some parts of Europe this is accomplished by treading, which is there mostly done by women and children, who attach flat boards, about six inches broad and twelve to fourteen inches long, to their feet.

By this time the peat has acquired such solidity that it will bear a person's weight upon it without sinking.

The surface is then marked off, or cut by the sharp edge of a board, or a large knife adapted for the purpose, to the depth of one or two inches, into squares; the sides of which are from three to six inches, according to the size desired for the fuel when it shall have been thoroughly dried, and ready for use.

In this condition it is left to dry; and, as evaporation proceeds, the squares contract, the cuttings gradually open down to the bottom, and the mass is separated into blocks of somewhat uniform size, standing on end, and of pyramidal form, the base being still quite moist, and covering nearly the whole surface, while the top, which has been most exposed to air and sun, has contracted, to nearly or quite one-quarter of its original size, and is dry and hard. The blocks are then turned once or twice, in order to give a more uniform exposure; and, at the expiration of a few days of good weather, they are in condition to be removed, and stored for use; care being taken however, that it be in a sheltered but airy location, and that it be not too closely packed; for, notwithstanding it may have the appearance of being quite dry, it will be found to have still retained a very considerable amount of water, and, if too closely packed, is liable to a fermentative process, which injures the quality, and has been known to raise the temperature so high as to cause spontaneous combustion.

RECENT PEAT.

Professor Lyell, in his "Principles of Geology," says,—"It is a curious and well-ascertained fact, that many of the mosses (bogs) of the North of Europe occupy the place of immense forests of pine and oak, which have, many of them, disappeared within the historical era. Such changes are brought about by the fall of trees, and the stagnation of water caused by their trunks and branches obstructing the free drainage of the atmospheric waters, and giving rise to a marsh. In a warm climate, such decayed timber would immediately be removed by insects or by putrefaction; but, in the cold temperature now prevailing in our latitudes, many examples are recorded of marshes originating in this source. Thus, in Mar Forest, in Aberdeenshire, large trunks of Scotch fir, which had fallen from age and decay, were soon immured in peat formed partly out of their perishing leaves and branches, and in part from the growth of other plants. We also learn that the overthrow of a forest by a storm, about the middle of the seventeenth century, gave rise to a peat-moss, near Lochbroom, in Ross-shire, where, in less than half a century after the fall of the trees, the inhabitants dug peat. Dr. Walker mentions a similar change, when, in the year 1756, the whole Wood of Drumlaurig was overset by the wind. Such events explain the occurrence, both in Britain and on the Continent, of mosses where the trees are all broken within two or three feet of the original surface, and where their trunks all lie in the same direction.

"Nothing is more common than the occurrence of buried trees at the bottom of the Irish peat-mosses, as also in most of those of England, France, and Holland; and they have been so often observed with parts of their trunks standing erect, and with their roots fixed to the sub-soil, that no doubt can be entertained of their having generally grown on the spot. They consist, for the most part, of the fir, the oak, and the birch. Where the sub-soil is clay, the remains of oak are the most abundant; where sand is the substratum, fir prevails.

"In the Marsh of Curragh, in the Isle of Man, vast trees are discovered standing firm on their roots, though at the depth of eighteen or twenty feet below the surface. The leaves and fruit of each species are frequently found immersed along with the parent trees; as, for example, the leaves and acorns of the oak, the cones and leaves of the fir, and the nuts of the hazel.

"The durability of pine-wood, which in the Scotch peat-mosses exceeds that of the birch and oak, is due to the great quantity of turpentine which it contains, and which is so abundant that the fir-wood from bogs is used by the country people, in parts of Scotland, in the place of candles. Such resinous plants, observes Dr. Macculloch, as fir, would produce a fatter coal than oak, because the resin itself is converted into bitumen.

"In Hatfield moss, which appears clearly to have been a forest eighteen hundred years ago, fir-trees have been found ninety feet long, and sold for masts

and keels of ships: oaks have also been discovered there, above one hundred feet long. The dimensions of an oak from this moss are given in the Philosophical Transactions, No. 275, which must have been larger than any tree now existing in the British dominions.

"In the same moss of Hatfield, as well as in that of Kincardine and several others, Roman roads have been found, covered to the depth of eight feet by peat. All the coins, axes, arms, and other utensils found in British and French mosses, are also Roman; so that a considerable portion of the European peat-bogs are evidently not more ancient than the age of Julius Cæsar: nor can any vestiges of the ancient forest described by that general, along the line of the great Roman way in Britain, be discovered, except in the ruined trunks of trees in peat."

Correspondence

Proportion of Power Obtained by the Steam Engine.

Messrs. Editors:—One of your correspondents seems to doubt if there be so much more efficiency in fuel than is obtained from it by the best steam engines. A few figures showing that it is so may, at the same time, suggest to him in what direction to apply his ingenuity to make the fuel more available. Chemists tell us that one pound of carbon completely burned furnishes 14,500 units of heat as they are termed, each of which will raise the temperature of one pound of water one degree, and also that each unit of heat may be converted into force sufficient to raise 772 pounds one foot high. The total energy of the pound of carbon will be 14,500 times 772, or 11,194,000 foot-pounds. A steam engine burning four pounds of coal per horse power per hour furnishes for each pound of coal 495,000 foot-pounds, since it raises 33,000 foot-pounds per minute, and one pound of coal lasts fifteen minutes.

Let us now examine the causes of this great difference in the result obtained in practice and the theoretical one. Charcoal contains about nine-tenths its weight of carbon, anthracite the same, and wood, if dry, one half as an average, so that the quality of the fuel may reduce the effect one half. Next, if the carbon be partly burned into carbonic oxide with six pounds of air to the pound of carbon, instead of being burned into carbonic acid with twelve pounds of air, the number of units of heat obtained from it is reduced from 14,500 down to 4,400.

Another cause of the difference is the quantity of unconsumed air passing through the furnace and thus lessening the volume of gases as it cools them, for if the pound of carbon burned with the proper quantity of air gives off its heat at an estimated intensity of 4,580°, it will have a temperature lowered to 2,440°, if twice as much air is admitted as is required for combustion. Besides these grounds of difference between theoretical and actual effect there is still another very important one. Carnot first pointed out the fact that the effect of an engine using heat depends upon the limits of temperature between which the engine works and not on the nature of the substance conveying the heat: and Rankine on "Prime Movers," page 304, remarks, that the difference between the whole heat absorbed and the whole expansive energy exerted depends on the initial and final conditions of the substance alone and not on the intermediate process. The true path for improvement, therefore, would seem to be in endeavoring to use water or some substance to which a given quantity of heat can be applied at a greater intensity or higher temperature than that at which it is used at present, and to expand it to the ordinary temperature of things around us. M.

Newburgh, N. Y., April 18, 1865.

Gas for Balloons.

Messrs Editors:—Will you please inform me what kind of gas is the best for inflating balloons—the gas that will lift the greatest weight per cubic foot—and how such gas can be made. I would also like to know if gas would have the same lifting power in a hollow wooden or tin globe as it does in a balloon-shaped receptacle. I would also like to know what weight the lightest gas will lift per cubic foot.

S. S. R.

Petersburg, Ill., April 3, 1865.

[The lightest substance known is hydrogen gas. It is obtained by decomposing water; water being formed by the combination of oxygen and hydrogen in the proportion of 8 lbs. of oxygen to one of hydrogen. Chemical affinities generally change with the temperature. At ordinary temperatures there is no cheap substance for which oxygen has a stronger affinity than it has for hydrogen, but at a red heat it has a stronger affinity for iron, and at a white heat for carbon. Iron is therefore used for decomposing water on a small scale, and carbon on a large scale. If a gun barrel be filled with iron filings and heated red hot, and a stream of water or steam be passed through it, the water will be decomposed, the oxygen combining with the iron, and, the hydrogen being set free, when it takes the gaseous form. On page 280, Vol. III., Scientific American, new series, we published an illustration of an apparatus employed for decomposing water on a large scale by means of carbon.

Atmospheric air is 14½ times heavier than hydrogen, and 100 cubic inches of air weigh 31·01 grains; hence it would require about 14 cubic inches of hydrogen to raise 1 lb. in the air. The form of the balloon does not affect its buoyancy, but if the material be so heavy as to balance its whole lifting power, of course it will raise nothing else in addition.—Eds.

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute on Tuesday afternoon, April 11, the President, N. C. Ely, Esq., in the chair.

From the several subjects discussed we select the following:

WHITE MAPLE SUGAR.

Solon Robinson presented from a correspondent a sample of maple sugar which was nearly as white as the best loaf sugar. A letter accompanying the sample stated that it was made by simply boiling down the sap slowly without any clarifying.

Prof. Mapes explained that if that was the case the result was due to the sugar having been crystalized from low-proof sirup—that is, sirup which was not boiled down to a very concentrated condition. This plan is not economical, as the sirup retains a large portion of the sugar in solution.

His practice of slow boiling is also wasteful. The longer sugar is kept at a high temperature in contact with the atmosphere, the larger the proportion of it which will absorb oxygen and be converted into molasses. The more rapidly sap can be evaporated, therefore, the larger the yield of sugar. The principal advantage of the vacuum pan is to prevent the conversion of the sugar into molasses by oxidation; this it does in two ways—by effecting very rapid evaporation, and by shielding the sirup from contact with the atmosphere.

CARBONIZED SHINGLES.

Professor Mapes exhibited some shingles manufactured by Tenney & Bennett, of Hubbardston, Mass., and explained that they were partially carbonized by passing them between red-hot rollers; the object being to render them more durable. The bearings of one roller are pressed down by springs so as to equalize the pressure throughout the length of the shingle. The expense of the operation was stated to be about one dollar per thousand.

THE CANKER WORM.

Dr. Trimble read a letter from a correspondent in relation to some insects which were inclosed, and stated that they were specimens of the male and female moth of the canker worm. He remarked, further, that this is the insect which he had spoken of as having been found in the crop of the cedar bird. Unlike other span worms, the chrysalis of the canker worm passes the winter in the ground, and the female being wingless her ascent of the tree is effectually prevented by surrounding the trunk with some impassable obstacle.

BLACK KNOTS ON PLUM TREES.

Dr. Trimble also replied to the question of a correspondent in relation to the cause and remedy of the black knots on the plum tree. They are caused by an insect of which there is a large class—the cynips. The effectual remedy is to cut them off when they are first formed, in the month of June. Some people cut them off in the winter or spring, but that has no effect in destroying the insect. These knots are used sometimes by the curculio as a deposit for her eggs before the fruit is sufficiently grown for the purpose. I have hatched numbers of curculios from eggs in these knots.

LIGHT MILK BETTER THAN HEAVY.

An article was read from some French *savant* on a new grass, in which it was stated that the grass made better milk than lucern, as shown by the hydrometer, the milk from the new grass being of greater specific gravity than that made from lucern.

Professer Mapes remarked that the richer milk is in cream the lower its specific gravity, cream being lighter than water.

Several other subjects were discussed but none of special interest for our columns.

Effect of Saleratus on the Teeth.

A correspondent of the *Dental Quarterly* makes the following statement in regard to the effect of saleratus on teeth:—

"I do not think it is generally known how much of this article is used in the community. To satisfy myself, I took the trouble to ask each of the grocers in Portsmouth, how much saleratus and cream of tartar they sold in a year, and the amount of all was—*saleratus*, 50,198 lbs.; *cream of tartar*, 15,100 lbs. Thus over twenty-five tons of the former, and more than seven of the latter, are probably used in Portsmouth and vicinity in a year! Portsmouth has 10,000 inhabitants.

"I subjected a handful of teeth to a strong and warm solution of saleratus, for about fourteen days; the consequence was, they became as brittle as burnt bones. The same time I subjected some to a solution of cream of tartar; the consequence was not the same, but equally, if not more injurious. This also may be called an extreme case, but subjecting them to common water for *fourteen months* would have but little or no effect on them. The saleratus removes the gelatine, the cream of tartar removes the lime, the two principal ingredients of the teeth; and between the two evils the teeth stand a poor chance, and hence the result."

Hunt's Feed Cutter.

A good feed cutter is a very essential thing on a farm, or, indeed, where cattle of any kind are kept. For some time past one has been standing in our office, which is pronounced by persons using it, whose testimonials have been shown us, to be a perfect thing. It is entirely self operating, and can be worked by boys or persons of moderate strength with great efficiency. This machine is known as "Hunt's Hoosier Feed Cutter," and an advertisement of it can be seen in the last number of the Scientific American. A machine can also be seen at this office.

Third Dentition.—In a letter from Brazil to the *Dublin Medical Press*, Dr. Richard de Gumbleton Daunt states that "in this city, Campinas, San Paulo, exists a person (a mulatto girl, with a severe chronic cough, a chronic discharge from the ear, with occasional severe ear ache, but not rachitic) in whom the second set of teeth were shed during convalescence from a fever at the age of 14, and were succeeded by a third dentition, which resulted in as fine and perfect a set of teeth as may anywhere be seen."

Export of Fish Bait.—A Boston paper states that the schooner, *M. C. Rowe*, is loading at Gloucester a cargo of some six hundred barrels haddock spawn for France direct. They are used by the French fishermen in the Sardine fishery for bait, and a small number of barrels have been shipped from Boston. It is stated that this is the first fishing schooner from the United States direct with a cargo for the fishermen of France.

As cold articles taken into the stomach, are warmed by the circulation of the blood, and as muscular exercise increases the circulation in every part, it should always be used when any chill is felt at the stomach after taking anything cold.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Petroleum Elevators.—This invention is embraced in two separate Letters Patents, and relates more particularly to apparatuses for the raising of petroleum from deep wells, although it can be adapted to the raising of liquids generally from great depths or to great heights, in which an air-blast is used, and consists principally in a peculiar construction and arrangement of the air-nozzle or orifice through which the air issues to the petroleum in the well, whereby the oil can come in contact with both the exterior and interior surfaces of the air blast, thus greatly increasing its suction and consequently drawing up and discharging a proportionally greater quantity of oil at the top of the well. S. F. Schoonmaker is the inventor, who can be addressed at the Astor House, New York City.

Smoking Pipe.—Mr. L. C. Walker, of 21 South Calvert street, Baltimore, Md., has obtained a patent through the Scientific American Patent Agency, for quite a noticeable improvement in smoking pipes. One feature of the invention consists in breaking the current of smoke in passing from the bowl to the mouth, allowing more time for the nicotine, an injurious element of the smoke, to be deposited and received into the saliva cup. Another point of the invention is in having the stem closed at the end and the smoke passage to lead into the mouth at the upper side of the stem, thus restricting the tendency of the saliva from passing into the mouth of the smoker. As a further guard against this latter evil, a smoke bag or sack is formed in the stem just below the egress opening for the smoke. The patent is dated March 21, 1865.

Baling Press.—This invention relates to a new and improved press of that class designed for compressing substances, such as cotton, hay, hops, etc., for baling, and consists in the employment of toggles, arranged and applied to the press in such a manner as to afford a very compact and efficient mechanism for operating the follower, and compressing the substance within the press-box. The invention for these consists in novel and improved fastenings for the side and top doors of the press, while the same may be very readily secured in a closed state, and also very readily opened. George C. Paine, of San Francisco, Cal., is the inventor, and the Patent bears date April 4, 1865.

SPECIAL NOTICES.

Aaron Palmer, Brockport, N. Y., and Stephen G. Williams, Janesville, Wis., have petitioned for the extension of a patent granted to them on the 1st day of July, 1851, for improvements in harvesting machines.

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Parties wishing to oppose the above extensions must appear and show cause on the 19th day of June next, at 12 o'clock, M., when the petitions will be heard.

During the starvation of an animal, all its secretions are still formed; a consideration which proves that the productions of urine, bile, and other such bodies are, in reality, connected with the destructive processes going on in the animal system. These processes of decay originate in the action of oxygen admitted by the process of respiration.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening April 13, 1865, the President, S. D. Tillman, Esq., in the chair.

CEMENT PIPE FOR SEWERS.

This was announced as the subject of the evening. Mounted on a table in the room were three pieces of pipe twelve inches in diameter and each piece about four feet in length; they were from the manufactury of Knight & Woodward, No. 10 Reade street, Brooklyn. This firm have made large quantities of this pipe for the sewers of Brooklyn.

Mr. Knight explained the process of manufacture. The materials are one part Rosendale water cement to two parts clean sand. These are thoroughly mixed together dry, then moistened with water into a stiff mortar, and immediately molded into pipe. The core is iron smoothly polished upon the outside, and the exterior mold is of iron polished upon the inner surface. The mortar hardens, or "sets" almost instantly, but it is kept in a damp place a fortnight before it is placed in the ground for use. The pipe is manufactured in sizes ranging from 3 inches to 24 inches in diameter, the prices being from 14 cents to $1·30 per lineal foot. More than 50 miles of the 12-inch pipe have been laid in the sewers of Brooklyn, and many miles of other sizes.

Mr. Woodward read some extracts from the report of an English commission appointed to examine the sewerage system of London, showing the conclusion of the commission that small pipes are less likely to be obstructed than large sewers which are several times more expensive.

Mr. Enos Stevens gave the results of some experiments that he had tried to ascertain the descent required for water to carry along stones and other substances. He found that in a V-shaped trough, after it had become smooth, a descent of 1 foot in 58 was sufficient to wash away all obstructions.

After further discussion at considerable length the subject of comb-making was selected for the next evening and the Association adjourned.

Curious Trees.

The Adansonia, or Baobab Tree, is the giant of the vegetable world. We have the record of one whose trunk measured one hundred and four feet in circumference. The hight of this tree does not exceed fifty or sixty feet, while the branches are about the same length, and when seen from a distance, the hemispherical cap of foliage almost resembles a forest. A full-grown Adansonia, with its deep green leaves, and large snowy blossoms is a magnificent sight. It attains to a patriarchal age, and it is said there are trees now living more than two thousand years old. It is a native of Senegal and other parts of Western Africa.

The Dragon Tree—another gigantic tropical growth—has ordinarily an erect trunk of not more than twelve or fourteen feet in hight, which divides into short branches, each terminating in an expanded tuft of pointed, sword-shaped leaves. There was one of these trees, destroyed by a tempest some forty years ago, in the island of Teneriffe, which measured forty-five feet in circumference, and nearly sixty feet in hight, and which was supposed to be one of the oldest living inhabitants of our globe.

The Courbarils, of Brazil, are described as having trunks more than eighty feet in circumference at the base, and sixty feet where the boles become cylindrical. They are said to resemble living rocks more than trees, for it is only on the pinnacle of their bare and naked bark that foliage can be discovered, and that at such a distance from the eye that the forms of the leaves can not be distinctly seen.

There was, and for anything we know, there is still, a cypress at Chapultepec, in Mexico, whose trunk measured one hundred and eighteen feet in circumference. In Buckinghamshire, England, there is a famous yew which has a diameter of about twenty-seven feet.

The Norfolk pine, or Kawri of the New Zealanders, attains a huge size. This majestic tree grows to the hight of from one hundred and sixty to two hundred and thirty feet. One is spoken of which measured seventy-five feet round the base.

Among gigantic flowers and leaves, we have the Victoria Regia, a water lily.

The Rafflesia Arnoldi is still larger. This colossal parasite is a native of Sumatra, growing on a kind of vine, and having no true stem or leaves. The petals of the flower, as observed by the discoverer, were five in number, of a dull brick red, and covered with yellowish white spots. They and the nectary were from one-fourth to three-fourths of an inch in thickness. The flower measured a full yard across, and the nectary was of the capacity of six quarts, while the weight of the whole was at least fifteen pounds.—*Horticulturist.*

Profits of Fruit Growing.

Looking carefully into the matter of the profit realized from all descriptions of fruit growing, and running over only two or three authorities on the subject, multitudes of instances are to be found where extraordinary gains are annually realized without apparent care or skill. Some years ago there was an orchard of 70 Mayduke cherry trees, a few miles below Philadelphia, the daily sales from which during the season amounted to $80. A single Washington plum tree, in a city garden, has been known to yield six bushels of fruit, worth $10 per bushel. A vineyard some sixteen miles from Philadelphia, occupying three-eighth of an acre, has produced $300, when the grapes sold only for eight cents a pound, or at the rate of $800 per acre. A single Catawba vine, in the same neighborhood, has produced ten bushels, worth $40 at market prices.

No matter what fruit is examined, the same results are found to occur. A row of common gooseberries a hundred yards long have realized $40. Two superior Apricot trees have produced $100 worth of fruit in a season. There are Onondaga pear trees in New Jersey gardens which yield fruit enough, every season, to net their owners $30 per tree.

Treatment of Fowls.

The *Country Gentleman* has a correspondent who writes as follows:—The best English chemists have pronounced kerosene oil to be the most effectual and harmless remedy known for the destruction of parasites upon animals and fowls. I have proved it by experience; the lice die at once and their extermination is almost certain. Two days' confinement is generally sufficient to overcome the incubating fever. I think it is by far the best and most humane remedy known. A very valuable remedy for sick fowls is jalap. I have often tried it, and been astonished at the rapidity of their recovery from disease; it is very efficacious in many diseases, and its timely administration would save many a valuable fowl; fourteen to sixteen grains made into a pill is a dose for a good sized fowl.

Stamp all Assignments.—We would call the attention of all corporations, stock companies and banking institutions to the fact that the Commissioner of Internal Revenue has lately decided that "an assignment of stock made by the owner which passes the title to the purchaser, whether made upon the bonds of the corporation or upon the certificate, is subject to stamp duty of five (5) cents." No general publicity having been given to this decision, the corporations, in consequence, have failed to comply with the law in this respect, the failure of which makes the transfer invalid.

Hardening of Burnt Clay.—At Rivieres, France, they make tiles and bricks of a sandy clay which contains 32 per cent of chalk. When first burnt they are so tender that, unless they are carefully handled, they fall to pieces. As soon, however, as they are cold enough to touch, they are quickly removed from the furnace and carefully stacked. They are then soused with water, by the action of which they are so hardened that they may be used the next day for building. This fact is, perhaps, easily capable of a chemical explanation, and brickmakers may be able to gather a hint from it.—*Chemical News.*

Gold may be purified from silver by quartation; that is, fusing it with three times its weight of silver, and then acting on the mass with nitric acid; the gold is left as a dark powder, and may be fused after being washed.

Improved Double-edging Machine.

This machine is intended to be used in mills where large quantities of lumber require to be edged parallel, or split into parallel strips for flooring or fencing boards. Its construction and operation is such that much time and labor is saved by it, and lumber produced with neat and parallel edges. The machine is provided with two saws on one arbor; one of the saws, A (Fig. 2), is attached to a stationary collar, B (Fig. 1), and the other saw is attached to a sliding collar or sleeve, C, which is provided with a feather or key that fits in a groove running the length of the arbor between bearings. The saws are adjusted in an instant to any desired width by operating the hand lever, D, which moves the sleeve and saw, by means of the rod and lever, E; this operates a sliding arm, F (Fig. 2), under the front fluted roller, G. The lumber is fed through the machine by means of the several fluted rollers, and the press rollers, I, mounted on the roller caps or frames, J, which are jointed to the curved side plates of the cast frame, K. The press rollers can be elevated or lowered at pleasure to suit any thickness of lumber by operating the long foot lever, L (Fig. 2), which carries or moves the two-branched lifting jack, M, on which rest the two frames beforementioned. This arrangement always insures a parallel position of press rollers with the feed rollers. It is an important detail, as it produces an equal pressure on either edge of the board, thereby feeding the lumber through straight, which cannot be done where one end of the rollers is allowed to raise and fall independent of the other. The feed rollers are put in motion from a small belt pulley on the end of the saw arbor (Fig. 1), and the belt, N, which operates the small friction pinion attached to the belt pulley, O. This friction pinion runs between the two flanges on the large pulley, P, giving motion to the fluted feed rollers, G; motion is also imparted to the feed roller or pulley, Q, by the belt, R, driven by the large friction wheel, S. The pulley, O, is mounted on a rock shaft, T, and by operating the lever, U, the friction pinion on O is made to impinge either against the inside or outside friction rim, at pleasure. This arrangement admits of first feeding the lumber through to take off the edges of it, and then by operating the hand lever, U, reverses the motion of the feed rollers, and thus brings the lumber back again for a second operation of sawing into strips if required. All the working parts of the machine are neatly and substantially built of iron and mounted on the iron frame, O, which is simply bolted down to the wood frame or table, W. X is one of several wooden rollers which should be carefully adjusted into line with the iron-fluted rollers.

This machine was patented Aug. 12, 1862; for further information address the patentees, Hayes & Newman, Unadilla, Otsego Co., N. Y.

Fig. 1.

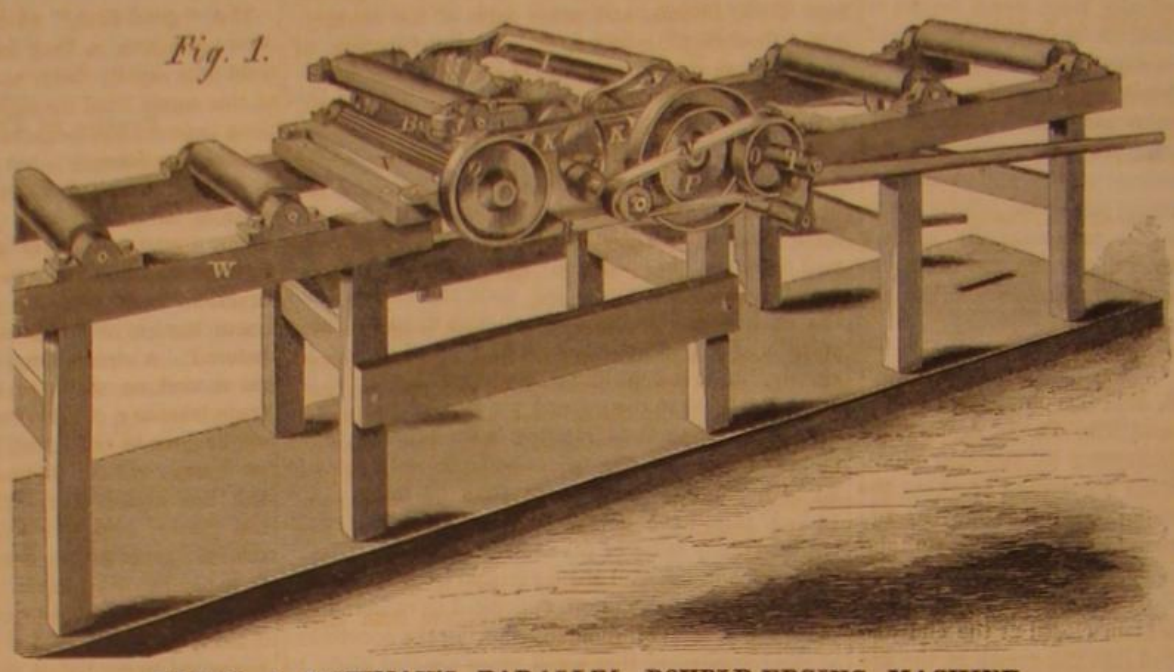
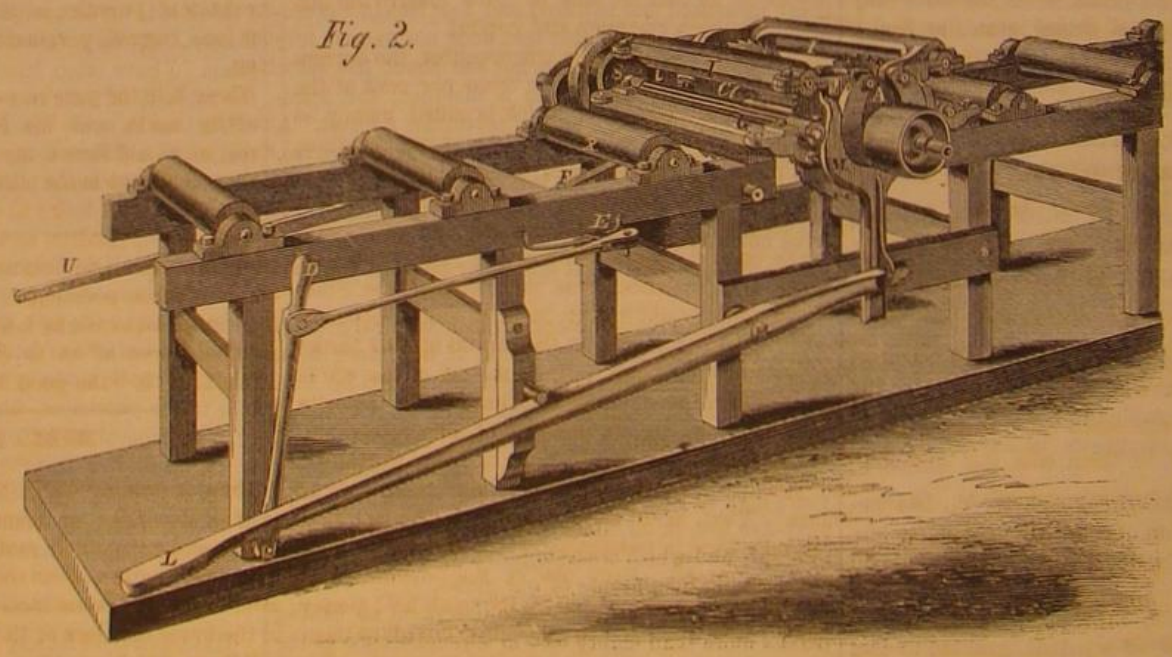


Fig. 2.



HAYES & NEWMAN'S PARALLEL DOUBLE-EDGING MACHINE.

Westfield, Mass. has been for a long time famous for the extent of its whip manufactories. The business was commenced there twenty years ago and there are now forty-two factories.

WONDERFUL SKILL IN BILLIARDS.

Many curious illustrations of the composition and resolution of forces can be seen in the movements of ivory spheres on a billiard table. It is found that in the rebound of a ball from a plane, the angle of reflection is not always equal to the angle of incidence, but that the relation of these angles depends on a number of circumstances.

On the evening of Tuesday, April 11th, several hundred persons, including a number of ladies, were gathered in the large hall of the Cooper Institute to witness a display of skill in billiards by M. Carme, who had recently arrived from France to enter the lists in contest with the eminent billiard players of this country.

The table used was a small carom, manufactured by Phelan & Collander for the occasion, having been commenced and completed on the same day of the exhibition.

Some of the shots made by the Professor, his *masse* shots especially, were exceedingly well executed, and evinced remarkable skill; but for some reason he did not seem to possess that degree of confidence in the result of his endeavors which always characterized the celebrated Berger's playing, and consequently he was too much given to *misses* to make the entertainment in the highest degree enjoyable. The management was bad on the opening evening, but will no doubt be improved on subsequent occasions. On the cards of invitation it was stated that seats would be reserved for ladies, but on our arrival, a few minutes past 8 o'clock, we failed to discover any vacant ones, although the number of ladies present was not overwhelming. A challenge to play with any one in America was read at the close of the exhibition, but the specified conditions as to size of table, balls, etc., may not meet the approbation of our American players. We should like to see M. Carme play with Kavanagh the American game, on a full-sized Phelan table, and we hope an opportunity will be given New Yorkers to witness such a contest.

ARSENIC POISON.

An old and respected correspondent sends us this note:—

"It may do good to some of your many thousands of readers, to remind them that a teaspoonful of common copperas, dissolved in a small tumbler of water, with another teaspoonful of common magnesia added, and drank, is a perfect antidote to arsenic taken into the stomach. Of course it will not repair any damage already done to tissues, but it will almost instantly check and prevent further harm. I leave you to state, if you will, what the reaction in the stomach will be. I suppose physicians would recommend an emetic within half an hour."

The importance of the subject of this communication induces us to publish it, in the hope of drawing out the truth in relation to the remedy proposed. Oxide of iron is a well known antidote for arsenic poison. If magnesia is added to a solution of copperas, which is sulphate of iron, the copperas is decomposed, the sulphuric acid combining with the magnesia and the oxide of iron being set free. It might therefore seem plausible that the plan suggested would be effectual.

But the form in which arsenic is most commonly used is that of arsenious acid, As O_3, and the antidote is the sesquioxide of iron, $Fe_2 O_3$. The iron gives up a portion of its oxygen which combines with the arsenious acid, converting it into arsenic acid, As O_5, and this combines with the iron, forming a sub-arseniate of the protoxide of iron, 4 Fe O, As O_5. In the plan proposed by our correspondent we do not see where the oxygen is to come from to convert the arsenious into arsenic acid. There may be, however, some reaction between these substances of which we are ignorant. If R.H.A. or any other correspondent has facts which settle the question, we should be pleased to hear from him. With our present information we are more disposed to caution people against trusting to this remedy than we are to recommend its use.

The sewing-machine inventor, James E. A. Gibbs, who went South in an early stage of the rebellion, is said to have been the chief of the torpedo corps organized by the rebel authorities, and the efficiency of those infernal machines is attributed to his ingenuity and mechanical skill. He is a native of Pocahontas County, Virginia.

A. Babcock, Brunson Harbor, Mich., wishes to obtain hand looms and plantation spinning machines for farmers' use.

A three-cent copper coin has been ordered, and by law to be a legal-tender, up to sixty cents.

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VOL. XII. NO. 17...|NEW SERIES.|....*Twentieth Year.*

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OUR CALAMITY.

An appalling and overwhelming calamity has befallen the nation. The Chief Magistrate has been stricken down by the hand of an assassin; and, as one man, the people are aghast at the magnitude of their loss. In the flood tide of victory, in the fullness of the joy which our successes in overthrowing the rebellion warranted, a pall drops upon the flag, ashes are strewn upon the laurel, the jubilant shouts are changed to cries of mourning.

It is too early to foresee the political results of this awful crime. Our hearts are sick unto death at the sudden revulsion which has taken place in public affairs. Though the hand of justice may not close over the offender presently, the execrations of all right-minded men will forever settle upon the infamous cause of it. In His own hour, the All-seeing God will exact punishment therefor.

The deep grief which sits upon the faces of the people, shows how dear to them was the simple, honest, upright man, who so lately guided us. Wise in judgment, inflexible in decision, magnanimous to his enemies, pure in private as in public life, history will record no brighter name upon its pages than that of ABRAHAM LINCOLN.

GETTING POTASH DIRECTLY FROM THE ROCK.

Potash is worth ten cents per pound, and unlimited quantities of it are distributed through all our granite rocks. Among the patents issued from the United States Patent Office during the week ending March 21, we see there was one to Frederick Oldfield Ward, of London, England, of a process for extracting potassa from the alkaline silicates in which it occurs.

Granite is composed of three minerals, mica, quartz and feldspar; it is in the feldspar that potassa occurs. Feldspar, besides being one of the components of granite, is found also in many places in this country and Europe in large masses or beds by itself. It contains generally about 16 per cent of potassa, and many efforts have been made to devise some economical process for extracting this potassa.

The potash in feldspar is combined with silica, forming a silicate of potassa, an insoluble salt. Silica has a very strong affinity for fluorine, and judging from Mr. Ward's claim we infer that his plan is to separate the silica from the potassa in feldspar by means of this substance. The cheapest source of fluorine is fluor-spar, a beautiful mineral that is found in considerable quantities in New England, New York, Illinois, and other parts of the country. It is a fluoride of calcium, being a combination of the two elements, fluorine and the metal calcium.

If fluor-spar and feldspar were finely pulverized, mixed together, and highly heated, both the fluor spar and the silicate of potash in the feldspar would be decomposed; the fluorine and the silicon of the silica would combine to form fluosilicic acid, which would pass off as a gas; the calcium would be oxydized, forming lime: and a mechanical mixture of lime and potash would remain.

By the addition of water, the potash would be dissolved, and if a portion of the lime were dissolved also, this could readily be removed by passing carbonic acid gas into the solution; thus a solution of pure potash would be obtained. From the phraseology of the claim we infer that this is Mr. Ward's process, and we do not see why it should not be economical and practical. If it is, the invention is one of great value.

In some deposits of feldspar a portion of the potash is displaced by soda, and in this case both alkalies are extracted by the process.

McCULLOCH ON CALIFORNIA CURRENCY.

It is stated in the papers that Secretary McCulloch has written a letter, giving his opinion that if California had adopted a mixed currency of paper and gold in place of her pure metallic currency, it would have materially increased her wealth, through its effect in lowering the rate of interest.

We have no doubt of the superior intellect of Mr. McCulloch, and of his eminent ability as a practical banker. We have entire confidence also that he will make an excellent Secretary of the Treasury, provided he does not fall into any unsound theories in relation to the currency.

But if he has written the letter attributed to him, it seems to us that he fails to draw clearly the distinction between currency and capital.

In California, as in other communities, the currency forms not more than two or three per cent of the aggregate capital. That which is called money at interest is really not money, but steam engines, stamping mills, gold-washers, steamboats, stocks of merchandise, and capital in various other forms. It is the relation of the supply and demand of this aggregate capital that determines the rate of interest.

When Mr. McCulloch was president of the State Bank of Indiana did it ever occur to him to consider what it was that made up the capital of that bank? The assets of the bank, to the amount of the whole capital and a considerable portion of the deposits and circulation, were in the form of bills receivable. These were pieces of paper, some of them worthless, and some of value to the amount of thousands of dollars. What made these valuable? The fact that the signers were in possession of money equal to their face? Not at all. Very few of the business men whose notes were discounted by the bank held money on hand to the amount of their debts, but all of them whose notes were good had capital in merchandise or other forms of personal property to the full amount of their debts. In ordinary times and in a normal condition of trade, the money which banks have on hand is due to depositors, belongs in fact to men who have left it with the bank for safe keeping, and every dollar of the capital of the bank exists in the form of merchandise. At the times when the capital is hired and when it is repaid, it exists in the form of currency, money being employed in these as in other exchanges of value; but during most of the time that it is loaned it exists in the form of merchandise.

Had California adopted a currency of mixed paper and gold the paper would have displaced gold to an amount nearly equal to its own volume. The shipment of this gold would have brought in cloth, steam engines, canned fruit, and other merchandise in exchange. A portion of this would have been consumed in more luxurious living, and a portion would have been added to the capital of the community. But had the whole been saved and added to the capital, it would not have increased the aggregate capital to the extent of one per cent, and its effect upon the rate of interest would not have amounted to the one hundredth part of one per cent.

THE GOOD TIME COMING.

The "good time," which tramping minstrels have been promising so long seems really coming at last. Gold falls rapidly daily, and as the political prospects of this sorely tried country brighten our foreign relations improve commensurately. By the surrender of Lee the Confederacy is left without an army to defend it, and from this time forward we may expect a new order of things.

The *Richmond Whig* says what we have before asserted that "Improvement, renovation and reconstruction must assuredly follow in the wake of the Union armies, in things political, as well as things material. A strong force of laborers is to be at once put at work on the broken points of the Richmond, Fredericksburg, Aquia Creek and Potomac Railroad, and its completion, which will occur within the next few weeks, will put Richmond in rail communication with the capital of the United States. Again the iron bands, broken by the ruthless hand of war, welded again, will once more re-unite a divided people in bonds too strong to be put asunder. The river obstructions are, we believe, being removed as expeditiously as possible, and forty-eight hours will not elapse, we opine, before we hear of steamers at Rocketts, direct from New York, Philadelphia and Baltimore. The river at City Point is filled with a sutler's fleet awaiting permits to enable them to bring their supplies up to Richmond."

In that portion of our beloved country uprooted by the chastening hand of the Goverment in reclaiming its own, there lies a fertile field for commerce which will speedily be worked. Lands that slovenly, enforced labor have impoverished, shall grow crops fabulous in that olden time when the thong was the master and no hope of remuneration visited the minds of those who tilled the soil. Factories shall rise, and hands to fill them, work them, and brains to manage them will be required and not found wanting, and the future seems bright with promise for mechanical pursuits, as the armies of the rebels fray out into ragged, purposeless crowds of unemployed men.

These it is the province of labor to call into useful activity again, and the hands that held the saber shall wield a different steel to far better purpose. Labor shall settle the differences, and hostilities be quenched in the desire to obtain homes and comforts for wives and children now destitute. Thus will the rank and file of the two armies once opposed to each other become assimilated in the bonds of good feeling and dissensions between sections which the political press affect to deplore will be unknown. Thus, then, is "the good time coming" at last.

MODEL HOUSES.

There is nothing which New York is more deficient in than dwellings, or homes, for people of moderate means at a reasonable rent. Our avenues are lined with costly brown stone residences, the rent of which would be a handsome income for most persons, and in the lower quarters of the city there are blocks of buildings which are let and sub-let to all comers indiscriminately.

It is the mean between these two that is wanting. To any one who has not lost all sense of the ordinary proprieties of life, who still retains sufficient self respect to hate dirt and uncleanliness, of whatever name and nature, these tenement houses are simply untenable. Rowdy boys cluster around the door and steps, clatter up and down stairs at all hours of the day and night; these, together with other nuisances affect the well being of those who desire to lead quiet lives.

Some of the houses alluded to were not built for the occupancy of more than one family, and the arrangement of them is faulty and unhealthy to the last degree. We need not hope for any abatement of taxes for years to come. On the contrary they will, doubtless, increase; real estate, therefore, will be

high, and whole dwellings are not to be hoped for by persons of small means. There is no reason, however, why houses, varying from two to four stories in hight should not be constructed with a view to the accommodation of gentlemen's families, or those, who, respecting themselves, regard their neighbor's comfort and convenience also.

Houses built in "flats," so termed, are common in Europe where taxes are great and many persons of the highest social culture and standing occupy said flats to their very great convenience. All the necessary fixtures and appurtenances belonging to housekeeping may be found on one floor, and within the limits of 100 by 25 feet, or less, according to rent, and the tenant is as much at home, as private and safe from inquisitive neighbors as any one can be under such circumstances. Dumb waiters for raising coal from the cellar, places for storing the odds and ends of housekeeping, laundries for getting up the linen, airy, well ventilated rooms for living, and above all sleeping in, kitchen with hot and cold water, bath room, in short the usual appliances of civilized life should be the distinguishing features of such houses and the demand for them is yearly increasing.

There are a few houses now in this city on such plans and they are secured immediately as soon as vacated; palpable proof of the estimation they are held in. An improvement on the plan of each tenant purchasing his own coal would be a heater in the cellar where, for a stipulated price the landlord could in cold weather heat the premises night and day with great economy; fuel for cooking alone would then be necessary.

Hundreds, yes thousands of our citizens are annually flying to the suburbs from the simple impossibility of living longer in the city under ordinary circumstances, and sooner or later such buildings as we have described will be indispensable in this and other large cities.

GUNPOWDER EXTRAORDINARY.

Under this head the *Mechanics' Magazine* describes the process of manufacturing a new kind of gunpowder which has been patented in the principal countries of Europe, by Captain Schultze, of the Prussian artillery. Our cotemporary says that the new article, "while being nearly four times as powerful as gunpowder, costs, weight for weight, considerably less than gunpowder, and can be used in precisely the same way as gunpowder, its substitution for gunpowder requiring no new method or precaution beyond that of using of the new powder only one-fourth as much as of the old.

"To this it must be added that Capt. Schultze's powder does not foul the guns in which it is used; that the products of its combustion are perfectly transparent gases, offensive neither to the eyes nor to the lungs, and lighter than atmospheric air, so that they soon pass away; and that its manufacture is much safer than that either of gunpowder or guncotton.

"The first process in the manufacture of the new powder is to cut some wood—we are told that any kind will do, but that the harder it is the stronger it will be—into sheets or veneers, of a thickness equal to the diameter which it is desired that the grains of the powder to be produced shall have. For powder to be used for ordinary small arms, Capt. Schultze recommends that the sheets be about one-sixteenth of an inch thick. These sheets, whatever their thickness, are cut up by a punching apparatus into little cylinders, of diameter slightly less than the thickness of the sheets from which they are cut. The cylinders thus obtained constitute, eventually, the grains of the new powder, which is thus granulated at the beginning, instead of, like the ordinary gunpowder, at the end, of its process of manufacture. In order to remove from these cylinders, or grains, all their constituents other than cellulose, they are boiled for about eight hours, in a copper kettle, in a strong solution of carbonate of soda, the solution being changed as often as it becomes discolored; they are then kept in a stream of running water for twenty-four hours; and are next steeped for about two or three hours, being constantly stirred all the time, in a solution either of chloride of lime or of chlorine gas. They are then well washed, first in cold water and afterwards in hot; and are finally kept a second time for twenty-four hours in pure cold running water. They are then submitted for six hours to the action of a mixture of forty parts by weight of concentrated nitric acid with a hundred parts by weight of concentrated sulphuric acid, one part by weight of the grains being placed with seventeen parts by weight of the mixed acids in an iron vessel, which should either be placed in a powerful refrigerating mixture, or have cold water constantly circulating around it. At the end of six hours the grains are taken out, and carefully drained from all adhering acid. They are then kept in cool fresh running water for two or three days, then boiled in a weak solution of carbonate of soda, then exposed to running water again for twenty-four hours, and then dried as completely as possible. Captain Schultze states—somewhat to our surprise—that up to this point the grains are not explosive, and that this drying operation therefore involves no danger. When fully dried, the grains are ready for the last operation but one, which consists in steeping them for ten minutes in a solution of some salt or salts containing oxygen and nitrogen. Captain Schultze prefers nitrate of potash (saltpetre), or nitrate of barytes, or, what he finds is better still, a mixture of both. He recommends for every hundred parts by weight of the grains, two hundred and twenty parts of water having dissolved in it twenty-seven and a half parts of nitrate of potash and seven and a half parts of nitrate of barytes. The temperature of the solution should be 112 deg. Fah. After having been stirred about in this solution for ten minutes, the grains have only to be taken out and drained, and then dried. The drying must be done, this time, in a chamber kept at a temperature of from 90 to 112 deg. Fah., and will occupy about eighteen hours."

Cotton fiber is almost pure cellulose, and wood fiber is mostly cellulose, but containing gums and other substances. Cellulose is composed of carbon, hydrogen and oxygen in the proportion of 6 atoms of carbon, 10 of hydrogen, and 5 of oxygen, C_6, H_{10}, O_5. As it takes one atom of oxygen to burn one of hydrogen to water, HO, and two of oxygen to burn one of carbon to carbonic acid, CO_2, it is plain that 22 atoms of oxygen would be required to effect the complete combustion of the carbon and hydrogen in one atom of the celloluse, 17 more than is contained in the cellulose. To burn cotton or wood, therefore, a supply of oxygen must be furnished from the atmosphere or some other source. In gunpowder this is not required, as the saltpeter contains sufficient oxygen to effect the combustion of the sulphur and carbon. Gunpowder, therefore, will burn in a close vessel excluded from the air, while cotton or wood would be extinguished.

Guncotton is made by treating the fiber of cellulose with nitric acid, NO_5; the acid loses, 1 atom of oxygen, becoming NO_4, and this enters into the compound, displacing a portion of the hydrogen. The proportion of hydrogen displaced depends upon the mode of treatment. In photographic guncotton the quantity of oxygen carried into the compounds is not sufficient to effect the complete combustion of the hydrogen and carbon, consequently, if photographic guncotton be set on fire in a close vessel, only a portion of it will be burned. By Baron Von Lenk's treatment the quantity of oxygen introduced is sufficient to complete the combustion, hence the explosive quality of his cotton.

As Captain Schultze's cellulose after it streatment by acids is not explosive, it is manifest that the process does not convert it into the tri-nitro-cellulose of Baron Von Lenk, hence the necessity for the addition of nitric acid in combination with either potash or barytes.

A TRUE HERO.

"He that ruleth his own spirit is better than he that taketh a city." Gen. Grant, according to this statement, is a hero in the highest sense. Having fought nearly a whole year for the possession of Richmond, and having captured the city with its defending army, it would not have been unnatural had the General, following innumerable precedents, desired to enter in triumph as a conquering hero. Few men could have withstood the temptation. But Grant, whose modesty equals his military genius, stopping not for such momentary gratification, considering this no time to indulge in military displays, hastens to Washington to attend to the legitimate duties of his position. Declining all public ovations, he goes at once to the War Department, and, as the result of his advice, the following orders will be immediately issued:—

To stop all drafting and recruiting in the loyal States.

To curtail purchases of arms, ammunition, Quartermaster and Commissary supplies, and reduce the expenses of the military establishment in its several branches.

To reduce the number of general and staff officers to the actual necessities of the service.

To remove all military restriction upon trade and commerce, so far as may be consistent with public safety.

It is estimated that these orders will save to the Government one million dollars per day. Gen. Grant thus shows himself to be not only a military hero, but also a true friend to the people.

HORSE POWER.

When Watt began to introduce his steam engines he wished to be able to state their power as compared with that of horses, which were then generally employed for driving mills. He accordingly made a series of experiments, which led him to the conclusion that the average power of a horse was sufficient to raise about 33,000 lbs. one foot in vertical hight per minute, and this has been adopted in England and this country as the general measure of power.

A waterfall has one horse power for every 33,000 lbs. of water flowing in the stream per minute, for each foot of fall. To compute the power of a stream, therefore, multiply the area of its cross section in feet by the velocity in feet per minute, and we have the number of cubic feet flowing along the stream per minute. Multiply this by $62\frac{1}{2}$, the number of pounds in a cubic foot of water, and this by the vertical fall in feet, and we have the foot-pounds per minute of the fall; dividing by 33,000 gives us the horse power.

For example:—A stream flows through a flume 10 feet wide, and the depth of the water is 4 feet; the area of the cross section will be 40 feet. The velocity is 150 feet per minute—$40 \times 150 = 6000$=the cubic feet of water flowing per minute. $6000 \times 62\frac{1}{2} = 375{,}000$= the pounds of water flowing per minute. The fall is 10 feet; $10 \times 375{,}000$=the foot-pounds of the water fall. Divide 3,750,000 by 33,000, and we have $113\frac{21}{33}$ as the horse power of the fall.

The power of a steam engine is calculated by multiplying together the area of the piston in inches, the mean pressure in pounds per square inch, the length of the stroke in feet, and the number of strokes per minute; and dividing by 33,000.

Water wheels yield from 50 to 91 per cent of the water. The actual power of a steam engine is less than the indicated power owing to a loss from friction; the amount of this loss varies with the arrangement of the engine and the perfection of the workmanship.

The Atlantic Telegraph.

Captain James Anderson, of the Cunard mail steamer *China*, has been appointed to command the *Great Eastern* during the laying of the Atlantic Telegraph cable. The *Great Eastern* will sail from Valencia, Ireland, about the 1st of July, and may be expected at Heart's Content, Trinity Bay, by the middle of that month. There were sixteen hundred and sixty-two nautical miles of cable completed on the 21st of March, and the whole twenty-three hundred miles will be made and on board of the *Great Eastern* in May.

The English Admiralty have agreed to order two powerful steamers of the Royal Navy to accompany the *Great Eastern* from Ireland to Newfoundland, and also to direct Vice Admiral Sir James Hope to afford such assistance on the approach of the expedition to Newfoundland as may be in his power.

It is confidently expected that Europe and America will be in telegraphic communication before the 20th of July.

GREAT GUNS.—The iron-clad *Stonewall* turned tail and ran away from two wooden ships with nothing but great guns and stout hearts to protect them.

BOOKS AND PUBLICATIONS.

INTERNAL REVENUE LAWS—As Amended by the last Congress. With Copious Marginal References. A Complete Analytical Index and Tables of Taxation. Compiled by Horace Dresser.

This is a very valuable publication, and ought to be in the hands of all who wish to be informed of our internal revenue tax system. It is published by D. Appleton & Co., No. 443 Broadway, New York.

INCOME RECORD. A List giving the Taxable Income of Every Resident of New York.

This work has just been issued by the American News Company, No. 121 Nassau street. Price, 75 cents. We select a few of the names of those who paid tax on the largest incomes:—

A. T. Stewart, the well-known merchant on Broadway	$1,843,637	August Belmont	$100,930
W. B. Astor	838,525	L. C. Clark	110,975
Cornelius Vanderbilt, the great speculator	680 728	D. Crawford	149,098
Legrand G. Lockwood	512,900	Peter Cooper	106,879
W. E. Dodge	392,217	David Dows	168,674
W. & J. O'Brien	189,051	W. W. De Forrest	157,500
Moses Taylor	873,494	Daniel Drew	101,293
Henry Young	150,464	C. P. Fischer	157,038
Rufus L. Lord	209 968	Peter Goelet	173,067
A. Stuart	112,762	P. Hayden	158,144
W. A. Brice	100,000	L. W. Jerome	100,001
James Brown	261,699	Bradish Johnson	185,545
Thomas Denny	106,352	John T. Lord	110,443
C. E. Detmold	103,893	B. H. Lewis	114,763
D. B. Fuller	106,539	Joseph Sampson	126,228
Arthur Gillender	350,000	Arion Arnold	158,929
J. C. Greene	142,354	J. S. Schultz	100,228
John Taylor Johnston	161,040	I. H. Lord	110,443
J. B. Johnston	110,829	Samuel Mitchell	109,824
Samuel Lord	117,929	H. T. Morgan	134,708
Peter Lorillard	289,098	Peter Moller	111,800
John S. Lyle	120,334	Edwin D. Morgan	119,053
Paul Spofford	100 000	George Opdyke	112,800
J. Thorn	137,699	Phœnix Phillip	229,864
George Bliss	148,980	Wm. Paton	284,519
G. F. Butman & L. A. Dowley	128,120	J. D. Phelps	113,200
		J. Tobin	149,400
		T. M. Taylor	105,200
		John Watson	166,591
		W. H. Webb	133,230

We shall all agree that these men ought to enjoy a comfortable living, but it would doubtless appear on examination that they are less happy than the same number of industrious mechanics picked out at random in any of the trades of this city.

A SUCCESSFUL COMMANDER.

Gen. Grant is the only one of our great commanders who has actually compelled, through the combined agency of stubborn fighting and stragetical skill, the surrender of rebel armies. Thomas nearly annihilated Hood in Tennessee; Sheridan nearly did the same thing to Early's army in the Shenandoah Valley, while Sherman has always outgeneraled his antagonist in a manner that places his name among the great military chieftains of history. It has, however, been reserved to Gen. Grant not only to defeat but also to cause the actual surrender of three large rebel armies. At the battle of Fort Donelson, in 1861, he compelled the surrender of nearly the whole force, amounting to about 15,000 men. In 1863 he drove Pemberton into Vicksburg, and captured his whole army, 31,000 strong. And now, to give the finishing stroke to his masterly skill, he attacks the largest army of the rebellion in its entrenched position, defeats that army, and compels its absolute surrender. Grant thus earns a place in history second to no other military chieftain.

THE YANKEE NUT-CRACKERS.—The Richmond correspondent of the London *Times*, February 16th, predicts "that General Lee's army will be a hard nut to crack, which will severely try the jaws not only of General Grant, but General Sherman." This Englishman, if he is yet in Virginia, has discovered before this that Grant does not crack nuts with his jaws. He has one of those new fangled Yankee machines, which takes the nut in iron grip, and smashes it with ease. This patent affair is beyond the Rebel ingenuity to counterpart, and it will squeeze the whole life out of the Rebellion before it ceases its tenacious pressure.—*Philadelphia Inquirer.*

[It's squeezed.—EDS.

BREAKING ROCK BY FIRE.—The ancient method of breaking rocks by fire, has lately been revived at the Rammelsberg Mine, in the Hartz Mountains. In a portable furnace about one and a half bushels of coke burn from 4 P. M., to 5 A. M., when the furnace is removed, and the rock left to cool, after being sprinkled with water. About noon the face of the rock spontaneously detaches itself: and after that, a further portion is broken. The effect of the fire extends to eight inches, and with one and a half bushels of coke, from 1600 to 2400 weight of ore is obtained at half the cost of the gunpowder process.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING APRIL 11, 1865.

Reported Officially for the Scientific American.

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

47,177.—Manufacture of Ordnance—Horatio Ames, Falls Village, Conn.:

I claim, First, Making the interior ring, a, of a combined series, out of solid metal, and without a weld, substantially as and for the purpose described.

I also claim making the section of a series of concentric rings, of which the inner one is longer than the one outside of it, substantially as and for the purpose described.

I also claim welding the sections to the mass during one and the same heat, by means of two hammers or rams, one working horizontally and the other vertically, substantially as described.

I also claim combining with the centralizing or matching pin, G, the arms and handles, g h, by which it is more readily operated, held and withdrawn, substantially as described.

47,178.—Lazy Jack for Vessel's Sails.—Daniel R. Arnold, Haddam, Conn.:

I claim a revolving lazy jack surrounding the boom, sail and gaff, substantially as set forth and described.

47,179.—Staging for Buildings.—Wm. Arronquier, Worcester, Mass.:

I claim the construction of the supporting bars and platform, and their combination with the ladders, forming a staging, as described.

47,180.—Boiler Feeder.—J. W. Bishop, New Haven, Conn.:

I claim the combination of the vessels, B and D, diaphragm, c, or its equivalent, with a steam boiler supplying pumps, when constructed and arranged to connect or disconnect the power operating said pump, as and for the purpose substantially as herein set forth.

47,181.—Automatic Boiler Feeder.—J. W. Bishop, New Haven, Conn.:

I claim the combination of the vessels, B and D, diaphragm, c, or its equivalent, with inlet and exit pipe, C and M, constructed and arranged to operate a valve, A, substantially as and for the purpose specified.

47,182.—Steam Trap.—J. W. Bishop, New Haven, Conn.:

I claim the combination of the vessels, B and D, diaphragm, c, with a water tank or reservoir and steam boiler, constructed and arranged to operate the valves connected therewith, substantially as and for the purpose herein set forth.

47,183.—Low-water Indicator.—J. W. Bishop, New Haven, Conn.:

I claim, First, The combination of the two vessels, B and D, arranged as described, with a diaphragm, c, or its equivalent, in the manner and for the purpose substantially as herein set forth.

Second, The combination of the vessels, B and D, diaphragm, c, or its equivalent, with a steam boiler, when arranged to operate substantially as and for the purpose herein specified.

47,184.—Water Regulator.—J. W. Bishop, New Haven, Conn.:

First, I claim the valve, C, when constructed with a hollow stem, and combined with chambers, F and G, substantially as and for the purpose herein set forth.

Second, Adjusting the pressure of water in pipes by means of the chamber, G, and cocks, L and O, substantially as herein specified.

47,185.—Skate.—Daniel S. Brigham, Worcester, Mass.:

First, In combination with the supporting plates, A B, the clamp bolts, E G, clamp lever, H, and lock plates, b, of the heel and sole, substantially as and for the purposes described.

Second, Providing one or both of the catch bolts E G, with a pin which enters the leather of the sole or heel, to prevent any longitudinal motion of the skate substantially as herein described.

Third, The application to a yielding or elastic runner of the adjusting screw, L, for the purpose of making the bottom part of the runner flat or crowning, substantially in the manner described

Fourth, The combination with the supporting plates, A B, of the clamp bolts, E G, clamp lever, H, elastic runner, D, and adjusting screw, L, when constructed and operated substantially as and for the purposes described.

47,186.—Fanning Mill.—J. K. Buck, Winona, Minn.:

I claim the combination of the elevator, B, shaft, e, provided with the pulley, d and wheel, b, with the driving wheel, a, when all the parts are arranged to operate as and for the purpose herein set forth.

47,187.—Saw-set.—John Ruser, Philadelphia, Pa.:

I claim, First, The pinchers, A, with their jaws, b b', and cheeks e e, combined with the within-described devices, or their equivalent, substantially as and for the purpose specified.

Second, The plate, C, its projection, d, and arm, f, in combination with the pinchers, A, and springs, g g, or their equivalents, the whole being constructed for joint operation, substantially as described.

Third, The adjustable plate, i, combined with the plate, C, substantially as and for the purposes set forth.

47,188.—Composition for Removing Scale from Boilers.—Jacob Buzby, Philadelphia, Pa.:

I claim the use for removing scale from steam boilers of a decoction of the bark of the sweet gum tree, in combination with a solution of gambeer or catechu.

47,189.—Gas Regulator.—Charles M. Cresson, Philadelphia, Pa.:

I claim the use in a gas regulator of a holder of the tapering form herein described, for the purpose specified.

47,190.—Machine for Spinning Flax.—Caleb S. Davis, Lancaster, Pa.:

First, I claim the direct application of steam to the rovings, in their passage through a chamber, I.

I claim a chamber, I, having a series of slots, Y, and caps, U, with a steam pipe, M, having perforations, z, opposite the slots, Y, within said chamber, together with valve, L, in combination with the connecting pipe, m', arranged and operating in the manner specified.

I also claim a modified chamber, I', with its slots, Y, enlarged in combination with the disk or pulley, X, lever, W, and steam pipe, M, without perforations, constructed and operating in the manner and for the purpose specified.

47,191.—Machine for Holding the Uppers of Boots and Shoes.—E. M. Dickinson, Fitchburg, Mass.:

First, I claim the forked clamp, B, the springs i i, the yoke, j, and the springs, K K, or their equivalents, in combination with the rest, A, as substantially described.

Second, I claim the forked clamp, B, the springs, i i, the yoke, j, and the springs, K K, or their equivalents, the rest, A, in combination with the rod, d, and the spiral spring, g, or their equivalent, for the purpose herein set forth, reference being had to the accompanying specifications and drawings.

47,192.—Press.—Hezekiah Dodge, Albany, N. Y.:

First, I claim the combination of the right and left hollow screw, E, fixed screw, G, and movable screw, F, with the follower, D, substantially as and for the purposes described.

Second, The stationary and movable right and left screw shafts, F and G, hollow screw, E, and spur wheel, C, with the driving spur wheel and shaft, B, B', substantially as described.

47,193.—Pump.—Wm. Foster Dodge, New York City:

First, I claim the cylinder cover, C, the air chamber, D, and the covers for the two side pipes, when such parts are united with the cylinder, A, and side pipes by a single plane joint, substantially as described.

Second, In combination with the air chamber, arranged directly over the cylinder, and with the stuffing box on the top of the so-arranged air chamber, I claim the tube, E, surrounding the piston rod, connecting the top of the air chamber with the cylinder cover, and isolating the piston rod and stuffing box from the air chamber, substantially as and for the purpose herein specified.

47,194.—Apparatus for Withdrawing Tubes from Wells.—Wm. H. Downing, Philadelphia, Pa.:

First, I claim the jaws or arms, A A, having projections, a' a', and adapted to be opened or spread by the spring, F, and lever, G, when lowered into the tubing of a well, for the purpose of taking hold of and raising the same, substantially as herein set forth.

Second, I claim the combination of the toggles, C C, yoke, C', and cord, D, for contracting the jaws, A A, when the apparatus is to be withdrawn from the tubing, as explained.

Third, I claim the detachable cap, E, employed to retain the jaws, A A, in their closed position while the apparatus is being lowered into the tubing, substantially as described.

[This device consists essentially of two pivoted jaws, having teeth or sharp projections on their outer faces, adapted to indent or penetrate the metal tubing to be withdrawn from oil wells. The jaws are thrown forcibly open to make the teeth catch the tube, by means of a spring and a lever, the latter being made to operate by means of a cord pulled by hand, which throws the end of said lever against the two jaws, opening them and forcing them toward the sides of the pipe with great force.]

47,195.—Upper Bearings or Bolsters for Spindles of Spinning Frames.—Mexworth D. Drake, Providence, R. I.:

First, I claim the use and employment of an upper and lower groove or oil chamber in the bore of the bolster, in combination with the use and employment of a spiral or helical groove, substantially as described.

Second, The use and employment of a spiral groove in the bore of the bolster, in combination with a groove, a, at the bottom, whether the top groove is used or not.

47,196.—Piano-fortes.—Spencer B. Driggs, New York City:

First, I claim the sounding chamber, B, provided under the case proper of the piano forte, substantially as and for the purpose herein specified.

Second, Connecting each or any one of the strings with the sound-board bridge independently of the other strings by means of two metal bearings, t m, constructed or provided on or in one side of a stud, n or p, secured in the bridge and having between them a lateral opening through which the string can be inserted in a lateral direction substantially as herein described.

47,197.—Wardrobe Bedstead.—John Eby, Muncie, Ind.:

I claim the combination and arrangement of the posts, A A C C and F F, bars, B B and G, rails, D and E E, doors H and K K, with the elevating board, P, and table, T, the whole being constructed as described for the purpose specified.

47,198.—Composition and Manufacture of Iron.—Alexander H. Everett, New York City:

First, I claim the combination of cast iron, wrought iron, oxide of manganese, oxide of iron and fluor-spar or other fluoride as and for the purposes set forth.

Second, The combination of cast iron, magnetic iron ore, oxide of manganese and fluor-spar or other fluoride substantially as set forth and described.

Third, The process herein described for improving the qualities of cast iron

47,199.—Tobacco Pipe.—George W. Francis and Wm. L. Woods, Washington, D. C.:

We claim, first, The combination of case, A, with its air holes, F F, with the bowl, B, and its nipple, D, the cap, C, the grooves, G, and air chamber, x, substantially as described.

Second, The combination of the bowl, B, and cap, C, with its air holes, F, substantially as described.

Third, The bowl, B, with its nipple, D, and cap, C, when arranged and operating substantially as described.

47,200.—Pumps.—Kingston Goddard, Philadelphia, Pa.:

I claim the construction and arrangement of the tubular and perforated piston rod substantially as described.

47,201.—Machine for Rolling Tea Leaves.—Kingston Goddard, Philadelphia, Pa.:

I claim the machine substantially as described which submits the leaves to the rolling action of the two described rollers.

47,202.—Method of Preserving Eggs.—Wm. Hansford, San Francisco, Cal.:

I claim the coating of eggs with glue substantially as and for the purposes herein recited.

47,203.—Fence.—Davis Harvey, Jackson Township, Iowa:

I claim placing upon any common fence a panel or board projecting outward and upward for the purpose of preventing dogs and wolves from getting to sheep.

47,204.—Tonic Bitters.—Isaac Hellman, St. Louis, Mo.:

I claim the combination of the several ingredients mentioned in the foregoing specification in the proportions and for the purpose set forth.

47,205.—Apparatus for Generating Carbonic Acid Gas.—Peter and Frederick Hinkel, New York City:

We claim, first, the long necked jar, l, hose, r, or their equivalents and the air tight connection between them and the cover of a gas generator, A, as described or its equivalent.

Second, We further claim the sliding car, m, the wires, w w, or their equivalents and the connection of them with jar, l, hose, r, and cover, k, in the manner fully described or its equivalent, and for the purpose set forth.

47,206.—Wash Board.—Nelson Homes, Laona, N. Y.:

I claim the wash board composed of the plane edged slats or bars, B B, fitting closely together so as to prevent the leakage of water through, and having a necessary degree of elasticity, said slats being provided with corrugations, a a b b, so arranged that the corrugations of any one slat alternate with the next substantially as and for the purpose described.

47,207.—Instrument for Lighting Gas.—Thomas W. Houchin, Morrisania, N. Y.:

In combination with the tube, A, I claim the use or employment of the wick or taper, B, cord or string, C, and attachment, D, when the frame shall be constructed and combined substantially as shown for the purpose specified.

47,208.—Straightening Rails of Railroads.—John Johnston, Alexandria, Va.:

I claim the use for straightening rails of three or more pairs of rollers having depressions and projections conforming to the shape of the rails, the rollers themselves as well as the said depressions and projections of the several pairs being arranged in respect to each other as set forth.

47,209.—Machine for Pressing Brick.—John K. Lemon, Allegheny City, Pa.:

I claim a brick press which employs a pressing follower, C, and a movable supporting follower, b, which are so combined and operated that the latter is allowed to descend by its own gravity during the introduction of a brick into the press box, and to rise during the retrocession of the pressing follower, C, substantially as herein described.

Second, A spring, d, or its equivalent for elevating the follower, b, in combination with the crosshead, E, and rods, f f, of the frame, C', for allowing the follower, b, to descend, substantially as described.

Third, Providing for adjusting the followers, C and b, so as to

work nearer to or farther from each other according to the thicknesses of the bricks required substantially as described.

Fourth, Sustaining the follower, b, when in an elevated position upon a spring, d, or its equivalent, and when it is in a depressed position upon the bottom, l l, of the press box, a, substantially as described.

Fifth, The combination of a reciprocating follower, G, and guides, H H', with the movable followers, C and b, substantially as described.

Sixth, A movable separating board, K, in combination with a brick press in which the three followers, C b and G, are employed substantially as described.

Seventh, The separator, K, when used in conjunction with a follower, G, or its equivalent, and a removable shelf, M, substantially as described.

Eighth, The parallel guides, H H', in combination with the movable followers, C b and G, arranged and operating substantially as described.

47,210.—Clamps for Stretching Card Clothing upon Carding Cylinders.—Joshua O. Lewis, Worcester, Mass.:

I claim as a new article of manufacture a card-clothing clamp constructed with forked braces to sustain and strengthen the ends of the clamp jaws so that they cannot spring or yield, and with looped ends for the operating strap all substantially as and for the purposes described.

47,211.—Carriages.—Lewis W. Mason, Shelburne Falls, Mass.:

I claim my peculiar arrangement of two sets of shafts, A B C D, and a crossbar, E, with the whiffletrees, F G, whereby the crossbar carrying the whiffletrees is brought in rear of the draft animals when they are between the shafts.

I also claim the combination and arrangement of the connector, K, and the two sets of shafts, A B C D, and the crossbar, E.

I also claim the combination and arrangement of the two mud guards, L L, with the two sets of shafts and their crossbar, E.

47,212.—Lantern.—John G. Leffingwell, Newark, N. J.:

I claim the lugs, C, when used in the manner and for the purposes specified substantially as described.

Second, My device for attaching the lamp to the lantern part by means of the hooks or flanges represented working in combination with a spring substantially as set forth.

Third, The lantern as it stands with its several devices, to wit, lugs, hooks or flanges and spring fastening with rivets, reflectors and posts combined and arranged substantially as described.

47,213.—Packing Projectiles for Rifled Ordnance.—Albert J. S. Molinard, Baltimore, Md.:

I claim the inclination of the mortises or openings, E, connecting the conical hole in the base with the outer belt of metal or packing, in combination with the soft metal packing united to the shot as therein described and the tapering of said packing to a thin feathered edge at or near the base of the short that is raised by the gases acting simultaneously against the solid lead at the base and feather edge at the time of the discharge for the purpose set forth.

47,214.—Helve.—Wm. Morehouse, Buffalo, N. Y.:

First, I claim a helve or handle, A, constructed with sockets, c, therein substantially as and for the purposes described

Second, I claim a helve or handle, A, constructed with a concavity, b, therein substantially as and for the purpose described.

Third, I claim so forming ax-helves and other handles that when fastened in the eyes of implements by wedges of wood the wedges will be allowed to expand and swell into recesses or sockets formed in the handles substantially as and for the purpose described.

47,215.—Alarm for Railroads.—C. P. Morton, Chester, Pa.:

I claim the combination of the arm, F, spring, H, projections, f' f2, with the rod, M, and bell crank, L, so constructed and arranged as to operate in connection with the draw-bridge, C D, in the manner and for the purpose herein described.

47,216.—Fruit Can.—Joseph Newberger and Peter J. Illig, Buffalo, N. Y.:

First, As a distinct article of manufacture a rim, A, made of tin or other similar material having a slightly tapering neck with a groove a', formed therein for receiving and holding a packing strip, C, substantially as and for the purpose set forth.

Second, In making a cap or cover, B, to fit on to the taper neck of the rim and having a flange, b, formed thereon in combination with a button, D, for the purposes and substantially as described.

47,217.—Treating Straw to Obtain Paper Pulp.—Theodore A. Nixon, Philadelphia, Pa.:

First, I claim manufacturing paper pulp from straw by a process substantially as described.

Second, subjecting the prepared straw to the action of a hot solution of alkali prior to boiling the same substantially as set forth for the purposes specified.

47,218.—Stove.—Edwin A. Parker, Horseheads, N. Y.:

I claim the special arrangement for supplying the air draw from the outside of the room, partly to support the combustion and partly to supply the room, the same consisting of the passage, E, central heating chamber, G, the induction pipe, H, and the draught pipe, I, operating substantially in the manner and for the purpose herein set forth.

47,219.—Churns.—Edward J. Phillips, Prescott, Wis.:

I claim the crank wheel, A, pitman, B, and adjustable wrist, I, in combination with the dasher, C, and guide pin, D, the several parts being constructed, arranged and operating as and for the purpose herein set forth.

47,220.—Velocipede.—Wm. Quinn, Philadelphia, Pa.:

First, I claim the combination of the two cranked axles, G and G', with the connecting link, z, with the bearing, c, substantially for the purpose as described and shown.

Second, The construction of the fulcrum bearing, N, the treadle levers, when used in combination with the brace, D, substantially as described and shown.

Third, The construction and arrangement of the frame, as herein-before set forth and described.

47,221.—Dying Kid Gloves.—Josiah T. Reed, Charlestown, Mass.:

I claim as a new article of manufacture a kid glove having the inside of the same color as the skin from which it was made, and the outside being colored of any desired shade after the glove is cut out and sewed, substantially as described.

I also claim the art, method or process of coloring kid gloves by applying with a brush or sponge the required dye or color to the exterior of the glove while it is stretched upon a suitable form or mold.

47,222.—Apparatus to Preserve and Exhibit Photographs.—Charles Robinson, Springfield, Mass.:

I claim the combination of a continuous band, G, provided with means for mounting the photographs thereon, two cylinders, B C, of sufficient diameter not to injuriously affect the appearance of the photographs by being bent around them, and an inclosing box or case, A, provided with an aperture or apertures, H H, through which the photographs are exhibited, substantially as and for the purposes herein specified.

I also claim the brake clamp shown in Fig. 4, for keeping the tangent portion of the connecting band or strip straight, as herein set forth.

47,223.—Clothes Pin.—Henry W. Sergeant, Jr., Boston, Mass.

I claim constructing a clothes pin with three flexible prongs, substantially as and for the purpose described.

47,224.—Pump for Oil Well.—John B. Root, New York:

I claim, First, The employment in an oil well of tubing composed of wooden staves and surrounding bands of metal, substantially as herein specified.

Second, The arrangement of the pump cylinder, in combination with the tubing of wood, substantially as herein specified, whereby the said cylinder can be drawn up through the tubing without disturbing it.

Third, The arrangement of the pump cylinder in the interior of the tubing of wood in an oil well, whereby the said cylinder and its piston may be withdrawn together from the said tubing by means of the piston rod, substantially as herein described.

47,225.—Machine for Boring Wells.—Charles A. Saxe, Philadelphia, Pa.:

I claim, First, The combination of the drill frame and the frame that carries the double cam planes, both suspended to the screw nut, and arranged to operate substantially as herein described and represented.

I also claim, in combination with a drill or boring tool that is raised and dropped, rotated, and fed up to the work, as herein described, the gear, U, and its stem or shaft, by which said feed motion may be increased, diminished, or suspended, as and for the purpose set forth.

I also claim, in combination with the raising and dropping, rotating, and feeding mechanism, the gear, V, and its appliances for raising the drilling tool and its frame, and automatically stopping its action when the drill is up, and without stopping the first moving power, substantially as described.

47,226.—Oil Ejectors.—S. Franklin Shoonmaker, New York City:

I claim, First, The use, in apparatus employed for the raising of liquids from great depths or to great hights, of an annular-shaped orifice or opening for producing an air blast in the same, said orifice being so arranged as to allow the liquid to be raised, to come in contact with both the exterior and interior surfaces of the air blast, substantially as described and for the purpose specified.

Second, In combination with the nozzle, c c, having an interior oil passage, the conical plug, n, or its equivalent, arranged and operating substantially as and for the purpose specified.

Third, Adjusting the hight of the nozzle of the air pipe in the oil or liquid pipe, the same consisting in the use of the movable plate or ring, c c, arranged and operating substantially as described.

47,227.—Oil Ejectors.—S. Franklin Shoonmaker, New York City:

I claim, First, Forming the delivery nozzle of an air blast pipe in elevators for petroleum or other liquids, of a series of pipes of any desired number and size, with their delivery ends in the same horizontal plane, and having the form of a circle or any other suitable form, and so arranged as to give the oil in the oil tube and surrounding the air pipe a passage through which to communicate with and to approach the interior surface or surfaces of the air blast, substantially in the manner and for the purpose specified.

Second, The combination with the double truncated conical diaphragm, o p, of the adjustable cone, l, arranged together substantially in the manner and for the purposes satisfied.

47,228.—Egg Boiler.—Abel Sharlow, Fort Lee, N. J.:

I claim as a new article of manufacture the culinary vessel, A, when constructed and operated substantially as described for the purpose set forth.

47,229.—Ditching Machine.—J. H. Snyder, Killbuck, Ill.:

First, I claim the guides, m' n', spring catches, r, and levers, m n, in combination with the adjustable standards, p, and slides, L, as and for the purpose set forth.

Second, I claim the curved levers, G', arms, J, in combination with the scrapers, G, and links, H, as and for the purpose set forth.

Third, I claim the standards, E, cross trees, h', in combination with the shoots, D, and scrapers, G, as and for the purpose set forth.

Fourth, I claim the carriers, f, guides, f', and spring, g', in combination with the shoots and scrapers, as and for the purpose set forth.

47,230.—Signal Frames.—William A. Sprague, Boston, Mass.:

I claim two kinds of frames to extend signals when there is no wind, as herein described and set forth in this specification.

47,231.—Fuse Hood for Explosive Shells.—Thos. Taylor, Washington, D. C.:

I claim the use of the flame hood, E, located between the front end of the shell and the front of the fuse, held secure in its place by the flange of the plug, c, the same constructed and operated substantially as described.

47,232.—Sediment Extractor for Steam Boiler.—Eli Thayer, Worcester, Mass.:

I claim the vessel, O, when arranged in the manner and for the purposes substantially as set forth.

47,233.—Flour Bolt.—Francis S. Thayer, Troy, N. Y.:

I claim the use of one or more falling weights, in combination with an inclosed tube, when the said tube passes entirely through the shaft, thus allowing the weights to fall from side to side of the bolt, substantially as and for the purpose set forth.

47,234.—Box for Transporting Plants.—Timothy F. Wardwell, Penn Yan, N. Y.:

I claim a box for plants, etc., formed by the flat pieces of wood grooved and set together in the manner specified, and provided with an opening, for the purposes and as set forth.

47,235.—Apparatus for Distilling Petroleum, Etc.—Cyrus M. Warren, Boston, Mass.:

I claim the special application of heat by means of a separate fire, or its equivalent, to a condenser attached to a still, for the purpose of controlling and regulating the temperature of the vapors given off in distillation, in order to produce a more complete separation of the constituents of complex mixtures of liquids.

47,236.—Machine for Pressing and Shaping Screws.—Thomas Welham, Washington, D. C.:

I claim the combination and arrangement of the movable and adjustable dies, H, and revolving stop, J, as herein described, for the purpose of pressing and shaping screws by pressure, instead of cutting and swaging the threads of screws as heretofore.

47,237.—Machine for Leveling and Smoothing Ice.—Wm. Wharton, Jr., Philadelphia, Pa.:

I claim, First, A machine for leveling and smoothing ice, consisting of a frame to which one or more blades or plates are secured, so that they may be carried across the ice perpendicular, or nearly perpendicular, to the surface of the latter, substantially as described.

Second, The inclined draught pole, C, combined with the frame, A, and its blade, a, substantially as and for the purpose described.

Third, The frame, A, its blade, a, draught pole, C, and guide rod, B, with its support, D, the whole being constructed and arranged substantially as and for the purpose specified.

Fourth, The detachable plank, H, in combination with the frame, A, and draught pole, C, arranged substantially as and for the purpose specified.

47,238.—Stopper for Fruit Jars.—John M. Whitall, Philadelphia, Pa.:

I claim a hollow stopper, with an opening at the top, and a cavity in it to hold ice or cold water, substantially as described, for the purpose specified.

47,239.—Knitting Machine.—Joseph Whittle, Philadelphia, Pa.:

I claim, First, The self-acting needles, a', with their long latches operating in combination with the self-acting needles, a, and their short latches, substantially as and for the purpose specified.

Second, The cam cylinder, forming a zig-zag groove, one or more of the projections in which are cut away, in the manner and for the purpose described.

47,240.—Automatic Valve for Steam Radiator.—James P. Wood, Philadelphia, Pa.:

I claim the cup, B, diaphragm, C, and valve, D, in combination with the vessel, A, and its tubes, E and F, or their equivalents, the whole being arranged and operating substantially as and for the purpose herein set forth.

47,241.—Chain Hook.—Michael Colgan (assignor to himself, Charles D. Cooper and L. H. Beckwith), Port Jarvis, N. Y.:

I claim the hook, A, in combination with corresponding suitable size chain links, B and D, so constructed that the hook will grasp the chain in the manner herein described, for the purposes set forth.

47,242.—Horse-shoe.—Oliver P. Macgill, Brooklandville, Md., assignor to himself and Thomas Poultney, Baltimore, Md.:

I claim, First, The expanding frame, to be attached to the horse-shoe, and provided with calk points or edges, substantially as described.

Second, I claim the removable roughing points or calks passing through the frame and resting at their upper ends (in situ) upon the under side of the horse's shoe.

Third, I claim the method of securing the false shoes to the ordinary shoe by means of the flanges on the expanding bars of the false shoe.

Fourth, The expanding false shoe, consisting of two parts hinged together, and provided with the expanding screw, substantially as described.

47,243.—Air Pump.—James Molyneux (assignor to the Bordentown Machine Company), Bordentown, N.J.:

I claim the combination of two air pumps, having barrels of different diameters, with an air vessel or reservoir, G, situated between and communicating with both pumps, all substantially as set forth.

47,244.—Harness Saddle.—Oliver B. North (assignor to O. B. North & Co.), New Haven, Conn.:

I claim the use of studs or pins upon the frame, for the purpose of holding or of aiding to hold the skirts, jockeys, back or tug straps of the harness thereto, substantially as described.

I also claim casting the bolt or projection, c, on the under side of the seat, as and for the purpose herein described.

47,245.—Carriage Bolt.—Alvin Pond, Hamden, Conn.:

I claim manufacturing bolts from round iron by means of dies formed so as to produce sharp corners at the ends of the squared portion, as set forth.

47,246.—Machine for Cupping Metallic Cartridges.—Timothy J. Powers (assignor to J. P. Fitch and J. R. Van Vechton), New York City:

I claim, First, The combination, as described, in a machine for cutting out and cupping cartridge shells of the punch, d, dies, i c e, and adjustable table, B, the whole operating as and for the purpose herein set forth.

Second, The rising and falling gage, p, applied in combination with the punch and dies, operated by means of a rod, q', tappet arm, q, and tappet collars or pieces, p' p2, and controlled by a rest, r, substantially as and for the purpose herein specified.

47,247.—Automatic Grain Weigher.—Martin Robbins (assignor to himself and Mahlon M. Wornbaugh), Cincinnati, Ohio:

I claim, First, The revolving and gravitating drum, E E', supported and balanced in the represented inclined position, and containing two or more chambers or compartments, F F' F'' F''', for the automatic weighing of grain, substantially as set forth.

Second, The provision, on an inclined gravitating grain drum, of the cams, J J' J'' J''', when combined with the devices, b b', C c, or their equivalents, for the automatic opening and closing of the hopper bottom, as set forth.

Third, In the described combination, with an inclined gravitating grain drum, armed with studs, K K' K'' K''', or other suitable projections, I claim the adjustable gage, D d, substantially as represented, or any mechanical equivalent thereof.

Fourth, The devices, L l l' l and M, or their mechanical equivalents, for the automatic opening and closing of each successive grain chamber, as set forth.

Fifth, The self-acting governor, consisting of the parts, P Q R S T U V W w, in the described combination, with the parts, b b C c, or devices, substantially equivalent, for the automatic arrest of the weighing action, as set forth.

47,248.—Syringe.—Luke Wheelock (assignor to himself and O. B. Leavenworth), New Haven, Conn.:

I claim a syringe when the discharged apertures are formed, substantially as and for the purposes specified.

47,249.—Well-boring Device.—Albert A. Wilson, Green Point, N. Y., assignor to himself and Hoffman Atkinson, Rouseville, Pa.:

I claim the method substantially as herein described of increasing the sectional area and strength of the concussion surface of jars, used in connection with tools for artesian well boring, for the purpose set forth.

47,250.—Shears.—George Carter, Nottingham, Eng.:

I claim constructing shears, scissors and other cutting instruments of a similar character thereto, with three edges, viz.: one cutting edge and two edges for keeping the cutting edge in proper position, and for preventing the same moving sideways, substantially as set forth and described.

47,251.—Filter.—M. Antome Espirat and Etienne Sause, Marseilles, France. Patented in France, Jan. 30, 1864. Patented in England, July 19, 1864:

We claim the combination of the filters, G H and R S, with their reservoirs, B and L, when constructed and operated substantially as and for the purposes described.

We also claim in combination with the filters and their reservoirs above described the self cleansing apparatus, consisting of pipe, p, reservoirs, c c' O', wheel, a, and syphons, d u, when constructed and operated as herein described.

We also claim in combination with the filters and the reservoirs, c c O', and their operating devices the recipient, x, and pipes, V Z, as substitutes for the pipe, p, as and for the purposes set forth.

47,252.—Revolving Fire-arms.—Alexander Guerriero, Genoa, Italy:

I claim, first, The combination in a revolver of the following parts, the barrel, the cylinder, the breech plate and the stock, when the said parts are constructed as described each being capable of being detached in the manner and for the purpose set forth.

Second, In combination with the many chambered cylinder and rotating breech plate I claim the means herein described of locking and unlocking the same.

Third, The combination of the rotating cylinder and breech plate, with a fixed breech casing and its spring packing device to hold the breech plate in place without interfering with its rotary movement.

47,253.—Barrel Packer.—Thomas Burns, Williamsburg, N. Y.:

First, I claim giving to the barrel the rocking motion, substantially as shown for the purpose specified.

Second, In combination with the flanged platform, A, levers, C C2, provided with the elongated slots, G G2, I claim the adjustable clamp, J, when the same shall be combined and operated, substantially as and for the purpose specified.

47,254.—Wick Scraper.—Charles W. Cahoon, Portland, Me.:

I claim a wick scraper, substantially as described.

47,255.—Saw.—Edwin S. Drake, Portland, Me.:

I claim as a new article of manufacture a saw constructed with cutting points or edges, substantially as described.

47,256.—Apparatus for Carbureting Air.—John H. Irwin, Chicago, Ill.:

I claim arranging a carbureting apparatus, provided with an inlet for air and an outlet for gas above the point of combustion, substantially as and for the purposes herein set forth and shown.

47,257.—Process for Carbureting Air.—John H. Irwin, Chicago, Ill.:

I claim producing a current of air through a carbureting apparatus and a pressure at the burners, by the action of heated air, substantially as and for the purposes herein specified and shown.

47,258.—Apparatus for Carbureting Air.—John H. Irwin and Isaac Simmons, Chicago, Ill.:

First, We claim so arranging a series of carbureting pans, A, with the chambers, C D, and connecting pipes, provided with stop cocks or other equivalents, that the apparatus may be regulated, controlled and operated, substantially as and for the purposes set forth and shown.

Second, We claim the combination of a series of carbureting pans with the chambers, C and D, and the two series of connecting pipes, G and L, provided with the stop cocks or their equivalent, operating substantially as and for the purposes specified and shown.

Third, We claim the combination of a series of carbureting pans with the chambers, C and D, and the three series of connecting pipes, G L and Q, substantially as and for the purposes specified.

Fourth, We claim, in combination with the series of pans, A, and the chambers, C D, the employment of a condensing chamber, E, as and for the purposes set forth.

Fifth, We claim connecting the said pans and chambers, A C D, by removable or detachable pipes, substantially as and for the purposes specified.

47,259.—Churn Dasher.—Danforth Johnson, Chicago, Ill.:

I claim a wooden churn dasher, conical or oval on the top, with wedging apertures around the bottom edge of the dasher for compressing the cream in the manner and for the purpose set forth.

47,260.—Scraper for Cleaning Gun Barrels.—E. L. Pratt, Boston, Mass.:

I claim the spring blades, when cut from sheet metal, and swayed or stamped into form, substantially as set forth.

I also claim the attachment of the blades to a shank or foundation piece, in the manner substantially as described.

I also claim the construction of the gun cleaner, by which the ring is prevented from slipping therefrom, substantially as set forth.

I also claim the employment of the swab, in combination with the spring blades, substantially as set forth.

I also claim the construction of the spring blades, by which they form a trumpet mouth, substantially as described

47,261.—Filters.—Thomas Simmons, Chicago, Ill.:
I claim, First, The combination and arrangement of the spiral wire, C, the horizontal plates, H, and the fibrous covering, F, when inclosed inside of a case, A, substantially as and for the purpose set forth.
Second, The combination and arrangement of the above with the carbon cups, substantially as and for the purposes described.

47,262.—Flexible Types and Apparatus for Printing.—Henry Tubesing, Pittsburgh, Pa:
I claim making the separate pieces of elastic type, with a projection at top and bottom having a gutter for the purpose of holding them in place by means of a cord or similar device for that purpose.
Also the use of a flexible bed plate for holding the movable elastic tppe, so that the bed plate and type may be attached to the curved surface of a frame, substantially as described.
Also the use of strips of leather or other flexible material, placed above and below the upper and the lower line of type, for the purpose of keeping the movable type straight, and yet a lowing the form to be readily curved when set on the machine for the purpose of printing.
Also the mode of securing the movable elastic type to the bed plate, by means of elastic cords resting upon the projecting base of the type, substantially as described.
Also the combination of the flexible bed plate, A, flexible strips, b and d, and slide, e, with a curved or cylindrical frame for printing with movable elastic type, substantially as described.

47,263.—Ox Yoke.—Erastus S. Woodford, Winchester, Conn.:
I claim the manner of arranging the staples and cords, in combination with the blow blocks, 5 and 6, the center blocks, 1 and 2, and the caps, 3 and 4, as and for the purposes herein set forth.

REISSUES.

1,930.—Sewing Machine.—R. G. Fairbanks, New York. Assignee by Mesne Assignment of W. A. Akins and J. D. Felthousen. Patented August 5, 1851. Reissued January 20, 1863:
I claim, First, The combination of the needle bar of a sewing machine with a spring to draw up the needle after the stitch is formed, for the purpose of tightening the stitches, substantially as set forth.
Second, The combination of the stitch-forming mechanism and spool spindle with an intermittent thread-griping mechanism, located between the spool spindle and the place where the stitch is formed, substantially as set forth.
Third, The combination of the needle bar and shuttle driver of a sewing machine with mechanism for operating them in such manner that the shuttle is caused to enter between the needle and its thread, while the needle is arrested after having made a short retrograde movement.
Fourth, The combination in a sewing machine of the stitch-forming mechanism with a cylindrical rest, for the purpose of supporting articles of curbed or tubular form, substantially as set forth.
Fifth, The combination of a toothed feeding instrument with reversible driving mechanism, substantially as set forth.

1,931.—Gas Cock.—John G. Leffingwell, Newark, N. J. Patented Feb. 19, 1861:
I claim, First, A set screw, in combination with a lever and gas cock, to prevent the flame from being extinguished, substantially as described.
Second, A set screw, in combination with a lever and gas cock, to prevent too great a flow of gas to the burner, substantially as set forth.

1,932.—Tackle Block.—Isaac E. Palmer, Middletown, Conn. Patented Nov. 1, 1859. Reissued Sept. 8, 1863:
I claim so constructing a tackle block and pulley that the rope or fall, when desired, may be clamped between a fixed portion of the block and a portion of the pulley, substantially as herein described, by simply leading it in a direction oblique (lateral) to the plane of revolution of the pulley without tying, or the use of dogs, or movable stops, or any other means of fastening.

1,933.—Design for a Trade Mark for Lead Pencils.—Joseph Reckendorfer (assignee of Joseph Rosenthal), New York. Patented April 3, 1860.
I claim the design for a new trade mark label for lead pencils composed of an eagle in flight, with the words "Eagle Pencils," substantially as and for the purpose described.

DESIGNS.

2,042.—Sewing Machine.—Caleb Cadwell, Waukegan, Ill.
2,043.—Trade Mark.—Stuart Gwynn, New York.
2,044.—Clock Front.—G. S. Lovell, Philadelphia, Pa.
2,045.—Clock Front.—G. S. Lovell, Philadelphia, Pa.
2,046.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.
2,047.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.
2,048.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.
2,049.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell Mass.
2,050.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.
2,051.—Carpet Pattern.—Elemir J. Ney (assignor to Lowell Manufacturing Company), Lowell, Mass.
2,052.—Composition in Alto-Relievo.—Helen P. W. Purdy, Cambridge, Mass.
2,053.—Trade Mark.—John C. Richard, New York.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

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MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged you duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands o inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c may be had, gratis, upon application at the principal office, No. Park Row, New York, or any of the branch offices.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to paya visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Notes and Queries

M. E. E., of Mo.—We do not understand what you mean by converting centrifugal into centripetal force. In reply to your question whether a jointless arrangement for accomplishing it would be patentable, provided it was useful and new, we reply that any mechanical device which is novel and useful is patentable.

N. A. M. H., of Pa.—We have no idea that a constant electric current would prevent the deposit of paraffine. It could be easily tried.

C. H., of Pa.—If your engine yields six horse power with 100 revolutions per minute, and you increase the number of revolutions, maintaining the same pressure, you will increase the power in proportion; 150 revolutions will give you nine horse power.

C. N. B., of R. I.—You will find the best shingle machines illustrated in back numbers of the SCIENTIFIC AMERICAN, with address of parties there given.

W. H. H., of Phila.—Mr. H. C. Baird, No. 406 Walnut street, your city, can tell you all about works for scroll patterns.

F. L. K., of Wis.—You can obtain kalsomine, in the form of powder, from any dealer in paints and oils. You had better address D. F. Tieman & Co., N. Y., in relation to it.

J. S., of Ill.—Water in escaping from an opening in the vertical side of a vessel issues with a velocity just equal to that which would be acquired by a body falling from the surface of the water to a level with the opening. A body falling 9 feet acquires a velocity of about 23 feet per second Water flowing at this velocity through a slit 50 by 2¼ inches, would issue at the rate of 17 cubic feet per second, equal to 1,062 pounds. This falling 9 feet would give 9,558 foot-pounds per second, equal to 573,480 foot-pounds per minute. Divide by 33,000 and we have 17-horse power. From the contraction of the vein and the great waste of a flutter wheel it is not probable that you would realize even half of this, probably not more than 5 or 6-horse power.

D. W., of Wis.—During the descent of the stone to the center of the earth there would be a mass attracting it downward greater than the mass attracting it upward; its velocity would consequently be constantly accelerated till it reached the center, and the momentum thus acquired would carry it through to the opposite side.

T. J. E., of Ill.—Air at the surface of the earth is subjected to a pressure of about 15 pounds to the square inch; if a portion be confined and compressed into half the volume the pressure will be doubled. The pressure is in inverse proportion to the volume.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

SPECIAL NOTICE TO INVENTORS.

The money receipts on account of patent business, which have heretofore been published in this column, and the notification of cases sent to the Patent Office, will for the present be discontinued. The receipt of specifications and money from inventors will be acknowledged promptly by mail.

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., VII. AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

WOOD-WORKING MACHINES.—ONE 24-IN. IRON Frame, Double Surfacer; one 6-inch Molding M., Improved Style; one Turning M.; one Scroll saw; one Power Mortiser; one Boring M.; three Saw Benches; one Blind Boring M.; one Elds Blind Slat M.; one Hub-mortising M., Etc. Address
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N. B. The object of this advertisement is to obtain control of a few meritorious inventions already patented in Great Britain, and no application from inventors will be entertained except their invention shall have been provisionally protected prior to the publication of the invention in America.
For references apply to any Mercantile Association or Trade Protective Society in Great Britain. 12 13*

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The services to be performed in the buildings of this depot, the contractor to furnish the machinery.
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Proposals must be accompanied by a proper guaranty, signed by at least two responsible parties, setting forth that if a contract is awarded to the party making the bid that he or they will enter into bonds for the faithful performance of the work.
Further information can be had at this office.
The right is reserved to the United States to reject all bids deemed objectionable.
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Samples of the standard articles required may be seen at this office.
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Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.
All proposals should be made out on the regular forms, which will be furnished on application at this office.
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Improved Car Spring.

However good the old-fashioned elliptic and semi-elliptic springs may be, still their great expense, and the large amount of space they occupy, have been inducements to inventors to rack their brains to bring out some other description of spring that would combine elasticity with cheapness and compactness. The principle of those at present in use are, first, the solid india-rubber cylinder, which makes a good spring for passenger cars, but is soon destroyed under freight cars. Then comes spiral springs which are used in various ways. The Camden and Amboy railroad use six or eight of them, made of about three-eighths round steel, and two and a half inches

Fig. 1

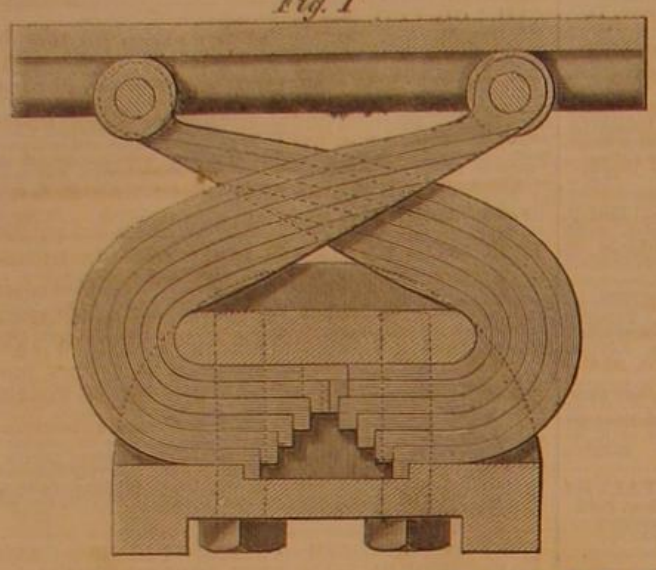
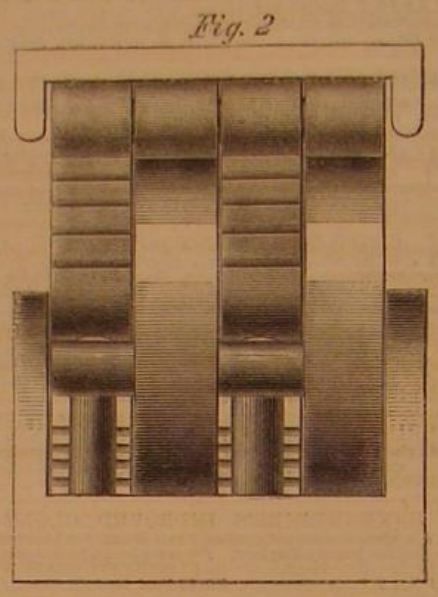


Fig. 2



TOSHACH'S CAR SPRING.

diameter, directly over the journal, and exposed to all weathers. Some one else puts a large number of small springs, about one and a quarter inches diameter, in a box, appropriately called a nest, but a very hard nest even for a freight car. Another stuffs the Camden and Amboy railroad spring full of wool and puts a series of them in a box. There is another spiral spring, however, made of a respectable looking bar of steel, an inch and a half wide and three-fourths of an inch thick, with a groove up the center of it on each side, and which is coiled into cylinder five and a half and six inches diameter, with an india-rubber cord running the entire length of the spring between the coils, and fitting into the groove referred to, thereby combining the two best known elastic substances. Without, however, referring to any more of these inventions, we will come at once to the one herewith illustrated.

The inventor of this spring claims that he has a good, elastic, compact, and cheap spring, that acts on the same principle as the semi-elliptic. It will be observed by inspecting the engraving that two or more springs are placed alongside of each other, and point in opposite directions, so as to have an equal bearing, and thereby render the spring independent, in itself, ready for being set in any position. The engraving shows the inventor's arrangement for freight cars, but there are other modifications of it included in the patent, such as a circular head over the clamp piece, made of iron or india-rubber or some other material, to assist the spring as the weight comes on it. Different descriptions of covers may also be used, and the number of steel bars may, of course, be increased or decreased in size or number, or both, so as to insure the proper degree of elasticity and strength according to the work to be done. The principle of the spring being so simple and fully represented in the engraving, we hardly think any further description of it is necessary from us, than merely to say that the full size of the spring herewith illustrated is six and a half inches long, five inches wide and six and a half inches high, which, however, need not be a standard size ; any further information may be had by addressing the inventor and patentee, William Toshach, 54 William street, New York. Patented August 30, 1864.

We observe that Mr. Wm. H. Van Gieson has become the successor to the Waterbury Machine Company, near the depot, Waterbury Conn. See advertisement. Mr. Van Gieson is an enterprising machinist.

A Large Filter.

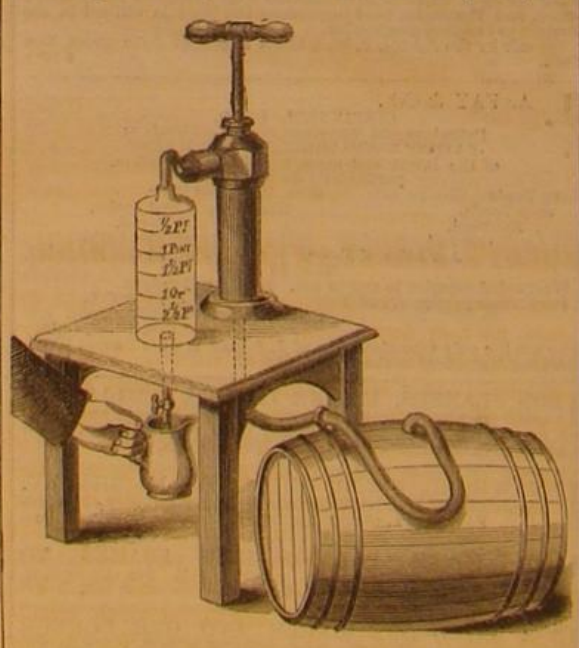
A new filter of large size has just been invented by Mr. George Hutchinson, and is being applied at the Allegheny Water-works, Pittsburgh, Pa. It is thus described:—

Mr. Hutchinson's improvement consists of an upright cast-iron cylinder, say ten feet high, and of several times the diameter of the supply pipe, of cast iron; it is intended to excavate a foundation for this cylinder, and place it upright, at the outer end of the supply pipe, with which it is to be connected by an opening, mid-hight of the cylinder which is to be open below and tight on top. The open end of the cylinder rests on broken stone, some five feet below the river bed, and it is also embedded in the same. The river water in percolating through this five feet of broken stone and gravel, to the cylinder, and thence through the supply pipe to the pump wells—will be somewhat clarified in the passage; it will at least be freed from chips, sticks, ice or leaves; it will also, it is claimed, collect a large part of the sand held by the water, and thus prevent this grit from getting into the pump valves, where it is a source of much annoyance.

In case the "tip-rap" surrounding the metallic cylinder should become so charged as to impede the free passage of the water, Mr. Hutchinson has provided for forcing a column of water out upon it, through a wash-out valve, which would readily free the pipe from any lodgment.

A NEAT THING.

In England many dealers in volatile oils, etc., use



a patented arrangement for measuring which is neat and economical and might be used in this country with advantage both to consumer and dealer. The accompanying engraving shows it clearly. The idea is to attach a glass vessel to the discharge pipe of a common pump, said vessel being graduated and marked for different qualities of the substance measured. There is a cock and a pipe at the bottom through which the contents of the glass measure can be discharged into any vessel held beneath. The pump connects by a pipe to the cask in which the oil is. This device saves evaporation, use of different measures, risk of explosion and waste from slop, and insures good measure—the whole amounting to a great deal where large sales are made.

Self-registering Compass.—A patented compass, the invention of Commander Arthur, of the British ship *Excellent*, was tried on board the *Royal Sovereign* during her cruise, and attracted much attention from officers on board. It is for registering a ship's course at sea on lined and prepared paper, working on a cylinder by clockwork, the direction of the ship's head being taken and marked by an indicator pencil every two minutes and a half. It can be placed in any part of the ship where there is no local attraction, and does not require to be placed with the ship's compass.

[This is not a new idea but its action may be more reliable than that of others made heretofore.—Eds.

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this latter department being very full and of great value to Farming and Gardeners; articles embracing every department of Popular Science, which everybody can understand.

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Vol. XII.—No. 18. (NEW SERIES.)

NEW YORK, APRIL 29, 1865.

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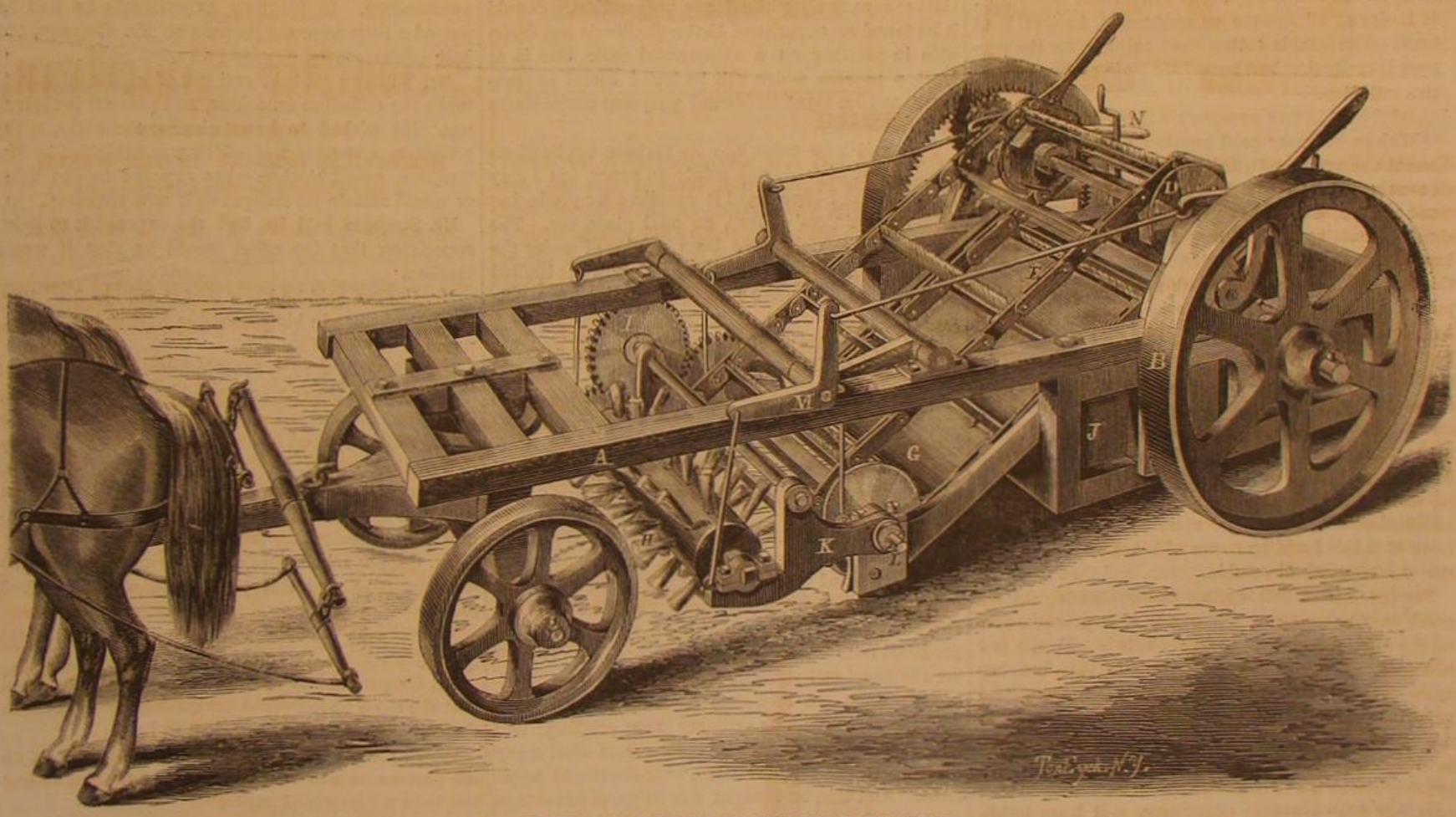
Improved Street-sweeping Machine.

It would seem eminently proper that the cleaning of city streets should be done in a systematic and thorough manner, by the aid of machinery instead of by slow and inefficient hand labor, which now characterizes the present mode of cleaning. The advantage of such a plan over the one now practiced would be great, and once thoroughly inaugurated, would become permanent.

The machine illustrated herewith is intended to clean streets, and is simple in design and operation. The principal parts are well shown in the engraving; a, being the frame which carries the whole machine. To this frame the wheels, B, are attached, one of them being toothed in its inner circumference so that a pinion, C, is revolved as the machine progresses. By revolving, this pinion drives a set of rag or cham wheels, D, over which the chains, E, run; these chains have scrapers, F, stretched between them, and then run over another set of similar wheels at the bottom; so that in this way an endless scraping and brushing device is produced which acts on the platform, G

It will be seen on referring to the engraving that there is a brush, H, in front of the inclined platform. This brush is driven by the gears, I, from the rag wheels before spoken of, as it rolls and acts on the pavement in advance of it and throws the dirt upon the platform behind, from whence it is removed by the scrapers into the box, J, at the rear end, which is provided with facilities for dumping the load when full. The adjustment of the brush is obtained by hanging its bearings in a frame, K, which swings on the shaft, L, the rods and cranks, M, serving as agents to raise and lower said frame while the machine is at work without throwing it out of gear, or otherwise suspending its operation.

The handle, N, acts on the pinion so as to slip it out of gear when the machine is to proceed from one place to another. The inclined flat frame is also furnished with a plan similar to that on the brush shaft for elevating its lower or working edge. These details are the principal ones and the combination of them gives a simple and desirable machine for the purpose required of it. A patent is ordered to issue on this machine to Daniel Sargent of Inagua, one of the Bahama Islands. For further information address the inventor, care of John Bacon, 53 South St., N. Y.



SARGENT'S STREET-SWEEPING MACHINE.

Snow Skates In California.

Says a Californian Journal, "Large numbers climb the sides of the mountains in sight of town, almost daily, for the purpose of sliding down, and it is truly wonderful to see with what speed and precision they can descend. The Norwegians, of course, take the lead, for they have been accustomed to the use of this kind of snow-skate from childhood. That those who have never seen a pair of snow-skates may understand something of them I will give a description of how they are constructed. They consist each of a strip of tough wood about 12 feet long by from 4 to 5 inches in width, and about 1½ inches thick in the center, tapering to about half that thickness at the ends. The front end is turned up very similar to a sled runner. In the center, a cleet or a few thicknesses of leather are nailed across, on which stands the hollow of the foot, and a strap about three inches in width passes over the toe of the boot, and is fastened to the sides of the skate. The parties using them usually carry a stick about 8 feet long, with which to balance themselves. Beginners can get along quite well on level ground, but when they attempt running down hill it is quite difficult, and requires considerable practice to keep on the feet. When one loses his balance he is plunged into the snow perhaps nearly out of sight, and is greeted with a laugh from the lookers on. His skates sometimes go on swiftly down the hill and he is left in a helpless condition until some one takes them back to him. Parties thus falling frequently end entirely over and sometimes go from thirty to forty feet from where they fell before stopping.

Singular Practice of English Engineers.

English engineers have peculiar tastes and habits. If one may judge from the sneers and recriminations they indulge in toward each other, professional courtesy is not very high among them. Some time ago a Mr. Burgh having designed a plan for a very awkward and uncouth steam engine for twin-screw propulsion, sent a drawing of the same to the *London Engineer*. That journal published an engraving of the drawing, whereupon engineers, both great and small, pitched into the design, and from denouncing that became personal, and are at this date discussing each other's professional abilities, and the educational opportunities they have respectively enjoyed—dignified pastime certainly. There is no accounting for tastes, as was sagely remarked by a venerable lady on one occasion.

Owing to the four days' suspension of business for the solemnities following the death of the beloved and respected chief magistrate of the nation, there has been some delay in getting this and the previous number of our paper to press. After this we hope to be able to mail the paper on the same day as formerly.

The Farmers' Club says that hay may safely go through the sweating process after being baled in the Beater Press, and consequently tolerably ripe grass might be cut in the midlde of a hot day and baled immediately, and prove more palatable and nutritious than that overcured in the usual way.

ANOTHER IMPROVEMENT IN PHOTOGRAPHY--THE SIMPSONTYPE.

At a recent meeting of the London Photographic Society, reported in our excellent cotemporary, the *Photographic News*, Mr. G. Wharton Simpson read a paper illustrative of a new method of printing, discovered by him, which attracted great attention.

Mr. Simpson's discovery consists in the use of chloride of silver in collodion as a sensitizer of paper for photographic printing. The following are Mr. Simpson's suggestions for using his process, which he generously presents to the public, no patent being taken:—

THE COLLODION.

To obtain the best results, the character of the plain collodion is important. The film should not be too horny, as besides giving a degree of gloss offensive to some tastes, it is at times inclined to blister, and leave the paper. It should not possess too much of the powdery character, as in that case it is apt to dry flat and dead, although such a collodion generally adheres well to the paper. Above all, it must dry perfectly transparent, without the slightest opalescence or opacity. If the film be in any degree opaque, the print will lose in brilliancy, and will, on drying, appear to have a slight film or bloom upon it. Before using any collodion for printing purposes, I pour a drop on a plate of glass and allow it to dry. If, when dry, it be perfectly transparent, so that it is not easy to discover it on the glass, it will answer admirably. If it dry at all opaque or opalescent, I reject it at once. The soluble cotton most suitable for the purpose is really that best suited for giving a good negative collodion.

THE SENSITIVE SALTS.

With an ordinary good negative I have found that about one grain and a half of chloride of calcium and seven grains and a half of nitrate of silver in each ounce of collodion has given the best results as regards sensitiveness, delicacy and vigor. With a less proportion of nitrate of silver, greater softness and less vigor are obtained. With a larger proportion of both salts, the paper is a little more sensitive, but no other advantage is gained.

There are various modes of dissolving the sensitive salts in collodion, but I have found the following the most convenient:—In each ounce of methylated spirit I find I can dissolve conveniently sixteen grains of nitrate of silver by triturating the salt in a mortar, then adding the spirit a little at a time and pouring it off until all is dissolved. I keep a stock bottle of this alcoholic solution of nitrate of silver. To an ounce of this I add an ounce of ether and the necessary proportion of soluble cotton, and then add of a solution of the chloride in alcohol, containing sixteen grains to the ounce, three-fourths of a drachm, containing one grain and a half. This is added, a few drops at a time, the collodion being shaken between each addition. In a few minutes the decomposition is complete, and something like an emulsion of chloride of silver is formed, with excess of about three grains of nitrate of silver in each ounce. This is immediately ready for use, and, so far as a few months' experience is suggestive, will keep indefinitely.

THE PAPER.

An absolute decision as to the most suitable paper will require a much wider experience than I have as yet had. I have tried various samples both with and without previous preparation. I have used Whatman's drawing paper, Turner's Calotype paper, Bristol-board, common writing paper, ordinary Saxe and Rive paper, and the paper prepared with arrowroot for the Wothlytype process by Mr. Sanford, and by the United Association of Photography. I have obtained some good results with all; but on the whole I decidedly like the last mentioned best. The chief disadvantage that I found in using unprepared paper has only been found with certain samples of collodion, and has consisted in imperfect adhesion of the film, giving the surface of finished prints a mottled effect. It is possible that some addition to the collodion may be found a remedy for this.

TONING, FIXING, ETC.

The paper having been coated, dried and exposed, the toning and fixing may be effected in the usual manner, with this difference, that a very much smaller proportion of the silver salts being present, a much weaker fixing solution may be used with advantage. The prints I exhibit to-night have been treated in various ways, and many of them have been toned and fixed in the mixed bath of chloride of gold and sulphocyanide of ammonium, which I first recommended for uranium prints. Others in the acetate bath, others in the lime bath, others with the *sel d'or*, and some have been fixed with hyposulphite of soda, and some have been fixed with sulpho-cyanide of ammonium. As you will perceive, every variety of tone is possible, from a warm sepia tint to deep black.

I will now add one or two words on certain characteristics of the prints and the process, in which they vary from others.

The image in most cases appears to be entirely in the collodion film, and not in the paper at all. In some cases where I have removed the film, there have been no traces of an image underneath; and in other cases, on removing the collodion film, a very faint image only has been found on the paper, not nearly equal in depth to that found on removing the film of albumen from an albumenized paper print.

There is no insoluble silver compound formed like that formed with albumen. A properly fixed and washed print by this process when tested with hydrosulphate of ammonia gives no indication of the presence of silver in the whites as an albumenized print does. There is, therefore, good reason to believe in the permanency of these prints.

The manipulations are very simple, and the materials always ready without any preparation. Should it be found on experience that collodion is not desirable in printing on a commercial scale, this is at least a process which will be found useful to amateurs, and for many incidental purposes unnecessary to detail here.

I do not here enter into its various applications besides that of producing prints on paper, but I may mention that I have found it excellent for producing prints on painters' canvas, on opal glass, etc. The specimens I exhibit have been produced under the difficulties of very dull weather, and with the limited attention my own more immediate duties have permitted me to give to lengthened experiments.

At the conclusion of the paper, Mr. Simpson exhibited about fifty specimens, including card and whole plate portraits, and landscapes of various sizes, with a great variety of warm tones of the sepia and bistre tints, and various purple and black tints. There were examples also of many gradations of vigor from extreme softness to great brilliancy. The prints were examined with much interest, and elicited many expressions of admiration from the members.

Mr. H. P. Robinson said he had had opportunities of seeing a good deal of printing carried on by Mr. Simpson's process. What struck him as one of its special advantages was, that good results could be produced from almost any class of negative. He had seen brilliant and vigorous prints taken from negatives so weak and thin that he should have considered them worthless for ordinary silver printing; and he had seen soft and delicate results from what many printers would consider hard, over-developed negatives. And this, he thought, was its great advantage over the Wothlytype process, which, he believed, required a considerable amount of density in the negative. There was another thing worth the attention of photographers. The germs of many good processes had been suggested, but these germs being nipped in the bud by patents, have never had the chance of coming to full maturity, the public generally having no great interest in improving the property of an individual. The Simpsontype, he was happy to find, was given freely to photographers, without any reservation whatever. So that whatever they could make of it by experiment belongs to themselves as common property. The credit of the discovery and the thanks of photographers belongs to the inventor—the profit to the public.

Mr. Simpson, in reply to Mr. J. Williams, said he had used alcoholic solutions throughout. He had on one or two occasions, when he found it desirable to add more silver to the portion already made, used a very concentrated solution of nitrate of silver, which enabled him to add sufficient without much altering its physical condition.

Mr. Mayall asked Mr. Simpson whether he had tried the experiment of giving his process a dose of castor oil. He also wished to know whether he had tried sulphide of potassium before fixing. He was happy to bear his testimony to the value of the new process which had been presented to the Society; and he felt it due to Mr. Simpson to say, that by whatever process the print he held in his hand had been produced, it possessed a degree of excellence in the shape of positive printing which he had never seen before, more resembling a fine engraving by Cousens than an ordinary photograph. Of course, with reference to a subject so new, and coming upon them as this did for the first time, they were not able to discriminate its peculiarities so materially as they would be in a position to do after a few days, when it had been more carefully considered. And he had no hesitation in saying, from the specimens now exhibited, that the Society had to congratulate Mr. Simpson, who had shed an honor upon the meeting by bringing forward in so disinterested a manner a process so new and interesting, involving, as it did, so many fresh chemical inquiries, which were as yet but imperfectly understood.

Mr. Sebastian Davis said he believed the process would commend itself to experimentalists, inasmuch as they themselves could prepare their own paper throughout, and would be thoroughly conversant with all the materials used during the preparation of their positive prints. This was a point of great interest to every one, because in this way they could trace out the particular difficulty which might interfere with obtaining uniformity of tone, density, and permanency. In his own experiments he had departed a little from the formula of Mr. Simpson, and had, consequently, obtained a varied result.

Mr. Williams said the real use of castor oil was to make the collodion tenacious, and prevent it shriveling. He wished to know whether the white, milky collodion, a specimen of which was exhibited by Mr. Simpson, would blacken when exposed to the light, or would remain permanent as it now appeared.

Mr. Simpson said he had not exposed it to light, conceiving that the effect would be that it would blacken.

Mr. Cooper said he knew that it did blacken, from the fact of some in his possession having become exposed.

Mr. Simpson, in reply to an inquiry, said he thought the sooner the paper was used, after being prepared, the better; but he had used some after the lapse of a week, which had not lost its sensitiveness. In reply to a further inquiry, he said it was difficult to state, in figures, how sensitive it was; but his impression was, that it printed in one-half the time that albumenized paper required for the purpose.

Mr. Cooper asked whether the prints did not lose more in tone and tint than those of albumenized paper

Mr. Simpson said he found they required almost entirely the same treatment in toning and fixing.

Mr. Cooper said, in his own experiments he found that the more he increased the quantity of chloride in the collodion, the more they lost in tone.

Mr. P. Robinson said that in the observations on the process he had made, he thought the prints lost less than albumenized paper.

Mr. Mayall said that losses would be stopped entirely by the sulphide of potassium. He had found that, if not washed in that salt before they began, they did lose considerably. A very feeble solution of not more than one-tenth of a grain to an ounce of water would enable them to get rid of the difficulty to which Mr. Cooper referred.

Mr. Frank Eliot suggested that nitrate of silver in the collodion would aid materially in giving vigor if required.

Mr. Simpson said, with regard to the use of castor oil, he had made one or two experiments; but he could not say that he had carried them out to any extent. The only difference he found was, that the physical character of the collodion was altered; it was made more tenacious and more adherent. It was quite possible, he considered (but he had not tested it sufficiently to speak definitely on the subject), that it might supply something that formed an organic compound with the silver. Reference had been made to the use of citrate of silver; he had not tried it himself, but he had been in correspondence with some persons who had done so with decided advantage. His special aim hitherto had been to get the best results by the simplest means; and he had

striven, therefore, at the obtaining of vigorous prints with the simple collodion, chloride of silver, and nitrate of silver. If these failed, he should necessarily apply himself to the use of organic compounds; and it was quite possible that those might be worth the experiment. He had not on this occasion brought any specimens which he had obtained by other means, simply because he wished to speak of the process in its broadest and simplest outlines. He had not met with any example like that referred to by Mr. Davis, of the image sinking into the paper. In almost every case the image had been in the film of the collodion; when that film was removed by cracking or otherwise, he had sometimes found faint traces in the paper of the deepest black of the image, but in other instances no trace whatever. One remarkable fact, well worth pondering over, was that he had obtained a good vigorous picture with collodion in which there was only half a grain of soluble chloride and two grains of nitrate of silver in an ounce of collodion; a sheet of paper 22 by 18 might be coated with this quantity, whereas in the ordinary albumenized paper about 50 grains of nitrate was absorbed by each sheet. This was a pregnant suggestion in regard to ordinary printing, as indicating the large amount of silver which ought to be saved.

Mining by Machinery.

Although upwards of half a century has elapsed since the first substitution of machinery for manual labor in the working of rocks, we have still to look forward to the invention of really efficient machinery for the purpose. At the recent meeting of the "Institution of Engineers in Scotland," a highly interesting paper on "Tunneling and Coal-Cutting Machinery" was read by Mr. John Downie, who remarked that the application of machinery in one form or another has now become universal in almost every branch of industry, but only within the last few years has there been any decisively marked advances made in the application of mechanical power as a substitute for manual labor in the extraction of the mineral wealth which may be truly said to be the very basis of our nation's greatness.

The first of the Tunneling Machines noticed was the celebrated one at present engaged in boring the Mont Cenis Tunnel, invented by M. Sommelier.

Schwartzkopf and Philippsohn's Machines are, he believed, in use in the Swedish mines, and consist of a column carrying a jib, which is raised or lowered by a pinion working in a rack. The boring cylinder, with piston, is the same as in an ordinary steam-engine; the valve is conical and circular, and is turned by a spiral groove in cross-head of piston-rod. This cylinder is traversed along a single frame by means of a screw by an attendant (according as the boring proceeds), exactly in the same manner and design as an ordinary slide-rest of a lathe. The rest or frame, with cylinder, is carried by the jib; the boring tool is loosely held in the end of cylinder frame, and is turned by a rachet, the pawl of which receives the same motion as the circular valve, being worked off the valve spindle; the boring tool, unlike the Mont Cenis one, receives its blows from the end of piston-rod; and, to allow the debris to get clear out of the hole (in consequence of the tool not reciprocating), the tool has to be made of a spiral form, like a wood auger, to allow the debris to wind out; when set to work, the column is jammed fast by clamps betwixt the top and bottom of adit in the desired position. The piston makes from 1,200 to 1,400 strokes per minute, and bores Norwegian granite at the rate of 1¼ inches to 1½ inches per minute.

Captain Penrice's tunneling machine is a powerful and colossal machine, and consists of a large face-plate (the diameter of the tunnel to be bored), with several rows of some hundred of steel chisels across its diameter. The face-plate is mounted on a massive axle, working in bearing, at the end of which is the piston, working in a central cylinder, and has a large and small area, the same as in the Mont Cenis cylinder. The face-plate, with its numerous chisels, receives its reciprocation from the above central cylinder. After each blow it is turned slightly round, at the rate of two and a half revolutions per minute. The entire face or heading of tunnel surface is thus struck or tritured into small fragments or particles, which upon falling down, are caught by an endless creeper, worked from a third donkey engine, which conveys the debris underneath its entire length, and delivers it at back of machine. It may be here mentioned that this machine would only do for soft stone; and the immense number of chisels take considerable time to take out and replace when they require sharpening.

The machine proposed by Gay, of Paris, consists of a cylinder the diameter of the tunnel, or say 6 feet 8 inches diameter by 2 feet 4 inches deep, and say 1½ inch thick; and round the front edge are fixed steel chisels at intervals for soft stone, prisms of flint agate, &c., for ordinary rock, and prisms of diamond for very hard rock. It is carried on an axle working in suitable bearings: and this axle carries a central boring tool. The cylinder and central tool receive a rotary motion from a belt or wire-rope, worked from a steam or air-engine, working in a pulley on a cross shaft, which gears into the axle by a pair of bevil-wheels—thus making a circular trench and a central hole. A rope is attached to the end of axle, and passed over a pulley, at the end of which is a heavy weight, for the purpose of keeping the cylinder and central tool steadily pressed against the rock whilst boring. Upon the necessary depth being attained, the machine is withdrawn, and another is placed to widen the bottom of the central hole, in order to make a powder-chamber; which, upon being blasted, will displace the whole mass out to the depth of the circular trench. He understands this machine works very well and rapidly, but is not aware where it is working. He has heard that a machine of a similar kind was, in the year 1852, made in Boston or New York, America, and worked, it is said, at the Hoosic Tunnel. It was designed for cutting a circle 24 feet diameter, but has no note of its performance.

Vallauri and Buquet's machine (made by Cail & Co., of Paris, the celebrated engineers) is composed of two carriages—the lower one being mounted on six wheels, and the other is placed on the top of lower carriage, along which it slides in two V grooves, after the manner of the table of a planing-machine. At the end of the top carriage is a cross axle, carrying four quarters of a circle—one on each side, and the other two intermediate. The diameter of the quarter circles when revolving is nearly the height of the tunnel: on the periphery of each quarter circle are steel points, placed at intervals, and so set spirallythat each cuts its own portion of a groov in the rock. These quarter circles are caused to revolve vertically by a wire-rope, worked from a portable engine outside the tunnel, after this manner.

He believes this machine has been at work in the Pyrenees and Carrara; and one claim the inventors put forward is, that this method does not require the employment of powder; another is, that the high speed of driving rope keeps up an excellent ventilation, and by working two machines alternately the system allows of the removal of the debris without interrupting the progress of the work.

De La Haye's machine consists of two frames, adjustable as to hight or length, which are secured between the top and bottom of shaft or adit. These frames carry a horizontal carriage for tool, which is caused to reciprocate and cut a trench after the manner of a plane: the raising or lowering of such, according as it executes the work, is done by an attendant. This machine is also adapted for cutting in a vertical direction; but he is not aware as to what power is employed to work such carriage.

The principal features of Freeby's machine are, a number of spindles carrying the tools (say eight or more) are carried in a cast-iron frame, which slides along a lower frame mounted on wheels, and so arranged that it can be set at an angle, slightly vertical, or horizontal, across each and midway of the spindles, one of which is driven by a belt which drives all the others by intermediate cog gearing. On each of the cross shafts is a revolving cam, which strikes a 7-toothed circular cam, on each of the longitudinal or tool spindles, which partly turns and presses them against a spiral spring, and so soon as the revolving cam slips clear, the springs cause the tools to strike.

Munro and Scott's machine consists of circular cutters, which reciprocate a part of a circle, and are worked from a circular steam chamber, in which a piston also works partly in a circle. The steam chamber with circular cutters is traversed up and down in a frame, and from side to side, cutting a trench around the tunnel.

Westmacott's machine, introduce by Mr. Sopwith at Mr. Beaumont's mines in Allenheads, is worked by water pressure, and strikes the tool same as Schwartzkopf and Philippson's, but with what results he is unable to say, and also to describe the machine. He read recently, in a short account of it, that it worked satisfactorily, but some trouble was experienced in keeping the holes clear of debris.—*Mining Journal.*

Manufacturing Items.

The water power of the country is being very largely increased by the construction of reservoirs for the supply of water in dry times.

The Hamilton Woolen Manufacturing Company, o Globe Village, have purchased a tract of land in the towns of Holland, Mass., and Union, Conn., which they are about to flow into an extensive pond, covering several thousand acres, sinking some of the best farms in the upper valley of the Quinebaug river.

The first tar manufactured in Maine was sold in Portland, and brought from $5 75 to $7 per barrel.

Owing to the fluctuations in the price of cotton, and uncertainty of sales, the mills at Lewiston, having run at a loss, are about shutting off work for a season. Some have already stopped. Cotton is now twenty-five cents per pound lower than when that now being worked was bought, and of course no mill can go on without sad losses, except upon contracts entered upon some time ago. Let prices of cotton goods touch bottom, and then manufacturing interests will prosper.

The various grades of metal are attracted to Pittsburgh by the demands of thirty mills for rolling iron, which produce one-third of all the iron rolled in the United States, and have a capability of producing fully one-half. Eight of these mills are fitted for the production of navy armor plates, and have supplied many thousands of tuns for our present iron-clads.

The mills of Rockville are as yet running on full time. The machinery is being rapidly put into the Carlisle Thread Co.'s new mill; also in the new Florence mill. The work on the Leeds mill is about at a stand still.

Tarred Corn for Crows.

It is generally understood that tarring corn prevents crows from destroying it. The *Country Gentleman* says: "The old remedy of applying tar was always effectual. It was applied by pouring hot water on a half bushel of corn in a basket or tub, allowing it to remain only a few seconds to heat the outside of the grain, but not to kill the germ, and then pour on, say a pint of tar, and stir it quickly and rapidly. Every grain will become nicely varnished with it. In the scarcity of common tar, we have been told that gas tar has been tried, and found to injure or destroy the grain."

[An old farmer recently told us that so far as *eating* the corn was concerned, tar is an effectual preventive; but the crows pull up and pull down to see if they cannot find some that is not tarred, and the only remedy he knew of was to feed them by throwing corn on the ground, so as to save them the trouble and anxiety about their dinners.—Eds.

Fictile Ivory.

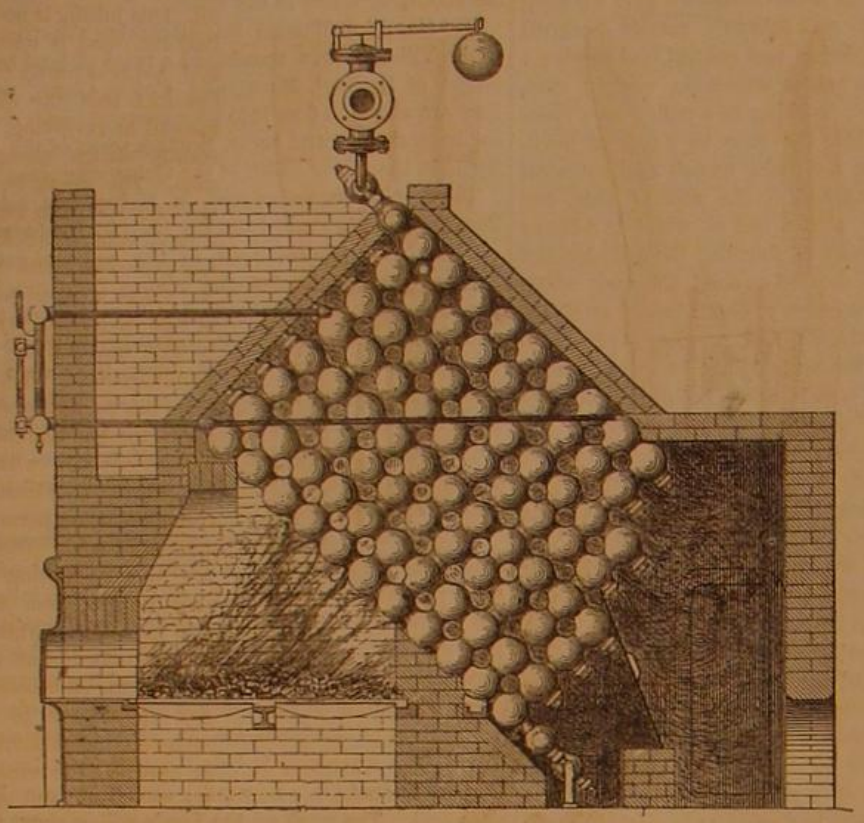
Fictile ivory is plaster of Paris which has been made to absorb, after drying, melted spermaceti, by capillary action, or it may be prepared according to Mr. Franchi's process as follows:—Plaster and coloring matter are employed in the proportions of a pound of superfine plaster of Paris to half an ounce of Italian yellow ocher. They are intimately mixed by passing them through a fine sieve, and a plaster cast is made in the usual way. It is first allowed to dry in the open air, and is then carefully heated in an oven; the plaster cast, when thoroughly dry, is soaked for a quarter of an hour in a bath containing equal parts of white wax, spermaceti, and stearine, heated just a little beyond the melting point. The cast on removal is set on edge, that the superfluous composition may drain off, and before it cools, the surface is brushed with a brush like that known by house painters as a sash tool, to remove any wax which may have settled in the crevices; and finally when the plaster is quite cold, its surface is polished by rubbing it with a tuft of cotton-wool.

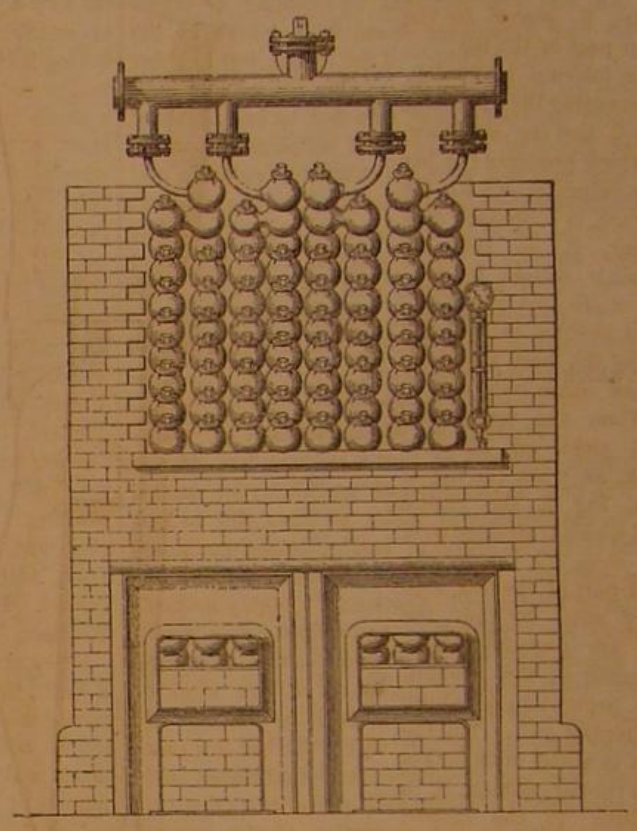
One million two hundred thousand two cent pieces were coined last month.

Improved Steam Boiler.

On page 90, Vol. XI., of SCIENTIFIC AMERICAN, we gave an editorial account of Harrison's steam boiler which was at that time attracting much attention from engineers abroad our foreign contemporaries especially speaking favorably of it. We here publish engravings of this steam boiler with a description of its construction.

The boiler, in plan, is simply a series of cast-iron bomb-shells, such at least in form, about eight inches in diameter by three-eighths of an inch thick. These shells are all strung on a bolt like beads, and the





HARRISON'S STEAM BOILER.

necks, where the bolts pass through, are three inches in diameter. Four shells are cast in one piece, connected by the necks of course. Each section, therefore, has eight openings, the edges of the outside shell being faced so as to have a true bearing on the others, and otherwise fitted so as to be steam tight. All the castings, of any number required, are then bolted together by 1¼ inch bolts. Each section of four shells may be considered a separate boiler. The heat surrounds the lower spheres, and completely envelopes them, so that they are all fire surface. In the upper shells there are fire-brick screens so placed as to moderate the heat on those parts. The shells weigh 22½ pounds each, or about one hundred of them to the tun, and the boilers are rated by weight, as "4-tun boiler," etc. Each shell holds seven pints of water, and in round numbers presents one square foot of heating surface, and holds one gallon of water.

A series of experiments made to test the strength of an individual shell showed them to be capable of resisting a pressure of five hundred pounds per square inch.

Another very great virtue in this boiler is its freedom from scales. It is stated that after a long period it was found absolutely free from incrustation. If all the results claimed are obtained, this boiler seems to be a most valuable addition to engineering science. Immunity from disastrous explosion is promised, for as but one of the spheres or shells is likely to explode at once, the injury is likely to be confined to that one, and the immense strength of the shell is almost an insurance against a disaster of the kind mentioned.

Our readers are referred to an advertisement of this boiler on the usual page. For further information address the Harrison Boiler Works, N. E. corner of Market and Juniper Streets, Philadelphia, Pa.

Extracting Silver from Lead.

Don F. M. Millan del Real, of Bordeaux, has brought forward an invention the object of which is the improvements in extracting silver from lead. For this purpose lead from which the silver is desired to be extracted is run from the reverberatory furnace into a heating pan, under which a strong fire has been kept, where the heat is raised to a point above the melting point of lead. The lead is then stirred with a wooden instrument, and the dross and impurities which rise to the surface are skimmed off. The temperature is then lowered to a point just above the solidifying point of lead, and the lead is

Improved Artificial Leg.

Artificial legs have been very greatly improved of late years, and many important additions, heretofore deemed unattainable, have added much to their appearance and utility. Externally they are undistinguishable from Nature's handiwork.

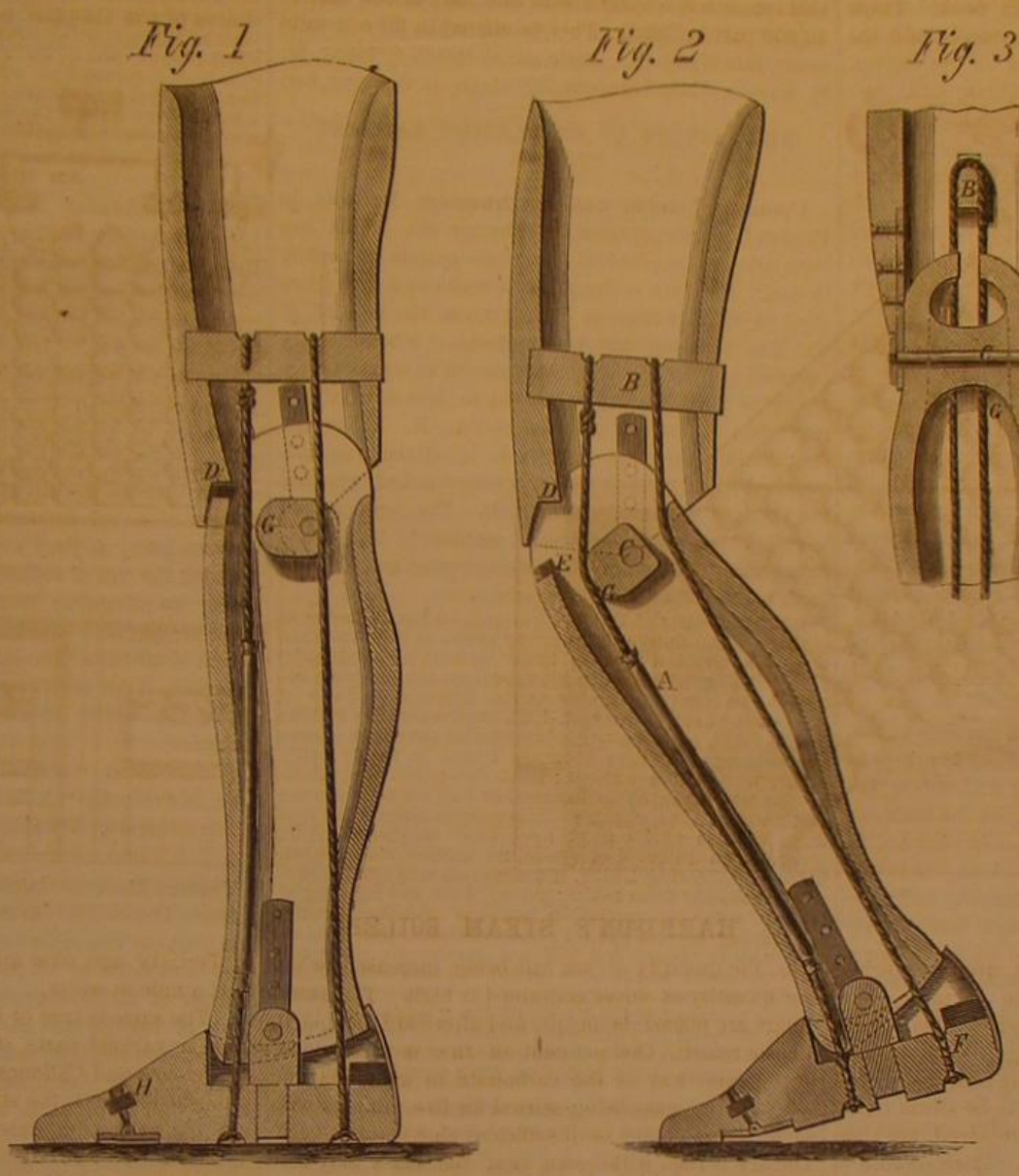
The leg here illustrated has a peculiar detail which consists in the employment of an elastic cord, fulfilling the functions, in a measure, of the sinews, tendons and muscles of nature. In the engraving, A represents this cord, one end of it being attached to a supplementary cord which is not elastic; this latter is connected to a bridge, B, placed in the upper part of the leg.

The fulcrum of the leg, representing the knee joint is at C, and the shoulder, D, which prevents the leg from being thrown too far forward, is cushioned with rubber, E, so that no sound is caused by contact of the two parts; another cushion is also fitted to the heel piece, F, for the same object.

When the non-elastic cord yields or becomes slack, as when the leg is bent, Fig. 2, the elastic cord which is strained over the stop, G, raises the front part of the foot with every step, so that the toes are prevented from dragging on the ground, also preventing a halting or limping gait. The toe joint is aided in its action by a rubber cushion, H, in addition to the hinged plate beneath it, so that the natural action of the foot is preserved.

Another improvement in the leg is in the construction of the foot piece, which, as may be seen, is entire so far as the outline is considered. By inserting the ankle joint in the solid foot, a shoe may be worn without inconvenience or the annoyance which is experienced where working parts come in contact with the hinder portion; it also adds to the neat appearance and fit of a stocking, and is unlikely to cause wrinkles or create a suspicion of anything unnatural.

This leg was patented by F. W. Newbert, of Pittsburgh, Pa., on the 22d of November, 1864. For further information address him at Box 471, as above.



NEWBERT'S ARTIFICIAL LEG.

Sweeping Carpets.

Sweeping carpets too often wears them out rapidly. It is obvious to any one that a brisk, daily brushing over the whole surface must wear away and carry off more woolly particles than the occasional stepping of feet during the day without the rubbing and scraping given by the broom. To allow sand and grit to accumulate on the surface, and to become ground into the fibers by the pressure of sole-leather is, however, worse than sweeping. They should therefore be always kept clean. Men who object to large carpet bills should provide themselves with slippers, and not come in with muddy boots. It is a matter of economy with them to pay $2 or $3 in the purchase of slippers, rather than a hundred or two for ingrain and Brussels. This perhaps would be a stronger consideration with some and exert a more controlling influence than frequent sharp reproofs from the mistress of the interior.

There are different ways of sweeping carpets. The most objectionable is performed as follows:—The operator first places the broom perpendicularly upon the floor; then with a quick, thrusting motion the lower part is pushed forward and thrown upwards, carrying the dust with it in large clouds, until the air of the room is filled with it. The brush of the broom, by a frequent use, thus becomes bent, somewhat in the form of a hook. The dust which fills the air gradually settles upon chairs, tables, bureaus, writing-desks, cases of books, picture-frames, clocks, maps, looking-glasses, &c. The process thus consists virtually in merely elevating a stratum of dust on the carpet and placing it on all these different articles of furniture. After some minutes the duster passes around and the stratum is removed to its original position on the floor, thus making a sort of perpetual motion resembling the great circulation of moisture from the earth to clouds and from clouds to rain back to earth again.

A much better way for performing the work, is to place the broom upon the carpet in an inclined position, with the handle inclining forwards; drawing it quickly over the surface in this position, and scarcely raising it from the floor, will prevent the raising of very little dust. In order to do the work effectually, however, the motion should not be given by long strokes, but by a quick succession of short ones. It would be worth fifty dollars to any housekeeper who does not understand the business, to see these two modes distinctly performed. By the former or thrusting mode, the coarser dirt, or that which does not rise in the air, is shot ahead several feet, and spread over a large surface; by the latter or drawing mode, it is kept more compactly together, something like the winrow of hay in the meadow. The broom, instead of being bent around like a hook, as above stated, is kept straight and smooth, and lasts several times longer.—*Country Gentleman.*

The Siberian Plague.

All Europe has been alarmed by the reported appearance of the Siberian plague at St. Petersburg and its advance toward the frontier of Germany. A telegram from St. Petersburg states that it is committing fearful ravages, and that official returns as to the number of victims have altogether ceased. A semi-official organ of the Russian Government denies the correctness of these reports, which, however, the neighboring countries agree in accepting as true. The Austrian Government has sent a Medical Commission to St. Petersburg to examine into the nature of the epidemic, and the French Government has ordered all ships arriving from Russia to be put in quarantine. The English Government has sent instructions to the consuls in Russia and the ports of the Baltic to collect all the information they could on the subject and forward it to England.

Weights on Railways.

Let an unaccustomed person ride on an engine going full speed, and he will characterize the jolting as something very frightful. This jolting is no proof that the road is unevenly laid, but it is partly due to the fact that the wheels, instead of revolving, constantly sledge along the rails. The result is, that the rails are worn away at a rapid rate. The following experiment will prove it. Clean a given portion of rail so thoroughly that it will not soil a white handkerchief. Wait till a train has passed, and then apply the handkerchief. It will be covered with fine iron dust. This dust represents so much permanent way destroyed. Directors are now adopting steel rails, costing from £14 to £15 per tun, which, of course, afford more resistance to the enormous burden they have to bear. Some engineers think this is applying the remedy at the wrong end, and, instead of making the rails tougher, the engines and carriages should be made lighter. It is certainly worth considering whether railway engines and carriages need necessarily be such ponderous affairs—at any rate for passenger traffic. The Americans accuse us, with some justice, of being wedded to weight and massiveness in all our manufactures, comparing, for instance, our crawling broad-wheeled wains and elephantine horses, with their express wagons and small-boned cattle. There is a curious comparison between a first-class railway carriage and an omnibus—carriage weighs 5 tuns, carries 18 people weighing 22 cwt.; omnibus weighs 1 tun, carries 30 people weighing 37 cwt. Consequently the railway carriage weighs five times as much as all the passengers put together, the omnibus only half as much. If omnibuses were proportionately as heavy as railway carriages, they would only carry three people; if, on the other hand, railway cars were as light as omnibuses, each carriage would carry 180 people!—*London Mining Journal.*

[If the road was as smooth as the slide of a steam engine how much jolting would there be?—Eds.

Embalming.—M. Falconi, in a paper read to the French Academy, states that after a series of experiments made with different salts, he finds that sulphate of zinc, prepared of different degrees of strength, is the best material. An injection of about a gallon would perfectly well preserve a dead body, as is proved by the preparations belonging to the anatomical cabinet at Genoa. Bodies so prepared preserve all their flexibility for 40 days. It is only after that period that they begin to dry up, still preserving, however, their natural color. Chloride of zinc and sulphate of soda are sometimes used also.

The Albany iron-works in Troy, have commenced the manufacture of mild steel under Bessemer's patent, of which they have the entire control in this country.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Steam Trap.—The object of this invention has been to make a steam-trap for the discharge of the water of condensation from steam pipes and vessels, automatic under all circumstances and of the utmost simplicity in its construction. The water is received in a metalic casing through the bottom of which is passed a pipe closed at its top and perforated with a series of holes at a small distance above the bottom of the casing. An open vessel, in shape like an ordinary pail, but having a collar fitted around and extending a short distance above an opening through the center of its bottom, fits over the pipe, and its collar acts as a moveable seat, to the perforations in the pipe. This collar or valve seat covers the valves when the float is at rest, and uncovers them when it is in motion, so as to discharge the water. Peter Hogg of New York City, is the inventor.

Churns—This invention consists in forming the sides or bottom or both of a churn, with a series of sharp pointed projections, in connection with the use of a revolving dasher provided with a series of sharp-pointed beaters, which dasher is so arranged with regard to the pointed sides and bottom of the churn, that as it is revolved therein, it throws or dashes the cream against the pointed sides with sufficient force to cause its butter-globules to be thoroughly and expeditiously broken and cut up, thus enabling butter to be churned with great quickness and rapidity. The advantages of this process are evident. A. O. Gallup and E. A. Hewitt are the inventors, and can be addressed at New London, Conn.

Inclined Bearing.—This invention consists in setting the lower part of vertical or inclined bearings in a cup or socket, which will receive and retain the lubricating material which escapes from the bearing; and also in providing a chamber opening inward in said cup, and near its highest part, which will retain any lubricating material received therein, and prevent it from being wasted by centrifugal force during the rotation of the spindle; and also in providing a similar chamber in the interior of the highest part of the bearing; and lastly in forming a spiral groove around the interior of the bearing from its bottom to the said chamber. George W. Briggs, Fiskville, R. I., is the inventor.

Improved Chandelier.—This invention consists in the combination of a sliding joint with the central rod or tube of a chandelier, so that the chandelier can be used in the ordinary manner and a drop light be obtained in connection with or independent of said chandelier. The gas is conducted to the various arms of the chandelier by a combination of two chambers connected with each other by a series of pipes arranged around the central tubes of the chandelier, the upper end of which is furnished with a central tubular stem which passes downward and forms the guide for the central sliding tube; and in combination with this tube and a small pipe rising from the gas chamber of the drop light it forms a liquid joint to prevent the waste of gas whatsoever the position of the drop light. Peter Loth, 374 and 376 Canal Street, New York, is the inventor.

Pump.—This invention relates to a new and improved pump of that class which are provided with two buckets or pistons working in one and the same cylinder pump. It also consists in placing a stuffling box in the upper bucket or piston in order to prevent leakage of air or water between the two piston rods —one being solid and the other tubular and the former working through the latter.—A. Sutton, Detroit, Michigan, is the inventor.

Grain and Grass Harvester.—This invention relates to a new and improved Grain and Grass Harvester designed for manual operation, and consists in the employment or use of an endless sickle arranged to work over polygonal pulleys and with a continuous movement in one direction whereby the jars and concussions attending the ordinary evaporating sickle are avoided. The invention also consists in a novel arrangement of the platform and framing of the machine whereby the grass or grain may be cut at different hights from the surface of the ground as may be desired. The invention further consists in a novel construction of the reel whereby the same may be adjusted to suit the hight of the sickle." Benjamin Wieland, Orangeville, Stephenson County, Illinois, is the inventor.

Machine for Tying Knots in Grain-binding Devices.—This invention relates to a new and improved device, for tying knots in sheaf cords, and is designed to be use in connection with a grain-binding apparatus. The invention consists in the employment or the use of a slatted shield in connection with a revolving tube, a sliding tube and a sliding rod provided with a hook; all arranged to operate in such a manner as to effect the desired end. The patent bears date March 21. Ante-dated March 6, 1865. W. P. Barker, Grand Rapids, Michigan, is the inventor.

NEW SYSTEM OF REGULATING RAILWAY TRAINS.

Upon the London and Southwestern Railway, in England, a new system of running the trains has been adopted in place of the time system generally in use. The plan is designed to make sure that there shall be but one train at a time upon the portion of the line between any two stations. When a train passes a station, A, a signal is raised to warn the engineer of the following train not to pass A, until the first train has passed the next station, B. When the first train passes the station, B, intelligence is telegraphed to A, when a signal is raised to indicate that the track is all clear to station, B. The new method is called "The block system of signals." Its advantages and the details of the arrangement are thus set forth by the *Mechanics' Magazine:*—

"In the words of Colonel Yolland, in his evidence at Egham, 'The danger of running trains at intervals can only be obviated by the block system of telegraph.' The same gentleman, in his report on the collision between two excursion trains on the Midland Railway at Market Harbro', in August, 1862, expressed the following decided opinion:—'An interval of time as a means of avoiding collisions between trains is, in my judgment, worse than useless; it is deceptive and thoroughly uncertain, as an interval of half an hour at one station may have entirely disappeared before the first train arrives at its next appointed stopping place; whereas an interval of space, no matter how short, between following trains, if preserved, will always prevent a collision from taking place. I am not arguing in favor of some impracticable mode of working traffic, and laying myself open to the remarks—that it is all very well in theory, but will not answer in practice; but I advocate, as the best means of preventing these fearful collisions, the adoption of the electric telegraph and the working of the traffic on the "block" system, of not allowing two following trains to be between two adjacent stations at the same time, a system now carried out on one of the principal lines of railway in this country.'

"The system simply consists of three wires, one for the up line, a second for the down line, and a third for the bell. Each station is provided with a switch, a semaphore, and a bell. On a train entering a station—say Barnes—the signal man there would communicate the fact to Putney by the bell. By a code of signals, the description of train is, also, at the same time made known. On receipt of the signal the man at Putney, by using his switch, raises the arm of the semaphore at Barnes against any following train, and this is not released until the train has cleared the Putney station, and the process is so repeated from station to station along the line. Every precaution has been taken to eliminate all imperfections in existing instruments, and to make the plan fully meet every requirement demanded of such an important adjunct to the working of the line. These requirements are:—Firstly, a means of communication between two stations which shall give notice of the approach and departure of trains and shall indicate its nature. The general method of distinguishing trains, in addition to the particular discs and lights, is by sounding the whistle a certain number of times when approaching a junction or station. The same system is adopted with electric signals, a bell of simple construction being sounded in place of a whistle. Secondly, a 'danger,' and 'all clear' signal to rule and protect each line of rails. The signal used to denote 'danger' and 'all clear' to the signal man is the same as that exhibited to the driver. Of course, the actual instruments themselves are not the same. The signal man's signal is in his box, the driver's on the line, but the nature and design of the signal are similar. Thus, if the raising and lowering of a semaphore arm be used on the line to guide the driver, a miniature semaphore arm is used in the box to instruct the signal man. Thirdly, that the man at one station shall have the sole and complete control over the signal at the other station, and that it shall be impossible for him to interfere with or alter the signal in his own box. The apparatus used on the South Western Railway most completely fulfills this condition. By it the man at one station has the sole and complete control over the signal at the other station, and it is impossible for him to interfere with or alter the signal in his own box. He cannot do this by any movement of his own apparatus or any accidental disturbance of his instruments. The 'all clear' signal can only be given by the man at the other station. The principle by which the various signaling instruments are actuated is simply that of the attraction of the electro-magnet being made to do what the strain of the wire effects upon the line. Gravity maintains the signal at 'danger'—the the electric current takes it off.

"The fourth is a most important point, and one upon which the whole safety of electric signaling depends. It is that every signal shall be properly acknowledged, and that the acknowledgment shall not only imply the due receipt of the signal sent, but that it has been correctly understood and properly acted upon. In pursuance of this, the instructions are that every signal received must be acknowledged, and that no signal is to be considered complete until it has been acknowledged.

"Electric signaling is perfectly distinct and dissimilar from telegraph signaling, with which it in no way interferes. The general auxiliary character of the telegraph is still preserved, and it continues to be useful in giving notice of the delay of trains, and, in various ways preventing the want of punctuality in one train affecting others. The electric signals govern the operations of the telegraph, and render them more secure, so that no harm can result from an error or misconception in the wording of a telegram. When viewed in its true light, railway authorities cannot fail to perceive what a power the electric system affords them to expedite traffic, guarantee safety, and so inspire the public mind with a confidence, which cannot be established whilst there exists the fear of such calamities as that which has just occurred."

An Old "Fogy."

The *Mechanics' Magazine* has the following:—

"Commander B. Sharpe, R. N., read a paper at the Royal United Service Institution, last Friday, on the comparative merits of smooth-bore and rifle ordnance when employed at sea, and on the proper armament for ships of war. After considering the first part of the subject at some length, Commander Sharpe arrived at the conclusion that rifle ordnance had no merits whatever, as compared with smooth-bore ordnance, for sea service. With regard to the second part, the author ignored the utiliry of the turret, or any similar system of naval armament and heavy guns, his objections being as they were inapplicable, and recommended the use of smooth-bore guns of small caliber. Being an afternoon paper no discussion took place thereon; had it been otherwise the gallant Commander would doubtless have quitted the Institution better informed, if not better convinced, than when he entered, of the utility of turret ships and heavy rifled ordnance.

[Commander "B Sharpe," who, to repeat Hood's joke, is evidently "A flat," do'nt like rifled guns, and ignores turrets. What a pity!

TESTING ENGLISH CANNON.—The testing of the competitive 12-pounder Armstrong and Whitworth guns was brought to a close on Tuesday last. The charges used consisted of 1½ lbs. to 3 lbs. of powder, and a number of shots varying from 3 lbs. to 6 lbs. The mode of testing was most severe, an air space being left between the shot and cartridge. The 12-pounder breech-loading Armstrong gun became unserviceable at the 42d round; the muzzle-loading shunt gun at the 60th round, and in both instances they simply cracked without a separation of the parts. The Whitworth 12-pounder violently burst into eleven pieces at the 90th round. The test applied to each gun was similar in all respects.—*London Mechanics' Magazine, March* 31.

Revenues and Expenditures of the United States for 1862, 1863 and 1864, and the estimated for 1865.

	1862.	1863.	1864.	1865.
Customs	$49,056,397	$69,059,642	$102,316,153	$70,271,092
Lands	152,204	167,617	588,333	642,186
Direct tax	1,795,332	1,485,103	475,649	16,080
Internal revenue	.....	37,640,787	109,741,134	249,562,860
Miscellaneous	931,787	3,046,615	47,511,488	24,020,171
Total revenue	$51,935,720	$111,39 ,766	$260,632,717	$344,512,389
Expenditures	474,744,778	714,709,995	865,234,087	1,248,790,997
Excess of Ex.	$422,809,058	$603,310,229	$604,601,370	$904,278,608

DEBTS OF THE STATES.

Pennsylvania	$39,379,603	Maine	$5,137,500
Massachusetts	22,893 972	Connecticut	5,000,000
Ohio	13,500,751	Michigan	3 541,128
Illinois	11,178.514	Wisconsin	2,500,000
New York	6,278,954	Vermont	1,642,845

Magnesium Light.

The Magnesium Metal Company are now manufacturing magnesium upon a commercial scale, and we are informed that a supply of this metal has been ordered by the American Government for introduction into the American navy with the view, by the aid of the magnesium light, to check, if possible, blockade running. Several European Governments are also engaged in experiments with a view to its adaptation to lighthouses, and coast and sea signals, and it has been found successful at a distance of twenty-six miles.

INDIA-RUBBER VARNISH.—Four ounces india-rubber in fine shavings are dissolved in a covered jar by means of a sand bath, in two pounds of crude benzole, and then mixed with four pounds of hot linseed oil varnish, heated, and filter.

English Breech-loading Rifles.

The London *Ironmonger* contains some interesting information about the trial to take place shortly to determine the best breech-loading weapon for military purposes. We copy:—

CONDITIONS.

I. Bore.—Minimum ·450. Each rifle must take the gage plug provided by the Council from muzzle to breech. Length of barrel—minimum, 2 feet 9 inches; maximum, 3 feet 3 inches; form of barrel, any; material of barrel, any; pull of trigger, minimum, 6 pounds; weight of rifle, 9½ pounds, full stocked, with metal ramrod and military sights; mechanically fitting ramrods not allowed.

The following general rules will guide the Council in deciding as to what constitutes military sights:—

FORESIGHT.

1. To be fixed to the barrel and incapable of adjustment.

2. The rifle to admit of a bayonet fitted for military purposes, being readily and firmly fixed without injury to the foresight.

3. If knife-edge, transverse section a triangle, of which the hight is not more than 1½ times the base, not undercut.

4. No bead sight unless covered by a strong shade, not less than four-tenths of an inch in diameter, inside measurement, firmly fixed to the barrel, and incapable of being removed.

BACKSIGHT.

1. To be attached to the barrel in front of the lock.

2. No transverse adjustment nor any other movable adjustment, except a hinged flap and a sliding bar, to be moved by hand only, without screws, racks, or any other mechanical appliances.

3. Graduations (on the Vernier principle or otherwise) may be marked on any part of the backsight.

4. The sliding bar to be with or without vertical lines or apertures, and the upper edge either straight or with a V of any angle or a rectangular notch, or a combination of these forms.

5. The outside measurement of the bed on which the flap of leaf rests must not exceed one inch.

6. No part of the backsight must exceed the width of one inch.

II. Ammunition.—Cartridges containing their own ignition.

III. Each competitor may enter more than one description of rifle on payment of £5 entrance fee for each rifle.

IV. The rifles shall be delivered at the office of the Association before 11 o'clock, A. M., on Monday, the 29th of May, and shall be tested and examined in the presence of the competitors or their representatives, between the hours of 12 and 5 P. M., on that day, by some person or persons appointed by the Council for that purpose; and the decision of such person or persons that any rifle is not in compliance with the above conditions shall absolutely disqualify such rifle for competition.

V. The rifles shall be fired from fixed mechanical rests. Government rests shall be assigned by lot to competitors who do not bring their own.

VI. Each competitor shall be responsible for the adjustment, fitting and general condition of the rest used by him during the trial. Each competitor shall be present to fire his rifle, or shall appoint a representative to do so.

VII. The order of shooting shall be determined by lot.

VIII. Each competitor, or his representative, shall five 20 rounds for accuracy from each rifle entered by him from a fixed mechanical rest. Five sighting shots shall be allowed before commencing the 20 rounds for accuracy.

IX. At the conclusion of the 20 rounds for accuracy the target shall be examined and a diagram of the shooting shall be taken, by which the figure of merit shall be determined, as at the School of Musketry at Hythe. The diagram shall be signed by the competitor, or his representative, and by some person appointed by the Council.

X. After the rounds for accuracy 100 rounds shall be fired from the shoulder by the competiter, or his representative, into a pit as fast as the rifle can be loaded and fired, and to avoid delay this shall be done while the target is being examined.

XI. The tests for accuracy and rapidity shall be repeated until each competitor shall have fired with each of the rifles entered by him 60 rounds for accuracy and 300 rounds for rapidity.

XII. No cleaning out shall be allowed after the first shot has been fired.

XIII. At the conclusion of each or any of the 120 rounds the competitor shall, if required, hand over his rifle to the Council, or to the person or persons appointed by the Council to conduct the trial.

XIV. The mere figure of merit shall not necessarily entitle a competitor to the prize, which will be awarded by the Council to such rifle as shall, in their opinion, combine accuracy with other elements of efficiency, so as to be of the greatest merit and utility for military purposes. Should no rifle be found to attain the standard which, in the opinion of the Council, is necessary for efficiency and serviceableness as a military rifle, the prize will not be awarded.

Peat as a Steam Fuel.

The value of peat, when properly dried, is well-known and admitted both for domestic fuel and for generating steam; and charcoal properly made from such peat is, in all respects, equal, if not superior to wood charcoal. When dug from the bog, peat generally contains from fifty to seventy-five per cent of water. The difficulty of getting rid of so much moisture has led to a preference for the upper portions of the deposit, which abound most with roots and coarse fibers, and part most readily with the water not actually shut up within those fibers. But this produces an inferior fuel which will not stand the blast nor make a good charcoal. The inference drawn from practical experience is, that to insure commercial success in utilizing peat, the operation must be inexpensive and expeditious, costly machinery being avoided. To produce a perfect fuel the coarse roots must be removed and the smaller fibers broken up. These objects appear to be accomplished by a simple machine, the invention of Mr. Buckland, which was to be seen in operation at the International Exhibition, 1862. The fuel prepared by this process is called condensed peat, in contradistinction to compressed peat. From four to five tuns of peat as taken from the bog are required to make one tun of dry condensed peat. The cost varies in different localities, but it may be safely assumed that the average cost will not exceed that of coal at the pit's mouth. Peat thus prepared burns very freely, will stand a powerful blast, emits great heat, is smokeless, and produces less ash than the average of coal or coke. It is impervious to water, improves by keeping, and is incapable of self-ignition. From two and a half to three tuns of prepared peat will make one tun of excellent charcoal, according to the degree of carbonization required.

The general heating power of the condensed peat has been proved to be very superior to that of coal; and, in fact, this article appears to be well adapted as a fuel for steam engines, whether marine, stationary, or locomotive. Its use has been found to effect a saving of fifty per cent in time in generating steam, and it will do double duty as compared with coal. The absence of smoke and clinkers, and the preservation of furnace bars and boilers from the destructive effects of sulphur from coal, are additional and important advantages. The peat has been tried on board a river steamer with perfect success. The vessel was under steam 2 h. 20 min., during which time the total quantity consumed was 12 cwt., the average consumption of coal for a similar trip being 12 cwt. per hour. It should be observed that the full effect of the fuel was not here obtained, as the fire-bars, being of the ordinary description, were too wide apart for peat, consequently a portion fell through only partially consumed.

The locomotive engineers of these railways in Ireland united to carry out a practical trial of the condensed peat, on the Belfast and Northern Counties Railway, with the view of testing its qualities as a fuel for locomotives. The trip was made from Carrick junction to Ballymena, a distance of tweny-seven miles. During the whole of the journey there was an excess of steam, although the fire-door was kept continually open, and the damper down, for the greater portion of the distance. The pressure at starting was 100 lbs. per square inch. The commencement of the journey was up an incline of 1 in 80, four miles long, and with double curves; while ascending the incline the pressure rose to 110 lbs., and afterwards to 120 lbs., and this with the fire-door open. The speed was about 40 miles per hour. While on the way the fuel emitted no smoke, and very little when at stations. The fire-box was examined at Ballymena, and a very small portion of clinker was found. The smoke-box was perfectly free from cinders or dust—a proof that the fuel had stood the blast exceedingly well; and it is the recorded opinion of the experimenters that the condensed peat was in every respect well adapted as a fuel for locomotive purposes.—*Mechanics' Magazine.*

Qualities of the Best Vegetables.

There is so wide a difference in the qualities of vegetables, that we are frequently surprised to see the indifference in regard to the purchase of vegetable seeds for sowing and planting. This is an error, which may readily be corrected. No person who desires garden esculents of fine quality need be without the best, if he will only take the trouble to make his selections of seeds with a little more than usual care. Somebody has laid down the following as a criterion to a certain extent, by which the quality of some leading esculents may be determined. We think him right, and commend his views:—

"In the blood beet we always look for a deep color, smooth, handsome form, small top, and sweet tender flesh. In the orange carrot, small top, smooth root, and deep orange color. In the cabbage, short stump, large, compact head, with but few leaves. In the cucumber, straight, handsome form, and dark green color. In the lettuce, large, close head, pleasant flavor, with the quality of standing the heat without soon running to seed. In sweet corn, long ears, very shriveled grains over the end of the cob. In the Cantelope melon, rough skin, thick, firm flesh, and high flavor. In the water melon, thin rind, abundant and well-flavored juice, and bright red core. In the onion, thick, round shape, small neck, deep color, mild flavor, and good keeping quality. In the parsnip, small top, long, smooth root, and rich flavor. In the pea, low growth, full pods, large and tender peas, rich flavor. In the scarlet radish, deep color, small tops, clean root, and quick, free growth. In the squash, medium size, dry, fine grained, deep-colored flesh. In turnips, handsome form, small tops, and tap root, sweet crisp flesh."

Those who have never seen better sorts than they possess, suppose they are of the first quality, when they may be very inferior or almost worthless compared with the finest varieties.—*Culturist.*

Reduction of Work at the Springfield Armory.

By order of the chief of ordnance, Major Laidley is about to reduce the product of the armory to five hundred guns daily, beginning the decrease with the entire suspension of night work. The former large product—one thousand guns a day—has been considerably lessened of late, the number during the last month having been between six and seven hundred per day. The cause of the proposed reduction is obvious, A large part of the machinery at the armory must soon be remodeled for the construction of the breech-loading rifle, which the War Department will doubtless decide to accept, in accordance with the recommendation of the military board which has been in session in this city, and recently adjourned. As this is to become eventually the arm of the service, it is not desirable to increase much more the number of guns of the old model, especially as those now stored in the arsenal count up nearly three hundred and fifty thousand, and as the war is so near its close. Probably none of them will ever be made over into breech-loaders, and the manufacture of the latter, after the necessary change of machinery is made, will keep the armory busy for some time to come.—*Springfield Republican.*

We understand that MM. Margueritte, Lalouet, de Sourdeval, and Worms, of Romilly, have established at Bondy a large factory of sulphate of ammonia, producing daily from 7,000 to 8,000 kilogrammes. The raw material is the liquor of the Bondy basins, which is merely the liquor of cesspools left to stand for a time sufficient to exhaust the fermentation, and transform the urea into carbonate of ammonia, the solution of which is decanted.

Improved Grain and Seed Separator.

This machine is an efficient one for cleaning and separating all kinds of grain that may have been accidentally mixed in the barn or the mill. It is convenient for farmers, or persons who have but little of this kind of work to do, and may be purchased and held in common by two or more parties, so that the expense comes lighter upon the individual.

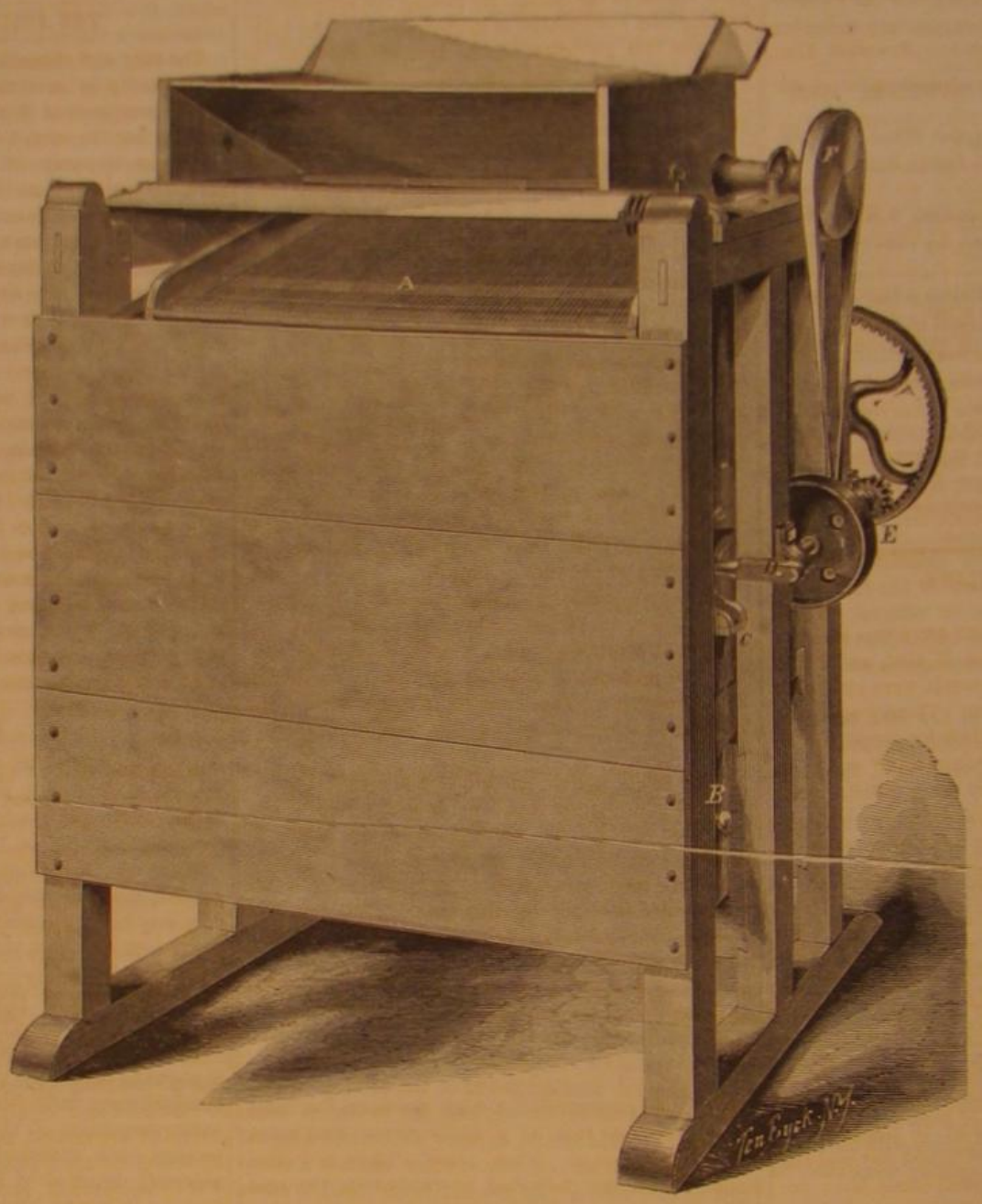
The object of the machine having been stated, it is necessary to add that the work is performed by means of different sizes or degrees of fineness in the meshes of the screens, one of which is shown at A. The grain that remains on the screen without passing through is thrown off by the agitation into a space or channel directly in front of it, and from this channel the grain finds its way into one of a series of drawers or compartments, as at B, or out through the spout, C, from which it is received in suitable vessels. All the screens are hung in a vibrating case, which is operated by the rod, D, through the gear and pinion, E. On the gear there is a handle, and the pulley, F, drives a feeding roller inside the hopper, said roller being channelled out so that the grain is thrown on to the screens as fast as it is required, and no faster, thus avoiding all crowding and choking, and preventing the grain from being mixed in the compartments by accidental spilling over the screens.

This machine separates shrivelled wheat from sound, and No. 1, or first quality, from inferior sorts, and all chess, cockle, hay seed, peas, oats, buckwheat—in fact any grain is carried separately to a certain place in the machine, from which it is easily removed in bulk.

The inventor says of his machine: "The most experienced farmers acknowledge that more bushels and plumper and better grain can be raised on an acre when they are sown mixed than when separate, and also that grain is not so liable to be attacked by insects sown mixed. If it is desired the farmer can sow buckwheat to subdue an old sod, to kill weeds and insects of all kinds, leaving the ground clean and in fine condition for sowing barley, oats, peas, flax and other seeds, which, by rotation, could not formerly be done, on account of the buckwheat remaining in the ground and growing with the following crop, thereby injuring it for market or seed. Wheat and oats can be sown together in any proportion if desired, thereby giving the farmer two chances for a crop, for if the season or soil should not be adapted to both the chance for one would still be good. Buckwheat, oats, peas and flaxseed can be sown together and perfectly separated. Spring wheat sown in where red winter wheat or barley has been winter killed is separated at one operation. No. 1 wheat will have the appearance of red winter wheat so much that the best judges have pronounced it such. The machine is so arranged that the miller is instantly notified of the slightest variation in the feed, and when once properly started the machine will regulate the feed to its motion perfectly, without any attention from the operator."

At a recent trial of this machine at the West, in connection with another, it did the work very thoroughly, and completely distanced its rival.

A patent is now pending on this machine through the Scientific American Patent Agency, for certain improvements in a previous patent obtained through this office. For further information address John S. Bodge, patentee, Tecumseh, Mich.



BODGE'S GRAIN AND SEED SEPARATOR.

Iron Dish Cloths—Iron Clothes Lines.

I was once so ill-informed, says a writer in an exchange, of the progress of the fine arts as not to know what an iron dish cloth was. But seeing one in use at the house of a friend, I learned from a Swiss gentleman who had presented it to her, that they were in general use in his native country, and he had accidentally seen a cask full at an importer's, which were unsalable in New York, and had become rusty, and looked upon as old iron. I procured a dozen and distributed them among my friends. They soon became bright from use, and are universally classed among those articles which "we wonder how we ever did without." These are made of rings of iron wire, No. 15, linked together, and are about six inches square; I counted fifteen rings on one edge. One outside row of rings is only connected with the other at each end and one inch or two in the middle which makes two loops to hang it up by.

Every kitchen maid who had scoured the inside or outside of a kettle with it pronounces it better than scraping with a knife or scouring with cloth and sand. They are very flexible, and I imagine must be like chain armor, which I have read of but never seen. We also find it useful to put under a pot or kettle hot from the stove, when we wish to place them on the table. We have used ours two years.

There is another iron convenience I have used six years, and which is as good as ever, that I would recommend to house-keepers—galvanized iron telegraph wire for clothes lines. It never rusts, need never be taken in, never breaks down and lets the wet clothes fall to the ground and have to be rinsed again.

PARIS INTERNATIONAL EXHIBITION OF 1867.

The number of *l'Invention* just received contains the report of M. Armand Behic, Minister of Agriculture and Public Works, on the plan for the great international exhibition of the products of agriculture, industry and fine arts, decreed by the Emperor in 1863 to be held in Paris in 1867. The report states briefly the financial results of previous exhibitions in London and Paris. At the first great exhibition in London, in 1851, the receipts were $2,500,000, and the profits were $1,000,000. The receipts of the second exhibition in London, in 1862, were $300,000; barely sufficient to cover the expense.

The expense of the Paris exhibition of 1855 was borne by the government; the receipts were $600,000 being $1,600,000 less than the cost.

M. Behic estimates the cost of the exhibition of 1867 at about $4,000,000, and the receipts at $1,400,000 to $1,800,000. He proposes that the deficit of $2,500,000 should be appropriated one-half by the city of Paris, and the other half by the imperial treasury, and that a company should be organized to furnish the balance of the funds required, these to be reimbursed from the receipts. In case the receipts should amount to more than the sum contributed by the company, the excess to be divided equally between the imperial treasury, the city and the company.

Titanium in Quantity.

Endeavors, which promise to be successful, are being made to produce in quantity, in the free form, the metal titanium, the question of the influence of which upon steel has at various times been the subject of so much controversy. These endeavors have been prompted by the belief that the light of burning titanium admits, like that of burning magnesium, of important practical applications. As yet, Wohler is the only chemist who has made—or, rather, perhaps we should say, who has published the results of—researches of any importance with respect to metallic titanium, and he has obtained the metal only as an amorphous gray powder, resembling iron reduced by hydrogen at a low temperature." He obtains the metal in this state by reducing the fluo-titanate of potash by means of potassium. Heated in the air, this powder "burns with lively scintillation. The smallest particle of it, projected into a flame, produces a brilliant star-like spark. Heated in oxygen, it occasions an instantaneous dazzling flame like lightning." Wohler believes that "there is no other body which burns so energetically in oxygen." It also burns with a vivid flame, accompanied by intense heat, in nitrogen.

PLASTICITY OF SULPHUR.—MM. Moutier and Dietzenbacher presented a note to the Academy of Science on "A Property of Sulphur." The second of these gentlemen showed some time ago that sulphur melted with a small proportion of iodine retained its plastic state. The authors now show that a number of other substances, naphthaline, paraffine, camphor, oil, wax, etc.—confer the same property. The mixture with some of these substances is insoluble in sulphide of carbon. Carbon also greatly modifies the properties of sulphur, rendering it completely fluid at 270°.—*Chemical News.*

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NAVAL DISCIPLINE.

At the opening of hostilities our navy was so inadequate to the duties required of it that, as all well know, quantities of merchant vessels were chartered and crews enlisted to work them. These vessels so manned were in no more condition for naval service than a country regiment on "trainin' day" would be to attack fortifications, and only after infinite pains and labor on the part of authorities were they brought to a state of usefulness. Acting engineers were insurbordinate in one sense; they could not be made to understand that rank and capacity were two different things; though the engineer might be in all things the superior, the next in rank above him was by law his commander and to be respected. Much derangement and many resignations occurred, and reputations previously untarnished were destroyed from this simple cause. Men who had spent all their lives in the merchant service and whose word was law, even to the owners and captains, felt that submission to a lieutenant was equivalent to degradation and sooner than put up with it resigned pay and the chance of prize money. Where such cases have occurred among engineers it is not unlikely that the sea faring branch of the service has been troubled in the same way, but it is creditable to the good sense of both classes that a short time sufficed to settle this trouble and that the acting appointments, which means persons chosen from the merchant service and not regularly bred to the navy, have of late given but little trouble.

Naval discipline has done much for the merchant service in this respect and it is one of the great benefits which the people, or that portion of it which go down to the sea in ships, will derive from the outlay of money during the struggle. Obedience and deference to superiors, which is indispensable to efficient action on ship board, will be accorded cheerfully and not grumblingly. The ships themselves will be better cared for in all that relates to matters sanitary and mechanical. A laudable and praisworthy desire to excel incited by the publicity given to individuals during the war, will result in shorter voyages, decreased expenditure, and better treatment of the crew. With the steam marine, observation and the routine required by the Bureau of steam engineering in making out reports, will develope and stimulate mental activity in the profession which is much needed, and cannot fail to produce good results.

It is easy to see that in many minor details, such as inducing habits of personal cleanliness among seamen, who are not generally given to morning toilets, attention to the minutiæ of sea-faring life, merchants and ship masters will be gainers by the system of naval discipline with which our merchant marine has been inocculated; while in the event of a foreign war our coast will swarm with such a host of privateers, with efficient crews, that it would be easier for a cannon to be loaded through the vent than for an enemy to escape them.

SAFETY MATCHES.

Phosphorus has a very strong affinity for oxygen, so strong that it slowly combines with it when exposed to contact with the atmosphere, producing a glow visible in the dark. By raising the temperature slightly this combustion is augmented to rapid burning, and this elevation of the temperature may be readily effected by moderate friction. This property of phosphorus has rendered possible that immeasurable convenience, the friction match.

Though the quantity of heat in burning phosphorus is pretty large—5700 units to the pound—the heat is not intense, generally not sufficiently intense to set wood on fire. It is, therefore, necessary in making matches to employ a third substance which the flame of phosphorus will kindle, and which will in burning produce heat sufficiently intense to kindle a splint of wood. The substance generally employed in this office is sulphur. Sometimes the intensity of the flame is still further hightened by feeding it with oxygen more rapidly than it can obtain this universal supporter of combustion from the air; to effect this there is added to the mixture some compound which contains a large proportion of oxygen held by an affinity so feeble that it is readily given up on the application of heat; these requirements are found in the nitrate and chlorate of potash.

Matches are made by dipping the sticks first in sulphur, then in a mixture containing phosphorus, and finally in a solution of gum Arabic or similar substance to protect the phosphorus from the action of the atmosphere. The same friction that kindles the phosphorus also removes the thin film of protecting gum.

In the safety match, patented by Bryant & May, of England, phosphorus is omitted from the match, and is applied to the box. Consequently the match is perfectly safe, friction on any surface other than that of the box having no effect to set it on fire. In this manufacture the phosphorus is used in that allotropic condition known as red or amorphous phosphorus. In this state it does not produce that frightful disease of the jaw which has made such havoc among workmen employed in match manufactories.

COAL.

When gold commanded a high premium the community were told that as a consequence coal must necessarily be dear. When trade strikes and riots among the miners disturbed operations in the coal fields the public were informed that these actions were the cause of scanty supplies and high prices for the staple. When Lee made his great raid into Pennsylvania similar reasons were advanced to keep up the price of fuel. When the spring freshets occurred the bridges were declared destroyed, and only limited supplies could be got over them. When the navy was building its iron-clad fleet and arsenals, and contractors were running their works night and day, the enormous and suddenly-increased demand for coal enhanced its value, so that rates before unheard of were obtained for it.

It is a poor rule that won't work both ways. If coal goes up under the existence of certain conditions it ought to come down when they change. Gold no longer commands the price under which coal was run up to $14 per tun. There are no trade strikes among miners. Lee is annihilated. The Confederacy is no more. The bridges have all been repaired. The navy has built its iron-clads. Contractors have filled their engagements. Government arsenals are shortening their force, and consequently their productions; the blockade is virtually terminated. Yet, in the face of all this, coal remains at an astounding and unwarrantable price when compared with other necessaries of life.

The fact of the matter is, that railroads and great stock companies who depend upon the exorbitant prices now obtained for fuel for the means to declare dividends, have conspired together to keep up its price, and they humor the market accordingly. For each day's needs they run in enough to supply but not glut the market, so that the figures remain unchanged. Along the line of the New Jersey Transportation Co.'s Railroad, and on other railroads, may be seen quantities of coal cars standing ready to be delivered at points where they are needed. It requires very little perspicuity to see that if these cars were run to their destination without other delay than the natural exigencies which occur in business of every kind, the market would be overstocked, and prices would fall, to the confusion of speculators and profit of the people.

THE FOLLY OF STRIKES.

The folly and absurdity of strikes is well illustrated by the termination of the great English "Lock-out." The correspondent of the London *Engineer* says:—"Now that the struggle is over—that is in the north—both parties may not unprofitably review their respective positions, and inquire what the lock-out has done for either of them. The men lost a fortnight's wages. Nothing more. They began work again on Thursday night on the same conditions as they were locked out on Saturday three weeks. The masters lost the profit on their works during that time. There are about 700 puddling furnaces in this district. Each furnace in round numbers may be said to have cost £1,000. There has, therefore, been something like £700,000 of capital lying idle and unproductive for sixteen working days. The men lost their wages for that time, and the employers lost their profit, and who has been benefitted? No one. Work was resumed in the northern iron factories on exactly the same conditions as it ceased nearly three weeks before." Workmen should understand that all persons or journals who endeavor to draw a line between them and their employers are their enemies, who have some base purpose, and care little what misery they cause to poor men so that they gain their ends.

PEAT.

In another part of this issue we have given extracts from the London *Mechanics' Magazine*, concerning some interesting experiments made with peat as fuel for steam engines—locomotives in particular.

From the article it appears that the most extraordinary results were obtained with peat when deprived of its moisture, and condensed by a machine specially designed for the purpose. It may be that in peat we shall find an economical substitute for coal; at its present prices, and even at rates much below, for the marketing of the former substance or preparation of it so as to render it available must certainly cost far less than for coal. No shafts have to be sunk no extensive and costly system of engineering and surveying are needed, and beyond the expense of the machinery for condensing it, or getting the water out of it by mechanical processes, little seems to be required to utilize the deposit with which nature has covered large tracts of land in this country.

The Chicago *Tribune* thus speaks of a sample of peat which it has received from parties owning one bed which is estimated to contain 250,000 cords:—

"This peat, in color, resembles the outside of pressed tobacco that has been exposed to light and air, and is quite as hard and heavy. The internal structure is so compact that on cutting it with a knife a smooth polished surface is formed. The specimens that we have burn with a flame clear and brilliant as seasoned maple or hickory, and produce no unpleasant odor like coal. Specimens of the peat have been exhibited to Dr. A. A. Hayes, of Boston, analytical chemist; Dr. E. Carr, Professor of Chemistry in the Wisconsin State University, and other distinguished practical men, and they speak highly of its merits. Professor Hayes says 'its flaming quality is of a marked character,' and that 'the inflammable part has a high heating power, and burns freely and clearly from the ash. Take the 59 parts of the inflammable compounds, as representing the positive combustible matter of this peat, we have an equivalent closely corresponding to that of oak wood; and I am led by my results to expect an equal heating power from an equal weight of this peat, burned in comparison with wood.' In regard to its gas-making powers, Prof. Hayes says, 'it exceeds all com-

mon cannels, and of course is far above any bituminous coal, and can be worked with *poor* coal to make *good* gas. There are only two or three cannel coals known which afford so much illuminating material, placing this peat in the first class of gas materials.'"

In former numbers of the SCIENTIFIC AMERICAN much has been said regarding this substance, and one of our large iron workers having tried it was not impressed with its great utility, but where such striking results as that recorded in the *Mechanics' Magazine* are obtained, and the testimony of scientific men is freely given as to its value it would seem that further experiment here would be likely to establish its character as a cheap and valuable fuel.

THE WAY TO LAY OUT AN ORCHARD.

If the proper method is adopted it takes less time and labor to set the trees of an orchard in perfectly straight rows both ways, than it does to set them in very crooked rows by the ordinary method of looking backward to get in range with the trees already set. The writer of this has set many orchards and has finally adopted the following plan:—

After the ground is plowed and harrowed, rows of small, straight stakes or pins are first inserted in the ground, not precisely in the positions to be occupied by the trees, but all on one side, say the west side for instance, in order that the holes may be dug and the trees set without disturbing the stakes.

The best way to get the position for the pins is to stretch a stout twine across the field, and then measure along this line from one pin to the next with a wooden pole of a length equal to the distance between the trees. A cane fish pole makes the best measuring rod, and next to this a slender white pine sapling, cut green and seasoned under cover. The pins should be straight twigs 8 or 10 inches in length and about a quarter of an inch in diameter; they may be cut from hazel or any other bush that grows straight.

First stretch the twine across the east side of the field, two and a half feet west of the line where it is desired to have the first row of trees. Set a pin in the place for the north row of trees, and measure along the twine with the rod, sticking a pin into the ground at each rod's length. Then lay off right angles from the extreme north and south pins, stretch the line and measure as before, leaving the pins standing, to the place for the west row of pins; stretch the line between these, and complete the measurement around the orchard. Finally stretch the line along the several north-and-south rows, and beginning at the north side measure along the line setting a pin for each tree. We shall thus have the ground marked out in squares with the pins all standing two and a half feet west of the positions to be occupied by the trees.

Now dig the holes on the east side of the trees, with the center of each hole about two and a half feet east of a pin. The holes should have vertical sides and flat bottoms, and should be sufficiently large to receive the roots in their natural position without bending. Provide a straight wand two and half feet in length, and placing one end of it against the pin, set the tree opposite the other end, ranging with the stakes to the west, and disregarding those to the north and south as the rows that way will take care of themselves. Pour two pailfuls of water into the hole, and sift in fine dirt from a shovel till the hole is filled. If the orchard is large so as to require a long line, a little art is required to draw the line straight. The stake at one end is firmly inserted in the earth, when a man by taking hold of the opposite end and shaking it vertically up and down, at the same time pulling upon it about as hard as its strength will bear, can very quickly whip it into a straight position; a few sods or stones may then be laid upon it at intervals to hold it in place.

In measuring, one man lays the rod along the line with its heavier end just opposite the pin already set, and another inserts a pin opposite the smaller end just one side of the line. The man who sets the pins should first stand astride *of* the line and insert the pin, and should then step around so as to face the line at right angles, setting the pin the second time if it should be found not to stand in a vertical position precisely opposite the end of the pole.

It may seem at first that this plan would be more laborious than the ordinary method of ranging, but in practice it will be found easier and more expeditious, as the work moves steadily forward without interruption or delay. We once planted an orchard of three acres with small peach trees by this method, and looking at the rows either directly or diagonally not a tree could be seen a single half inch out of line.

"Beelzebub."

Beelzebub is the name given to the new twenty-inch gun just completed and prepared for proving at the Fort Pitt Works. It is a Dahlgren navy gun, weighs as finished 98,915 pounds, and will throw a solid shot weighing 1,080 pounds to a distance, it is calculated, of over six miles. This has been done by the mate of this gun, which is mounted in New York Harbor. The gun was cast on the 5th of May last, was taken from the pit on the 22d of June, and has since been brought to its present perfection of finish, the equal of any gun in the world. Its rough measurements were as follows:—

	Inches.
At the base	66
30 inches from the base	65
60 inches from the base	61
80 inches from the base	54
120 inches from the base	48
175 inches from the base	47

Its finished dimensions were as follows:—

	Inches.
At the base	64
40 inches from the base	63.05
60 inches from the base	58.40
80 inches from the'base	55.50
100 inches from the base	44.34
120 inches from the base	32.80
175 inches from the base	34.09

The bore star gaged zero, or exactly twenty inches, the entire distance, except at four places; when it varied the one-hundredth part of an inch.

This immense "shooting-iron" is now in readiness for removal to the proving ground, when it is to to be tested by nine discharges, firing a solid shot with each, three of which will be with a charge of 60 lbs. of powder, three with 80 lbs. two with 100 lbs. and one, in all probability with 125 lbs. No notice will be given publicly of the day of proving as it is desirous to avoid the presence of a crowd on the occasion.—*Pittsburgh Chronicle.*

Steam on Common Roads.

The *London Engineer* thus speaks of some of the causes which have prevented the practical use of steam on common roads:—

Amateurs have rushed in where engineers fear to tread. Those gentlemen, with the best intentions, no doubt, combine an astonishing amount of ignorance with an audacity now and then bordering on the sublime. In the attempt to do everything they achieve nothing. Moderate speeds are regarded as ridiculous. The weight, which is rendered absolutely necessary by the necessity for a considerable heating surface, is quietly set down as being excessive. Machinery is contrived without any consideration for the strains to which it is exposed, and, as a result, a very few miles of bad or indifferent road suffices to render the engine helpless. A tenth part of the practical skill which has done so much for other forms of steam machinery would suffice to render the steam passenger carriage a machine which could be built with profit, and worked after a fashion which would quickly return fair dividends in countries or districts where an opening of the proper character exists for the display of its powers.

[When shall we have this practica. skill.—EDS.

SPECIAL NOTICES.

ULYSSES PRATT, of Deep River, Conn., has petioned for the extension of a patent granted to him on the 6th day of July, 1851, for an improvement in process of bleaching ivory.

RICHARD DUDGEON, of New York City, has petitioned for the extension of a patent granted to him on the 8th day of July, 1851, for an improvement in portable hydraulic presses.

Parties wishing to oppose the above extensions must appear and show cause on the 19th day of June next, at 12 o'clock, M., when the petitions will be heard.

COMPOSITE SHIPS.—Mr. John Smurthwaite, Pallion, Sunderland, is constructing a vessel on the combination principle, but in which a new feature is being introduced. Her floors are of wood, constructed as wooden ships usually are, whilst her frames are of trough iron, 6 in. on the flat and 4 in. on the depth, and she is being built entirely by wood shipwrights. Competent judges declare that she will be one of the strongest vessels that has been built on the Wear. We understand she is the second ship of the kind built in England.

[Many such ships have been launched in this country.—EDS.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING APRIL 18, 1865.
Reported Officially for the Scientific American.

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

47,264.—Apparatus for Agitating and Kneading Substances.—Wm. Adamson, Philadelphia, Pa.:

I claim, first, The cone-shaped roller caused to traverse in a circular path and to revolve on its own axis in a closed vessel within which pressure is maintained by the introduction of steam or otherwise, all substantially as and for the purpose herein set forth.

Second, The combination of the vat, having either an open or closed top with the central shield, H, and the traversing and revolving roller.

47,265.—Crutch.—G. T. Allamby and John G. Bugbee, Bangor, Maine:

We claim a spike, C, inserted in a metal socket, B, placed on the lower end of a crutch or cane and provided with a spring, D, and an arm, E, the latter extending through a slot, F, in the socket, all arranged to operate substantially as and for the purpose set forth.

[This invention relates to a new and improved manner of applying a spike to a crutch or crane, whereby the spike may, by a very simple adjustment, be made to protrude from the lower end of the crutch or cane, and prevent the latter from slipping on ice or other smooth or slippery surfaces, and the spike, when not required for use, be, by an equally simple adjustment, withdrawn into the crutch or crane.]

47,266.—Time Reporter.—Theodore Ascherfeld, Elkton, Md. Ante-dated April 17, 1865:

First, I claim the plates, C D, having pointed projections, c d, and apertures, c' d', for securing the dial, E, and preventing the position of the same being changed without detection, substantially as and for the purposes specified.

Second, I claim the metallic plate, G, applied beneath the dial, E, and aperture, A2, to prevent the entrance of a pointed instrument, as described.

Third, I claim the cloth, G', placed beneath the aperture, A2, and saturated with printer's ink or other suitable material or covered with transferring paper for preventing fraudulent inscriptions, as explained.

47,267.—Lantern.—J. S. and T. B. Atterbury, Pittsburgh, Pa.:

We claim, first, Securing in place the guard frame of a lantern in the act of securing the metallic mountings or collars to the globe of said lantern, substantially as described.

Second, The combination of screw collars, rings or mountings, B B', with a wire guard frame, and a globe adapted to receive the same, substantially as described.

Third, A lantern globe constructed substantially as described.

47,268.—Globe Lantern.—James B. and Thos. S. Atterbury, Pittsburgh, Pa.:

First, We claim a signal globe lantern having one or more signal plates, b, applied to it, substantially as described.

Second, The combination of a reflector, a, signal plate or plates, b, and lantern globe, A, substantially as described.

48,269.—Making Printed Felt Hats.—Alfred Bailey, Amesbury, Mass.:

I claim as my invention my improved mode, as above described, of making a printed or embossed felt hat.

47,270.—Feed Bags for Horses.—A. T. Ballentine, New York City:

I claim the combination of the flexible bag, A, head stall, a b, rope, B, sheaves, C, and adjusting loops, c, all as herein described and for the purposes specified.

[This invention relates to a new and improved feed bag to be applied to a horse so that the latter may eat therefrom while in harness, and without the aid of any support or fixture for the bag to rest upon.]

47,271.—Self-lubricating Spindle Bolsters of Spinning Frames.—Stephen S. Bartlett, Providence, R. I.:

First, I claim the combination with the bolster and casing of a spinning frame spindle of a vertical groove, d, and oil hole, g, substantially as and for the purposes described.

Second, The combination of the groove, m, in the upper part of the bolster, C, with the vertical groove, d, and oil hole in the casing, substantially as and for the purposes described.

Third, The combination of the circular grooves in the bolster and casing with the vertical groove, d, and oil hole, g, substantially as and for the purposes specified.

Fourth, The combination with the bolster, C, of a casing, a, having a vertical groove, d, oil hole, g, and inner spiral groove, n, substantially as and for the purposes specified.

47,272.—Apparatus for Carbureting Air.—John A. Bassett, Salem, Mass.:

First, I claim the general arrangement and construction of the apparatus as shown and described.

Second, The carburation of air or gases by the submerged serrated tubes in combination with the reservoir, substantially in the manner described.

Third, The combination of a power meter, constructed substantially as described, with an apparatus used to aerate and vaporize liquid hydro carbons, the whole operating together in the manner and for the purpose substantially as set forth.

47,273.—Barrel for Holding Oil.—John A. Bassett, Salem, Mass.:

I claim the herein-described compound, consisting of the materials specified, or their equivalents, when used for lining or coating barrels or other vessels, substantially as set forth.

47,274.—Waste Saving Attachment to Cording Engine.—Anthony A. Bennett, Norwalk, Conn.:

First, I claim the combination of the curved shell waste saver, A, having a plain face and the receptacle guard roller, c, or their equivalents, in the manner and for the purpose substantially as herein described.

Second, The clearing brush, G, or its equivalent, operating in combination with the waste saver, A, and the guard roller, c, for the purpose described.

47,275.—Fire Proof Roof Composition.—N. E. Blake, Almond, N. Y.:

I claim the within-described composition, made substantially in the manner and proportions as set forth.

47,276.—Harness Saddle.—Politorus Bottyer, Newark, N. J:

I claim inserting the rein hook in, and securing it to, the saddle-

tree, as hereinabove specified; also holding the parts of the saddle together, in the manner described, when so held in combination, with the improved manner of holding the hook.

47,277.—Whip Socket.—James F. Brewer and Enos E. Stow, Plantsville, Conn.:

We claim the securing of whip sockets to the dash-boards of vehicles by means of straps passing alternately in and out through slots or openings in the socket, substantially as herein shown and described.

[This invention relates to an improved mode of attaching whip sockets to the dash-boards of vehicles by means of straps.]

47,278.—Self-Lubricating Spindle Bearing for Spinning, etc.—George W. Briggs, Fiskeville, R. I.,

I claim in upright and inclined bearings the cup or socket, D, attached to and revolving with the spindle, in the described combination with the spiral groove, G, in the bearing, C, for the purposes set forth.

47,279.—Sawing Machine.—Victor H. Buschmann, Baltimore, Md. Antedated April 17, 1865:

First, So arranging and supporting feed and pressure roller frames, B B', which are controlled by a central force that, while they will preserve their parallelism and accommodate themselves to boards of different thicknesses passed between them, they are also allowed to deviate from parallel planes and accommodate themselves to boards of uneven or unequal thickness, substantially as described.

Second, The employment of pressure rollers, f f, or their equivalents, applied so as to guide and hold the ends of the boards up to the saw after leaving the main pressure rollers, substantially as described.

47,280.—Combined Spittoon and Foot Warmer.—George B. Clarke, Leonardsville, N. Y.:

I claim a combined spittoon and foot warmer, or furnace, constructed substantially as described.

47,281.—Artificial Leg.—Richard Clement, Philadelphia, Pa.:

First, I claim the removable pin, I, when used in the manner and for the purposes specified, substantially as described.

Second, The cord, L, in combination with the pulley, M, and spring, N, when constructed in the manner and for the purpose specified, substantially as described.

47,282.—Treadle Motion.—Albert L. Dewey, Westfield, Mass.:

I claim the spring, E, and hub, D, applied to shaft, A, substantially as shown and used, in connection with a foot treadle, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved treadle motion designed for turning lathes, sewing machines, and all other devices in which motion is given a rotating shaft through the medium of a foot treadle.]

47,283.—Guide for Piston Rods.—Edward Dunscomb, Boston, Mass.:

I claim as my invention, in a crank eccentric or any equivalent motion or movement, the employment and application of anti-friction rollers, substantially as hereinbefore described.

47,284.—Balanced Slide Valves.—Charles E. Emery, Brooklyn, N. Y.:

First, I claim the combination of a valve, of the kind or style above specified, with its seats in such a manner that when the parts, a and b, of the valve are secured together, or cast or formed in a single piece, the whole valve may be inserted in and removed from its place, by putting one part, b, through an open[illegible]c, in one of its seats, a', substantially as described and as shown in the figures numbered 3.

Second, The use of the supports, a'' a'', Figs. 4, or their equivalents, between the valve seats, a' and b', and of the standards or supports, s s, between the parts, a and b, of the valve, with actual or metallic contact at such of their joints as can vary the distance between the valve seats or faces, combined in manner described, to secure the purposes herein specified, with a common joint, of any reliable kind, to prevent leakage, substantially as shown and applied in Figs. 4, between the steam chest, seat, a', and cover, D.

Third, The combination, to accomplish the purposes intended and specified, of a double-faced slide valve, of the kind or style to which these improvements are applied, as above expressed, with a steam chest or its equivalent, supporting one or both the parallel valve seats, and so constructed that all joints between the parts of such steam chest or equivalent or between such steam chest and either or both of said valve seats, a' and b', which can vary the distance between said seats, are made in sufficient actual or metallic contact, by scraping, grinding, or other means, to be tight without other appliances, and sustain said seats at a proper and certain distance from each other, substantially as described.

47,285.—Hand Spinning Machine.—Turner Evans, Paris, Iowa:

I claim the combination of the roll receiver, H, the crank shaft, R, the spindle frame, o, the thread guide, m, the shaft, T, with pulleys attached, the bar, G, the pivoted bar, F, spring, W, and the hook, u, the whole constructed and operating substantially as and for the purpose herein set forth.

47,286.—Process of Working Silver Ores.—William L. Faber, New York:

First, I claim the within described process for treating silver ores, consisting of eight different manipulations, as enumerated under the proper heads.

Second, Also the process as modified by omitting the first and sixth manipulations, and treating the ore as described under the second, third, fourth, fifth, seventh and eighth heads.

Third, Also the process as modified by omitting the fourth, seventh and eighth manipulations, and treating the ore as described under the first, second, third, fifth and sixth heads.

[The object of this invention is to work silver ores more economically than can be done by the present process, and it is intended to be applied to real ores of silver, such as occur in Arizona, Nevada, etc., but not to argentiferous lead ores. Where gold occurs with the silver ores, it is all obtained by this process, alloyed with the silver.]

47,287.—Skate.—John P. Farmer, Cambridge, Mass.:

I claim the combination and arrangement of the encompassing toe strap, D, with the slider E, its retracting mechanism, the heel catch, C, and the foot rest, A, applied to the runner, B.

I also claim the arrangement and combination of the screw, F, and the nut, G, with the toe part of the skate runner and the slider, E, and strap, D, the whole being substantially as described.

I also claim the combination and arrangement of the passage, a, with the slider, E, and the screw, F, and the nut, G, arranged at the toe part of the skate runner as described.

47,288.—Hoop Lock for Cotton Bales.—E. Victor Fassmann, New Orleans, La.:

I claim the plate, A, provided with the slots, B B, and ridges or projections, b b, at one or both sides of the plate, and with the slits, a', to form a new and improved cotton bale, tie or hoop lock as set forth.

[This invention relates to a new and improved fastening for securing iron hoops on cotton bales previous to the removal of the latter from the press and which fastenings are commonly termed "cotton bale ties," or "hoop locks." The object of the invention is to obtain a tie or lock for the purpose specified, which may be cheaply manufactured, admit of having the ends of the hoops readily applied or attached to it to secure the hoops on the bales, and which will admit of the hoops being applied to bales varying in size or dimensions.]

47,289.—Mine Pump.—Thomas M. Fell, New York City. Antedated April 7th, 1865:

I claim the combination of the several devices, viz:—The cylinder, a, connected with the mine pump by the rods, T, exit pipe, S, weight, V, chain, w, condensing apparatus, K Q and L, and the valves, B C R L and O, substantially and for the purpose as herein set forth.

47,290.—Rock Drill Apparatus.—Wm. S. Fickett, Rochester, N. Y.:

First, I claim working the drill by means of a crank composed of a fixed arm, C, and a loose one, C', constructed and operating conjointly, substantially in the manner shown and for the purposes described.

Second, The employment of the locking bar or latch, G, for the loose arm of the crank, said bar having an automatic action substantially as and for the purpose set forth.

47,291.—Stove.—Charles Fownes, Pittsburgh, Pa.:

I claim the annular deflectors, F G, attached alternately to the external case, A, and internal tube, D, in the described combination with a fire chamber from which heated products of combustion are passed through the annular flue so as to heat air in its passage through the air tube, D.

[This invention relates to a new and improved stove of that class designed for giving the draught or products of combustion a circuitous route in its passage from the fire chamber of the stove to the flue so as to cause a greater radiation of heat than when there is a direct draught, and which are also designed for heating air for warming apartments in a building other than that in which the stove is placed.]

47,292.—Churn.—A. O. Gallup, Salem, Conn., and E. A. Hewitt, New London, Conn.:

We claim, first, Forming the sides or bottom of the churn, or both, with a series of sharp pointed spurs or projections, arranged substantially as and for the purpose specified.

Second, The use of the pointed dashers or beaters arranged as described and for the purpose specified.

Third, The combination of the dashers, h h, with projections, f f, arranged and operating substantially as described.

47,293.—Smoke Pipe Damper.—Edward M. Gardner, Nantucket, Mass.:

I claim the combination of the curved damper with the round pipe, and the air inlet, C, such damper being hinged to the pipe and arranged with respect to the said air inlet in manner and so as to operate with the same and the pipe substantially as specified.

47,294.—Plow.—Joseph George, Green Co., Mo.:

I claim the curved coulter bar, B, it having a heel, e, secured to the back brace, b, and beam, A, as described, in combination with the land side, D, and mold board, C, they forming plow shares of various sizes, to be fitted on one stock, the same being secured, and operated substantially in the manner herein set forth.

47,295.—Composition for Cleaning Marble, Etc.—Wm. Ginnaugh, Niles, Mich.:

I claim the within described marble restorative made of the ingredients specified and mixed together in about the proportions and substantially in the manner set forth.

[This invention is intended for cleansing, restoring and purifying marble, namely tomb stones, monuments, etc., exposed to the weather. Such articles are liable to turn black from the influence of the atmosphere and by the application of this preparation with a stiff brush all dirt and spots will be removed, and furthermore the pores of the marks are filled up so as to admit no more dirt or moisture after its surface has once been cleaned. By the use of this preparation a beautiful finish can be given to the marble and it is readily restored to its natural color.]

47,296.—Artificial Fuel.—Gilbert R. Gladding, Providence, R. I.:

I claim a composition fuel composed of the combustible materials above mentioned in combination substantially as described, and held in mass by fine and adhesive clay or similar substances as specified

47,297.—Machine for Crushing Ore, Etc.—Alexander W. Hall, New York City:

I claim the combination of a horizontally moving direct action stamp and a stationary abutment having the upper parts of their working faces convergent and the lower parts thereof parallel, when the movement of such stamp is produced by an eccentric at the rear end of the stamp acting in concert with a sliding journal box near the head of the stamp, substantially as and for the purpose herein specified.

47,298.—Cooler for Breweries.—Adolph Hammer, New York City:

I claim the horizontal partition, a, with a double set of zig-zag flanges, b b, one above and the other below in combination with the pan, A, constructed and operating substantially as and for the purpose set forth.

[This invention consists in a cooler divided in two chambers by a horizontal partition which is provided on its top and bottom with zig-zag flanges in such a manner that the water or other liquid to be cooled can be passed in an indirect current through the upper chamber while an opposing current of the cooling liquid passes through the lower chamber and the cooling of the wort can be effected in a shallow pan in a short time and when covered without exposing the wort to the decomposing influence of the atmosphere.]

47,299.—Pump.—Joseph Hampson and George Ladue, Newburgh, N. Y.:

We claim, first, The arrangement, to lift both suction valves and one discharge valve, by means of small cogs, below the valves, connected by the rods, r1 r3 r4, to the one main rod, P P', and by a spiral spring applied to the rod, P P', as specified.

Second, In combination therewith a solid piston, having an exterior of brass attached, as herein specified.

Third, The application of india-rubber plates on the inside of the cylinder heads, so as to form a packing and a cushion for the piston, all substantially as shown and described.

47,300.—Lap Shaver and Leather Splitter.—John Harvey and Frederick Herkstroder, St. Louis, Mo.:

We claim the adjustable pillar block, a, the pressure roller, d, the gage, e, and the adjustable lock pin, i, arranged and operating in the manner and for the purpose set forth.

47,301.—Separating Gummy and Silicious Matters from Vegetable Fibers.—Chas. Heaton, New York City:

I claim the application of mechanical pressure substantially as described for the purpose of separating gummy or silicious matters from vegetable fibrous materials.

[The object of this invention is to seperate gums, silicious and other surrounding matters from the gums in a simple and expeditious manner, and to substitute mechanical means in part for that purpose.]

47,302.—Wire Broilers or Toasters.—H. A. Hildreth, Lowell, Mass., and W. J. Johnson, Newton, Mass.:

We claim as an improvement in the construction of wire broilers and toasters, the crimping of the ends of the frames for the reception of the bars, or slats, substantially as and for the purpose described.

47,303.—Bayonet Attachment.—Wm. Hoffman, Washington, D. C.:

I claim the form above described of the bolt and plate making part of the frog or attachment, which prevents the scabbard from revolving above the horizontal line on either side.

47,304.—Steam Trap.—Peter Hogg, New York City:

I claim, first, The open mouthed float with its valve collar or their equivalents in combination with the perforated pipe, D, substantially as described.

Second, The use in steam traps of an open mouthed float which opens and closes the orifices for the discharge of water from the trap substantially as described.

Third, The combination of the float constructed substantially as shown with the discharge pipe, D, the casing, A, and the connecting pipe, G, substantially as shown.

47,305.—Gum Elastic Coupling Spring.—Samuel M. Hoover, Carlisle, Pa.

I claim the use of elastic rubber enclosed in a metalic case, constructed and connected, substantially as and for the purposes specified.

47,306.—Calendar Clocks.—Henry B. Horton, Ithica, N. Y.:

I claim, first, The use of the stops or pawls, S and S X, or other equivalent device, for the purpose of fixing with precision, the movements of the month, the day of the week, and the year wheels as described.

Second, The lever cam, f, on the month wheel, J, for the purpose of passing the stop or pawl, K, over the 31st tooth of the month wheel, for months of 30 days, and over the 30th and 31st teeth for February, leap year; and over the 29th, 30th and 31st teeth of said wheel, when February has 28 days, or otherwise using the said lever cam, f, for the same purpose.

Third, I claim the detached lever, a, for the purpose of changing the length of the months, and of February in leap year, in a 31 toothed month wheel; and also the detached lever when acting in combination with the lever cam, f, of the month wheel, the cams on the year disk, and the projections on the four year wheel.

Fourth, I claim putting on, but not fixing fast, the four year wheel to the shaft of the month wheel, as described.

Fifth, I claim the wide cam, e, on the corrugated disk, Z, of the year wheel or its equivalent, for the purpose of carrying the bent rod lever, a, on the projections of the four year wheel.

Sixth, I claim operating the calendar by the slotting of the rod, B, about the shafts of the cam, A, for retaining the rod in its place; and also by the combination of the cam, A, and rod, B, producing the changes of the calendar instantaneously, at midnight.

Seventh, I claim securing by the pin, W, the double flexion of the rod, B, at C, and thus the pawls, T and U; and also holding the lever, H, by the other pin, w, and the pawls under it; and also by the said pins, the pawls, m and k; thereby preventing any displacement of the calandar during transportation.

Eighth, I claim the click, r, for reducing the labor of bringing up the weight lever, n, drawing a period of 72 hours or less, according to the distance the lever falls, by the lengths of different months.

47,307.—Farm Gate.—James G. Hunt, Cincinnati, Ohio:

I claim, first, The hollow cap, composed of plate, C', constructed and applied together and to the gate post, A, substantially as and for the purpose described.

Second, The arrangement of pulleys, g g', on the arm, e, of the segment in combination with the pull-cords, i i', arranged and operating upon the gate and bolt, m, substantially as described.

Third, The levers, D, G, rod, n, and spring bolt, m, applied to a swinging gate which is opened and closed by means of two cords, i i', acting upon a system of levers substantially as described.

47,308.—Cleansing and Revivifying Charcoal.—Gustavus A. Gasper, Charlestown, Mass.:

I claim the washing or cleansing of the charcoal within the filter by reversed currents of water, and by steam applied to it substantially as herein before described.

And in combination therewith, I claim the application of an acid solution, substantially in the manner and for the purpose described.

I also claim the combination and arrangement of the separate blanket chamber with the filter, so applied to the filter as to enable the blanket or blankets to be removed from it without disturbance of the charcoal charge of the filter.

I also claim the application of the exhaust cock, h, and the pipe, t, or either to the side of the filter and to its blanket chamber substatially in manner as described.

I also claim the combination and arrangement of the cistern, F, its pipes, p' t, and the discharge cock, c, with the filter, A', the pipes, p' and t, having stop cocks, b and d, and the whole being to operate substantially as described.

I also claim the combination of the filter, an apparatus or means of causing water to flow through it in reversed directions, and a means of applying steam to the filter or the contents thereof in manner and the whole being for the purpose or objects as specified.

47,309.—Cock.—Nathiel Jenkins, Boston, Mass.:

I claim, first, The swivel, H, in combination with the follower, E, and seat, L, substantially as and for the purpose described.

Second, The combination and arrangement of the thimble, I, swivel, H, and packing, K, substantially as and for the purpose described.

47,310.—Lightning Conductor.—Isaac Johnson, Lodi Station, Ill.:

I claim a lightning conductor composed of a triangular tube, A, with inwardly arched sides, in combination with a continuous central iron wire, C', extending partly or wholly through the length of the tube, substantially as and for the purpose herein set forth.

47,311.—Manufacture of Friction Matches.—Stefan Kackowizer, New York City:

I claim the formation of a metallic skin around the friction or phosphoric mass of matches consisting of sulphide of lead, substantially in the manner above described.

47,312.—Chandelier.—Peter Loth, New York City:

I claim, First, A chandelier and central adjustable drop light combined as a new article of manufacture.

Second, The chamber, b c g, in combination with tubes and pipes, d' e j, arms f and h, and balance weight, k, or their equivalents, all constructed and operating substantially as and for the purpose set forth.

47,313.—Deoderizing Coffin.—Alfred E. Lyman, New York City:

I claim the deodorizing machine of the crooked or angular form, for the purposes herein described and substantially set forth.

47,314.—Fastening for Blocks of Shoe Last.—Daniel Lynahan and Harry H. Kock, Buffalo, N. Y.:

We claim the improved device for fastening the blocks to shoe lasts consisting of the revolving hooked bolt, b, and spring, c, or its equivalent, arranged and operating substantially as described.

47,315.—Mechanical Movement.—Wm. C. McGill, Cincinnati, Ohio:

First, I claim the arrangement of shaft, A, ratchet wheel, C, geared levers, D D', and pawls, E E', combined and operated in the manner set forth.

Second, The arrangement of shaft, A, duplex reversed ratchet wheel, C, geared levers, D d and D d', and reversible duplex pawls, E'' and E'', combined and operating as represented.

47,316.—Manufacture of Gun Cotton and Lint.—James P. McLean, Brooklyn, N. Y.:

I claim the introduction and use of the asclepias, or milk-weed fibers, N N, figures 1 and 2, for the manufacture of a new article of gun cotton, also for lint, either from the fiber itself or from the fabric or yarn made of the fiber, as above set forth.

47,317.—Cartridge for Small Arms.—David M. Mefford: Cincinnati, Ohio:

I claim the combination of the wood case, A, the binding cord, f, the metal cap, e, and the fuse tube, D, for explosive cartridges as herein described, for the purposes set forth.

47,318.—Dusting Brush.—C. Mason Moody, Greenfield Mass.:

I claim a dusting brush composed of a series or bundle of flexible or elastic quills or supports, A, to which any suitable soft flossy or fibrous material is attached, substantially as herein shown and described.

[This invention relates to a peculiar mode of forming a dusting brush, to be used as a substitute for the ordinary "feather duster," so called, it being much cheaper, and possessing nearly the same flexibility and softness.]

47,319.—Printing Press.—Richard W. Moran, St. Louis, Mo.:

First, I claim the combination in a single printing press of two independent type cylinders, B B', and corresponding impression cylinders, H H' and J J', with each other and with independent systems of tape rollers and endless tapes, substantially as herein set forth, whereby two separate rolls or sheets of paper may, in passing simultaneously through the press, both receive on each side opposite impressions from each type cylinder.

Second, I also claim the within-described combination of distinct galleys, g g, with the turtles, E E, of a printing press when the same are constructed and arranged substantially in the manner and for the purpose herein set forth.

47,320.—Bean Harvester.—D. B. Munger, Mumford, N. Y.:

First, I claim the cam guides, g, in combination with the puller heads, H, substantially as and for the purposes set forth.

Second, In combination with the cam guides, g, and puller heads, the springs, S, or their equivalents, for the purposes specified.

47,321.—Apparatus for Manufacturing Sugar Wine and Oil from Sorghum.—Isaac Myers, Pisgah, Ohio:

I claim the arrangement, construction and combination of the oblong furnace, A, adjustable molasses pan, J, finishing pan, N, boiling water pan, F, with its steam condenser, R, all as herein described and for the purposes herein set forth.

47,322.—Tackle Hook.—Joseph W. Norcross, Middleton, Conn.:

I claim the band, B, passing around the neck and point of the hook and secured to the latter, in the manner herein set forth.

[The object of this invention is to overcome two of the principle difficulties experienced in the use of the common hooks, etc., viz.: the straightening of the hook and the spontaneous unhooking of the same.]

47,323.—Tension Pulley.—A. B. Nimbs, Buffalo, N. Y.:

I claim, first, Supporting the tension pulleys, B, in a frame, A, of cast iron, having in itself sufficient weight to give the required tension to the belt, substantially as described.

Second, The combination of the spherical sleeve, C', within which the straight journal of the shaft runs, with the spherical socket, C, for the purposes and substantially as set forth.

Third, Supporting the tension pulleys, B, in the frame, A, by means of journal boxes, C C', made capable of adjustment to bring the tension pulley shafts in line with that of the driver, without such adjustment causing them to bind the journals running therein.

47,324.—Traveling Lunch Bag.—John H. Noyes, Oneida, N. Y.

I claim a combined traveling bag and lunch box or receptacle, with or without the pocket, constructed and arranged as herein set forth.

[This invention consists in combining with a traveling bag a lunch box or receptacle and also a pocket, if desired, all being constructed and arranged in such a manner that the necessary clothing of a traveler, letters and papers, and also provisions or lunches, may be carried in one device with equally as great facility as clothing alone, can be carried in the ordinary traveling bags.]

47,325.—Lock.—Henry Oaks, Waynesboro, Pa.:

First, I claim the hooked detachable hasp, I, in combination with the bar, D, the expanding jaws, J T', and spring, K, substantially and for the purpose described.

Second, The combination of the expanding jaws, J J, and spring, K, with the drawing and thrusting bars, L M, operated respectively by the bits, R S, on the key, as described.

Third, The key, Q, with the operating bits, R S, as described, and the supplementary safety bits, T, located on the shank relatively to a notch in the side of the passage way occupied by the shank in unlocking and affording a means of adapting each key to a specific lock as described

47,326.—Thrashing Machine.—S. E. Oviatt, Richfield, Ohio:

I claim, first Discharging the blast from the case, K, above the thrashing cylinder through a pipe or flue upon the separating carrier between the thrashing cylinder and the tail board, for the purpose of bearing down the straw upon the separating carrier and of forcing the same along without clogging as well as for clearing the front of the machine from dust, substantially as and for the purpose described.

Second, Hinging the stocker to the rear end of the thrashing machine in such a manner that is perfectly free to be elevated or depressed on said hinge without changing the relative positions of the pulleys, D and D', which operate the elevator belts of the stocker, substantially as and for the purposes described.

Third, I claim the braces, I I, in combination with the carrier, C C, and S, as described.

Fourth, I claim the grain box, F, with the inclined planes, G G, and gates, F, so arranged as to draw the grain from either side of the machine, as herein specified.

47,327.—Foot Warmer.—Charles Palmer, Brookline, Mass.:

I claim a foot warmer, consisting of a receptacle, B, for holding sand upon the surface of which the gas is burned and a box or casing, A, provided with a perforated foot rest, substantially as described.

47,328.—Air Compressing Apparatus.—John S. Patrie, Victor, N. Y.:

I claim, first, The combination of the floats, F and F', and the diaphragm, d, with the inlet and outlet water valves, a, and E and E', all the parts being arranged and operating within the air and water chamber,

Second, Operating the water valves, a and E, by the bar, s, which is connected to the flexible diaphragm, d, substantially as set forth.

Third, The combination of the floats, F and F', with the jointed levers, f and f', arranged and operating substantially in the manner and for the purpose shown and described.

47,329.—Hog Tamer.—Theodore G. Pelton, Lyons, Iowa:

I claim the slotted spring, e, the slotted jaw, a2, the grooved jaw, a, with its gage, B, the barbed wire, m, of steel or iron, all for the purpose as above set forth.

47,330.—Horse Carriage.—Robert Perrine and Samuel M. Stewart, Rochester, N. Y.:

We claim the construction and arrangement of the cranes, B, and the box, C, and their connection with the same springs, h, by means of the joints, G, or equivalent, substantially as and for the purposes herein set forth.

47,331.—Machine for Tempering and Preparing Peat.—Nath'l F. Potter, Providence, R. I.:

First, I claim the use of a series of combing teeth, a a a, or their equivalents, operating upon the mass of peat to remove the undecomposed vegetable fiber, in the manner and on the principle substantially as described.

Second, The combination of a brush or a series of brushes, O, or clearers with the combing teeth, a a a, substantially as described for the purposes specified.

Third, The employment of a series of comb teeth, N, arranged substantially as shown, in combination with the brush or series of brushes, O, for the purposes described.

Fourth, The method substantially as described, of separating the vegetable fiber from a mass of crude peat and transferring the same to a place where it can be removed by the combination of the movable set of comb teeth, a o a, the stationary set of comb teeth, N, and the clearing and delivering brushes, O, as herein set forth.

Fifth, The use of a receiving trough, G, or its equivalent, provided with the Archimedean screw, K, arranged and operating to receive the refuse vegetable material extracted from the peat and to deliver the same to suitable receptacle, as described.

Sixth, The combination of such receiving and delivering apparatus with the apparatus for extracting and transferring the refuse vegetable material to the same, as herein described.

47,332.—Cultivator.—T. J. Potts, and P. C. Yost, Hamilton, Ill.:

We claim the lever, L, fitted in the slotted bar, M, and connected at its rear to a cross bar, J, attached to the standards, e, at the rear of each beam, the front end of said lever being fitted between the prongs, h h, of a foot lever, N, and all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a cultivator of that class in which the driver may ride upon the machine and operate or adjust the plows; it also consists in the means employed for operating the plows, whereby it is believed that a simple and efficient cultivator is obtained and one which may be operated with the greatest facility and possess no parts which are liable to get out of repair.]

47,333.—Apparatus for Separating Fish Oil from Water and other Impurities.—Thomas L. Robinson, Boston, Mass.:

I claim, first, Automatically separating and purifying oils from all extraneous matters and liquids contained therein, by means of an apparatus arranged and operating substantially as herein described.

Second, Forming the oil vessel, b b, with heads or ends of a conical shape, substantially as described and for the purpose specified.

Third, The use of the peculiar-shaped nozzle or sprinkler, z, for the delivery of water to the oil vessel, b, arranged and operating substantially as described and for the purposes specified.

Fourth, Dividing the oil vessel, b b, into two or more chambers, having communication with each other for the purpose of preventing the violent upward agitation of the oil, substantially as described.

Fifth, The apparatus herein described for separating and purifying oils from extraneous and refuse matters and liquids the same consisting of the double-headed conical shaped vessel, b b, oil pipes, o o and r r, water pipes, h and p, and sprinkler, z, or their equivalents, the whole being arranged together and operating substantially as described.

47,334.—Carriage.—Elisha Robbins, Worcester, Mass.:

I claim as my invention the application of the axle to the cart body, so as to be capable of moving underneath and with reference to such body, in manner as described, and connecting the axle with the thills, and the latter with the body by mechanism, substantially as specified.

And in combination with the axle, so applied to the body and thills, I claim the rack and pendulous double catch, or the equivalents thereof, such being applied to the body and axle, substantially as and to operate as described.

I also claim the combination of the tongue, e, and the eye or clasp, f, or their mechanical equivalents, with the axle applied to the cart body and the thills, in manner and to operate substantially as explained.

47,335.—Powder for Lighting Segars, Etc.—Charles William Roesling, Cleveland, Ohio:

I claim the composition prepared substantially as set forth, for the purpose specified.

47,336.—Achromatic Object Glass for Photographic Cameras, Etc.—Hermann Roettger, Philadelphia, Pa.:

I claim the construction of an achromatic object glass, composed of four lenses—two of crown glass and two of flint glass, cemented to compose one object glass for telescopes, as well as for other purposes in the manner shown and described

47,337.—Artificial Fuel.—Julius Augustus Roth, Philadelphia, Pa.:

I claim the impregnation of the solution of lime with sulphurous acid obtained from coal or other sulphate, for the purpose of conglomerating the waste coal dust, and thereby producing a solid fuel, substantially set forth in my specification.

47,338.—Reel for Harvester.—E. P. Russell, Manlius, N. Y.:

First, I claim constructing the shafts of harvester reels in two pieces, S' S2 or their equivalents, operating substantially in the manner and for the purpose specified.

Second, The clamps, I, constructed, applied and operating substantially as and for the purposes herein specified.

47,339.—Graining Instrument.—William Russell, Beloit, Wis. Antedated Dec. 14, 1864:

I claim, as an improvement in a graining machine or tool, the curved-shaped pieces of wood, B B, or any other available material, divided in sections, and attached to the solid piece, A, and made with screws and springs adjustable, and made of brass, iron, rubber or any other proper material, the whole in combination and for the purpose set forth.

47,340.—Leather Shoe String Cutter.—J. A. Safford, Boston, Mass.:

I claim, First, The circular cutter, C, with a tangential opening and a cutting end, h, substantially as set forth and for the purpose described.

Second, The employment of the spring, J, or its equivalent, within the circular cutter, C, substantially as and for the purpose described.

Third, Rendering the tangential opening or throat adjustable, substantially as and for the purpose described.

Fourth, The tangential wing or cutter, i, substantially as set forth and for the purpose specified.

47,341.—Heel-trimming Machine.—Joseph F. Sargent, Boston, Mass.:

I claim the combination of a pattern block with a heel-cutting or trimming mechanism, when the block is so arranged and is of such form as to serve as a pattern for trimming heels of different sizes and contours, substantially as set forth.

Also, A mechanism so organized that the size and form of the heel are determinod by the size of the shoe and patterns or pattern block, substantially as set forth.

Also, The combination of the jaws, l, arm, l, inclines, h, and pattern block, arranged to operate together, substantially as specified.

Also, The employment of an adjustable or spring last pin, in connection with a clamping mechanism, substantially as described.

Also, The auxiliary roll, r, in combination with the pattern roll, for giving the proper angle of presentation to the stationary knife, g.

Also, The arrangement of a shoe in a yoke with the heel, centered with respect to the post which carries the pattern, and so as to be held toward and rotated with respect to the cutting mechanism, substantially as set forth.

Also, The arrangement of the mechanism by which when the joint between the heel and vamp is irregular the shoe shall have a corresponding vertical movement given to it, as set forth.

47,342.—Railway Car Seat.—Geo. W. Sayre, Pisgah, Ohio:

I claim the arrangement, construction and combination of the upright ends, G, of the bar, E, notched lever, M, and adjustable flat spring, J, as herein described and for the purposes set forth.

47,343.—Machine for Covering Wire.—T. S. Sperry, New York City:

First, I claim in a machine for covering wire with wire, making the main wire self-feeding by means substantially as herein described.

Second, The smooth projection, d, on the end of the hollow spindle, C, in combination with one or more guides, c, or equivalent therefor, or the disk, F, which carries the spools containing the covering wire, substantially as and for the purpose shown and described.

[This invention relates to an improvement in that class of machines which are used for the purpose of covering wire of inferior metal with thin wire of some more costly and non-corrosive metal, and the engraved machine is intended to be used particularly for covering skirt wire, but it can also be used for wire of any other description, flat or round.]

47,344.—Pump.—N. Sutton, Detroit, Mich. Antedated April 3, 1865:

I claim the combination and arrangement of the eccentric gearing with the piston rods, C D, substantially as and for the purpose specified.

I further claim the stuffing box, E, when applied to the upper bucket or piston, B, and used in combination with the solid and tubular piston rods, C D, substantially as and for the purpose set forth.

47,345.—Carding Machine.—Daniel Tainter, Worcester, Mass.:

First, I claim the combination with the main frame of a machine for carding wool or cotton of a supplemental hinged or swinging frame for supporting the feed rolls, burr and leading in cylinders, substantially as and for the purposes described.

Second, The combination with the hinged frame, H, of the pivoted hook, b, or its equivalent, with the pin, c, on the main frame, substantially as and for the purposes specified.

Third, Mounting the burr cylinder and feed rolls on a hinged frame, whereby said cylinders and frame can be lowered or removed from the main cylinder, substantially as and for the purposes described.

Fourth, Mounting one or more of the small cylinders which assists in conveying the fibrous material to the main carding cylinder of a wool or cotton-carding machine upon a hinged swinging frame, whereby the latter can be expeditiously lowered or removed from the main cylinder, for the purpose of clearing, grinding or repairing said cylinders, or to make room for the easy removal of other cylinders, substantially as herein described.

47,346.—Grain Separator.—B. F. Trimmer, Rochester, N. Y.:

I claim a draught passage, D, of sufficient transvese dimensions to enable a draught proportioned in amount to the quantity of grain passing through it, to be employed and arranged so as to diffuse or concentrate the draught uniformly upon the falling grain, according to the kind, quality or condition thereof, and at right angles, or nearly so, thereto; and in combination therewith a valve, I, and board, K, or its equivalent, arranged so as to properly separate the sound grain from the refuse, as the intensity of the draught, or the kind or condition of the grain varies, substantially as herein specified.

Second, In combination with the board, K, having a passage for the draught both above and below, and with the pocket, I, I also claim the valve, N, so arranged as to cut the passage off entirely at the top and force it to pass downward through the pocket, or to allow the passage at the top, substantially as described.

Third, I also claim the adjustable board, H, arranged in combination with the mouth, a, of the space, D, in such a manner as to contract or concentrate the draught upon a particular portion of the falling stream of grain, or to diffuse it through said space, substantially as described.

Fourth, I also claim a series of two or more pockets, I I', in combination with the screws, S S S, beneath, in such a manner the contents of said pockets will fall on said screens, and mix with the main portion of grain through sprout, F, and so that the pockets, I', that contain the greatest amount or refuse with the smallest amount of sound grain, shall pass over a shorter space of the screens, substantially as described.

Fifth, I also claim the combination and arrangement of the tilting board, W, with the pocket, I', screens, S S, tube, T, and discharge pipe, p, in such a manner as either to discharge the contents on said screen, or into said spout, substantially as herein set forth.

Sixth, I also claim the combined construction and arrangement of the tubes, T U, provided with the valves, t t'', at their upper ends, and having the grain crossing the lower ends from the screens, by means of the chutes, q s, as and for the purposes herein described.

Seventh, In combination with the shoe, P, I also claim the spring standards, Q Q', those in the rear being raised or lowered by means of the rock bar, k, and pinion, l, in such a manner as to adjust the angle of the shoe, said shoe being operated by the spring pitmens, R R, the whole arranged and operating substantially as and for the purpose herein set forth.

Eighth, I also claim the removable section, S', and the slide, S'', of the screens, S S, arranged in relation to said screens, and the shoe, P, in such a manner that the end of the shoe may be opened to allow the cleaned grain to fall directly through, substantially as described.

Ninth, I also claim, in combination with the section, S', of the screen, provided with enlarged perforations, the slide, u, substantially as and for the purpose herein set forth.

47,347.—Reservoir for Beer, Wine, Etc.—Mathew Tschirgi, Dubuque, Iowa:

I claim, First, The employment of subterrene structures for the purpose of storing beer and other fermentable liquids, which are constructed of masonry, and rendered impervious to air, substantially as described.

Second, Providing reservoirs of masonry, which are adapted for storing beer and other liquids, with feed pipes, gages and man-holes, substantially as described.

47,348.—Suspenders.—Albert W. Upton, Lowell, Mass.:

I claim the improved suspenders as made with the single elastic dorsal strap, b, arranged and combined with the shoulder and back buttoning straps, substantially in manner and by means as specified and as represented.

47,349.—Lock for Piano-forte.—Sylvenus Walker, New York City:

I claim a lock, constructed with the diagonal movement of the bolt, B, substantially in the manner and for the purposes set forth.

47,350.—Breech-loading Firearm.—Albert M. White, Port Chester, N. Y.:

I claim operating the latch which holds the lock frame in position in the receiver, by means of the trigger, substantially as above described.

Second, I also claim elongating the slot in the trigger which receives the joint pin, r, of the latch, in a vertical or nearly vertical direction, so as to permit the trigger to have a vertical downward movement, when it is pushed forward to draw the latch, substantially as above described.

Third, I also claim elongating the slot, c, of the fulcrum, J, horizontally to permit the trigger to move horizontally forward when unlatching the lock frame, substantiantially as described.

Fourth, I also claim the combination of the vertically-elongated slot, q, and the horizontally-elongated slot, c, as arranged to permit the —— and the trigger to have a vertical, horizontal and rotary motion, when the latch, G, is thrown forward to release the lock frame, substantially as described.

Fifth, I claim the spring cartridge shell drawer, connected with the swinging breech-piece or lock frame, by means of a pin, h, and slot or lock, i, in such manner as to preserve the connection while the pin, h, moves in a circle concentric with the pin, J, on which the breech swings, and the said drawer moves parallel, or nearly so, with the bore of the barrel, substantially as herein described.

Sixth, I claim so combining and arranging the hammer and the trigger in a swinging breech piece or lock frame, that the two may form arms of a three-armed lever, of which the attachment of the cartridge shell drawer forms the third arm, and of which the pin on which the trigger works is the fulcrum, whereby with the thumb in front of the comb of the hammer, and the fingers behind the trigger, the whole power of the hand may be applied to withdraw the cartridge shells from the barrel, substantially as herein specified.

Seventh, I claim the sliding latch, G, and the stop, s, in combination with each other, as described, as a means of forming a rigid connection between the hammer and trigger, whereby they are made to serve as two arms of a lever, for the purpose of withdrawing the cartridge shell.

47,351.—Harvester.—Benjamin Wieland, Orangeville Ill.

I claim the combination of the adjustable platform, D, uprights, B, and the endless sickle, constructed as described, and operated through the medium of the spur wheel, q, pinion, p, bevel gearing, o m, shaft, F, and polygonal pulley, as described and represented.

47,352.—Pad-lock.—Daniel T. Brown, Newton, N. Y., assignor to James H. McWilliams, New York City:

I claim, First, A compound tumbler, f, swinging upon the bolt, d, and acting in the manner specified, to retain the tumblers when unlocked, substantially as specified.

Second, I claim projecting the bolts by the action of the spring, compound tumbler and incline, 4, substantially as specified.

47,353.—Artificial Leg.—Theodore Burr, Battle Creek, Mich., assignor to himself and Smith M. Kellogg:

I claim, First, The segment, C, constructed with the plates, c c, and otherwise, substantially as described, for the purpose set forth.

Second, The combination of the parts, F G r, constructed and applied so as to form a knife-edge joint, substantially as described.

47,354.—Knitting Machine.—A. C. Carey, Malden, Mass., assignor to Samuel A. Bradbury, Dorchester, Mass.:

I claim, First, A knitting machine, so constructed as to be capable of knitting the closed end or tip of a stocking, or other tubular article, in the manner and by the means substantially as described.

Second, The combination of the two rows of needles, in each of which every needle acts independently of the others, with the inclines, A and A', and the jack, E, as and for the purpose substantially as herein described.

Third, I also claim the ring gear, R, in combination with the moving arms, p and p', the crosshead, a, the slide, s, thread guide, g, and the inclines, A A', substantially as and for the purpose described.

Fourth, I also claim the jack, E, for the purpose of pushing forward successively the needles of the right or left hand row, while those of the other row are forming the loops preparatory to knitting, substantially as described.

Fifth, I also claim the snail wheel, N, in combination with the arms, L L, and the levers and connections by which it operates said arms. I also claim the self adjusting compound weight, as and for the purpose herein described and represented.

Sixth, I also claim, in combination with a jacquard chain or pattern that has at times a revolving or forward motion independent of its frame, and at times an uniform backward and forward motion with its frame, a series of adjustable weights that are in active operation when the chain has its forward or rotary in connection with its backward and forward motion, for the purpose of widening the work as it is being knitted, and that are in passive operation only when the chain has only an uniform backward and forward motion for continuing the work of uniform size or width, substantially as described.

47,355.—Smoke Houses.—William Hamilton (assignor to David Carlisle), St. Louis, Mo.:

I claim the constructing the fire-box, A, outside of the smoke house, in connection with the smoke chamber, B, inside of the house, and the openings, t, and the plate, x, substantially as described.

47,356.—Shoe Fastening.—Charles B. Hatfield (assignor to Charles Eugene Woodman), Boston, Mass.:

I claim the combination of the catch, f, and its socketed plate, C, or their equivalents, with a buckle or strap holder.

I also claim the arrangement of the pointed tongue, b, and the larger or plate tongue, g, and the buckle frame, a.

I also claim the combination and arrangement of the pointed tongue, g, with the buckle frame, a, the catch, f, and its socketed plate, C, or their equivalents.

I also claim the catch socket recess, k, and its mouth, l, as made with reference to the shank of the catch, and arranged substantially as described.

47,357.—Automatic Stop Motion for Steam Engines—John Jackman, Jr. (assignor to the American Automatic Stop Motion Company), Newburyport, Mass.:

I claim the combination of a spring, d or d', and button, e or e',

with the rod, a, or its equivalent, and with the trip lever, B, or inclined planes, B', or their equivalents, and with the governor, A, substantially as and for the purposes herein shown and described.

47,358.—Automatic Stop Motion for Steam Engines.—John Jackman, Jr. (assignor to the American Automatic Stop Motion Company), Newburyport, Mass.:

I claim the sleeve, D, connected to the rod, C, of a governor, and locked to the same by a dog, a, in combination with a spring, d, and button, e, constructed and operating substantially as and for the purpose set forth.

47,359.—Automatic Stop Motion for Steam Engines.—John Jackman, Jr. (assignor to the American Automatic Stop Motion Company), Newburyport, Mass.:

I claim, First, The spring, H, applied in combination with the rod, I, arms, J, catch bars D D, or their equivalents, governor, A, and with a suitable stop, substantially as and for the purpose set forth.

Second, The adjustable cam, c, with an inclined plane, in combination with the lever, K, notched disk, b, spring, H, rod, I, with arms, J, and with the governor and catch bars, or their equivalents, constructed and operating substantially as and for the purpose described.

[The invention which forms the subject of these three patents was profusely illustrated and described on pages 95 and 96 of the current volume.]

47,360.—Detachable Horse Shore Calks.—Charles H. Johnson (assignor to Himself and Chas. Eugene Woodman), Boston, Mass.:

I claim the arrangement and combination of the two tenons, c c, and their mortises, b b, or b' b', on opposite parts of the calk and flange, with the shoe, the calk and the flange.

I also claim the combination of the relievo and incavo crosses, f g, or their equivalents, with the calk, the flange, and the tenons and mortises of the calk and shoe.

I also claim the combination of the lateral recess, d, on the flange, and its corresponding projection, e, on the tenon, with the calk tenon, and flange applied to the shoe, substantially as specified.

I also claim the arrangement of the fastening screw, h, viz., so as to pass through the shoe and through the tenons, as set forth.

47,361.—Apparatus for Stirring and Cooling Lards.—Alonzo R. Judson, (assignor to Himself, E. H. Clark) New York City and James D. Gray Brooklyn, N. Y.:

I claim the combination of the cranks, H H, vertical shafts, C C, radial arms, D D, and stirrers, F G, all constructed and arranged as herein described so as to oscillate the said stirrers simultaneously in horizontal planes and in opposite directions, as explained.

[This invention relates to a new and improved device for cooling lard, and it consists in the employment or use of two oscillating frames or stirrers, arranged uprightly in a vat, whereby lard may be stirred and cooled very expeditiously, and with but a very moderate expenditure of power, as there is but little friction attending the working parts of the device.]

47,362.—Regulator for Gas Burners.—Wm. Mallerd (assignor to J. D. Alvord), Bridgeport, Conn.:

I claim the employment of the independent ring in combination with the inner case and the diaphragm, substantially as herein shown and described.

I also claim the combination of the diaphragm regulator with the diaphragm, substantially as herein shown and described.

I also claim the combination of the said diaphragm regulator with the adjustable valve, substantially as herein shown and described.

[This invention relates to a novel mode of securing a flexible diaphragm within the regulator, whereby its edges are entirely prevented from being cut or worn as it is used, and also in a peculiar arrangement of devices for adjusting the regulator according as it may be desired to allow more or less gas to pass through it to the burner.]

47,363.—Lining Petroleum Barrels, etc.—Thomas Oliver (assignor to Himself and Wm. H. Farrar), Oregon:

I claim, First, A preparation composed of the juice of the prickly pear, or other gelatinous plants, mixed with lime, plaster of Paris, flour, bran, or other similar substances, as a priming or preliminary application to the inside of barrels or other vessels, as and for the purposes set forth.

Second, The combination of a first and second application to the inner surfaces of barrels or other vessels, as described.

Third, The application of the ingredients herein described, when incorporated in one composition, and applied substantially as and for the purposes herein set forth.

47,364.—Fruit Picker.—Benjamin C. Phelps, Wethersfield, Conn., assignor to himself and Frederick H. Williams, Hartford, Conn.:

I claim a vertical blade, C', upon the shank, D, in combination with the vibrating spring lever blade, F H C, basket, B E, handle, A, and cord, G, when constructed and arranged substantially as described.

47,365.—Low Water Indicator for Steam Boilers.—G. Adolph Reidel, Philadelphia, Pa.:

I claim, First, The oscillating receiver, C, combined and arranged with the boiler, A, substantially as described and for the purposes specified.

Second, The jointed pipes, D and E, arranged and operating substantially as described.

Third, The combination of the weighted lever, H, with the receiver, C, substantially in the manner described and for the purpose set forth.

Fourth, The combination and arrangement of the conical valve, N, and whistle, O, or other alarm, substantially as described.

47,366.—Trace Connection.—John E, Seavey, assignor to himself and Edward S. Hutchins, Kennebunkport, Maine:

I claim as my invention the breeching or trace connection as composed of the eye, a, the shank, b, the head, c, the spring, C, the head, g, the passage, d, the notch, e, and the screw, f, or the equivalent of the latter, the whole being arranged substantially as and so as to operate as specified.

47,367.—Lubricator.—Francis Bresson, Paris, France:

I claim the combination of the air-tight vessel, A, with pipes, b c and I, substantially as and for the purpose specified.

I also claim the combination of the air-tight vessel, A, and stopper, B, and pipes, b c and I, substantially as and for the purposes described.

I also claim, in combination with the pipes, b c and I, when applied to the vessel, A, the vessel, A, the concave cap, e, substantially as and for the purpose described.

47,368.—Method of rendering Doors and Windows Water Tight.—William C. Fuller, London, Great Britain. Patented in England Feb. 16, 1864:

I claim the employment of a rib, strip or bead of elastic India-rubber, chemically united to a harder surface, whether of vulcanite or brass, as herein set forth and described.

47,369.—Winding and Setting Watches.—George Gondelfinger, Seloncourt, France, and J. Louis Bichet Besancon, France:

We claim, First, Combining with the wheels, H and H', which respectively control the movements of the watch hands and of the winding devices, a movable double pinion, F, upon a stationary shaft, which pinion can be set in and out of gear with either of said wheels, substantially as and for the purposes described.

Second, The combination with the wheels, H and H', of the movable pinion, F, stationary shaft, A, and spring clutch lever, G, substantially as and for the purposes specified.

47,370.—Winding and Setting Watches.—Charles Eugene Laederich, St. Imier, Switzerland:

I claim the above described arrangement and operation of the stem and its pinion with the train and other wheels, for the purposes and in the manner substantially as described and illustrated in the drawings.

47,371.—Horse Rake.—James M. Jay (assignor to W. H. Alexander & Company), Canton Ohio:

I claim, in combination with the bar, D', and rake head, d, the S shaped hangers, a, so arranged that the bars will swing into one of the curves of the hanger and the rake head into the other, substantially as and for the purpose described.

47,372.—Breech-loading Fire-arm.—William H. Elliot, Plattsburg, N. Y.:

First, I claim a brace which receives the recoil of the breech plate and communicates it to the frame or other portions of the arm, independently of the pivot or bearing of the hammer, when said brace is operated by the hammer substantially as herein specified.

Second, The arrangement of the brace, e, between a hammer and main spring, when said hammer and brace swing upon separate pivots, substantially as herein described.

Third, Operating the brace, e, by means of a hammer which is pivoted to a breech plate, substantially as herein specified.

Fourth, The employment of lock notch, w, for locking the brace out of the way of the breech plate, substantially as set forth.

Fifth, So arranging the full cock notch, v, upon the hammer that that the brace, e, will still support the breech plate when the hammer is cocked for firing, substantially as herein shown and described.

Sixth, Passing the pivot of the hammer through the hubs of the breech plate, substantially as and for the purpose described.

Seventh, The combination and arrangement of the auxiliary spring, l, the half cock notch, u, and trigger, h, substantially as and for the purpose set forth.

47,373.—Car Springs.—G. Adolph Riedel (assignor to A. Merritt Asay), Philadelphia, Pa.:

I claim, First, The tubes, J, combined with the head plates, A B, and arranged and operating in relation to the springs, C F, substantially as hereinbefore described, and for the purpose set forth.

Second, Combining and arranging the spring, C', with the tube, J, substantially in the manner and for the purpose above set forth.

Third, Constructing the combining spring, G, of a twin shape bar or plate, substantially in the form represented in Fig, 4, when operated as described for the purpose set forth.

47,106.—Instrument for Cutting Potato Seedlings.—W. P. L. Herr, Brooklyn, N. Y. Dated April 4, 1865.:

I claim a scoop or cutter constructed substantially as shown in Fig. 2, for the purposes herein described.

REISSUES.

1,934.—Wringing Machine.—Selden A. Bailey, Simeon S. Cook and Benedick M. Cook, Woonsocket, R. I., assignees by mesne assignments of John Allender, New London, Conn. Patented January 11, 1859. Reissued June 28, 1864, and Nov. 8, 1864:

First, We claim a roller made of a spirally-coiled spring, arranged on a shaft or roller made smaller at the center than at the ends, as and for the purposes specified.

Second, A roller so constructed as to yield more at its center than at or near its ends, covered with vulcanized rubber or any other elastic compounds impervious to water, substantially as and for the purpose set forth.

Third, Cog wheels, in combination with rollers of vulcanized rubber, or any other elastic substance, or compound impervious to water, for the purpose set forth.

Fourth, Rollers made of or covered with vulcanized rubber, or any other elastic substance, or compound impervious to water when used in combination with cog wheels, and a spring or springs around the shaft of the roller, for the purpose set forth.

Fifth, Rollers for washing or wringing machines made of or covered with vulcanized rubber or any other elastic substance, or compound impervious to water, when used in combination with adjusting spring or springs.

Sixth, Rollers for washing or wringing machines, made of or covered with vulcanized rubber or any other elastic substance or compound impervious to water, when used in combination with adjusting spring or springs, and screw or screws, to adjust the pressure to the springs and rollers.

1,935.—Corn Planter.—George I. Bergen, Galesburg, Ill. Patented Dec. 1, 1863:

First, I claim the combination in a seed planter of a front frame, carrying the seeding mechanism and a drop-man's seat, and a rear frame, carrying a coupling windlass and a driver's seat, with the slotted coupling, substantially as described, for the purposes set forth.

Second, Balancing the front and rear frames of a seed planter by a windlass, substantially in the manner and for the purposes set forth.

Third, The windlass, C, to balance the front and rear frames, or control the depth of planting in a seeding machine, or to regulate the weight of the tongue upon the team, as set forth.

Fourth, The combination of the chain, fastened to either frame, with the windlass, and running spirally around it, to vary the leverage, substantially as described and set forth.

Fifth, Revolving seat for the drop-man, combined with a seed-planter, constructed and operating as and for the purpose described.

Sixth, The combination of the drop-man's seat with the driver's seat, and with the windlass, substantially as described and for the purposes set forth.

Seventh, The indicating spring, with its ribs constructed and operating substantially as described.

Eighth, The slotted joint, connecting the front and rear frames when the draft of the rear frame is effected by this coupling alone, and so as to allow a vertical movement of the front or rear frame, as and for the purposes set forth.

Ninth, I claim locating the drop-man's seat in the rear of the heel of the runners, for the purpose of balancing the weight of the front part of the frame and the tongue, as and for the purpose set forth.

Second, I claim operating the seed slides by applying the power direct to the handle that moves the slide, without the use or intervention of a lever, as set forth.

1,936.—Revolving Fire-arm.—Wm. H. Elliot, Plattsburgh, N. Y. Patented Oct. 1, 1861:

I claim the combination of a chamber or chambers, which are left open at their rear end, for the purpose of being charged thereat with a hammer hung or pivoted forward of the rear end of said chamber or chambers, substantially as set forth.

1,937.—Revolving Fire-arm.—Wm. H. Elliott, Plattsburgh, N. Y. Patented Oct. 1, 1861:

I claim resisting the recoil of a cartridge case by means of a hammer, which is pivoted underneath and forward of the rear end of a chamber or chambers, substantially as herein set forth.

1,938.—Revolving Fire-arm.—Wm. H. Elliot, Plattsburgh, N. Y. Patented Oct. 1, 1861:

I claim the combination of a chamber or chambers which are bored through at their rear end and left open for the purpose of being charged thereat with a lock frame, which is extended forward of the rear end of said chambers, and a hammer pivoted or hung in the part of said frame so extended forward, substantially as and for the purpose set forth.

1,939.—Hay-elevating Fork.—Thomas F. Hisert, Greenville, N. Y., assignee of Thomas T. Jarrett, Horsham, Pa. Patented May 30, 1854:

I claim, First, The employment or use of a weight on the cord, attached to the catch, which shall operate to discharge the hay from the fork at any desired hight, substantially as and in the manner described.

Second, The combination of one or more pulleys with a hay-elevating fork, for the purpose described.

Third, The pulley, J, at the back part of the head, operating as and for the purpose described.

Fourth, Securing the handle or bail to the head by means of loop eyes, which are secured in the head and project therefrom.

Fifth, Securing the tongue or brace lever to the handle or bail by means of a spring catch attached to the said handle or bail, for the purpose described.

Sixth, A spring catch twisting upon a pin or bearing the functions of which, are to keep the tines or body of the fork in position to retain the load, and to discharge it whenever desired.

Seventh, In hay-elevating forks I claim the combination of the tines, the wooden head, the tongue or brace lever, and the spring catch.

Eighth, The combination of a spring catch with a rigid tongue or brace lever, extending from the piece which receives the tines, for the purpose described.

DESIGN.

2,054.—Letter-press Type.—Andrew Little, New York City.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication o the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of al the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5 accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the

shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
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SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

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Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c may be had, gratis, upon application at the principal office, No. Park Row, New York, or any of the branch offices.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

P. B. J., of N. Y.—Heat may be produced by many chemical processes besides combustion. One of the most familiar of these is the pouring of water upon lime; the water enters into chemical combination with the lime, forming a hydrate of lime, changing from the liquid to the solid state, and giving up in the change its latent heat of fluidity. Where the quantity of lime is large the heat generated is sometimes sufficient to set wood on fire. The writer of this once lost some fifty barrels of lime by the burning of the barrels from this cause.

R. F. F., of R. I.—Locomotives have attained a speed of seventy miles an hour for a short time, but this is exceedingly rare, and is never done except for some special purpose; fifty miles an hour is not unfrequent where lost time has to be made up, but railway trains in this country, one with another, do not average over twenty-five miles an hour. There is undoubtedly a small per centage of slip in the driving wheels, but we are unable to say what the exact proportion is. The distance run in a given time and the revolutions of the driving wheels determine the amount of loss from this cause.

Subscriber, N. Y.—You must be the judge of the dose in the cure for drunkenness. Have the prescription made up and try it.

F. S. B., of Ind.—No per centage is allowed for the slip of paddle wheels. If you require the size of cylinder to work a certain boat send us the dimensions of the boat, not the size of the wheel.

C. B. M., of Conn.—Olive oil can be bleached by exposing it in bottles to the strong sunlight.

I. B. R., N. Y.—No difficulty is experienced from using stoneware for cooking in if you heat the vessels gradually at first until they get tempered or annealed. A good way to do this is to put the stoneware into an iron pot full of cold water, bring it to a boil gradually and then cool slowly.

R. P. W., of R. I.—We have never seen an auger to bore a square hole, but we have seen a tool constructed with cutters which were drawn in after the circular bit has passed, so that a sort of square orifice was made. If you have anything new in this line we should be pleased to see it.

C. P. L., of Mass.—A "snell" or "snood" is the transparent sinew or gut used by fishermen to hide the connection between the line and hook; it is invisible in transparent water.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt on of their funds.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

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RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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Improved Carpet Stretcher.

When carpets are to be put down for the first time or replaced after "house cleaning," it is important to have them perfectly smooth. If they are entirely free from creases they will not only look well but wear well. It is a difficult job for men, and still more so for women, to pull a carpet close up to the wash-board and hold it there until it is tacked fast to the floor. And it is, moreover, an operation which every one dislikes. The device herewith illustrated is specially designed for the use of upholsterers and housekeepers. Having no prongs or teeth to tear the carpet, and no jaws to bite its edges, but taking a firm hold of it by means of friction, this implement will stretch the finest fabric without doing it the least injury. It is made of light material, and is very simple in its construction, so that it may be easily handled and properly applied by persons of ordinary strength and intelligence. It is constructed as follows:—A piece of rubber cloth, roughened on its surface, is firmly fastened to the bottom of a block, by means of a light metallic frame, and a handle is then inserted at a proper inclination. The operator, in a stooping posture, presses the block down on the carpet, and at the same time pushes it gently forward; the carpet yields to this motion, and the relieves one end of the card from the groove, B. Now with the thumb and forefinger of the right hand, the thumb resting on the face of the card, and the forefinger entering from below, through the end hold, lift the card and work it out of the holder. The removal of the card is facilitated by pressing and pushing on the opposite end with the thumb of the left hand. The whole movement is very simple and easy to learn.

This holder would make a good substitute for the old-fashioned "tags" used in the Post Office Department for directing mail bags. Travelers, market people, and express companies will find it very convenient and serviceable.

The inventor will receive proposals for the purchase of this patent or any part thereof.

For rights and all further information address the inventor, F. J. Collier, Canonsburg, Washington County, Penn., by whom it was patented Oct. 2, 1860.

Fig. 1

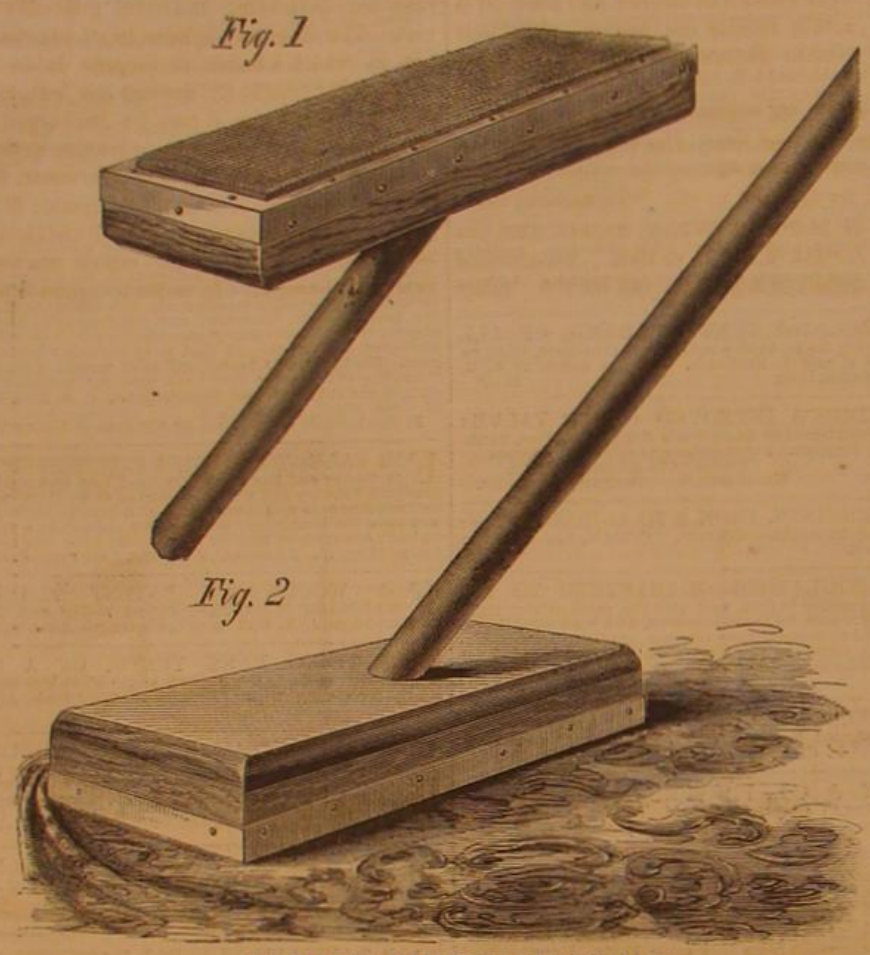


Fig. 2

COLLIER'S CARPET STRETCHER.

Fig. 1

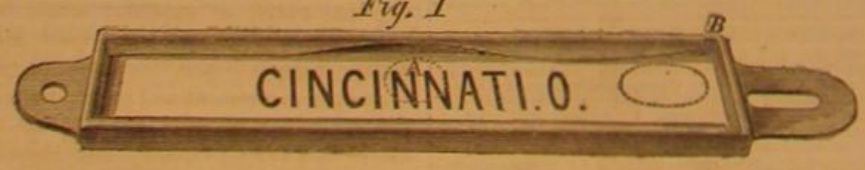


Fig. 2



COLLIER'S LABEL HOLDER.

Improved Label Holder.

This invention consists in providing a cheap, simple and durable holder for labels to secure them to any package, without the use of string or paste; exhibits the marks or direction plainly; protects the stretching is easily and rapidly done. This is a very neat and capital thing for the purpose.

Proposals for the manufacture of this implement or the purchase of the patent will be received by the inventor, F. J. Collier, at Canonsburg, Pa., by whom it was patented on the 21st of March, 1865, through the Scientific American Patent Agency.

The Mackay Gun.

The long-expected Mackay gun, manufactured at the Mersey iron and steel works, has at length arrived at Woolwich Arsenal, and was proved at the ordnance butt on Tuesday last. The gun was fired one round only, the charge being a cartridge of 50 pounds of powder, and a proof projectile of plain cast iron, with flat ends, weighing 336 pounds. Major Freeth, inspector of artillery, directed the proof, which was attended by Mr. Mackay on his own behalf, and Mr. Yates representing the manufacturers. On the usual test and examination made after each round, it was discovered that the plug at the end of the bore was set back by the force of the concussion, leaving a small space, two inches in depth, visible only to a practiced eye, but of considerable detriment in its present condition. The proof was consequently at an end. The defect, it is stated, will be made good, and the gun will be submitted to further proof. It weighs 10¾ tuns, is 14 feet long, with 8 inches diameter of bore, and is rifled with twelve grooves. The gun consists of a first solid forging from muzzle to breech, hooped over from the trunnions to the breech, the trunnions forming also a separate piece. The grooves, which are cut at a very sharp twist, are of the same depth and form as those used by Bashley Britten for firing lead-coated shot, and are termed "windage grooves," the gas passing through them.—*Engineer*, March 19.

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Vol. XII.—No. 19. (NEW SERIES.)

NEW YORK, MAY 6, 1865.

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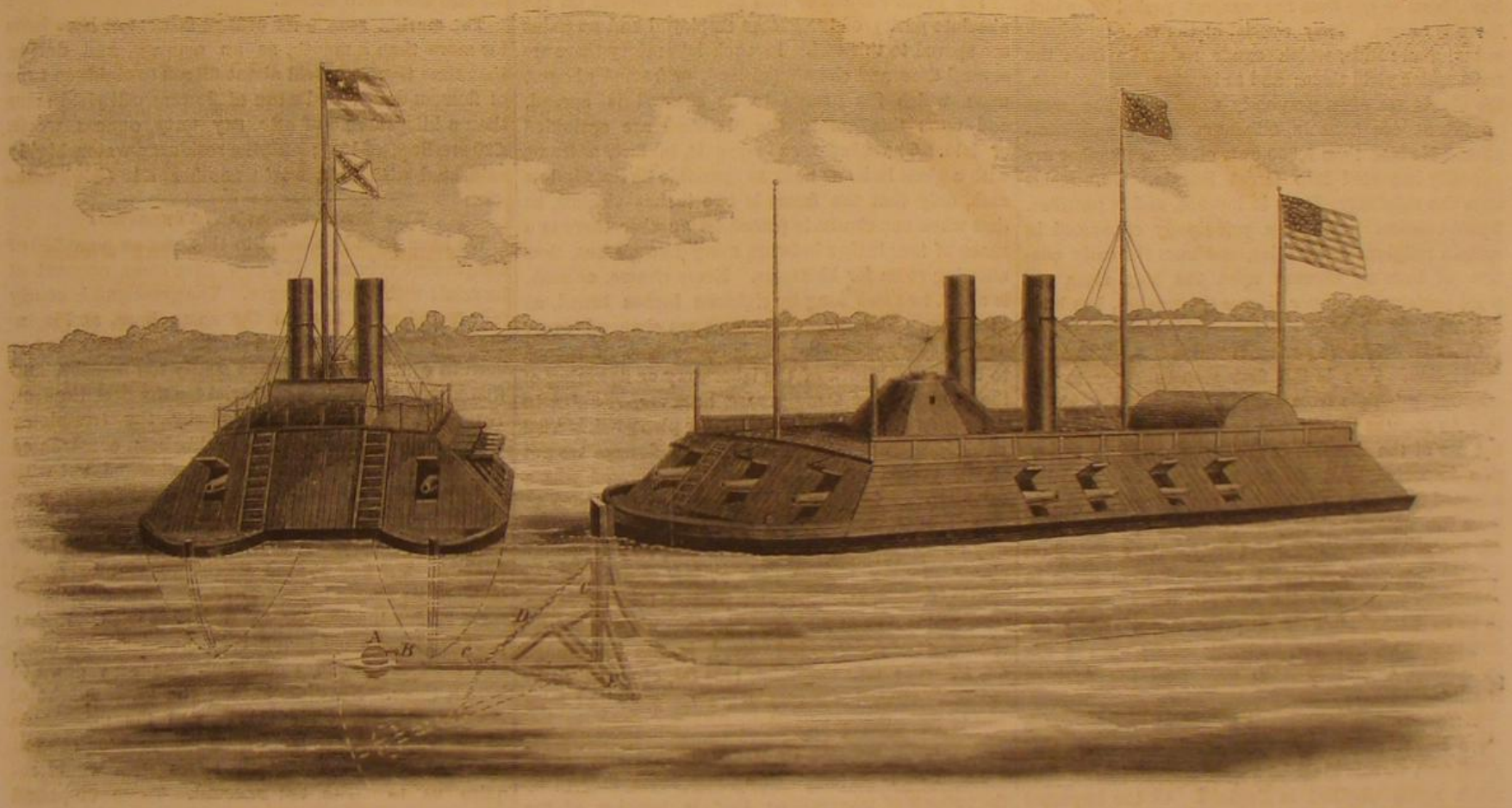
THE DESTRUCTION OF THE REBEL RAM "ALBEMARLE."

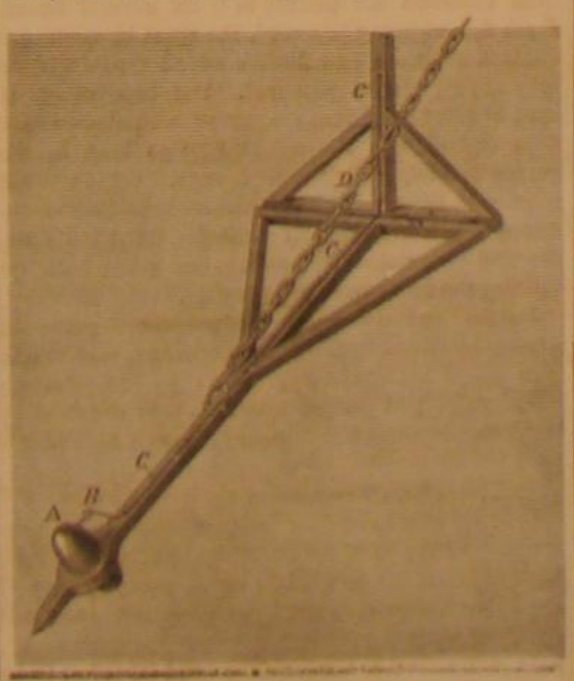
The appended article is forwarded by the inventors of the plan here illustrated:—

The ingenuity and daring of the gallant Lieut. Cushing, in the exploit which destroyed the rebel ram *Albemarle*, and rid the federal navy of its principal annoyance and the nation of a formidable and constant menace, has caused universal rejoicing among our own people and excited the admiration of the world. The writer of this article would not confess himself second to any in rejoicing at the deliverance, or in admiration of the brave and heroic conduct of the deliverer. Nor does due honor to him demand that the just meed of praise, or at least of recognition, be withheld from any other who may deserve it at the hands of his countrymen.

The reader will perhaps be surprised to learn that the plan adopted or invented by the adventurous Cushing for the destruction of the *Albemarle*, was one of the but recently "rejected proposals" of the Navy Department. Yet such is the fact. As early as August 9th, 1862, drawings and a description of a "Portable Submarine Battery," for the destruction of rebel gunboats and ships, combining the essense of Cushing's plan with some advantages, obvious on casual inspection, were submitted to the Navy Department by Lieut.-Colonel Geo. V. Rutherford, at that time Assistant Quartermaster-General of the State of Illinois, now a Colonel in the Quartermaster's Department at Washington. The Department decided that "the present state of naval warfare precluded the possibility of adopting this style of invention." How their decision has been approved by the results of Cushing's bold experiment the country knows, rejoicingly, and recognizes in it another instance of that hasty official judgement which frowns upon invention as impertinent innovation, and which would keep the world forever running in the ruts of old fogyism, but for the persistence and courage of genius which overrides all obstacles, and often by a single daring action refutes the learned objections and doubts of erudite officials and fossilized philosophers.

Hereto are appended copies of the correspondence of the inventor with the Navy Department, comprising an intelligent description of the "Battery," and the manner of its disposal by the "Permanent Commission." It is hardly necessary to add that the "ramming" "state of naval warfare," inaugurated from the first, seems to especially call for the "adoption of this style of invention," and that it was, indeed, that alone which suggested the contrivance.





QUARTERMASTER-GENERAL'S DEPARTMENT, Springfield, Ill., August 9th, 1862.

SIR:—I respectfully submit to your consideration a plan for destroying the rebel gunboats or ships of war. The diagram explains itself, showing the manner in which a bomb or torpedo is to be carried under and brought up against the bottom of the hull of the vessel, where it may be discharged either by a galvanic wire and battery, or friction-primer and lanyard, properly protected from the water, by tube and air-tight casings, A being the torpedo; B the friction primer; C the supporting frame; D the elevating chain, and E the hinge or joint, which enables it to be raised or lowered. In order to appreciate its practicability it has only to be borne in mind that powder, exploded under water, has no downward, scarcely any lateral, but mainly a vertical expansion; indicating that a shell so exploded would be unattended with danger to the attacking vessel, unless from the falling fragments from the blown-up gunboat, which by proper experiment and precaution can be guarded against. I am impelled by no other motive than a desire to serve my country and the advice of scientific friends, in obtruding this upon your attention. I have only to add that I hold myself in readiness to superintend any experiment that it may be thought desirable to test the merits and efficacy of this machine. Very respectfully, your obedient servant,

GEO. V. RUTHERFORD,
Asst. Q. M. General, State of Illinois.

Hon. GIDEON WELLES, Secretary of the Navy, Washington, D. C.:

NAVY DEPARTMENT, August 19, 1862.

Lieut.-Col. G. V. RUTHERFORD, A. Q. M. General, SPRINGFIELD, Ill.:

COLONEL:—Your communication with drawings of your "Portable Submarine Battery," has been received. The appropriation made by Congress for experiments having been expended the Department has no authority to incur any expense in testing the merits of your machine. Very respectfully,

GIDEON WELLES, Secretary of Navy

NAVY DEPARTMENT, PERMANENT COMMISSION, March 31st, 1864.

SIR:—We have the honor to report that the commission has had under consideration and examination a plan of Mr. G. V. Rutheford for destroying gunboats or ships of war. The present state of naval warfare precludes the possibility of adopting this style of invention. Very respectfully, your obedient servants,

C. H. DAVIS,
Chief of the Bureau of Navigation.
A. D. BACHE,
Supt. U. S. Coast Survey.
JOSEPH HENRY,
Secretary Smithsonian Institute.

Hon. GIDEON WELLES, Sec. of Navy.

LECTURE ON PERFUMES.

We have received from Septimus Piesse, Ph. D., F. C. S., a copy of a lecture on perfumes, delivered by him before the Royal Horticultural Society, and we select from it the following extracts:—

THE THREE CLASSES OF PERFUMES.

Perfumes that are derived from plants may be, for the purpose of description, conveniently divided into three classes. Class I. are the most ancient, and have been in use from the earliest period of which there is record. They consist of the various odoriferous gum-resins, which exude naturally from the trees which yield them; and to increase the produce, the plants are often purposely wounded. The most important are benzoin, olibanum, myrrh and camphor. No less than 5,000 cwt. of these together are annually imported into Great Britain. Gum-resins form the chief ingredients in incense, and in pastilles. These odorous bodies are principally consumed in certain religious ceremonies, and from the early custom of burning incense upon the holy altar, our word perfume, from *per fumus* (by smoke), has been derived.

Class II. are those perfumes which are procured by distillation. This is the first step to separate the odorous principle from the material which contains it. As soon as the Greeks and the Romans learned the use of the alembic or still, which was an invention imported by them from Egypt, they quickly adapted it to the separation of the odorous principle from the numerous fragrance-bearing plants which are indigenous to Greece and Italy. An essential oil or otto thus produced from orange-flowers bears in commerce to this day the name of Neroly, supposed to be so named after the Emperor Nero. Long before that time, however, fragrant waters were in use in Arabia, as all may learn who read the Arabian Nights.

More than 200,000 pounds-weight of various ottos were imported into Britain in 1860, and valued at £180,000; to this must be added at least one-third as much again distilled in England. Of the imported articles enumerated, oils of lemon and bergamot, from the Two Sicilies, reached 128,809 pounds, valued at £57,054.

We now pass to class III. These are the perfumes proper, such as are used for perfuming handkerchiefs. It will have been observed, that hitherto I have not spoken of the fragrance from any flower, but only of those odors which are derived from either the leaves, the wood, the fruit, the root, or the seed of the plant. What we have now to say refers more particularly to the perfumes derived from flowers.

PROCESS OF ENFLEURAGE.

Contrary to the general belief nearly all the perfumes are not made by distillation, but by the processes of enfleurage or inflowering and by maceration or infusion.

The odors of flowers do not, as a general rule, exist in them as a store or in a gland, but they are developed as an exhalation. While the flower breathes it yields fragrance, but kill the flower, and fragrance ceases. It has not been ascertained when the discovery was made of condensing, as it were, the breath of the flower during life; what we know is, that if a living flower be placed near to butter, grease, animal fat, or oil, these bodies absorb the odor given off by the blossom, and in turn themselves become fragrant. If we spread fresh unsalted batter upon the inside of two dessert plates, and then fill one of the plates with gathered fragrant blossoms of clematis, covering them over with the second greased plate, we shall find that after twenty-four hours the grease has become fragrant. The blossoms, though separated from the parent stem, do not die for some time, but live and exhale odor, which is absorbed by the fat. To remove the odor from the fat, the fat must be scraped off the plates and put into alcohol; the odor then leaves the grease and enters into the spirit, which thus becomes "scent," and the grease again becomes odorless.

The flower farmers of the Var follow precisely this method on a very large scale, with but a little practical variation, with the following flowers: rose, orange, acacia, violet, jasmin, tuberose and jonquil. The process is termed, as said before, enfleurage or inflowering. In the valley of the Var there are acres of jasmin, of tuberose, of violets, and the other flowers named; in due season the air is laden with fragrance, the flower harvest is at hand. Women and children gather the blossoms which they place in little panniers like fishermen's baskets hung over the shoulders. They are then carried to the laboratory of flowers and weighed. In the laboratory, the harvest of flowers has been anticipated. During the previous winter great quantities of grease, lard, and beef suet have been collected, melted, washed and clarified.

The great success of this process depends on the absolute purity of the grease employed and no pains are spared to this end. In each laboratory there are several thousand chassis (sashes), or framed glasses, upon which the grease to be scented is spread, and upon this grease the blossoms are sprinkled or laid. The *chasse en verre* is, in fact, a frame with a glass in it, as near as possible like a window sash, only that the frame is two inches thicker, so that when one chasse is placed on another there is a space of four inches between every two glasses, thus allowing room for blossoms. Every chasse, or sash, is about two feet long by eighteen inches broad, as here seen. The flower blossoms are changed every day, or every other day, as is convenient in regard to the general work of the laboratory or flowering of the plants. The same grease, however, remains in the chasse so long as the particular plant being used yields blossoms. Each time the fresh flowers are put on, the grease is "worked"—that is serrated with a knife—so as to offer a fresh surface of grease to absorb odor. The grease being inflowered in this way for three weeks or more—in fact, so long as the plants produce blossoms—is at last scraped off the chasse, melted, strained and poured into tin canisters, and is now fit for exportation. We have here specimens of fat thus inflowered, jasmin fat, orange fat, tuberose fat, violet fat, rose fat, etc. In every moderate-sized laboratory there are employed from two to three thousand sashes.

PROCESS OF MACERATION.

Fat or oil is perfumed with these same flowers by the process of maceration; that is, infusion of the flowers in oil or melted fat. For this end, purified fat is melted in a *bain marie*, or warm bath, and the fresh blossoms are infused in it for several hours. Fresh flowers being procured, the spent blossoms are strained away and new flowers added repeatedly, so long as they can be procured. The *bain marie* is used in order to prevent the grease becoming too hot from exposure to the naked fire; so long as the grease is fluid, it is warm enough. Oil does not require to be warmed, but improved results are obtained when it is slightly heated. We have upon the wall here a sketch showing the water bath for melting the fat or warming the oil.

Jasmin and tuberose produce best perfumed grease by enfleurage, but rose, orange, and acacia give more satisfactory products by maceration; while violet and jonquil grease is best obtained by the joint processes—enfleurage followed by maceration.

EXTRACTING THE ODOR FROM THE FAT.

In order now to obtain the perfume of these flowers in the form used for scenting handkerchiefs, we have to infuse the scented fat or oil, made by any of the above methods, in strong alcohol, that is rectified spirits of wine.

In extracting the odor from solid fat it has to be chopped up fine as suet is chopped, or melted, and then put into the spirit, and left to infuse for about a month. In the case of scented oil it has to be repeatedly agitated with the spirit. The result is, that the spirit extracts all the odor from the fatty body, becoming itself "perfume," while the grease again becomes odorless; thus is procured the essence of jasmin, essence of orange flowers, essence of violets, and others already named—rose, tuberose, acacia and jonquil. Several specimens are here shown.

It is remarkable that these flowers yield perfumes which, either separate or mixed in various proportions, are the types of nearly all flower odors; thus, when jasmin and orange flowers are blended, the scent produced is like sweet pea; when jasmin and tuberose are mixed the perfume is that of the hyacinth. We will practically exemplify this thus; all the various bouquets and nosegays, such as "frangipanni," "white roses," "sweet daphne," are made upon this principle.

THE FLOWER HARVEST OF CANNES.

The commercial importance of this branch of perfumes may be indicated by the quantity of flowers annually grown in the district of Cannes. Flower harvest: orange blossoms, 1,475,000 lbs.; roses, 530,000 lbs.; jasmin, 100,000 lbs.; violets, 75,000 lbs.; acacia, 45,000 lbs.; geranium, 30,000 lbs.; tuberose, 24,000 lbs.; jonquil, 5,000 lbs. The quantity produced at Nice I have been unable to ascertain; with violets and orange there are more, but with Cassie less than here stated.

The market season for orange flowers at Nice lasts for more than a month, as an average, and during that time there are sold about fifteen to eighteen tuns of flowers daily! and a tun of flowers will yield more than a kilogramme of otto, say forty ounces, worth £20 sterling, ($100); and the residuary water, highly saturated with odor, worth another £10 ($50) note.

The Twenty-inch Navy Gun.

We have already alluded to this gun on page 280 of the present volume. We now give some account of its trials with heavy charges. The great gun is nearly four feet shorter, but has the same bore, and is intended to possess the same relative capacity. It has been in course of completion nearly ten months, and was placed in position for trial for the first time on Thursday. It was suspended by the trunnions, breech and muzzle, the sling having been constructed for the special purpose. It was charged first with sixty pounds of powder, and subsequently two successive charges of the same amount of powder, the last accompanied by a solid shot weighing 1,080 pounds. The gun at each discharge vibrated about one-half its length in its slings.

On Friday the heavier charges were tried. Eighty pounds of the usual heavy rock powder were used, and the 1,080 pound solid shot was sent down to keep it there. Notwithstanding the great weight of the gun, the size of the charge, and the magnitude of the solid shot, the loading of the monster cannon was accompliseed in a briefer space than would require us to write the account. Three 80-pound charges were fired, and, as an old salt remarked, that they were "beautiful to hear." To a sensitive tympanum the shock of this gun is pleasant in comparison with that produced by a 9-inch Dahlgren.

A charge of 100 pounds was next introduced, the solid shot sent home, the percussion arranged, when Mr. James Knapp pulled the lanyard. The ball struck the stony bank, and tuns of rock fell into the cavern, already existing from similar ponderous blows.

This time the gun recoiled about two-thirds of its length in the sling, and the concussion scarcely differed from that experienced with the 80-pound charges. A second charge of 100 pounds was fired, and immediately after the recoil, a wrought-iron bolt, three inches in thickness, suddenly snapped, and the breech-band broke, letting the enormous mass to the ground, crushing as if they were made of timber, the T-rails beneath.

This sudden accident brought the test to a conclusion. Captain Yard, United States Navy, who superintended the test, expressed himself highly gratified with it. The gun had done its duty so far as the preliminary examination was concerned, and the accident that brought it to a termination before the final charge was fired—but one remaining to complete it—was regretted by all present.

THE striped bug, says Dr. Trimble, so destructive in melon and cucumber beds, may be effectually got rid of by cooping a hen with a brood of small chickens near the vines. The little chicks will hunt and destroy the bugs, without injury to the plants.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Iron-clad and Other Vessels.—This invention consists in the application to a vessel of a hinged adjustable shifting keel connected to the main keel and operated by chains or other suitable means in such a manner that it can be turned down to a perpendicular position whenever it may be desirable to increase the steadiness of the vessel, or that it can be turned up on the side of the main keel if the latter is deemed sufficient to keep the vessel steady. The invention relates also to certain improvements in the gear for operating the turret, also to a certain novel arrangement for operating steam rams and scuttling rams or augers extending through the sides of the vessel and calculated to produce holes in a hostile vessel, either by blows or by boring such holes, as may be most convenient. Charles Slater, Brooklyn, N. Y., is the inventor.

Printing Press.—This invention relates to a new and improved printing press for general use, but more especially designed for printing labels or small bills, etc. The object of the invention is to obtain a press of simple construction by which any person can do his own printing in a small way. Druggists, for instance, print their own labels, storekeepers their own circulars, bill-heads, etc., etc. The invention will prove valuable in those cases where dates are put on labels, and consequently require to be changed every day, and where the titles on labels are frequently changed. Henry Redlich, Chicago, Ill., is the inventor.

Ore Separator.—This invention relates to a new and improved device for separating the heavier masses of ore from the lighter portion or "slime" as it is technically termed, and it consists in the employment or use of a hopper provided with a deflecting board and a chute, and also provided with an exit chamber having a pipe or tube communicating with it and provided with faucets or plugs, all arranged in such a manner as to effect a complete separation of the two parts of the ore specified. James Watson, Cliff Mine, Mich., is the inventor.

Composition for Preparing Ribbons for Hand Stamps, Etc.—In certain classes of hand stamps ink-prepared ribbons are used, which are drawn through between the die and the bed, and give the impression when the die is depressed. For the purpose of preparing these ribbons ordinary printing ink has been used in the absence of some better composition, and a ribbon thus prepared will give about thirty impressions on the same spot. The composition which forms the subject matter of this invention, and the coloring base of which is one of the aniline colors, when properly mixed and applied to the ribbon allows of taking more than a hundred impressions from the same spot; in fact, the color seems to be inexhaustible, and is, therefore, of great value for the purpose above stated. Horace Holt, No. 264 Broadway, is the inventor.

Oil Press.—This invention consists in the use of doors sliding in grooves in the adjoining movable sides of the press boxes, said grooves being arranged in such a manner that they retain the slides firmly in position, and compel them to close tight when the press is filled, and at the same time they do not interfere with the sliding motion of the sides of the press boxes. The invention consists also in the application of a steam supply and of an exhaust pipe, extending over the entire length of the press, and communicating with each press box by small pipes, in such a manner that said small pipes will have sufficient spring to allow the sides of the press boxes being moved the requisite distance, and all complicated joints in thin pipes can be avoided. Wm. V. McKenzie, Jersey City, N. J., is the inventor.

Circular Cutter.—The object of this invention is to cut out circular disks or rings of india-rubber or other material, such as is used for the packing of flanges and other circular parts of steam engines and other machines. To effect this purpose a movable knife holder is secured to a rod provided with a rule and with a screw handle, and fixed center, in such a manner that the knife can be readily adjusted to any desired distance from the fixed center. By turning the handle the knife holder can be released or fastened at any desired point on the rule. The fixed center is secured in a stationary head provided with a swiveling arm rest, in such a manner that the operator is enabled to press the fixed center down with his arm, and take hold and operate the knife with the hand, while his other hand is free to hold the material and move it against the knife, and the cutting operation will be executed in a short time with care, and with perfect exactness. Emil Hubner, New York city, is the inventor.

Fire-arm.—This invention consists, among other things, in forming the lock frame and the guard in one piece, and in so connecting the frame to the receiver as to be removable by the withdrawal of the pin on which it rotates; also in a novel method of forming the shell drawer for withdrawing the empty shell of the cartridge, and in other devices and modes of operation which are considered to be valuable improvements in breech-loading fire-arms. The patent bears date April 18, 1865. Albert M. White, Port Chester, Westchester Co., N. Y., is the inventor.

BOOKS AND PUBLICATIONS.

ATLANTIC MONTHLY.—The May number of this standard periodical has a leading article upon birds of America, which, in a discursive and genial way, tells us all about our feathered friends—those familiar to us from constant flitting about our houses, and those afar off who haunt the woodside or the depths of the forest. Every lover of nature will read the article with pleasure. The poetry of the May number is not remarkable for depth, feeling, or originality of thought—"Gold Egg; a phantasy," being as fantastical in meter as it is vague and misty in purpose. "Out of the Sea" is a local romance, with a vigorous, fresh life and tone, and other tales, together with Mrs. Stowe's always welcome and popular, because sensible, articles on topics of everyday interest, make this number a most entertaining one. Sold by all booksellers and newsdealers.

GAZLAY'S PACIFIC MONTHLY.—This magazine is a new comer in the field of periodical literature. It is intended for circulation in California principally, and has articles bearing upon topics interesting to the people of that State. It is printed very handsomely, and is published in New York at No. 34 Liberty street.

DEMOREST'S MONTHLY MIRROR OF FASHIONS.—This magazine is chiefly valuable for the attractions it presents to modistes and housekeepers generally in the very elaborate set of paper patterns which accompany each number, and which would cost if bought on Broadway more than the price of a year's subscription. By consulting this periodical our readers in remote towns can have the earliest fashions brought to their firesides. In addition, there are recipes for cooking which are also valuable to those who consider taste any object in culinary matters. Published by W. I. Demorest, New York.

The Russian Epidemic.

There seems to be no occasion for alarm in regard to the epidemic prevailing in Russia. In the French Academy of Medicine it is declared to be typhus fever, a disease wholly unknown in this country except among crowds of foreigners just landed from emigrant ships. Our common typhoid fever is so named because it resembles the typhus in some of its symptoms, but it is an entirely distinct disease, characterized by ulceration of the bowels. Dr. Murchison, physician to the London Fever Hospital, writes to the *London Times* this full account of the Russian epidemic:—

If the details furnished by foreign physicians are to be relied on, it is not a new pest which has invaded the world, nor has the disease any relation whatever to Asiatic cholera. The malady is evidently relapsing fever, which, under different designations, has been well known in Britain and Ireland for nearly two centuries, which constituted a great part of the Irish epidemic of 1817, and which about the same time was very prevalent in Upper Silesia and in other parts of Germany. The Russian disease corresponds with relapsing fever in every particular save one—viz., its great fatality; but this difference is apparent rather than real, and is attributable to an admixture of ordinary typhus. The mortality from relapsing fever has rarely exceeded three per cent; but almost all epidemics of relapsing fever have coexisted with epidemics of typhus, of which the average mortality is nearly 20 per cent. Hence the aggregate mortality of an epidemic of the two diseases varies with the proportion of typhus. One peculiarity of relapsing fever is that it prevails in great epidemics, and then entirely disappears for years. In 1851 more cases of relapsing fever were admitted into the London Fever Hospital than of any other fever, but for upward of ten years not one case has been observed. The intervals between some of the epidemics have been so long that time has been afforded for a new generation of medical men to spring up having no experience of the disease, and who, on the occasion of a fresh outbreak, have imagined that they were encountering a new malady. So it was in Scotland in 1843, and so it is now in the case of the Russian epidemic. The causes assigned for the Russian epidemic are the crowding into St. Petersburg of 43,000 laborers in search of work, but more particularly the unusual destitution among the poor, and their recourse to unwholesome food, such as bread containing a large quantity of horned rye. The epidemic, we are told, is "exclusively confined to the poorer classes." In this respect the relapsing fever of Russia is not singular. In this country the disease has always been confined to the poorer classes.

The Way Tar is Obtained.

In compliance with the request of a correspondent we publish this description of the process of procuring tar, which we take from an article on the subject in Appleton's New American Cyclopædia:—

Tar, a thick, black, viscid material, a product of the destructive distillation of carbonaceous substances, as wood, peat, bituminous coals and shales. It is a commercial article, largely produced, and applied to a variety of uses. It was known to the ancient Greeks, and Dr. Clarke, who describes the method of manufacturing it in the forests of Bothnia, states that there is not the smallest difference between the processes there practiced and those of ancient Greece. Along the whole coast of the Gulf of Bothnia the inhabitants are very generally engaged in this occupation. They make use of the roots of the fir trees, with logs and billets of the same, which they arrange in a stack of conical shape, fitted to a cavity in the ground, generally made in the side of a bank. In the bottom of this cavity is placed a cast-iron pan from which a spout leads out through the bank. The heap is covered over with turf, and is then fired, as in making charcoal. Tar collects in the latter part of the process of charring, and runs off through the spout into barrels placed to receive it. Tar is a product, where charcoal is the chief object of the process, but is seldom obtained in quantities sufficient to render it an object to collect it, except in charring the resinous woods of the pine family. In Sweden, where the business is also an important one, some peculiar methods are adopted to increase the yield of tar in wood. Trees of no value for the saw-mill are partially peeled of their bark a fathom or two up from the ground, not enough to kill them, but only to check their growth. After five or six years, when cut down, the wood is found to be much richer in resinous matters which produce tar. It is noticed that the condition of the weather during the process of charring may make a difference of 15 or 20 per cent in the yield of tar. In the United States tar is produced in almost all parts of the country where pitch pine and the *pinus australis* are found. Along the coast of the Southern States, especially of North Carolina, Virginia, and Georgia, the business has been carried on upon a large scale in connection with the manufacture of turpentine, rosin, and pitch. Old trees, which have ceased to produce turpentine, and dead wood which is rich in resinous matter, are selected for the coal pits. The process does not materially differ from that already described.

VEGETABLE ORIGIN OF DIAMONDS.—Prof. Gœppert, who recently obtained the prize offered by the Dutch Scientific Society for an essay on this subject says:—"In my essay I have given ample proof that at one time diamonds were soft bodies. I have not yet attained any results with respect to graphite, but in diamonds I have found numerous foreign bodies inclosed, of which, if they cannot be said to be evidently and undoubtedly vegetable in their origin, it would, on the other hand, be difficult to deny their vegetable nature altogether."—*Seemann's Journal of Botany.*

MM. MOUTIER and DIETZENBACHER have been investigating the modifications of the physical properties of sulphur which are produced by minute quantities of carbon. They find that sulphur, when heated to 270 deg., in contact with carbon, absorbs about one-tenth per cent of that body, and is thereby rendered soft and plastic. Minute quantities of iodine, and of several other bodies, are similarly absorbed by sulphur, and similarly modify its properties.

Improved Parallel Ruler.

In mechanical drawing parallel rulers are indispensable, and, as the inventor of the one here shown says, the ordinary one is very defective. When opened they continually move to one side and from the work, which is inconvenient. They are likewise liable to become untrue, for if the connecting bars are not hinged at the same angle, or if one joint gets worn more than the other, the lines will not be parallel.

The engraving represents a new parallel ruler which is a very desirable improvement, and a useful addition to the draughtsman's case. It may be moved in parallel lines directly from the operator, by simply working the pinions, A and B, which mesh in appropriate racks, said racks being fixed to crossp.eces dovetailed to the rulers themselves. The toggle-jointed bars, C, cause the rulers to move in either direction, as before explained, and by the number of joints the wear of each individual one is lessened, so that greater durability is combined with efficiency in this instrument. It is also light and free from sharp points liable to stick in the paper and mar the drawing. A patent was procured on this invention through the Scientific American Patent Agency on the 14th of February, 1865, by E. C. Gillette, of San Francisco, Cal., temporarily residing in Richfield, British Columbia. For further information address Henry Lyon, No. 119 Nassau street, New York.

Fig. 1

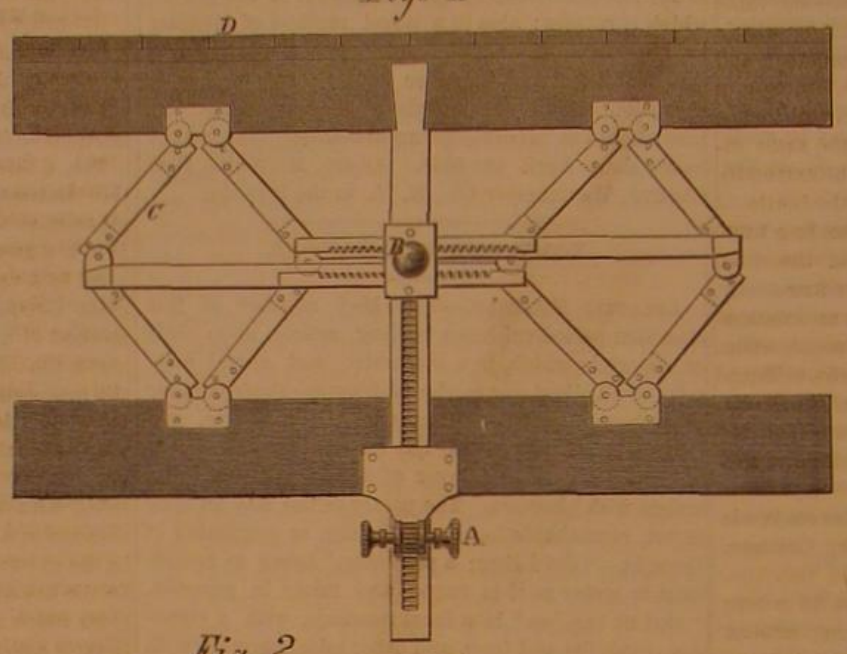
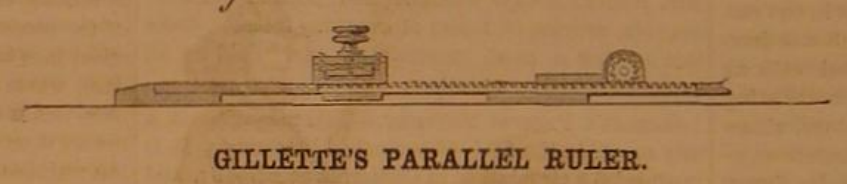


Fig. 2



GILLETTE'S PARALLEL RULER.

Drainage Works of London.

On the 4th of April last there was a celebration in London on account of the opening of the main drainage works of that city, by which the Thames river is to be purified or relieved of the refuse matter of the city which has been poured into that stream. The London *Times* gives a very extended account of these works.

The river runs through the center of the city, which stands on the north and south sides of it, and receives all its drainage. It is desired to intercept this matter before it reaches the stream, and the contents of the sewers carried off in another direction. It became necessary to construct certain main sewers of great length and capacity to receive this refuse. There are three great main lines of sewers, or rather tunnels, which run from the extreme west to the extreme east of the metropolis, and which are laid at angles to all existing sewers and a little below their levels, so as to intercept their contents and convey them to an outfall 14 miles below London bridge. As large a proportion of the sewage as practicable is by this means carried away by gravitation, and for the remainder a constant discharge is effected by pumping. At the outlets the sewage is delivered into reservoirs situated on the banks of the Thames, and placed at such a level as will enable them to discharge into the river at or about the time of high water. By this arrangement the sewage is not only at once diluted by the large volume of water in the Thames at high water, but is also carried by the ebb tide to a point in the river 26 miles below London bridge, and its return by the flowing flood tide within the metropolitan area is effectually prevented. The work required the highest engineering skill. Tunnels have been carried under railways, streets, water-courses and highways. Foundations have been laid in all varieties of shifting ground, from peat to quicksand. One whole mile of tunnel was driven under the town of Woolwich. The ordinary drains of the metropolis are, in the aggregate, about 1,300 miles in length, and it required 82 miles of main sewers to intercept their contents from the Thames. The cost of the work has been £4,000,000. Six-sevenths of it has been completed, and London is now the best drained city in the world. The improved health of the city already attests the importance of the work.

THE recent demand for black and white muslins caused an advance of 15 per cent.

Malleable Cast Iron.

On the 3d of April, Mr. Zerah Colburn read a paper before the Society of Engineers in England on certain methods of treating cast iron. We extract the portion in relation to making castings malleable:—

"The next point to be considered is the treatment for making castings malleable. I should have said nothing of this were it not that, although exceedingly simple, it is but very little understood, for it is a very common notion that many and curious 'chemicals' are required, and that there is much mystery in the process. Making iron malleable was, indeed, among the lost arts, and old records show that it was lost and rediscovered more than once. The French philosopher Reaumur, who wrote upon it 140 years ago, observed that it was then practiced as a great mystery in Paris. At last chemistry came to the aid of the metal worker, and he learned that what he had so long called sulphur in the iron—and sulphur was once a name applied to many substances—was really carbon, the same as charcoal or diamond. And chemistry showed how carbon would always forsake iron for oxygen, and that cast iron, treated with oxygen, was made malleable, as it always is, whether in the old refinery fire, in puddling, in pig boiling with forge scales and refinery cinder, in the Bessemer process, and in still other modes of treatment. In 1804, Samuel Lucas, of Sheffield, turned his knowledge practically to account. He took out his patent, too, and described his improvement very clearly; and, to put it in the fewest words, it was nothing more than the present process of making castings malleable by roasting them, at a high heat, from 72 to 120 hours in powdered hematite iron ore, or in any metallic oxide. The oxygen of the ore unites with the carbon in the iron casting, which, being thus left without carbon, becomes malleable—malleable, indeed, to a remarkable degree. It is commonly said that castings intended to be malleableized should be from very hard, brittle iron. It is not exactly because a casting is brittle that it is of the best sort for the malleable iron treatment, but brittle castings contain less carbon than those from gray iron, and so the malleable process does not have to be so long continued to get rid of it. To those who are not accustomed to consider all forms of iron and steel as combinations merely of iron and carbon in different proportions, there is something a little paradoxical in the fact that a gray iron containing much carbon is tough; a white iron, containing less carbon is brittle; while wrought iron, containing but little carbon, is very tough. Even to a chemist these facts are not easy to be explained; nor shall I examine them further here, it being sufficient merely to have shown why a white and brittle cast iron, such as some of the Ulverstone iron of which clock bells are made, is the best for the malleable iron process, because it contains less carbon than a gray iron. The castings must be packed perfectly air-tight in layers of powdered ore, and shut up in cast-iron boxes, of which the joints should be luted. The natural ore used for purifying gas at the various stations of the Chartered Gas Works would, no doubt, answer very well for malleable castings, although it cannot be said whether Mr. Hill's oxide would do as well. The goods should be heated very gradually, twenty-four hours being occupied in getting up, and twenty-four hours more in letting down the heat, beside the two or three days at full heat. The heat should be very even over all parts of the goods, and while the full heat is on it should be kept constant by careful firing and attention to the draft. The iron ore may possibly fuze upon the surface of the casting, thus covering it with lumps or warts; but this is the result of too high a heat, or of access of air. Oxide of zinc, which is abundant in some parts of America—as near New York—is preferable to iron ore, but those who cannot obtain the former can get on very well with the latter. The agricultural implement makers have turned the properties of malleable cast iron to good account for the tines of their cultivators. At the large works of my friends, Messrs. Howards, of Bedford, unusually large pieces are made malleable by roasting in hematite ore. McHaffie's malleable castings—and for which it is generally supposed that there is a patent, although I believe there is none—are no doubt made in much the manner described, as also, no doubt, are Crowley's, of Sheffield, although different makers add various chemical substances, which may act in the same manner as the iron ore, and thus, to a certain extent, replace it, although it is doubtful if they greatly promote its real action.

Wherever a shape can be easily made in wrought iron this is probably cheaper than a malleable casting, and it is doubtful, therefore, whether the latter will ever be extensively used. It may be added that the tensile strength of malleable castings varies according to their size, and the depth to which the decarburization extends. If they were freed of their carbon all the way through, they would be converted into wrought iron, or, say, 'homogeneous metal,' as the softest kind of steel has been called. So much of the casting, however, as is not decarbonized by the malleable iron treatment remains cast iron, and has only the strength of cast iron. The effect of the process is generally visible for only a small depth below the surface, but small malleable iron castings have borne a tensile strain of 50,000 pounds per square inch."

Velocity of Liquids Through Siphons.

John Galletly has published the results of some very interesting experiments on the rate at which different liquids flow through siphons. No two liquids flow at the same rate through siphons of the same dimensions—the periods required, for example, to draw off water, ether, bisulphide of carbon, and whisky of 914 deg. specific gravity, from a vial holding a little over four ounces, through a siphon of somewhat narrow quill tubing; being, respectively, seventy-four, forty-eight, forty-seven, and one hundred and eighty-two seconds. The same liquids flows at different rates through siphons of different diameters of bore, or of different lengths of limb, but the degree in which the rate of efflux through a siphon of given dimensions varies from the rate of efflux through a siphon of other dimensions, is far from being the same for all liquids. Mr. Galletly gives the results of three sets of experiments, in all of which the bottle employed was one capable of holding just 7,300 grains of water, and was four and a half inches deep, while the siphon used was a little over one-

seventh of an inch in diameter of bore. In the first set of experiments the long limb of the siphon was eighteen and a half inches, in the second set of experiments nine inches and three-eighths, and in the third set of experiments only one quarter of an inch, longer than the short limb. The results of the three sets of experiments are embodied in the following table :—

Having so adjusted the lengths of the long limbs of siphons of different diameters as to cause them to empty a bottle of water in equal times, Mr. Galletly tried whether other liquids would also flow through them in equal times, and found that no other liquids would do so. He also experimented with long and short siphons, exactly alike in diameter of bore, and with the extremities of their limbs kept in each case at the same relative levels. The following table shows the results of two expements, the first with a siphon of which both limbs were about nineteen and a half inches long, and the second with a siphon of which both limbs were nine and a quarter inches long. Both siphons were of precisely the same diameter of bore, and in both experiments the extremity of the limb of the siphon placed outside the bottle,—which was the one already mentioned as holding 7,300 grains of water,—was kept just three-eighths of an inch lower than the extremity of the other limb.

Mr. Galletly concludes his paper with an example which suggests that their respective rates of efflux through siphons may be used to distinguish one liquid from another. He filled the bottle used in the experiments already quoted with paraffine oil of 797 deg. specific gravity (water=1,000), and found that drawing off this oil by means of the siphon used in the third of the three sets of experiments referred to in the first of the two tables given above, occupied 286 seconds. He then re-filled the bottle, this time with petroleum, of precisely the same specific gravity as the paraffine oil used in the preceding experiment, and found that for drawing off this petroleum by means of the same siphon 375 seconds were required. These facts point to the possibility of valuable practical tests of the purity, etc., of various liquids being based upon the phenomena to which Mr. Galletly has called attention. Is it not curious to consider how intensely individual the phenomena in question, together with those of spectrum-analyses, of the formation of cohesion-figures, etc., etc., show every substance in nature to be, in regard to every one, even the most seemingly insignificant, of its properties?

Steam Carriages in France.

"From the *Journal de Loir et Cher*, we learn," says the *Mechanics' Magazine*, "that a joint stock company has been formed at Blois for running stage coaches from that city to the principal towns in the department. The coaches are to be drawn by steam engines on the ordinary roads, according to the system of Mr. Lotz, an engineer residing at Nantes. The first coaches established will run between Blois, Romorantin, Selles sur Cher, St. Agnan, and Montrichard. Ten miles an hour, stoppages included, is the rate at which it is stated they will travel."

[These road locomotives will not run long. It is an old saying that one man may lead a horse to the water, but twenty can't make him drink. Engineers are able to construct machines to run by steam on common roads, but if the public won't patronize them, what is to be done? It is not a question of mechanical ingenuity, for that is already settled, but one of the popular taste, which no blatant arguments or hobby riding can overcome.—EDS.

Trades Represented in the English Army.

A return, recently issued, shows the number of non-commissioned officers and men in every regiment at home who have learned some trade before enlisting, and of the number who have worked at their trade since they entered the army. The largest number are shoemakers, of whom there were 3,279 enlisted, and 1,197 have practiced their trade since enlisting. The smiths are not far behind them, 2,732 of these having enlisted, and 1,083 afterward practiced their trade. It is a sign of the times that 2,756 weavers are among the enlisted men ; only three of them have practiced their trade since entering the army. There were also among them 2,151 tailors, 2,053 carpenters, 1,289 bakers, 984 painters, 973 masons, 855 butchers, 813 bricklayers, 556 gardeners, and 546 printers.

OYSTON'S STREAM-SPREADING NOZZLE.

This invention is designed to spread the stream of water issuing from the pipe of a line of hose, so that said stream would cover a larger area and be more efficient in extinguishing a conflagration than a straight jet; to effect this object the inventor constructs a cup shaped vessel, A, which is attached to the end of a nozzle, said vessel having a number of levers jointed at the middle, and so operated by the revolving cap, C, that they assume different positions, affecting the nature of the stream issuing from the mouth of the vessel, so as to change the character of it with each alteration in the position of the levers. These levers can be thrown entirely clear of the stream as shown by the dotted lines, so that a straight



jet will be projected; or by partially rotating the cap C, four of the levers will be first thrown in toward the center as at, D, and by continuing the rotation the other four will be forced entirely in so that all radiate from a common center, thus changing the stream issuing from the nozzle into a mist or spray which is said by the inventor to be more effectual in extinguishing fires than a solid column.

The figure holding the pipe and the several streams shown issuing therefrom explain the idea of the inventor very clearly.

The above article may be seen at the office of Cornish & Congden, 179 Broadway, up stairs, New York. A public exhibition of it will be given in this city in a few days, of which notice will be given in the daily papers. The inventor desires to call the attention of insurance Companies and all persons interested in saving property from fire to this improved pipe, which was patented through Scientific American Patent Agency, on Aug 25th, 1863, by Charles Oyston of Little Falls N. Y. for further information address him as above.

CASTOR-OIL beans are said to be a most profitable crop to grow, being worth at the present time $2 50 per bushel, with small prospect of a decline.

Experience with Bessemer Metal.

We make the following extracts from an editorial in the London *Engineer*, of March 31st:—

RAILROAD RAILS.

We are in a position to give some particulars as to the results already attained in the use of Bessemer metal for rails, ships' plates, etc., and these, it will be seen, are such as to leave no doubt of the vast importance of this material for the purposes of the engineer and constructor. In the year 1861 the London and North-Western Railway Company purchased 500 tuns of rail blooms from Messrs. Bessemer and Co., and when rolled into rails one of these, taken at random, was put down in a part of the line near Camden Town, where the traffic was unusually heavy. The wear of the contiguous iron rails and that of the steel rail was carefully noted by order of the Board of Directors. On the application, in 1864, of a gentleman interested in the subject, the following particulars were kindly furnished him:—The rail was laid down May 9th, 1862, and when examined in September, 1864, "there were little signs of wear." 8,000 goods trucks pass over this rail in twenty-four hours, and it is estimated that 7,000,000 trucks passed over it in the two years and four months covered by the report. The neighboring iron rail, also put down new on the 9th of May, 1862, was turned in July; new rail September 9th, 1862, turned November 6th; new rail January 6th, 1863, turned March 1st; new rail April 29th, turned July 3rd; new rail September 29th, turned December 16th; new rail February 16th, 1864, turned April 12th; new rail August 6th, still down at the date of the report. So the Bessemer rail had nearly worn out both sides of seven rails. The steel rail, it is since understood, is still in use, in good condition, and without having been turned. Here if ordinary rails are worth £7 per tun, the Bessemer rail would be worth very much more than £50. The traffic through the Crewe station is, it is well known, very great. Formerly the iron rails were worn out there in four months, each side of the rail giving two months' wear. The station was laid throughout, November 10th, 1861, with steel rails rolled by the company from ingots made by Messrs. Bessemer and Co. None of these rails have yet been turned, and it is understood that they appear likely to go two years more before even the first face is worn out. Here the comparison with iron would appear to be something like twenty or more to one.

SHIPS' PLATES.

In the case of ships' plates, Messrs. Jones, Quiggin & Co., of Liverpool, employed Bessemer cast-steel almost exclusively in their ships built in 1864, and they have used large quantities of it since 1860. This firm last year launched twelve sailing ships and eleven steamers, the frames of which were of puddled steel and the plates of Bessemer cast-steel. The plates are, on the average, five-eighths as heavy as iron used in like vessels, the saving in weight being, of course, added to the useful burden of the vessel on a given draught. Among the steamers will be recognised the names of the well-known blockade runners :—the *Colonel Lamb* and *Hope*, each 281ft. long, with 350-horse engines; the *Rasine* and *Raiby*, 260ft. long, with 300-horse engines; the *Cora Bellt*, *Wasp* and *Hornet*, each 250ft. long, with 220-horse engines; and the *Lynx*, *Fox*, *Bat* and *Owl*, varying from 532 to 771 tuns.

FINE TOOLS.

Messrs. Benjamin Hick & Sons, of Bolton, employed Bessemer tool steel in their works for some years, and, we believe, are still using it of their own make —they having become licensees some time since.

RAILWAY TIRES.

Railway tires thus far made of Bessemer metal have not, heretofore, been generally made out of a solid block, but in a bar or bars, afterwards welded together. There is no cast-steel tire whatever that can be depended upon if completed by welding, and several Bessemer tires thus made have failed in the weld. Among these were a considerable number of engine tires supplied to the London and South-Western Railway. But the fault was not that of the material, and we feel no risk in saying that Krupp's tires, excellent as they unquestionably are, would, had they been welded, have failed in the same manner. Krupp's tires are made from a solid block of oblong shape, and through which a slot is made by drilling and cutting, this slot being afterwards opened out so as to

form the metal into a hoop, which is finished by heating and rolling. Arrangements are being made for making Bessemer tires in the same manner, and it is not unlikely that, the risk of broken welds being thus removed, they will take the place of all tires now in use.

PLATE GIRDERS.

We believe some small plate girders of Bessemer steel have been constructed, but its advantages would appear chiefly in large spans, where, in the case of iron, the weight of the bridge itself forms the greater part of its own load. For ordinary spans the present price of Bessemer steel leaves no margin of advantage to the engineer. It is known, however, that it is being learned how to turn the commoner kinds of English iron to good account in the Bessemer process, and as the waste in manufacture is very little and as a great number of firms are now competing in the business, it is in all respects probable that Bessemer metal will fall rapidly in price, and that its use will be as rapidly extended.

OUR SPECIAL CORRESPONDENCE.

The center of the cotton manufacture. Enormous profits of the business. Prosperity during the war. Curious effects on the business of our inflated currency. Work being resumed. Prosperity of other manufactures.

PROVIDENCE, April 22, 1865.

MESSRS. EDITORS:—This is the center of the manufacturing interest of New England. On the beautiful hights in the eastern part of the city are noble residences of the Spragues, the Browns, the Iveses, and many others whose villages are scattered along the valleys of this and the adjoining States, and who have made collossal fortunes by spinning, weaving, bleaching, or printing the white ala of the *gossypium herbaceum*, and thus fitting it for clothing the backs and limbs of men and women.

One establishment that I happen to known about, which has a capital of $200,000, made last year a gross profit of $97,000, and after reserving $27,000, they divide $60,000, which is a net profit of 30 per cent. This is, however, better than the average for the last year, as the decline in cotton from $1 80 to 25 cents per pound has in some cases swallowed up the whole, and in others, a large portion of the profits. But the cotton manufacture has never known a a more prosperous period than during this war.

I was very much interested in the details of the embarrassment to this industry, as to all others, from the fluctuations resulting from our inflated currency. A large manufacturer was asked the present cost of making a yard of 60×64 print cloths, besides the cost of the cotton. He replied about 3 cents, just double the cost under the old specie currency. He explained that wages are about 50 per cent higher, coal, freights and supplies generally about double, carrying the cost up to about 2½ cents, and the remaining half cent is caused by the uncertainties and fluctuations in the business. For instance, two months ago he decided from the rapid fall in cotton to stop buying, and to work up all he had on hand; consequently the beams were filled first with 30 yards of yarn, then with 20 yards, and then with 15 yards, thus making the expense of "drawing in" the same for half a piece as for a whole piece when the mill was running full time. Furthermore, the expense of superintendence, clerk hire and many other departments is no more with a full product than with half product. In short, there are innumerable ways in which the uncertainties and embarrassments resulting from a fluctuating currency operate to diminish the production of wealth, in this, and in all other branches of the national industry.

The present comparatively low price of cotton has produced a common feeling that it will not probably fall much more at present, and a good many mills that have been suspended are resuming operations. There is a general feeling, however, that it is very much of a speculative, gambling transaction, rather than a safe, steady and substantial business.

The iron, steam engine, machine making, and other manufactures generally are very profitable, and the city is accumulating wealth with great rapidity. I have just been through one of the large manufactories of cheap jewelry, but will reserve an account of that for my next communication. B.

Correspondence

Northern Cotton.

MESSRS. EDITORS:—By an act of Congress, public attention has been attracted to the mode of preparing flax and hemp as a substitute for cotton. Those engaged in the experiment of these fibers are sanguine of success. Owing to the scarcity of the staple resulting from the war, the culture of cotton has been attempted in the States of Kansas and Missouri, and other States as far north as the 40th degree of north latitude, which seems to be the northern boundary of King Cotton, beyond which Nature has forbidden his jurisdiction on the American continent. This parallel appears to be also the southern boundary prescribed by nature in America for the growth of a plant which has many, if not all, of the characteristics of the cotton plant, viz., *Epilobium*, and which, according to the books, is indigenous as far south as Pennsylvania, and as far north as the arctic circle.

In the month of October last I collected a small quantity of the plants of the common fire-weed. The plant proved to be Epilobium, and in compliance with a request of the Agricultural Department at Washington, I have made certain experiments which it may be interesting to your readers and to the public to have submitted to them.

My first utilization of the fiber was the simple operation of picking it from the pod in which it grew, and placing it in the tube of a common oil lamp—forming a wick by twisting it with my fingers; it answers every purpose of wicking for which we have been paying from seven to ten dollars per pound.

Encouraged by this success, I resolved to ascertain whether it would spin, and the result was a stocking, which was carded, spun, knit and dyed by the same tiny hand that picked the fiber from the pod in which it grew. Next I had made a flat wick for the rotary burner used in kerosene lamps, which was equally successful in its operation; then a braided wick for a sperm candle, and a common strand wick for a tallow candle. For the purpose of testing the strength of the fiber, I took the braided wick to a shop, and lifted first a seven, then a fourteen pound weight, and then both together, without any symptoms of breaking. Furthermore, I had made a cord, about the size of a common clothes-line, which did not break till I put two fifty-pound weights upon it. The wicking was saturated with sperm oil; the cord was not saturated, but entirely dry, and twisted by hand, after the fiber had been spun into strands, on an old-fashioned large spinning wheel. The fiber was carded by hand, on cards of number 32 wire. Mixed with one-fourth wool or cotton fiber, the yarn can hardly be distinguished from woolen or cotton yarn, but I have not enough of the material to weave it, and of course know nothing upon that branch of the case. The woman who spun it said that it was much better than yarn she had worked in a cotton factory. A manufacturer of under-shirts and drawers (mixed half and half) has promised to try it next fall.

That it will make wadding, batting, etc., is conceded by the manufacturers of those articles, and an extensive paper manufacturer pronounced it the best material (except silk) he ever saw for fine paper. The fiber measures from three to six-eighths of an inch in length; the former grew on dry, sandy loam, the latter on moist ground near a spring of water.

Dr. Copman, of Utica, who is considered a very cautious observer, certifies, after careful examination and comparison under his glass, that the fiber of the Epilobium has all the characteristics of the cotton fiber, and is a very different substance from the fiber of the milk-weed, which was compared at the same time with both the cotton and Epilobium fiber.

RUTGER B. MILLER.

Utica, April 4, 1865.

Petroleum in Chemung Valley.

MESSRS. EDITORS:—I am a reader of your valuable paper, and among the quantities of good reading I occasionally see an article on petroleum oil, and I write this letter to communicate something upon that subject. We have discovered petroleum in the Chemung Valley. It has been found all along the Chemung Canal, and in the Valley clear to the head of Seneca Lake. I myself have skimmed quantities of it off the water, and will send you a sample if you would like to see it. Others have done the same thing, and the people of Havana and Watkins are now in a blaze of excitement upon the subject. The oil is of the best quality, as many will tell you who have gathered bottles of it. The existence of the oil has only lately become generally known, but last week it was discovered oozing out of the ground in large quantities in different places. Some geologists and chemists have examined it, and say the whole valley is filled with oil. I send you this letter thinking the information may be worth publishing in your valuable journal, of which I am a constant reader. W. J. CRANDELL.

Millport, April 24, 1865.

Saleratus and the Teeth.

MESSRS. EDITORS:—In the last number of the SCIENTIFIC AMERICAN I notice an extract from the correspondence of the *Dental Quarterly* in regard to the effects of saleratus and cream of tartar upon the teeth. The publication of such ideas as we find expressed therein for a long time, in all kinds of journals, has resulted in disseminating among the people erroneous ideas in regard to their teeth, and has increased the labor of dentists exceedingly, thus showing their baneful effects. If the people generally had clear ideas of the simple nature of decay of their teeth, the trouble and expense of keeping them in good condition would be exceedingly lessened. Hence one who understands why teeth go to ruin and cause so much misery in life must feel as if the short extract in question must go still futher to mystify the public. This simple subject should have one thorough ventilation in the public journals to solve the difficulties and wonders of many minds in this respect, and set the people to thinking rightly, instead of catching up here and there little absurd notions, which only have the effect to mislead and injure them.

The enlightened labors of Dr. Amos Westcott, one of our leading dentists, have settled to a certainty the cause of caries of the teeth, and his experiments have been so thoroughly conducted and so generally recorded in standard works on dentistry, that if any dentist has of late felt that there is a mystery about the decay of teeth, he shows that he cannot have studied any standard work in dentistry, and hence is unfit to advise the public in dental matters. Saleratus is an alkali, and cream of tartar is an acid, and the correspondent says:—"Saleratus removes the gelatine, the cream of tartar removes the lime—the two principal ingredients of the teeth—and between the two evils the teeth stand a poor chance, and hence the result." The experiment of the correspondent conflicts with Dr. Westcott's experiment with saleratus and teeth, for on page 286 of Harris's "Principles and Practice of Dental Surgery," the main work extant in dentistry, we find among the results of Dr. Westcott's experiments the following recorded:—"Alkalies do not act upon the enamel of teeth; the caustic potash acts readily upon the bone of the teeth by uniting with its animal matter." Why? Because in the enamel less than one in one hundred parts consists of animal matter, while in the bone twenty-eight parts in one hundred are gelatine and water. In the enamel ninety-nine parts consist of lime, magnesia and soda. Although the two results are differently recorded, we must give preference to that of Dr. Westcott, for it has the stamp of authority and consistency and relative facts, which show great sagacity and education, while all we have to do to demonstrate the lack of penetration and information of the Portsmouth correspondent is to consider what has escaped his notice, although I dare say any woman could have told it to him, viz., that of all this 32 tuns of saleratus and cream of tartar dispensed to the 10,000 people of Portsmouth in a year, to the ruin of their teeth, not one ounce ever came in contact with a sane person's teeth until after the two articles had been combined in cooking so as to form tartrate of potash, a neutral salt, or the bitartrate and carbonic acid gas, which are two totally different articles from either cream of tartar or saleratus, and absolutely harmless to the teeth practically. Suffice it to say that the only cause of the decay of the teeth is contact with acids, which arise either by the taking

of one into the mouth, or by decomposition of food left in small portions between the teeth, where it finds three things eminently conducive to its decay, viz., warmth, moisture, and oxygen from the air. This would be prevented by an alkaline state of the saliva, but that condition is found only in those cases where a person enjoys the most perfect health constantly. Pardon me for sending you so long a communication; but these things seem so little understood by the public generally that some degree of minuteness appears called for. C. A. N.

New York, April 24, 1865.

Incubation.

MESSRS. EDITORS:—Can you inform me what the amount of heat used in incubation is, and if it is the same for the whole three weeks. I have made some experiments to find out myself, but none were satisfactory. H. H.

Woburn, Mass., April 15, 1865.

[The proper heat for the hatching of hens' eggs, is 104° of Fah., to which degree the surface of the body of the hen will raise the thermometer when she sits upon her eggs. In those birds that do not sit constantly, but trust to the heat of the sun, the temperature of the eggs is probably below 104°.

The full period of incubation by the hen, in this country, is well known to be twenty-one days. In warmer climates it is said to be a day or two less. The periods of incubation vary much in different species of birds; we introduce the following table, which has been compiled from different authors by Count Morozzo, in a letter from him to Lacepede, to show the periods of incubation compared with those of the life of certain birds.

Names of Birds.	Periods of their Incubation. Days.	Duration of theis Life. Years.
Swan	42	about 200
Parrot	40	about 100
Goose	30	80 or more.
Eagle	30	Period of life not known.
Bustard	30	
Duck	30	
Turkey	30	
Peacock	26 to 27	25 to 28
Pheasant	20 to 25	18 to 20
Crow	20	100 or more.
Nightingale	19 to 20	17 to 18
Hen	18 to 19	16 to 18
Pigeon	17 to 18	16 to 17
Linnet	14	13 to 14
Canary	13 to 14	13 to 14
Goldfinch	13 to 14	18 to 20

Crane and heron, as well as ostrich, hatch their eggs chiefly by the heat of the sun.—EDS.

Thin Steel Wanted.

MESSRS. EDITORS:—Being engaged in working on smut machines, I have observed that the zinc we use for screens, no matter how well put on, seems to be so much affected by the weather that the surface gets very uneven, and the wheat cannot spread evenly over it. I was thinking, from seeing several interesting articles in your valuable paper about rolling steel thin, that if we could get steel about 36 on the wire gage, not to cost a great deal more than zinc, it would answer a better purpose, be more durable, and keep a better surface. Would you be kind enough to let me know the names of any parties that make steel such as would answer, and oblige.

R. A.

Chicago, April 4, 1865.

[The plate for the steel letter was rolled at the Sligo Iron Works, Pittsburgh, Pa.—EDS.

To Preserve Maple Sirup.

MESSRS. EDITORS:—The SCIENTIFIC AMERICAN of April 8 has a plan for keeping maple sirup to retain its delicious flavor, which is to nearly fill bottles and put cotton in the mouths of them, "to allow the gases of fermentation to escape." Maple sirup to be fit for anything but vinegar or rum must not ferment in the least. It may be kept the year round just as good as when made by filling bottles or stone jugs with the hot sirup, leaving just room for the corks, and sealing them with wax. We have kept it thus for several years past, and ask for no better plan.

Red Bank, Ohio. P. F.

[The best way to have maple sirup pure is to buy good sugar and melt it down as required. It is more economical in this way, for the consumer does not pay for water and other matters which the sirup holds. There is no risk or trouble whatever, either with bottles or any other vessels.—EDS.

The Laws of Falling Bodies.

MESSRS. EDITORS:—Several questions having arisen in regard to the force of falling bodies, between some parties here, I am requested to write to you and get your opinion in regard to the matter.

The first is, "Will a ball shot from a rifle into the air, perpendicularly, have the same velocity, and consequently the same force, when it returns to the earth that it had when it left the gun?" In practice, common pigeon shot, being discharged into the air, fall back harmlessly to the earth, although they leave the gun with force enough to kill one. This fact does not harmonize with the law, that the velocity of a descending body is the same in its ascent as in its descent. Why do not shot have the same force in falling as in ascending.

Second, "Will not a ball of candle wicking, weighing 1 lb., fall 100 or 1,000 feet in exactly the same space of time as a ball of lead of equal weight?"

Third, "Will not all bodies of the same material and same shape fall alike to the earth in the same space of time, notwithstanding one may be three times as heavy as the other?"

These questions all suppose the experiments to be done in the air with the atmosphere as it is, and not in a vacuum. I myself can understand the solution of these questions, but I cannot answer the question "why shot do not have the same force in falling they have in ascending." My answer is, they will when they have acquired the same velocity in falling they had at the moment of leaving the gun. We know they do not have that velocity, but yet the answer is "that the velocity acquired during the fall is equal to the velocity of projection."

WM. SPALDING.

Derby Line, Vt., April 19, 1865.

[The resistance of the air causes the shot to fall with a velocity less than that of their ascent. A ball of candle wicking will fall with the same velocity as a ball of lead in a vacuum, but not in the air. In a vacuum the size of a body has no influence on the rate of its descent, but in the air the larger the ball of any material the more rapid is its fall.—EDS.

New Discovery of the Breeding of Sex.

[For the Scientific American.]

A knowledge of the cause of the difference of sexes in the animal kingdom is a means of breeding whichever sex may be preferred.

For several years I have been in possession of this knowledge, and being a Frenchman, I had intended to communicate it to the Academy of Sciences at Paris; but illness has prevented my return to France. Fearing that my secret may perish with me, as in the case of Segato, I have decided to publish it for the benefit of all civilized people.

Experience has shown that the theory heretofore prevalling in regard to the production of the sexes is false, and that this which I submit is the only true one.

It is the male who engenders the substance destined already to be of the masculine sex or the feminine before the female receives it. The right apparatus engenders the male, the left the female. By operating a partial castration, therefore, of the male, it is easy for stock breeders to procure offspring all of either sex.

At La Hotte, near Fort Liberty, in Hayti, this process has been in operation for several years, and for the twelve years that I have watched the result it has never failed.

A. DE FERRANDI.

Mahan's Field Fortification.

Messrs. John Wiley & Son, 535 Broadway, New York, have published a new edition of the treatise on Field Fortification, by D. H. Mahan, L.L.D., Professor of Civil Engineering in the United States Military Academy. It is a work of 284 pages, and is designed as a text book for the numerous private military schools that are springing up all over the country. We extract the following definitions:

The term *Intrenchments* or *Lines* is applied to fortifications of considerable extent, thrown up to cover an entire army or an army corps on the front and flanks. A position so fortified is said to be *Intrenched*.

The term *Field Work* is applied to a fortification of limited extent, to be occupied by a small isolated detachment dependent upon its own means of resistance.

Fortifications should be regarded only as accessory defensive means, but still a very important one, and they will conduce to the end proposed the more nearly they are made to satisfy the foregoing conditions of a strong defensive position.

To satisfy the first three of these conditions, viz.: to offer an obstruction to a hand-to-hand conflict; to shelter the assailed from the view and fire of the assailant; and to afford the assailed a commanding view and a sweeping fire over the assailant's lines of approach; fortifications must consist of a covering mass of earth, stone, wood, or iron, of sufficient height and thickness to screen the men behind it from view, and to intercept the missiles of the assailed, and of some obstruction in advance of it which will prove a serious obstacle in the way of the assailant's advance.

Parapet.—The covering mass is termed a *parapet* when it fulfils the last two of these conditions; when intended simply as a screen, as in the case of a cover for cavalry when waiting to be brought into action, it is termed an *epaulment;* and when used to cover troops from an enfilading fire on the flank or in the rear, a *traverse.*

Ditch.—The most usual obstruction to impede the enemy's advance to attack with the bayonet, is a *ditch* placed in front of the parapet. When the parapet is of earth, the ditch furnishes the material for its construction.

Banquette.—When the parapet is too high to admit of a man standing on the natural level of the ground to fire over it, a platform of earth or wood is placed behind it, from which the soldier can fire at the proper level. This is termed a *banquette.*

Banquette Slope.—When the top surface of this platform, termed the *banquette tread,* is too high to be reached from the ground by an ordinary step, a ramp, either of earth or timber, is placed in rear of it, by which it is reached. This ramp is the *banquette slope.*

Interior slope.—The interior face of the parapet, when arranged for musketry, is termed the *breast hight,* or *interior slope;* when for artillery the *genouillère.*

Superior slope.—The top of the parapet is the *superior slope.*

Exterior slope.—The exterior face is termed the *exterior slope.*

Berm.—Between the parapet and ditch a narrow zone is usually left on the natural surface of the ground which is termed the *berm.*

Scarp and Counterscarp.—The side of the ditch adjacent to the parapet is termed the *scarp;* the side opposite to this, the *counterscarp.*

Glacis.—A mound of earth placed in front of the counterscarp with a gentle slope outwards is termed a *glacis.*

Trench.—To obtain speedy cover, the parapet is formed from a ditch within, termed a *trench,* of sufficient depth, with the height of the parapet, to give shelter to the troops when standing in the trench. The natural ground serves as the banquette tread in this case.

A NEW invention for working ships' pumps by the capstan in case of fire, for which a patent has been registered by Mr. Matthew Blank, engineer, was tried on the 6th ult. on board the *Irresistible,* in Southampton-water. Sixty revolutions were obtained with one man to each bar of the capstan, and 73 with two men to each bar; while 100 men would, as we are informed, be required, under ordinary circumstances, to get 70 revolutions. The trial was successful, and the invention was pronounced very valuable. Extra hands were put to the capstan to force a column of water to the upper deck. This pressure was hardly fair to the inventor, but, notwithstanding the immense force applied, nothing gave way.—*London Artizan.*

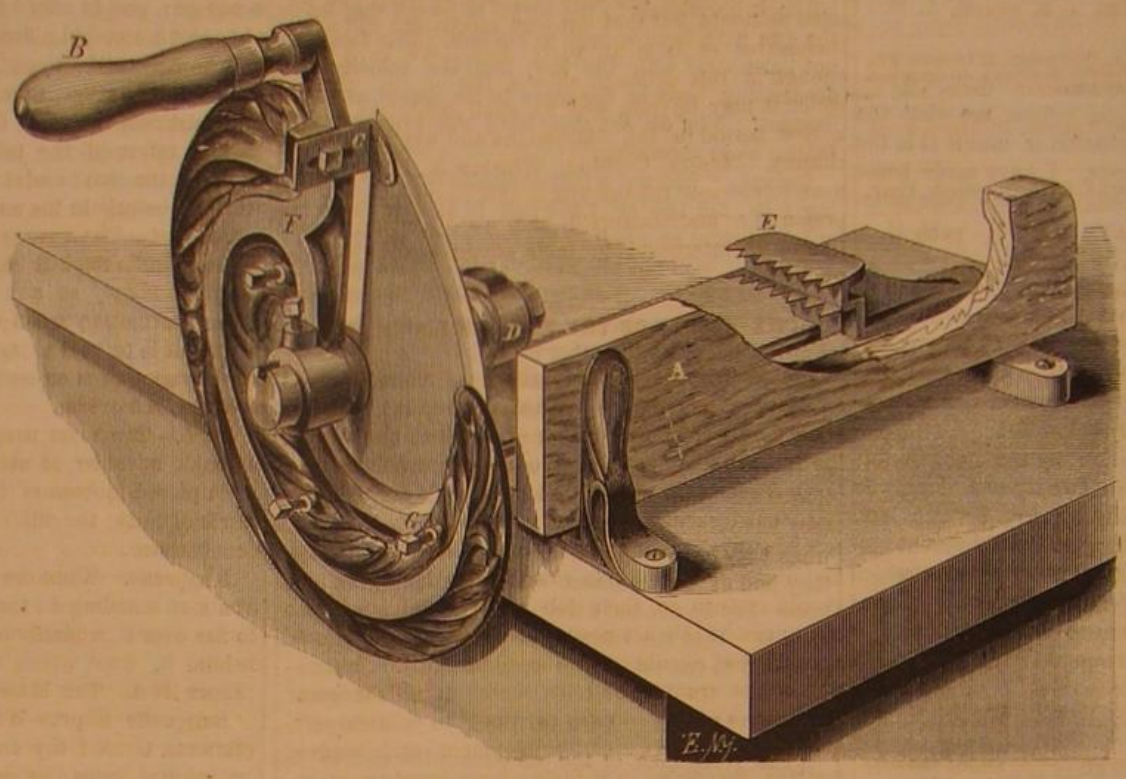
MR. CAILLET has pointed out to the Academy of Sciences that cast-iron loses carbon when kept for a considerable period at a heat somewhat below its point of fusion, and suggests that this fact might be turned to practical account. He finds that "blades of iron, heated among clean borings of cast iron, become cemented and form excellent steel," while "blades heated in the same furnace, but not in contact with the cast iron, are not cemented." He adds that the cast iron is not at all deteriorated by the process.

Improved Bread Slicer.

There has been a great demand of late years, especially since the war, for a convenient and simple machine to slice bread and meat with. The inventor of the one herewith illustrated says that his object has been to combine utility, neatness and durability at a moderate cost, and he thinks the end is obtained in his machine.

It is self-feeding, and by merely placing the loaf or joint of meat to be cut in the feed box, A, on turning the handle, B, the knife is revolved against the food and a slice is removed. The knife works close to the edge of the board, and can be adjusted at any time by the screws, C, in the handle. The loaf is fed up to the knife through the agency of a leather belt, D, which passes over rollers not seen; the end being attached to the clamp, E, which presses the work forward and holds it down at the same time.

In the guard, F, which protects the knife there are several cutters provided with bolts, G, which score the food to be cut in a vertical direction, so that strips may be removed instead of slices; the knife acts in conjunction with these. Any desired thickness of slice or shred can be cut by properly adjusting the feeding mechanism, and for cutting cabbage, bread, boneless meats, etc., it will be found useful. It was patented Jan., 3d, 1865, by G. B. Pullinger. For further information address J. H. Beardsley, 219 Nassau street, New York.



PULLINGER'S BREAD SLICER.

Improved Longitudinal Time Fuse.

Great difficulty is experienced in lighting the time fuses on the front ends of shells, particularly those used in rifled guns having soft cups or rings, to cut off windage, or impart rotary motion to the projectile; in these the flame from the charge is stopped too suddenly to reach the fuse. This imperfection is remedied in the shell shown herewith. This time fuse —graduated and cut like the Boreman fuse—is located in a longitudinal groove or grooves in the periphery of the shell, commencing near its base in front of the gas cup, and extending forward, entering the chamber of the shell nearer its front. Its position thus greatly increases the chances of ignition, whilst its construction is exceedingly simple as can readily be seen. Mr. Wright, the inventor of this shell is also the inventor of the ring fuse, and the cap machines which have supplied our armies since the rebellion, some sixteen machines being in operation, each capable of making fifty thousand a day. This fuse was patented March 21, 1865; for further information address. Geo. Wright, care of S. S. Fahnestock, Washington City, D. C.

Fig. 1

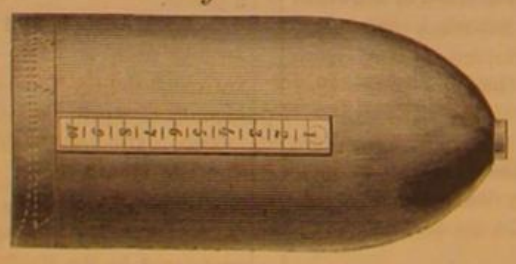
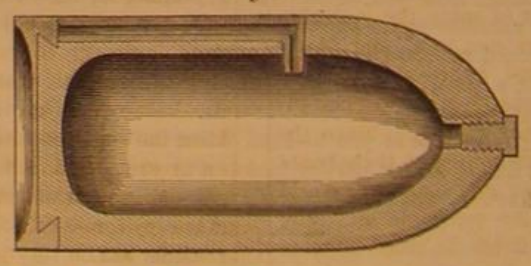


Fig. 2



WRIGHT'S LONGITUDINAL TIME FUSE.

New English Water Motor.

A rotary engine which, if it should utilise the percentage of power claimed for it by the gentleman who designed it, Mr. C. H. L. Fitzwilliams, is likely to be very largely adopted where small power is occasionally required, was described at a recent meeting of the Institute of Engineers in Scotland.

Practically, the engine may be regarded as two drums united to form one large cylinder, within which there work two pistons, each formed by uniting the halves of cylinders of different diameters, and easing down the asperities. Each piston rotates upon a shaft, which passes through the center of the drum, and as the pistons are connected by toothed wheels outside the cylinder, so that the large sides shall always be parallel to each other, it will be obvious that in each drum a water channel is alternately formed and closed between the piston and the side of the cylinder, the pressure of water in the supply-pipe acting upon the portion of the piston which connects the peripheries of the two halves. Mr. Fitzwilliams considers that if the fall is not more than 30 feet it cannot matter much where the engine is placed with regard to it; it would be just as efficient placed at the top as at the bottom of the fall. The water moves through the engine in one solid stream, during one-half of the revolution down one side, and during the other half down the other.

A comparatively small surface of the water comes in contact with the sides of the engine, so that the friction cannot be great between either the water and the engine itself, or between the different molecules of the water. The invention is likewise applicable as a water-meter, and as a pump, for which latter use it is claimed to be superior to the ordinary centrifugal pump, as it can work at quick or slow speeds with equal efficiency.

An interesting discussion followed the reading of the paper, Prof. Rankine, Mr. J. M. Gale, Mr. Downie, Mr. J. Elder, Mr. Yule, Dr. Joule, Mr. Day, and Mr. Fitzwilliams, taking part; and the general opinion seemed to be that it could not be used as a motive power economically, but that as a water meter it could be advantageously employed.

TRAINING DOGS.—In the course of some conversation in relation to dogs, Governor Anderson, of Ohio, related a Texan practice in training dogs with sheep. A pup is taken from its mother before its eyes are opened, and put with a ewe to suckle. After a few times the ewe becomes reconciled to the pup, which follows her like a lamb, grows up among and remains with the flock, and no wolf, man, or strange dog can come near the sheep, and the dog will bring the flock to the fold regularly at 7½ o'clock, if you habitually feed him at that hour.

New Metallic Alloys.

Messrs. T. Dunlevie and John Jones of England have patented a metallic alloy, to be employed for the bearings of shafts or frictional surfaces in machinery. The improvements consist in the combination and use of spelter and block tin, to which is added a small quantity of copper and a small amount of antimony, and the mode of combining the above in the melting pot is as follows:—First, take 4 ozs. of copper, melting or fusing it in any ordinary crucible.—When fused, add 16 ozs. of block tin and 1 oz. of antimony; and when the whole are melted together, pour the compound out into a mold. Then melt in a separate vessel 128 ozs. of spelter, together with 96 ozs. of block tin, and when both are fused, add the above ingot of copper, tin, and antimony, and fuse altogether; when properly fused in these proportions, or thereabouts, the alloy is complete. The chief features of this alloy are of great durability, and its low temperature when under the heating influence of friction.

For lining bearings, journals, etc., the bearing is to be tinned, in the ordinary method, with block tin and salammoniac. The improved lining alloy is then gradually fused, and the bearing heated, until it will fuse a solid strip of the alloy. A heated shaft, or mandril, is then inclosed in the bearing and mold, and the alloy poured in between the bearing and the shaft, remaining until it hardens; the bearing is then taken from the mold lined with the alloy.

JEFF DAVIS AND HIS 16 TUNS OF GOLD.

The flying ex-President of the ex-Confederacy is reported to be on his way to Mexico with a sum in gold variously estimated from six to thirteen millions of dollars—being the proceeds and net avails of the contents of all the banks he could get at during the closing hours of his career. The probability of its safe transport is much lessened when we reflect upon the enormous weight of it. We read, in a familiar verse of "John Gilpin:"—

He carries weight, he rides a race
'Tis for a thousand pounds!

In like manner Davis carries—estimating his plunder at $10,000,000, net—the enormous weight of 16 tuns—one million of dollars weighing 3,700 lbs. Considering the condition of Southern roads and the endurance of wagons and horse-flesh, it is unlikely that the treasure will ever be carried off safely, and we hope ere long to chronicle its capture.

Mechanical Improvements.

There have recently been introduced in the Fort Pitt Works two very important mechanical improvements, the first a new plan for turning trunnions, and the second for casting shells. Heretofore, the shoulders about the trunnions have had to be shipped off by hand, a slow and laborious plan, but by the employment of another eccentric cam applied to the lathe, this portion of the gun, like all the rest, can now be turned. This great improvement has been made by Mr. Kaylor, an employee of the works. The second improvement, in the making of shells, is in casting them with five-inch sinking heads, which are subsequently turned off, instead of the small heads formerly made, by which great density of metal is obtained.

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NEW YORK, SATURDAY, MAY 6, 1865.

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BESSEMER STEEL IN THIS COUNTRY.

The old steamboats which ran upon the North River in the palmy days when a sail up that glorious water course was like a chapter out of a poem, present many features which, to the curious and those who love to compare present progress in the arts with past, are interesting in the highest degree. Wide of beam, long in the keel, with huge paddle boxes overtopping the frail hulls they looked more like some absurd and unnatural relic of the antediluvian period than modern vessels intended for the transportation of passengers.

The machinery of the steamers was not more remarkable than the hulls; and those details, which are now usually forged, were cast or constructed of such materials as the workmen in that day were able to manage. Thus one steamer—and doubtless others—had huge shafts of boiler iron; they were six feet in diameter, adequately stayed and strengthened, and were adopted partly in order to solve the question of fitness between them and cast iron, and partly because forges to construct and lathes able to take in wrought iron or cast-iron shafts of the proper dimensions were unknown in the country. Since the period which marked the introduction of these boats and the adoption of their boiler iron shafts, the world has made great strides in the mechanic arts, and there are but few exigencies liable to arise wherein the remedy is not at hand.

The increased facility with which wrought iron can be worked and its adaptation to obvious purposes have rendered it almost indispensable. Iron in its three principal forms is the chief substance on which we rely for strength and durability, and since wrought iron has a higher tensile strength than cast, and steel a greater than either, it is obviously the material to be used where it can safely be to the exclusion of other.

The expense, however, has been one of the greatest barriers to general use, and its introduction in machinery has only been possible where large sums have been paid for work and makers instructed to spare no pains to make their work first class.

But by the success of the Bessemer process, and its practical adaptation to the production of steel in large masses of superior quality, the mechanic arts have received a wonderful impulse in all that relates to the durability of the machinery by which they are prosecuted.

The expense of repairs and renewal of railway stock, which are the chief items of outlay, involving often the sacrifice of dividends, and causing grief to stockholders, the breakage of costly shafts on steamships, the great advantages from dispensing with the transportation of non-paying weight and the perfect integrity of the material throughout, are reasons for advocating its adoption in place of wrought iron. English shipbuilders have used quantities of this metal in past years and the saving in weight above alluded to is very great—in iron vessels five-eighths of the thickness being used in place of iron; and we have no doubt but that our own mechanics will avail themselves of it at an early date. We have said enough in this artice to show a few of the uses to which it may be put, and we shall doubtless mark a new period in the dimensions and weight of machinery. Messrs. Corning, Winslow & Holley, who have introduced the process in this country, are now prepared to manufacture it, and we direct the attention of all interested to their advertisament in this number.

ONE RESULT OF THE ENGLISH LOCK-OUT.

The great strike of the English iron manufactures, or *masters*, as they are termed abroad, has been described and commented on in a previous number of the SCIENTIFIC AMERICAN. To those persons who may not have seen the account referred to it is necessary to state that by reason of some men in a certain locality refusing work the masters took concert in action and declared their works closed until the operatives should return to their labor. The injustice and meanness of this act needs no comment, and it now appears that agents went abroad on the first intimation of the troubles and by representing the great advantages of this country in respect to political privileges, wages, permanent employment, and kindred matters, succeeded in inducing large numbers of operatives to embark, and many of them have already arrived.

So far as regards permanent employment and the want of workmen there can be no question as to the expediency of coming to this country, but between the days when the arts of peace shall supplant those of war and the disorder which now exists in society at the South, there must invariably be a period of relaxation when trade will be dull and times hard. From the tremendous strife and struggle in which we have been engaged we must take breath for the sober business which is to follow.

Already the Government is discharging the superfluous hands from its armories and navy yards. The contracts for iron-clads have been completed, and while there is work enough in store for all there will be a period of dullness, as we have remarked, which must of necessity ensue. We therefore warn our mechanics to be provident now when wages are high and prepare for the future, and if English workmen see fit to come here they should not come with empty pockets or expect to find employers coming off in small boats to take them from the ships before they land.

When the war first broke out, four years ago, there was a greater demand for workmen than there now is and emigration of artisans to this country at this juncture will result in overstocking the market so that wages will be very low.

WHO INVENTED ILLUMINATING GAS?

The last number of *Le Gaz* has a report of a lecture by M. Payen on lighting by gas, delivered at the Sarbonne before a brilliant audience of scientific men and men of the world. The first part of the lecture was devoted to a historical sketch of artificial lighting. After tracing the use of candles and oil, M. Payen said:—

"The invention of lighting and heating by gas is due to Philip Lebon. The priority of this discovery was acquired (*acquise*) by a patent dated 1798, and by the memoir more explicit which he presented the following year to the Academy of Sciences. This able engineer understood at that time all the scope of his bold conception; in his enthusiasm he said to his fellow citizens, "My friends, I shall be able to send you continually from Paris to Brachay by artificial light and heat." The peasants who heard him shrugged their shoulders and remarked, "He is crazy!"

M. Payen speaks of Murdoch having lighted the shops of Watt and Bolton with gas in 1792, but still awards the priority of the discovery to Lebon from the statements in his memoir.

PRIZES AT EXHIBITIONS.

On another page we publish a list of thirty-two prizes offered by the Industrial Society of Amiens, in France, and they will doubtless offer suggestions to our own people, not only to the managers of fairs and exhibitions, but also to manufacturers and others who may desire to call out some particular invention or information in connection with any part of their business. It will be observed that a manufacturer of velvet offers a prize of twenty dollars, in addition to the gold medal of the Society, for an improved dressing for his fabrics, and several other prizes are increased in value by donations from persons specially interested in the invention or information sought.

The distribution of prizes is a matter of sufficient importance to merit the fullest and most earnest consideration of the men to whose determination it is committed. The principal service of fairs to exhibitors is the advertising given to the articles exhibited. In order, therefore, to obtain articles for the fairs, it is necessary that the prizes should be so distributed as to call out an active competition among those having wares to sell. But as the object of this class of exhibitors is mainly to secure the certificate of a tribunal supposed to be impartial, diplomas would generally be as efficacious as costly medals.

There is another class of competitors for whom the only suitable prize is a sum of money—the experimenters. A few years since the Massachusetts Agricultural Society offered a premium for the best experiment to test the comparative value of cooked and uncooked food for swine; and the facts developed by this offer have passed into the standard literature, and have become a portion of the established science of agriculture. Reading the reports of such experiments may be dull and prosy compared with the inspection of mammoth oxen or over-fattened hogs, but they exert a powerful influence in permanently raising the position of the Society, and they are of immeasurable value to the community. The proper compensation for the labor of weighing, measuring and recording necessary in experiments, is an adequate sum of money.

If committees and managers to whom the arranging of premiums and prizes is committed will give their thought to the matter, doubtless many improvements over the usual stereotyped course will be suggested, our design at this time is simply to call attention to the importance of the subject.

MARKET FOR THE MONTH.

Notwithstanding the important public events of the month of April, the capture of Lee's army, and the assassination of President Lincoln, the markets during the month have been remarkably free from fluctuations. The following table shows the change in price of the leading staples:—

	Price March 28.	Price April 26.
Coal (Anth.) ₩ 2,000 lb.	$13 00 @13 50	$11 00
Coffee (Java) ₩ lb.	33 @ 35	33 @ 35
Copper (Am. Ingot) ₩ lb.	34 @ 36	34 @ 36
Cotton (middling) ₩ lb.	@ 50	50 @ 51
Flour (State) ₩ bbl.	$9 25 @ 9 75	$7 00 @ 7 90
Wheat ₩ bush.	2 25 @ 2 50	2 20 @ 2 50
Hay ₩ 100 lb.	1 60 @ 1 70	1 32
Hemp (Am. drs'd) ₩ tun.	275 00@300 00	275 00@350 00
Hides (city slaughter) ₩ lb.	7½@ 9	8 @ 9½
India-rubber ₩ lb.	65 @ 1 05	51 @ 90
Lead (Am.) ₩ 100 lb.	9 75 @10 00	9 75 @ 9 87
Nails ₩ 100 lb.	7 50	7 00
Petroleum (crude) ₩ gal.	33	37 @ 37½
Beef (mess) ₩ bbl.	$13 00 @21 00	12 00 @20 00
Saltpeter ₩ lb.	28	28
Steel (Am. cast) ₩ lb.	15 @ 27	14 @ 22
Sugar (brown) ₩ lb	9½@ 14½	10½@ 15
Wool (American Saxony fleece) ₩ lb.	75 @ 85	75 @ 85
Zinc ₩ lb.	14 @ 15	13½@ 14
Gold	1 54	1 51¾

A SWEDISH MONITOR.—The launch has just been safely effected in Stockholm of the *John Erikson*, the first Swedish monitor. She measures 205 feet long by 46 wide. The side plating is five inches thick, and around the turret it is 12 inches, as is also that which protects the rudder. The vessel will be provided with six engines.

TREATISES AND INVENTIONS DESIRED IN FRANCE.

We find in the last number of *l'Invention* a list of the prizes offered by the Industrial Society of Amiens, and though it is too late for competition from this country, the list may be interesting; we accordingly present a brief translation.

First—Memoir on the fabrication and sale of bricks in the department of the Somme. Silver medal.

Second—Memoir on the construction of the buildings and the arrangement of the machines for the manufacture of linen, cotton and wool cloth. Gold medal.

Third—Memoir, with designs on machines, for raising the materials in constructing buildings. Silver medal.

Fourth—Prize for the invention of a pyrometer for measuring the temperature of the gases escaping from the furnaces of steam boilers. Silver medal.

Fifth—Prize for the best heaters of steam boilers in the department of the Somme. $100.

Sixth—Prize for the invention and application of a good meter for measuring the water fed to steam boilers. Gold medal.

Seventh—Prize to be distributed to a certain number of workmen of the department, remarkable for their conduct, labor, morality and devotedness.

Eighth—Construction of a power loom in which the feed and take-up shall proceed regularly without requiring any manual adjustment from the beginning to the end of the work. Gold medal.

Ninth—Construction of an automatic knitting loom making the return stitch. Gold medal.

Tenth—Construction of an automatic knitting loom, making the return stitch and narrowing. Gold medal and $20.

Eleventh—Prize for the best description of a spinning of wool mixed in all its parts. $60 given by M. Vayson.

Twelfth—Prize for the best description of a dye-house for dyeing woolen yarn in the skin; the heating to be done by steam, which must also supply a small engine. $40 given by M. Vayson.

Thirteenth—Prize for the invention of a good dressing or facing for linen cloth. $20 given by M. Boudard.

Fourteenth—Memoir on the improvement of lands. Silver medal.

Fifteenth—What will be the advantages of the cultivation of tobacco in the department of the Somme. Silver medal.

Sixteenth—Indicate new means for the preservation of grains in store. Gold medal.

Seventeenth—Present the finest and richest collection of woods of the country, worked and in the rough. Silver medal.

Eighteenth—To find for the velvets of Utrecht, a dressing filling the following conditions:—1st, To be without odor; 2d, Not to alter, either in color, softness or brilliancy; 3d, To preserve the softness of the tissue; 4th, Adapted to any length of nap. Gold medal and prize of $20.

Nineteenth—To find the means of producing the bitartrate of potassa, otherwise than by deposit from wines. $200.

Twentieth—For a composition which in dyeing woolens will replace with a notable economy tartar in colors requiring the employment of the salts of tin. $200 and a gold medal.

Twenty-first—To find the means of giving immediately and with economy to the decoctions of Campeachy the tinctorial force which they acquire only by age. Silver medal.

Twenty-second—To find for dressing cotton velvet a preparation which will replace animal glue, at the same time giving suppleness to the tissue, and preserving to it the strength necessary for sale. The mucilage must be economical, without odor, and without action on the colors. Gold metal.

Twenty-third—For specimens of cotton velvet having the qualities of English velvet in color and solidity. Gold medal.

Twenty-fourth—For an easy means of detecting the adulteration of oils. Gold medal.

Twenty-fifth—For a better means of bleaching cotton velvet, cut and not cut. Silver medal.

Twenty-sixth—For a lubricating oil. Gold medal.

Twenty-seventh—The invention of a machine to measure in a practical manner the lubricating qualities of oils.

Twenty-eighth—A means of applying in a practical manner hydrate of alumina to the filtration of sugars.

Twenty-ninth—A memoir on the use of trade marks, and the means of rendering them practically efficacious.

Thirtieth—To set forth the advantages and the inconveniences which result, in both a moral and material point of view, from an increase of the working population in the great manufacturing centers, in consequence of the development of industry. Gold medal.

Thirty-first—Study on the industrial arts in the department of the Somme, and on their progress or decline from the thirteenth century to the present time. Gold medal.

Thirty-second—Study on the habitual maladies of the workmen of the department of the Somme, following their diverse professions. What are the hygienic measures to be employed for each class of workmen? Gold medal.

"Cannel Coal."

About a century ago the celebrated Duke of Bridgewater was the proprietor of a large estate situated at a place called Worsley, seven miles from Manchester. This estate contained numberless valuable coal seams, easily to be got at, but nevertheless comparatively worthless, in consequence of the great expense and difficulty of transporting the coal to market. The Duke, being a singularly enterprising individual, determined, if possible, to remedy this defect, and by one of those happy coincidences which so frequently reward a praiseworthy effort, he found, in the self-instructed genius James Brindley, the very man to contrive the means for securing the desired end. Suffice it to say that Brindley constructed an excellent profit-paying canal between Liverpool, Manchester, Worsely, and the Great Wigan district. This canal appears to have been finished about the year 1766, and store-houses were built at various points at its course, where the Duke's coal was deposited, for the purpose of supplying the immediate neighborhood. At this time the word "kennel" or "kannel" was generally employed in Lancashire and Cheshire to designate an artificial watercourse; and even Brindley himself, in some of his letters, speaks of a new undertaking as "the Duke's kennel." It is not, therefore, surprising that the Duke's coal should have received the name of "kennel coal," being, so to say, kennel borne; and this name would be peculiarly applicable at Liverpool, where sea-borne coal from Whitehaven, in Cumberland, had long been in use, and was, moreover, an article differing in many of its qualities from the Duke's coal. That this is the true origin of the name now applied to this kind of coal is further established by the fact that the eminent geologist Werner, who visited the coal districts of England not long after the above period, has adopted the very word, and in speaking of the Wigan coal calls it "kennel kohle." This word has indeed been lately written "cannel" in this country, and some ingenious persons, finding themselves quite at a loss to discover the source of such a name, come to the conclusion that it is derived from the word "candle," and to support this they have asserted that slips of this kind of coal will burn like a candle; an assertion which we need hardly say is altogether fabulous.—*Newton's Journal of Arts.*

SPECIAL NOTICES.

James Warren, of Springfield, Mass., has petitioned for the extension of a patent granted to him on the 15th day of July, 1851, for an improvement in revolving breech-loading fire-arms.

Lewis Lillie, of Troy, N. Y., has petitioned for the extension of a patent granted to him on the 15th day of July, 1851, for an improvement in fire-proof safes.

Parties wishing to oppose the above extensions must appear and show cause on the 26th day of June next, at 12 o'clock, M., when the petition will be heard.

White-washed walls which are to be papered should be well brushed over with strong vinegar previously, or the paste will not adhere.

It is asserted that the disbandment of Lee's army has reduced the expenses of Government $1,000,000 a day.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING APRIL 25, 1865.
Reported Officially for the Scientific American.

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

47,374.—Slide for Extension Table.—Erastus P. Allyn, North Canan, Conn.:

I claim a slide for extension tables manufactured of malleable cast-iron or other metal, with its parts fitted together by the dovetail projections and recesses, and provided with stops, substantially as herein described.

[This invention consists in having a series of slides of malleable cast-iron, and fitted together by means of dovetail projections and grooves, and provided with stops, whereby a very economical and desirable slide for the purpose specified is obtained, and the annoyances and embarrassments occasioned by the shrinking, swelling and warping of the ordinary wooden slides are avoided.]

47,375.—Coffin Handle.—Ira Almy, Farmer, N. Y.:

I claim a detachable coffin handle, secured to a coffin through the medium of a plate applied in the manner substantially as shown and described.

[The object of this invention is to obtain a handle which may be readily applied to a coffin, and detached from it in a moment of time, and without the aid of any mechanical tools, whereby a set of handles may be applied to an indefinite number of coffins, the former being applied to a coffin when the body is placed in it, and removed when the coffin is to be encased or deposited in its final place.]

47,376.—Paper Bag.—James Arkell, Benj. Smith and Adam Smith, Canajoharie, N. Y.:

We claim as a new article of manufacture a quadrangular paper bag, with a double bottom produced by folding and pasting in the particular manner herein described.

[This invention consists in making or preparing paper bags in such a way as to give to them at their upper ends a flexible character, so that when properly filled with flour or other substances the sides of the bags at their upper ends will come together after the manner of the sides of a cloth bag.]

47,377.—Steam Engine.—John Baird, New York City:

I claim, First, A horizontal engine, provided with a box framing near and attached to the cylinder, and containing vertical pumps, substantially as described, said framing also constituting the condenser, or the channel ways thereof.

Second, I claim a horizontal engine, having a box framing, containing pumps and an independent pillow block framing, when the latter is combined with the former by wrought-iron rods, substantially as described and for the purpose specified.

Third, I claim arranging engines having the characteristics set forth in the second claim, on opposite sides of a vessel, when such engines have openings through the framing for the passage of a propeller shaft or shafts, substantially as hereinbefore described.

47,378.—Table and Desk.—Cyrus Baldwin, Manchester, N. H.:

I claim the combination of the table and writing desk, when arranged to operate substantially as set forth.

47,379.—Hay Rack.—Goldsmith Baldwin, Bluffton, Ind.:

I claim the binder, B and C, or their equivalent, for the purposes set forth.

47,380.—Cultivator.—Lester B. Barton, Metamora, Ill.:

I claim the hinged or jointed frame, E, placed within the main frame, A, as shown, in combination with the laterally-swinging shovel or plow standards, g g, levers, J J, with stirrups, K K, attached, and the curved or bow-shaped bar, M, all arranged to operate substantially as and for the purpose herein set forth.

[This invention relates to an improved cultivator, of that class in which the plows or shovels have a lateral adjustable movement, in order that they may be made to conform to the sinuosities of the rows of plants, and cast the earth up to the same or cast it therefrom, without the liability of plowing out the plants or injuring the roots thereof.]

47,381.—Coal-oil Burner.—W. W. Batchelder, New York City:

I claim the employment, in combination with a tubular wick holder and vapor or gas-generating and air-mixing chamber, of a perforated plate, or the equivalent thereof, together with a metallic or other heat conductor or conductors projecting downwards and dipping into the wick, substantially in the manner herein described, for operation as herein set forth.

47,382.—Microscope.—J. J. Bausch (assignor to Bausch & Lomb), Rochester, N. Y.:

I claim the combination of the object piece, A, eye piece, B, and spring, C, substantially as and for the purpose herein set forth.

47,383.—Churn.—Charles F. Baylor, Clinton, N. J.:

I claim the combination of the belt and rollers, substantially as described, with the slides, S and T, attached to the dasher shafts, and the block or attachment, J, deriving its motions from the hand crank and its connections, as described and represented.

47,384.—Shaking and Rocking Table for Amalgamating Gold, Etc.—Adolph Behr and Wm. James Ward, Black Hawk, Colorado:

We claim a shaking or rocking table, with amalgamated copper or brass riffles or grooves, which may be charged with more or less additional quicksilver, alone or in connection with one or more wooden riffles or grooves, in the shape and manner above described, or constructed in any manner, substantially the same, which will impart to substances suspended in water both the sifting and splashing motion which throws and forces the particles in contact with the amalgamated surface of the copper or brass riffles or grooves.

47,385.—Manufacture of Soap.—Jacob B. Bennett and James S. Gibbs, Buffalo, N. Y.:

We claim the agitation and commingling by any suitable machinery of the ingredients used for making soap in a closed vessel while under heat and pressure sufficient to insure the desired new combinations, and produce cheaply and quickly a uniform good quality of soap.

47,386.—Straw Cutter and Feed Mixer Combined.—E. F. Bishop, Burton, Ohio:

I claim the special arrangement of the hopper, H, mixer, F, shaft,

d, within its arms, f, and spout, g, in combination with the straw cutter, when operating conjointly, substantially as and for the purpose set forth.

47,387.—Press.—Louis Boudreanx, Thibodaux, La.:

In combination with the toggles, I I, and beater, H, I claim the shaft, C, and jacket, F, so constructed as to be coupled and uncoupled by the lever, G, and adapted to permit the rope, K, to be unwound and the beater to be raised without reversing the motion of the wheel, L.

[This invention relates to a new and improved press for compressing substances such as cotton, hay, etc., for the purpose of baling the same. The invention consists in the employment or use of toggle levers and a windlass arranged in a novel manner, so that the press may be used in either a vertical or horizontal position, and by any convenient power.]

47,388.—Coupling for Shafting.—Robert Briggs, Philadelphia, Pa.:

I claim the construction of couplings for shafts of a cylindrical casting or forging, C, with a slot or opening, n, along one side, and clamped together by bolts, b, as described.

47,389.—Galvanic Battery.—Daniel J. Brown and Cyrus W. Baldwin, Boston, Mass.:

We claim the arrangement of the separate iron positive bars or rods, C C, radially around, and in combination with the carbonaceous negative plate, D, substantially as and for the purposes herein specified.

47,390.—Engine for Operating Rock Drills.—James D. Butler, North Adams, Mass.:

I claim the combination and arrangement of the piston, E, the openings, c c', the piston rod, F, its packing, b*, the piston, G, and the openings, d, with the cylinders, K A, the tubular piston rods, C D, and the hollow cones, I and L, and the gibs, J J, the whole being constructed in manner and so as to operate substantially as described.

I also claim the combination of the crosshead, Q, and the slides, Q" (constructed and operating substantially as described), with the drill, N, and the tubular piston, C. And I also claim the combination of the collar, Q', therewith, the same being for the purpose specified.

I also claim the connection of the crosshead, Q, with the piston rod, C, in such manner that there may be a freedom of transverse and rotary motion with reference to one another, as and for the purpose hereinbefore described.

I also claim the combination of the cushioning space, x, and the piston extension, b" b"', or their equivalents, with the port, r', arranged in the cylinder, and with reference to such space, substantially in manner as specified.

I also claim the construction of the cylinder, A, with the reduction of bore, as shown at a a', and with the piston, B, with the part, b b', to operate in such reduction, the port, r, being disposed with reference thereto as specified.

I also claim the combination of the spring, M, the nut, H, and the series of notches, h h, or their equivalents, with the hollow cone, I, the same being substantially as and for the purpose described.

I also claim the combination of the segments, P P', of a conical ring, the cylinders, p p' and p" p", the ring, p"', and the hollow cones in the head, A", and the follower, A"', the whole being substantially as and for the purposes set forth.

I also claim the combination of the spring, W, the pin, w, and the yoke V", with the valve steam, U, and the slide bar, V, constructed, arranged and operating substantially as described.

I also claim the combination as well as the arrangement of the piston, E, the piston rod, F, its packing, b,* and the piston G.

Also, The combination of the openings, c c' and d, the piston rods, D F, arranged with a tubular space between them, the pistons, E and G, and the packing, b*, the whole being arranged substantially as described.

47,391.—Artificial Skating Pond.—M. C. Campbell, Philadelphia, Pa.:

I claim The preparation of a surface with a congealed material or composition substantially as described and for the purpose specified.

47,392.—Curtain Fixture.—James Chase and Wm. S. Longhborough, Rochester, N. Y. Antedated April 15, 1865:

We claim the combination and relative arrangement of the guide loop, i, on the bracket, b, with the spool and oblong journal socket, c, and stop, e, the parts being constructed and operating in the manner and for the purposes shown and described.

47,393.—Apparatus for Obtaining Extracts from Vegetables, etc.—John Chillcott, Brooklyn, N. Y. Antedated April 20, 1865:

First, I claim subjecting the substances to the action of heat in a steam tight chamber or box in which they are separated by perforated shelves and in which they are surrounded by an atmosphere of steam, but protected from direct contact with the steam during the whole or any portion of the extracting process substantially as herein described.

Second, Providing between such chambers a connecting steam pipe, F, by which steam can be admitted among the substances under treatment during any stage of the process, substantially as herein specified.

47,394.—Process for preparing Grain for Distillation.—John Chillcott, Brooklyn, N. Y. Antedated April 15, 1865:

First, I claim the process of preparing grain for distillation by steaming and crushing it between rollers substantially as herein described.

Second, I claim the combination of the steaming vessel, A, perforated pipe, d, hopper, B, and rollers, C C', substantially as and for the purpose set forth.

47,395.—Mode of Splicing Timbers.—H. M. Claflen, Cleveland, Ohio:

First, I claim the knobbed plates, C', as and for the purpose set forth.

Second, I claim the knobbed plates, C', in combination with the link, C, or its equivalent substantially as and applied to the purpose specified.

47,396.—Breech-loading Fire-arm.—John W. Cochran, New York City:

I claim the safety pin, h, applied and operating substantially as herein described in combination with the hammer and with a spring catch applied to lock the barrel opposite the breech as herein set forth.

47,397.—Horse-shoe.—William Coes, Worcester, Mass.:

I claim the bars, A C C, connected by joints and provided respectively with a toe piece or cap, B, and lips, D D, and the bars, C C, constructed or secured by a suitable catch or fastening substantially as and for the purpose herein set forth.

[This invention relates to a new and improved horse-shoe of that class which are secured to the hoof without the aid of nails, so that they may be removed from and secured to the hoof at any time without the services of a smith or shoer.]

47,398.—Mop Head.—Stillman Cooper, Antwerp, N. Y.:

I claim the fixed or permanent jaw, A, provided with oblong slots, h h, and notches, d d, in combination with the movable or adjustable jaw, B, provided with pins g g, and teeth, e, and the sliding collars, C C, fitted or placed on the sides c c f f, of the jaws, substantially as and for the purpose set forth.

47,399.—Oil Ejector.—Erastus Crooker, Buffalo, N. Y.:

I claim a steam pipe covered with gutta percha or other equivalent material fitting closely thereto, in combination with an ejector and discharge pipe, substantially as and for the purpose set forth.

47,400.—Device for Well Boring.—James Donnell, Allegheny City, Pa.:

I claim the combination of two toothed rings, the teeth of which have one side parallel and the other side at an angle to the axis of the rings, with the bevelled arms, o o', of a shaft which has a reciprocating motion between the rings, for the purpose of producing an intermittent rotary motion of the shaft, or rings, according as one of them is fixed and the other capable of rotation, at each stroke of the shaft; the length of the arc of motion at each half stroke being regulated by the number of teeth in each of the rings, substantially as herein, before described

47,401.—Sap Pans.—Henry Earl, Edwards, N. Y.:

I claim, First, The combinatin of the receiving pipe, A, with the steam pipe, D, substantially as and for the purpose set forth.

Second, The combination of the movable pan, H, with the pipes, A and D, substantially as and for the purpose set forth.

Third, The combination of the steam box, K, with the movable pan, H, substantially as and for the purpose set forth.

Fourth, The combination of the main pan, M, with the steam box, K, substantially as and for the purpose set forth.

Fifth, The combination of the slide or gate, o, with the main pan, M, substantially as and for the purpose set forth.

Sixth, The winding arrangement or channelling the pan, by means of which the sap, being admitted at the central or hottest part of the pan, is conducted to the outer or cooler parts of said pan substantially as described and for the purposes set forth.

47,402.—Process for Treating Sirup and Saccharine Solutions.—Edward P. Eastwick, Baltimore, Md.:

I claim the use of acids, acid salts or neutral salts for the purpose of decomposing and altering the coloring compounds in molasses and analogous sirups, the products of mother liquor remaining after the crystallization of the sugar manufacture or refining.

47,403.—Awl.—R. Egan, Brooklyn, N. Y.:

I claim, First, Constructing awl hafts in the manner substantially as above described.

Second, In combination with the screw threaded socket piece, B, constructed as specified, I further claim forming a screw thread upon the shank of the awl as and for the purpose set forth.

[This invention consists in a novel manner of fastening an awl into its haft, whereby it is easily and securely fixed in place without strain upon the awl and without the usual liability of splitting the handle.]

47,404.—Sawing Machine.—William Emris and Henry J. Bosworth, Hudson, Mich.:

We claim the lever, S, in combination with the spring, V, when constructed and operated substantially as and for the purpose herein set forth.

47,405.—Drop Hammer.—John Evans, New Haven, Conn.:

I claim the combination of the connecting rod with the hammer, when they are constructed and attached, substantially as herein described.

Second, I claim the combination of the connecting rod with the crank pin, when they are constructed, arranged, and fitted for adjustment substantially as herein described and set forth.

47,406.—Pencil and Eraser.—W. R. Evans and L. D. Benner, Thomaston, Maine:

We claim the combined pencil and eraser above described, constructed substantially in the manner above set forth.

47,407.—Smelting Copper Ores.—Wm. L. Faber, New York City:

I claim the within described process for expelling antimony and arsenic from copper and copper ores by roasting with some substance developing chlorine during the process of roasting, substantially as herein set forth.

[The object of this invention is to remove from copper and copper ores during the process of smelting such impurities as antimony and arsenic, and this purpose is effected by a process which is strictly confined to copper and copper ores, and which has to be modified materially for treating other ores.]

47,408.—Carriage Jack.—Austin W. Field, Vergennes, Vt.:

I claim the stock or standard, A, perforated sliding bars, B B, and lever, D, in connection with the pin, E, all arranged substantially as shown and described to form a new and improved carriage jack.

[This invention consists in the employment or use of two parallel slides fitted in a suitable stock or standard, and having a lever placed between their upper ends, all being arranged in such a manner that the device may be readily applied to axles of any hight, and the latter elevated and secured in such position with the greatest facility, to enable the wheels to clear the ground or floor, so that they may be removed from and placed on the axle for lubricating purposes.]

47,409.—Coal Breaker.—Jacob Fox, Philadelphia, Pa.:

I claim a stationary hopper, B B, adjustable at the bottom, to regulate the size of coal, substantially as described and for the purpose specified.

Second, I also claim the vibrating plates, c c, in combination with picks, D D, substantially as described and for the purpose specified.

Third, I also claim a stationary hopper, B B, with picks, D D, in combination with vibrating plates, c c, or their equivalents, as and for the purpose specified.

47,410.—Mode of Treating Oil Wells to Remove Paraffine, Tar, etc.—J. Fraser, Buffalo, N. Y.:

I claim the method of treating petroleum wells with hot liquids for the removal of obstructions composed essentially of paraffine, substantially as set forth.

47,411.—Apparatus for Delivering Paper from Printing Presses.—C. O. Furbush, Machias, Me.:

I claim the bars, D E, provided respectively with jaws, c d, the projection f, and pin, e, in combination with inclined planes, g g, the spring, F, and the bolt, C, by which the jaws are opened and closed at the appropriate times to receive, clasp, convey, deliver and return, substantially as above described and represented.

[This invention consists in the employment or use of nippers arranged in such a manner as to have a reciprocating motion to convey the sheets from the press.]

47,412.—Winding and Setting Watches.—Frederick A. Giles, New York City:

I claim the combination of the wheel, C, having two series of teeth, a and c, turning on a fixed pivot, n, the two pinions, b d, movable lengthwise upon the arbor, the spring, f, and the sliding pin, h, the whole arranged and applied in relation to the wheel, A, and the cannon pinion, substantially as herein specified.

47,413.—Ventilator.—Henry A. Gouge, Brooklyn, N. Y.:

I claim, First, The ventilating apparatus described, with the several parts arranged and acting together substantially as set forth.

Second, The combination of light, F, flues, B and C, and ventilator, E, constructed and arranged substantially as and for the purposes described.

47,414.—Coffin.—Thomas Graham, Philadelphia, Pa.:

I claim the vessels, G, containing alcohol or other equivalent fluid, and arranged in a coffin so as to be detachable therefrom, as set forth, for the purpose specified.

47,415.—Grape Wire Support.—F. B. Green, Seneca Falls, N. Y. Antedated April 17, 1865.

I claim making the frame or support, B, adjustable vertically between the posts, A A, by means of the adjusting holes and pins, d f, or equivalent, the whole arranged, combined and operating substantially in the manner and for the purpose herein set forth.

47,416.—Roofing Composition.—Nicolaus Groh, Helenville, Wis.:

I claim a roofing compound made of the ingredients herein described, and mixed together about in the proportion and substantially in the manner herein set forth.

[This invention relates to a roofing compound which is perfectly impervious to water, and which is also fire-proof.]

47,417.—Grain Separator.—John H. Hamaker, Trease's Store, Ohio:

I claim the construction of the carrier, with the close and open portions together, with the transverse grooves, a a, and projections, d d, substantially as and for the purpose herein specified.

I also claim conveying the straw and grain forward and upward on a single carrier, by giving the said carrier a rapid vibratory motion through the means of the double sets of cranks and auxiliary connecting rod, substantially as and for the purpose set forth.

I also claim communicating the vibratory motion to the shoe directly from the vibrating carrier by means of the connecting rod, G, or its equivalent, as herein described.

47,418.—Lamp-shade Holders.—James Hanley, New York:

First, I claim the making a ring attachment with clips, for the purpose of holding the shade and connecting with the lamp.

Second, I claim the clips.

Third, I claim the mode of connecting the shade to the lamp glass by suspension.

Fourth, I claim the loose hanging of the shade, and the consequent horizontal action.

Fifth, I claim the creasing of the paper. Each claim substantially in the manner and for the purpose as herein described and set forth.

47,419.—Marine Propeller.—Austin S. Hatch, Addison N. Y.:

I claim the combination and arrangement of the double screws or wheels, C D, revolving in opposite directions, and the taper form of the hull or bottom of the vessel before and behind the said screws or wheels, and in combination of the form of their blades, substantially as and for the purposes herein specified.

47,420.—Removing Foreign Substances from Sugar.—Jonas Hoover, Oscaloosa, Iowa:

First, I claim treating crude sugar to alcohol and sweet milk, substantially as and for the purpose specified.

Second, I claim subjecting sugar to a second pressure between cloths, after the same has been moistened with alcohol and milk and pressed once, substantially as described.

47,421.—Implement for Cutting Rubber, etc.—Emil Hubner, New York:

First, I claim an adjustable circular packing cutter, constructed as herein described, as a new article of manufacture.

Second, The movable head, C, holding the knife, d, in combination with the rule, A, screw handle, D, and stationary center, a, constructed and operating substantially as and for the purpose set forth.

Third, The swiveling or stationary arm rest, b, in the stationary head, B, in combination with the center, a, and adjustable knife, d, constructed and operating substantially as and for the purpose described.

47,422.—Stair Rod Fastening.—Henry Jackson, Brooklyn, N. Y.:

I claim the spring, D, dish, E, and the supplemental shoulder, c, applied to one or both buttons, in connection with the flat stair rod, having its flanges, a, provided with curved notches, e e, all arranged substantially as and for the purpose herein set forth.

[This invention relates to an improvement in the ordinary fastening hitherto employed for securing flat stair rods to the "risers" of the stairs, and it consists in the application of a spring to one of the buttons composing the fastening, whereby the rods are securely fastened, being prevented from casually slipping off from the buttons by a longitudinal movement.]

47,423.—Fire Place.—Wm. H. James, Cincinnati, Ohio:

I claim as a new article of manufacture the fire-place composed of the elements, A B C D E F and G, the same being formed, combined and adapted to operate in the manner set forth.

47,424.—Steam Engine.—Henry Johnson, Pittsburgh, Pa.:

I claim the use of a movable disc or independent piston seated in the steam cylinder above the working piston, with a steam space between it and the cylinder head, through and into which the live steam from the boiler is caused to pass on its way to the steam chest of the engine, for the purpose of a steam cushion, and to increase the efficiency of the steam engine, substantially as hereinbefore described.

47,425.—Machine for Grinding Paper Pulp.—John F. Jones, Rochester, N. Y.:

I claim the machine for grinding paper pulp, having the grinding surfaces, d d, made dishing or inclined upward from the center to the periphery, and used in connection with the case, H, the whole arranged and operating substantially as and for the purpose herein set forth.

47,426.—Gas Heater.—J. H. Jones, New York City:

I claim the combination and arrangement of the concave or inverted conical-shaped screen, C, and tube, A, in connection with a gas jet or opening, G, for the purpose herein set forth.

47,427.—Machine for Oiling Wool.—James Kelly, Troy, N. Y.:

I claim the two rollers, A A', one of which dips in a cistern containing oil, while the other serves to spread the wool, when used in combination with a can, C, and pipes, b c, arranged substantially as herein set forth, for the purpose of keeping up a uniform supply of oil to the lower roller.

[This invention consists in oiling the wool between two rollers, one of which runs in a cistern containing the oil, in such a manner that by the action of the two rollers the wool is spread in a thin sliver or sheet, and the oil taken up by the lower roller is communicated uniformly to all the fiber.]

47,428.—Universal Chuck.—Wm. Haskell King, Troy, N. Y.:

I claim a concentric or other chuck, provided with one or more laterally adjustable plates, substantially as herein shown and described, for the purpose of converting a concentric chuck into an eccentric chuck, as set forth.

[This invention relates to a new and improved chuck for lathes, by which the eccentric and concentric chucks are combined and the chuck rendered capable of being adjusted to suit any kind of work to be operated upon in the lathe.]

47,429.—Hanging and Latching Farm Gates.—Ira Kinman, Freeport, Ill:

I claim, First, The arrangement and combination of the adjustable hinges, P and K, operating on the rings, H and I, on the back post, as herein described, and for the purposes set forth.

Second, I also claim the construction and combination of the up right bolt, A, with the movable latch, B, as operating on the staple E, and movable prop, G, as herein described and for the purpose set forth.

Third, I also claim the construction and combination of the self-acting prop, G, and staple, E, as herein described, and for the purpose set forth.

47,430.—Jewel Case.—G. F. Kolb, Philadelphia, Pa.:

I claim the within-described jewelry case, composed of the lower portion, A, the upper portion or lid, A', the leaf, B, and spring, D, the whole being constructed and operating substantially as and for the purpose herein set forth.

47,431.—Metallic Skeleton Hat Frame.—Albert Komp, New York City:

I claim forming the frame for a hat body of hoop-skirt spring wire, by forming two hoops, and by connecting the same with three or more vertical stays, by means of clasps formed of thin metallic strips, each of said clasps being shaped into a horizontal part, O P, and a vertical part, R, cut to the required shape and bent over, and pressed to the joint, substantially in the manner and for the purpose substantially as described.

47,432.—Fountain Pen.—R. J. LaMothe, New York City:

I claim, First, The spring ink-conveyor, formed as a trough, passing through an opening near the pen, in the manner and for the purposes specified.

Second, I claim the pencil, x, formed in the manner set forth, and combined with the plunger of the fountain pen, as specified.

47,433.—Washing Machine.—Andrew F. Lapham, New York City:

First, I claim the spring, M, combined and arranged relatively to the rocking box, D, and bed, A, or its equivalent, substantially in the manner and for the purposes herein set forth.

Second, I claim the hinged boards, H H, and springs, I I, in combination with a rocking box, D, adapted for washing or churning, substantially as and for the purpose herein set forth.

47,434.—Apparatus for Inhaling Vapors.—A. P. Lighthill, Boston, Mass.:

I claim the exhalation apparatus, substantially as and for use in manner as described.

47,435.—Churn.—John B. Lindsay, Davenport, Iowa:

I claim, first, Arming the blades of the dasher of the ordinary

churn with leaves set vertically upon their upper faces, substantially as described.

Second, The combination of the twisted shank of the dasher with a dasher constructed of vertical and horizontal leaves and blades, substantially as described.

[The object of this invention is to produce a churn which shall combine the simplicity and convenience of form of those in common use, with cheapness of construction and increased capacity for successfully doing its work, and it consists in arming the blades of the dasher with leaves of metal or other suitable material, set at right angles to them, and also in combining therewith the screw shank of the dasher.]

47,436.—Gear-cutting Rules.—C. B. Long, Worcester, Mass.:

I claim a gear-cutting rule upon which is marked in figures the numbers of cogs of a given pitch which can be cut upon a given diameter of a wheel, substantially as and for the purposes described.

I also claim making the first inch of the rule with a figure or figures to indicate the number of cogs of a given pitch which can be cut upon a wheel of one inch in diameter with allowances for pitch line, substantially as set forth.

47,437.—Hay Spreader.—David Lyman, Middlefield, Conn.:

First, I claim in combination with the teeth for scattering the hay of a spring attachment so arranged as to allow the teeth to yield upward in accordance with the irregularities of the ground, substantially in the manner herein set forth.

Second, The method herein described of attaching the teeth of hay-making or spreading machines to blocks, or the equivalents thereof, capable of sliding up and down, substantially as set forth.

Third, In hay-making or spreading machines in which levers are used having an up-and-down and back-and-forth motion, I claim the teeth when constructed and combined with springs, giving them elasticity both backward and upward, as described.

47,438.—Photographic Name Plate.—James E. Mackerley, Paint, Ohio:

I claim as an improved article of manufacture, an adjustable photographic name plate, made substantially as herein shown and described.

I also claim the employment, in combination with the said name plate, of the movable letters or cards, substantially as and for the purpose set forth.

[This invention relates to a novel device to be used by photographers, the object of which is to secure, in addition to the photographing of the sitting person or of a picture or view, and upon one and the same negative plate, the full or any desired portion of the person's name or the title of the picture view.]

47,439.—Cultivator.—Roswell Marsh, Steubenville, Ohio:

I claim the combination of the rotating cylinder with the digging forks and the clearer, substantially as described and for the purpose set forth.

47,440.—Railroad Car Brake.—A. F. McCrone, Ellicott's Mills, Md.:

I claim the coupling and brake-operating bars, extending through the length of the train and operated by the steam from the engine to rotate the pinions to whose shafts are attached the crossheads which connect by suitable rods and levers with the rubber bars, the whole described arrangement being constructed and operated substantially as described.

47,441.—Oil Press.—Wm. V. McKenzie, Jersey City, N. J.:

I claim, first, The combination of the separate slides, D D, and mortises, g g, with the sides, B, of the press boxes, when constructed and arranged to operate as herein specified.

Second, The lips, c, in combination with the slides, D, grooves, d, and sides, B, of the press boxes, constructed and operating substantially as and for the purpose described.

Third, I claim the pipes, E F, with branch pipes, e f, arranged in combination with the movable sides of a press, substantially as specified, so that said branch pipes retain sufficient spring to allow of the motion of the sides of the press boxes.

47,442.—Beer Faucet.—John Miller, Buffalo, N. Y.:

I claim the combination with the plunger, C, of the valve nozzle, F, discharge nozzle, D, operating for the purposes and in the manner described.

47,443.—Hot-air Furnace.—Joseph A. Miller, New York City:

I claim, first, Forming a heat reservoir between or within the tubes of a hot-air furnace by means of lamps or pieces, L L, of brick or other material which is a poor conductor of heat, so applied that the flame and heated gaseous products of combustion may circulate through interstices between the said lumps or pieces, substantially as herein specified.

Second, The arrangement of the horizontal flue, C, drop flue, I, forward and backward circulation pipe flue, J, in combination with each other and with the cold air chamber, H, tube sheets, D D', air tubes, G G, and air-distributing chamber, E, substantially as herein specified.

47,444.—Oil Ejector.—Geo. E. Mills, New York City:

I claim, first, The use of corrugated metal for tubing oil wells, the same being supported on a perforated bulb, and cone-pointed base, substantially as herein described.

I claim the tube, C C', put together in sections, and secured by screws in sockets, on the air pipe, E, so that the point where the air comes in contact with the fluid, may be adjusted in hight, as and for the purposes set forth.

47,445.—Washing Machine.—Jarvis T. Mudge, Cleveland, Ohio:

First, I claim the plunger, C, moving in a vertical plane upon the pivot or hinges, c', and operated by a system of levers, substantially as herein described.

Second, I claim the use of the tubes, C', in connection with the plunger, C, to prevent the water from overflowing and adding weight to the latter, as explained.

47,446.—Ratchet Brace.—L. H. Olmstead, Newark, N. J.:

I claim, first, The combination of the frame, B, and handle, S, of the ratchet brace, constructed and arranged substantially as set forth.

I claim making the main spindle of a ratchet brace, with a part of the thread cut away between the socket for the drill and the upper end of the spindle, as shown and described, and for the purpose set forth.

47,447.—Manual Power.—I. E. Overpeck, Overpeck's Station, Ohio:

I claim the arrangement of the connecting rods, c c, at an angle to a vertical line drawn through the center of the crank shaft of wheel, b, to operate in combination with levers, d and e, of my manual power sawing machine, substantially as described for the purposes specified.

47,448.—Chimney.—C. C. Phelps, Janesville, Wis.:

I claim the construction of chimneys of cast iron or its equivalent, in sections substantially as described and for the purpose specified.

47,449.—Shingle Sawing Machine.—C. L. Pierce, Buffalo, N. Y.:

I claim the combination of two pair of "dogs," C C', with the reciprocating table, A, said dogs being so arranged as to clamp the block above and below upon each side of the saw kerf, in a manner to prevent the block from pinching or binding the saw, when constructed and operating substantially as set forth.

47,450.—Bread Cutter.—John T. Plass, New York City:

I claim the knife, D, and bar, E, in combination with the automatically moving gage, J, all arranged to operate in the manner substantially as and for the purpose specified.

[This invention relates to a device for cutting or slicing bread, meat, vegetables, etc. for family or table use, and it consists in the employment of a knife and gage, arranged with or applied to a box so as to operate in a very efficient manner, for the purpose specified.]

47,451.—Coal-oil Lamp.—A. H. Platt, Yellow Springs, Ohio:

I claim the combination of the downwardly convex perforated basilar partition, B, and the perforated cap, C, having a degree of convexity downward less than the former, substantially as and for the purpose herein specified.

I also claim the combination of the flaring open base, A, perforated partition B, perforated cap, C, and deep flame opening, d, arranged and operating together, substantially as and for the purpose herein set forth.

47,452.—Pump.—Alex. F. Porter, Philadelphia, Pa.:

I claim, first, Constructing and arranging a cylindrical double-acting pump, having inlet through and exit passages, substantially as herein described, and adapting the same to the raising of oil or other liquids from deep wells, as set forth and explained.

I also claim fastening and supporting or securing a pump in a deep well, by accurately fitting it to the bore of said well and resting it upon legs or other supports, at the bottom of the well, through which legs or support the liquid is drawn into the pump, thus rendering the pump firm and steady, preventing vibration, the opening of the joints, and other injurious consequences arising from instability, substantially as herein described and represented.

47,453.—Balanced Slide Valve.—James Rankin, Detroit, Mich.:

I claim the lever, D, rocker, E, link, F, and lever, G, in combination with the piston, H, and slide valve, B, constructed and operating substantially and for the purpose set forth.

[The object of this invention is to balance the pressure of the steam on the back of a slide valve in such a manner that the same works equally free under a pressure of a hundred pounds or more to the square inch as it does in the open atmosphere. This object is obtained by combining with the valve a piston, through a series of intervening levers, rockers and links, in such a manner that the upward pressure of the steam on the piston counter balances the downward pressure on the back of the valve and the valve is perfectly balanced. Patented in this country and in Europe through the Scientific American Patent Agency.]

47,454.—Printing Press.—Henry Redlich, Chicago, Ill.:

I claim the peculiar manner of constructing the type cylinder, C, to wit, by means of the metal heads, F F', wooden heads, e e', nuts, G G, wooden segments, f, and removable types, h, substantially as herein described.

47,455.—Car Coupling.—John H. Reed, New Haven, Conn.:

I claim the combination of the bar, B B, with the lever, E E', and catch, b, when constructed, arranged and fitted to produce the required result, substantially as herein set forth and described.

Second, I claim the combination of the bar, B B, with the levers, l and k, and the spring, a a, when construced, arranged and fitted for uncoupling, substantially as herein described.

Third, I claim the combination of the lever, E E', with the coupling pin, c, and link, F, when constructed and fitted for use, substantially as herein described.

Fourth, I claim the combination of the lock lever, G, with the bar, B B, when combined, and made to operate substantially as herein described.

Fifth, I claim the combination of the draw head with the link, F, when constructed and fitted for use, substantially as herein described.

Sixth, I claim the combination of the link, t, with the pedal, g, when fitted to prevent coupling, substantially as herein described.

47,456.—Horse Power.—J. Wyatt Reid, New York City:

I claim the combination of the master wheel, F, arms, a a', stationary tubular spindle, A, platform, G, shaft, C, and one or more horizontal shafts, H, when constructed and arranged to operate as herein specified.

[This invention consists in constructing or arranging the several parts of the device in such a manner that power may be taken from different shafts having different degrees of speed, and machinery driven with a greater or less application of power, as circumstances may require.]

47,457.—Manufacture of Hard Rubber Articles.—George Samuel Rice, New York City:

I claim as a new article of manufacture, First, Watch cases or lockets made of hard rubber or vulcanite, in the manner hereinbefore set forth.

Second, In vulcanite watch cases or lockets, I claim the method of securing the hinge, substantially as described.

Third, In vulcanite watch cases or lockets, I claim forming an annular groove, with a thin overhanging rim, for the inserting and holding the glass, substantially as set forth.

Fourth, The method of securing the hard rubber shank to the hard rubber bezel, substantially as described.

Fifth, In combination with vulcanite watch cases or lockets, I claim the use of varnishes, in the manner and for the purpose set forth.

47,458.—Exploding Torpedoes in Artesian Wells.—Edward A. L. Roberts, New York City:

I claim, First, The priming chamber, b, in combination with the flask plug and nipple, substantially as described.

Second, The arrangement of the tube, f, or its equivalent, composed of india-rubber or other similar material, with the guard, d, and bolt, e, substantially as described, in combination with the flask.

47,459.—Vibrating Piston Engine.—John B. Root, New York City:

First, I claim the combination of a cylinder, A, of a form substantially as herein specified, and two vibrating pistons, D D², occupying reversed positions within the said cylinder, and both connected with the same crank shaft, to operate substantially as herein set forth.

Second, So arranging the connections between the said vibrating pistons and the crank, that each piston, though being only single-acting, may act upon the crank during more than half of each revolution of the latter, substantially as herein described.

Third, The crank, E', arranged directly between the vibrating pistons, and within the cylinder of an engine, substantially as herein described, with a separate and independent connection with each piston, substantially as herein set forth.

Fourth, The connection of the side-packing strips, c', and end-packing strips, c2, of the piston, by means of pins, f, and slots, e, in combination with mortise and tenon joints, substantially as and for the purpose herein specified.

47,460.—Coffee Settler.—Wm. F. Rossman, Hudson, N. Y.:

First, I claim the hollow cone, A, with open base, having funnel, B, attached in combination with the perforated cup, C, all constructed substantially in the manner and for the purpose set forth.

Second, The open space between the base of the cone, A, and top or upper margin of funnel, B, and for the purpose described.

47,461.—Street-sweeping Machine.—Daniel Sargent, New York City:

I claim the adjustable scoop, E, and box, I, in combination with the three-armed hangers, F, adjustable brush, H, rock shafts, t t, hand levers, t, movable pinion, c, and wheel, B, constructed and operating substantially in the manner and for the purpose herein set forth

[An engraving and full description of this invention have been published in the Scientific American.]

47,462.—Adjustable Tension Device for Sewing-machine Shuttle.—Frederika Schenkl, Boston, Mass., administratrix of the estate of John P. Schenkl, deceased:

I claim the arrangement and combination of mechanism herein described, when made to operate substantially in the manner and for the purpose specified.

47,463.—Ships of War.—Charles Slater, Brooklyn, N. Y.:

First, I claim the hinged adjustable keel, C, applied in combination with the main keel, B, of a vessel, and with the vertically-adjustable rods, f, and ropes, c, all constructed, arranged and operating substantially as and for the purposes specified.

Second, The combination of the punches, H, piston, H', and steam cylinders, H2, constructed, arranged and operating as and for the purposes specified.

Third, The scuttling augurs, I, applied in combination with the horizontal shaft, l, and adjustable gear, p2, substantially as and for the purpose herein shown and described.

47,464.—Machine for Attaching Revenue Stamps.—Robert L. Smith, Stockport, N. Y.:

First, I claim the rack bar, F, and gate, D, with feed rollers, G G', and subjected to the action of a weight or spring, in combination with an automatic stop, c, and plunger, H, all constructed and operating substantially as and for the purpose set forth.

Second, Making the rack bar, F, removable, substantially as described, so that the machine can be readily adjusted for stamps of different width.

Third, The oscillating arm, l, and tappet, m, in combination with the stop, c, rack bar, F, handle, l, and plunger, H, constructed and operating substantially as and for the purpose specified.

Fourth, The rollers, G G, arranged in the longitudinal sliding gate, D, and operating in combination with the absorbent roller, q, and plunger, H, substantially as and for the purpose set forth

Fifth, The employment of the elastic spring block, p, or its equivalent, in combination with the plunger, H, and metal edges, o, substantially as and for the purpose described.

[An engraving and full description of this machine have been published in the Scientific American.]

47,465.—Barrel-rolling Device.—Henry W. Stephenson, Cincinnati, Ohio:

I claim the frames, A A, crossed and pivoted at c, in combination with the disks, B B, the whole constructed and arranged so as to be capable of being applied to a barrel, substantially as and for the purpose described.

[This invention relates to a new and useful device for rolling barrels, designed more especially for the use of porters, laborers at railroad freight depots, etc., in order to facilitate the removal of barrels into and out from houses, freight depots, etc.]

47,466.—Coffee Pot.—James H. Swing, Cleveland, Ohio:

First, I claim the cup, d, and flange, b, in combination with the rim, l, annular chamber and section, A, as and for the purpose set forth.

Second, I claim the disk, h, strainer, f, and filter, B, in combination with the section, A, and cover, D, as and for the purpose herein described.

47,467.—Forge.—Charles N. Taylor and Elijah J. Holmes, Upton, Dedham, Mass.:

We claim the improved forge herein described with its removable plates, for the purpose of adapting it to the size and shape of the article to be heated.

47,468.—Corn Planter.—James C. Thomas, Redpoint, Md.:

I claim, First, The forked seed box, B, in combination with the wheel A, and the hollow tooth, C, when constructed substantially as and for the purpose specified.

Second, The circular rack, A, sector, B, lever, C, and arm, D, when the several parts are constructed and arranged substantially as and for the purpose herein set forth.

47,469.—Reclining Chair.—Hopkins Thompson, New York City:

I claim in combination with a clamp fastening on the stationary part of a reclining chair, a hinged brace bar jointed to one of the movable parts of a jointed reclining chair, substantially as described, whereby the movable parts may be clamped and braced rigidly to the stationary parts, substantially as set forth.

47,470.—Lock.—Benj. M. VarDerkeer, Clyde, N. Y.:

I claim the traverse or key dog, with its bolt, operated by the keys in locking and unlocking the latch, together with the spring catch in the head of the latch, which holds the dog in its linear or central position after having accomplished its mission.

47,471.—Pulley Block.—S. Van Hennick and T. Allen, New York City:

We claim the combination in a single pulley block of the small sheaves, a a', for carrying the rope or chain, B, to which the weight is attached, and the larger sheave, a'', attached rigidly to the first two, and carrying the rope or chain, D, to which the power is applied, all the parts being constructed and arranged to operate as herein specified.

[This invention consists in providing a pulley block with an extra or supplemental sheave of larger diameter than the others, and provided with an independent chain or rope, whereby considerable power is gained in operating the blocks, or in raising weights thereby.]

47,472.—Feed Rack.—John M. Van Nest, Claytown, Iowa:

I claim the combination of the sliding trough with the granary, the latter being provided with a spout or opening to discharge the feed into the trough, which moves beneath it, substantially as described.

47,473.—Vehicle.—Zalmon B. Wakeman, Rockford, Ill.:

I claim, in combination with the tongue, C, the swiveled box or bearing, F, having an eye or aperture increasing in size from front to back, and employed to receive and support the end of the brace rod, E, substantially in the manner and for the purpose explained.

Second, I claim the combination of the coiled sprung, E', and nut, I, with the supporting rod, E, the nut permitting the spring to be contracted and expanded at will, for the purpose of varying the position of the tongue.

Third, I claim the tongue, L, employed in combination with the spring, E, rod, E, tongue, C, and nut, I, substantially as herein set forth.

Fourth, I claim the adjustable springs, K K, adapted to operate in connection with the knuckles, L I, in the manner and for the purposes set forth.

Fifth, I claim the spring or springs, J, wrapped around the tongue rod, and with their ends secured under the tongue hounds, and the forward axle or sand board adapted for adjustment in any manner, and employed for sustaining the tongue, C, as set forth.

47,474.—Stove.—George W. Walker, Boston, Mass.:

I claim a stove constructed with a sub-base separated from the main base by an air chamber or passage, and operating in the manner and for the purpose substantially as described.

Also the construction of a stove, with flues formed of the material of the outside of the stove body, and of tie sheets within the body, when such flues are arranged to convey the products of combustion to heat a hollow extension of the base in front of the stove.

47,475.—Rolling Mill.—Edwin Wassell, Pittsburgh, Pa.:

I claim the use of a flanged guide roller, placed in front of a pair of rolls, when such roller is tapered between the flanges, for the purpose of causing the iron bar to slide sideways when it drops out from one pass between the rolls to the proper position in front of the next adjoining pass, substantially as described.

The use of a guide holder, consisting of the combination of a cylinder or box, d, rod, c, spring, i, and pressure screw, f, constructed substantially as and for the purpose hereinbefore set forth.

47,476.—Apparatus for Separating Ores.—James Watson, Cliff Mine, Mich.:

I claim, First, The hopper, A, provided with the deflecting board, C, chute or trough, D, and the opening, a, at its bottom, substantially as and for the purpose set forth.

Second, The chamber, B, below the hopper, communicating with the pipe or tube, E, provided with one or more plugs or faucets, and having water admitted into it under pressure, substantially as and for the purpose specified.

Third, The combination of the hopper, A, chamber, B, pipe or tube, E, provided with faucets or plugs, the deflecting band, C, and chute or trough, D, all arranged to operate substantially as and for the purpose set forth.

47,477.—India-rubber Packing Former.—Wm. Webster, Middletown, Ohio:

I claim the cylindrical packing former, A, for preparing India rubber annular packings for sealing fruit cans, in the manner described and represented in the accompanying drawings.

I also claim the pressure ring, x, or its equivalent, in combination with the flange or base, a, applied and used in the manner and for the purpose specified.

47,478.—Machine for Making Lanterns.—Wm. Westlake, Chicago, Ill.:

I claim the former or device constructed substantially as describ upon which to make lantern guards.

47,479.—Train Way for Ferry Boats.—Norman W. Wheeler, Brooklyn, N. Y.:

First, I claim in connection with the deck, A, and coaming, D, the deflector or switch bar, G, so arranged and operated as to slide the rear wheels outward, and cause them to describe the larger curve, substantially in the manner and for the purpose herein set forth.

Second, I claim in connection with the above the employment of the perforated or roughened plates, F F, of hard material, combined and arranged to operate in connection with the deflector, G, so as to afford a hold for the animals, and provide for the lateral movement or sliding of the wheels, substantially as and for the purposes herein described.

47,480.—Tubular Condenser.—Norman W. Wheeler, Brooklyn, N. Y.

I claim the improvement in condensers and analagous tubular constructions herein described—to wit, the employment of the soft packing, G, and driven annulus, E, the latter holding itself in place and supporting and guiding the tube, D, and compressing the packing, G, substantially in the manner and with the effect herein set forth.

47,481.—Movable Berth.—Norman W. Wheeler, Brooklyn, N. Y.:

First, I claim in the described combination with a vessel the employment of the sockets, D D and E E, stanchions, F and H, the two or more berths, C' C2, and the free supporting stanchions, I and K, arranged substantially as and for the purposes described.

Second, I claim in connection with the above combination of hooks, links and stanchions, constructed and arranged to operate together substantially in the manner and for the purposes described.

47,482.—Landing Platform for Steamboats and other Vessels.—Norman W. Wheeler, Brooklyn, N. Y.:

First, I claim the construction and use of an adjustable bridge, B, permanently attached to a vessel, A, and arranged to allow of its being turned in board, and operated by the hoisting means in both positions, substantially in the manner as herein set forth.

Second I claim in combination with an adjustable bridge the yielding and rolling hinges, G A' B', arranged to operate in the manner and for the purposes substantially as herein set forth.

Third, I claim the within described arrangement of the jib stay, H, continuations, h h, and rigid post, I, for the purpose herein set forth

47,483.—Bottle Stopper.—E. R. Wilbur, New York City:

I claim the bottle stopper above shown, constructed aud applied substantially as described.

47,484.—Railway Chairs.—J. E. Williams, Xenia, Ohio:

First, I claim supporting the joints of rails by means of a two part chair resting upon and bridging the space between two separate ties, with lips, b b, extending the entire length, and flanges, c c, extending below and falling between the ties, the parts being clamped and held by the bolts, e e, or their equivalents, substantially in the manner herein described.

In combination with the foregoing, I claim the block of wood, f, for the purpose specified.

47,485.—Shield for Breaststraps.—Henry F. Wilson, Elyria, Ohio:

I claim the reversed hooks having their upper ends covered so as to correspond to the inner circle of the ring for the purpose of giving the greatest possible length to the hooks, and at the same time admit the ring freely, the whole being constructed and operating in the manner and for the purpose described.

47,486.—Plow.—T. Winslow, Cleveland, Ohio:

I claim the herein described construction of plows, the distinguishing feature being the relative position of the lower edge of the mold board to the land side substantially as herein set forth, thus forming in one implement a common and subsoil plow.

47,487.—Braiding Machine for covering Skirt and other Wires.—Oliver R. Burnham, (assignor to J. I. and J. O. West) New York City:

First, I claim the uniting by a braided covering of the wires, held separately and apart until the point of braiding, and the bringing them together at the point, so as to braid them just before, or as they are brought together side by side or parallel, and then the twining them edge to edge, during the continuous movement of the wires, so as to strain and tighten the braid upon the wires as described.

Second, I claim the construction and use of the guide and supporting pieces, b b, with the apertures in the same, for the passage of the wires by which the wires are supported and directed to the point of braiding, without interfering with the motion of the bobbins or threads, in the manner and for the purposes described.

Third, I claim the guide piece, c, constructed and operating in the manner and for the purposes described, by which the wires are brought and kept together, as they ascend, at the required point for braiding, and at the same time the continuous and unobstructed passage of the wires and their joints is provided for, as the braiding proceeds and is completed.

Fourth, I claim the application and use of the pressure and delivery rollers whether with or without the guide piece, f', combined with the apparatus above described underneath, by the combined operation of which the wires are twined edge to edge by a gradual progress from their position of side by side, at the same time that they are conducted away as completed.

47,488.—Knitting Machine Needles.—Augustus C. Carey. Lynn, Mass., assignor to himself and Geo. S. Sullivan, Boston, Mass.:

I claim the combination in a machine knitting needle of a latch with an elongated flexible hook that extends upwards nearly parallel with the shank of the needle, and to such a distance or length as to reduce the angle that the latch makes with the shank, thus forming a narrow or slim needle that can be used for fine work, substantially as herein described.

47,489.—Heating and Fuel Device.—Daniel C. Colby (assignor to himself, D. W. Rawson, J. Reddington and Thomas I. Harris), Claremont, N. H.:

I claim the arrangment of the damper, H, the pipe, G, and the orifice, j on the upper end of the funnel, B, the damper, I, the pipe, F, and the orifice, k, on the other end substantially as described, and the combination of the funnel, B, thus provided, with the outer funnel, A, and the stove, C, one or both, as and for the purposes set forth.

47,490.—Cotton Press.—Geo. C. Davies, (assignor to Ohio Erolin Company,) Dayton, Ohio:

I claim, First, The provision in a baling press of the screw, B, winged nut, C c, vertical guides, D and a, toggles, G G', rods, F, platform, E, and baling trunk, H, in the described combination with the swinging platten, I, the whole being arranged and operating substantially as set forth.

Second, I claim the suspended platten or abutment, I, articulated to the frame, by means of the links, K K', and pintles, L L', so as to be capable of being swung to one side for filling or charging the baling trunk in the manner described.

47,491.—Game Boards.—James T. Edson, Stowe, Mass.: assignor to himself and Geo. L. Crosby, Berlin, Mass.:

I claim the combination of the groove, B, and the passage, b, leading therefrom, with the game board, A, and the receiver, c.

47,492.—Valve Gear for Steam Engines.—Chapman E. Gage, (assignor to Columbia Drew,) Winona, Minn.:

I claim the sliding valve rods, 14 14, constituting supports and guides for the bar, 7, which imparts movement to the valve rods by coming in contact with the shoulders, 5 13, and thus effect the alternate opening and closing of the proper induction and exhaust parts.

47,493.—Lamp.—Alonzo Hicks, Factoryville, N. Y., assignor to himself and Leoniel Jacobs, New York City:

I claim the combination of the diaphragm, d, deflectors, f f, guards, f f, and wick tube, c, in the manner and for the purposes specified.

47,494.—Composition for Preparing Ribbons for Hand Stamps.—Horace Holt, (assignor to W. W. Secombe,) New York City:

I claim the within described composition applied to a ribbon, substantially as and for the purpose set forth.

47,495.—Horse-shoes and Calks.—Charles H. Johnson (assignor to himself and Charles E. Woodman), Boston, Mass.:

I claim as my invention the combination of the fastening flange, a, and the mortise, b, with the corresponding socket, c, and tenon, d, of the calk, and with one or more bolts, a', or equivalents, extending through the flange and the calk, substantially as specified.

47,496.—Composition for Lining Oil Barrels.—Henry Loewenberg, New York City, assignor to himself and Emile Granier, Paris, France:

I claim the use of a compound of the ingredients herein described, viz., of glue, acid and sirup, and mixed together substantially in the manner and about in the proportion set forth.

47,497.—Process for Treating Auriferous Ores—W. Adolf Ott (assignor to himself and Henry Jackson), Brooklyn, N. Y.:

I claim the use, in treating auriferous ores, and particularly pyrites containing gold, of hypochlorous acid, substantially in the manner herein set forth.

[This invention consists in the employment or use of a mixture of hypochlorous acid in extracting gold from auriferous ores, and particularly from pyrites containing gold.]

47,498.—Feed Bag.—Henry Pennie and Chnnock (assignors to themselves and Levi Bissell), New York City, and reassigned by L. Bissell to said Pennie and Chinnock:

We claim a feed bag, or portable crib, for a horse or other animal, so constructed that it may be at the same time suspended from the head and attached to or near the breast of the animal, and when so suspended and attached may have its bottom inclined downward toward or from the animal's mouth, by the downward and upward movements of his head, substantially as and for the purpose herein described.

47,499.—Feed Water Heater.—Robert Poole (assignor to himself and German H. Hunt), Baltimore, Md.:

I claim the manner in which I have arranged and combined the tank, A, with regard to the inlet and outlet water pipes connected with it, the scatterer, and the branch pipe leading from the ordinary exhaust or waste pipe to its interior for the purpose of heating the water passing through said tank without interfering with the free escape of the steam through said exhaust or waste pipe, substantially as herein described.

47,500.—Fastening for Harness.—Josiah Shepard, New Britain, Conn., assignor to himself and Richard Butler, New York City:

I claim a strap fastening for harnesses and for similar purposes, composed of two curved side pieces, a a, connected at their ends by cross pieces, b b' b'', placed relatively with each other as shown, and the center cross piece, b', provided with a central piece, c, substantially as described.

47,501.—Floating Dock.—Edward Turner (assignor to Simon R. Golibart), Baltimore, Md.:

I claim, First, So constructing a floating dock that a vessel may be raised bodily out of water and suspended between floats or pontoons upon vertically adjustable frames or elevators substantially as described.

Second, The use of vertically adjustable frames, D D, in combination with pontoons, A A, and mechanism applied to these latter, which is adapted for adjusting the frames independently of each other or simultaneously, substantially as described.

Third, The employment of guides, D' D', in conjunction with the elevating frames, D D, and floats, A A, substantially as described.

47,502.—Horse-shoe.—Alexander Tyrrell (assignor to himself and Kimball Ferrin), Batavia, N. Y.:

I claim a horse-shoe, constructed as described, with the recesses, a a, made at any point between the heel and toe, for the purposes specified.

47,503.—Capsules for Preventing the Soiling of Fire-arms.—F. L. M. Dorvault, Paris, France:

I claim the employment or use of self-discharging capsules, substantially as herein described, in combination with fire-arms, to prevent them from soiling, as set forth.

47,504.—Medicated Candy.—Lazarus Morgenthau, Mannhiem, Baden:

First, I claim the combination of sugar with an extract from the young shoots of the pine tree, substantially in the manner and for the purpose herein set forth.

Second, I claim the compound formed of the several specific ingredients in the proportions herein set forth.

47,505.—Mode of Disintegrating Vegetable Substances for Paper Pulp.—Zephirin Gaspard, Alozandre Nathan Petrone Orioli, Amable Alfred Fredet and Pierre Amable Henri Matussievare, Paris, France:

We claim the within-described process for disintegrating vegetable materials by the application of aqua regia, substantially in the manner herein set forth.

47,506.—Manufacture of Iron and Steel.—Geo. Parry, Ebro Vale Iron Works, Eng. Patented in England Nov. 18, 1861:

I claim the process above described, whereby I am enabled to produce purified wrought iron and hard or soft cast-steel in large masses, in an economical manner.

REISSUES.

1,940.—Enema Syringe—Hamilton D. Lockwood, Charlestown, Mass., assignee of C. H. & H. E. Davidson. Patented March 31, 1857:

What is claimed as the invention of Charles H. and Herman E. Davidson, is a syringe, having an elastic bulb or chamber, flexible tubes, and a suitable valvular or arrangement, when organized so as to operate substantially as described.

1,941.—Folding Bed Bottom.—Frederick C. Payne, New York City. Patented March 29, 1864:

I claim, First, The connection of the two parts, A A', of the frame or box of a folding bed bottom or mattress on each side thereof, by means of a double hinge composed of a plate, d, pivoted to the said parts, A A', at two points, at such a distance apart as to make room for the stuffing between the said parts, when folded parallel with each other, substantially as herein described.

Second, The blocks, D D, in combination with the plates, d, and the recesses, i i, in the connected ends of the two portions, A A', of the box or frame, substantially as and for the purpose specified.

1,942.—Hot Air Engine.—Stephen Wilcox, Jr., Westerly, R. I. Patented Nov. 20, 1860:

I claim, First, In combination with an air engine in which the air and gases are heated by combustion within the cylinder or in a chamber leading thereto, the use of a regenerator, F, substantially as and for the purposes herein described.

Second, Gradually supplying the combustible gas or vapor for a gas engine operating substantially as herein described, as it is consumed and in the proper quantity for each stroke by means of the pump, G, or its equivalent, for the purpose set forth.

Third combining a quantity of cooler air with the products of combustion by the combined action of piston, b, and valve, M, or their equivalents, substantially as described, for the purpose of preserving a safe degree of heat within the cylinders as above set forth.

Fourth, The supplemental valve, m, arranged and operating substantially as and for the purpose herein specified.

Fifth, The arrangement of the heated evaporator, N, and cooler reservoir, O, in combination with an engine operating with the direct pressure of the products of combustion, with or without the pump, G, substantially in the manner and for the purpose herein set forth.

Sixth, Placing a piece of fire brick, L, or equivalent substance, in close proximity to the burner, j k, for the purpose above specified.

Seventh, In an engine operated with the direct pressure of the products of combustion and having the working cylinder and the combustion chamber arranged upon a single portable base, x, I claim the arrangement of the furnace casing and the working cylinder in the additional casing, S, common to both, with air or other non-conducting substance filling the intervening space, substantially as and for the purpose herein set forth.

Eighth, I claim in such engines in combination with provisions for reducing the temperature of the products of combustion before their admission to the cylinder as shown, the employment of the thick, non-conducting piston, a, working in a vertical cylinder and having its packing widely removed at all times from the heated parts of the apparatus, all arranged substantantially as and for the purpose herein set forth.



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FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 3d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the

shortest time by sending a sketch and description of the invention. the Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO's Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1835, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

F. S. C., of Mass.—Simple as the rule for nominal horse-power of an engine is, it seems that many persons get very much befogged on it. The number of inches of area in the piston is to be multiplied by the steam pressure on each inch of said area, which will give the total pressure on the piston. The sum thus obtained is multiplied by the feet per minute which the piston travels; divide the sum by 33,000, the mechanical expression of one horse power, and we have what purports to be the force of the engine. We can't make the matter any simpler, and we have answered this question about once a week for the last five years.

H. H., of Wis.—We cannot tell you the exact quantity of glycerine to put in plaster to keep it soft, but it would be a very simple matter to try a little, and thus ascertain by experiment.

J. G. P., of Pa.—Your cast-iron pulley can be turned with a chilled iron tool. Make an iron mold of a tool, in shape like a fence picket—flat on top, a little round on the end, and with but little rake; cast a tool of white iron, face down, in this mold, and you will succeed without taking off the scale. Run the pulley very slow, and take light cuts. Do not grind the tool but very little.

F. A. Y., of Ohio.—If you examine the SCIENTIFIC AMERICAN you will find many boilers illustrated therein; perhaps some of them will suit your purpose.

E. P. A., of Conn.—India-rubber is insoluble in alcohol. One part of rubber dissolved in sixty-four of chloroform will make a transparent cement, and resist alcohol and linseed oil.

J. K. L., of Kansas.—You say you sent us a year ago a query and a drawing, with a request to work out an elaborate calculation of the power of a certain windmill, and what weight it would require to run a set of mill-stones by a tram of gears, and you complain that you have never seen any answer thereto. We answered you at that time that we cannot engage to make calculations of the power of windmills or other machinery for individuals; all that we do in that line is furnished for general reading.

W. D., of Ill.—We can recommend the *Tinman's Manual* and *Mechanic's Handbook* for your purpose. J. K. Butts & Co., publishers, Washington street, Boston, Mass.

C. T. G., of Ill.—You will find it cheaper to buy malleable iron castings from those who have works erected to make them than to erect works for a small quantity. We cannot give a description of the process in a few lines, but malleable iron is simply annealed cast-iron. It requires time—nearly three weeks—and experience to conduct the operation.

G. B. D., of Md.—There is no ground to write an article upon the manufacture of seamless brass tubes. They are cast in a short, thick ingot or cylinder, and drawn through dies, and annealed after every drawing.

F. S. C., of Mass.—According to the laws regulating the velocities of falling bodies, all substances fall through an equal space in the same time

C. D. W., of Mass.—To charge a bar of steel with magnetism, place the end of a magnet upon the side of the bar at one end and draw it to the other end, then return the magnet through the air and repeat the stroke, making the passes always in the same direction. Soft iron loses its magnetism instantly.

J. L. G., of N. Y.—If one pound of sulphur be thoroughly mixed with six or eight pounds of india-rubber and pressed in a mold, at a temperature of 300°, it will be vulcanized by the operation, and will afterward retain its form.

D. H. W., of N. Y.—The easiest way for you to divide a circle into any given number of equal parts, we presume, would be by simply trying it with your dividers. In plane geometry, however, you will find the relations of the diameter of a circle to the sides of inscribed polygons. You will probably find the meaning of all those words in any large dictionary.

R. D. R., of Tenn.—The gnomon of a sun-dial must point to the pole of the heavens, and to do this it must be inclined at an angle from the horizon corresponding to the latitude of the place where the dial is located, and set due north. Perhaps the needle in your locality deviates from the north.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

PERSONS WISHING TO SAVE FUEL BY A SIMPLE attachment to their steam engines, please apply to Box 641, P. O., Newburgh, N. Y. 1*

PLATINA—WHOLESALE AND RETAIL—FOR ALL purposes. H. M. RAYNOR, Importer, No. 748 Broadway, New York. Platinum Scrap of any sort purchased. 19 4*

GUN AND PISTOL SCREWS.—COMSTOCK, LYON & CO., Manufacturers (Office 74 Beekman street, New York), are always prepared to furnish Gun and Pistol Screws to sample. Screws to fit U. S. Musket, Sewing-machine Screws, and Metal Screws generally, of the best quality, at short notice. XII 19 20*

WINSLOW, GRISWOLD & HOLLEY, MAKERS OF BESSEMER CAST-STEEL.—Troy, N. Y., April 15, 1865.—Having commenced the manufacture of Cast-steel under the Bessemer Patents, we are now prepared to furnish Railway Tires without welds, Rails, Axles, Piston and Connecting Rods, Crank Pins, Boiler and Ship Plates, shafting, Cannon and Projectiles, Bars and Rods, Spring Steel, Forgings to shape, Ingots, and Machinery Castings to pattern, of this material, up to 5,000 pounds weight. Preparations are making to produce masses of 25,000 pounds weight.

This manufacture, developed by Mr. Bessemer in 1856, has already reached a production of about 100,000 tuns per year in England and on the Continent, and is largely superseding wrought iron for the purposes named above. Railway Companies, like the London and North-Western, and Iron Works like the Ebbw Vale and Dowlais, have erected apparatus to produce 200 to 500 tuns each per week. Bessemer Steel has more recently been used in the United States in the form of Axles, Rails and Plates.

The grand advantage of this material over wrought iron, especially in large masses, is its perfect homogeneity—the absence of welds and consequent imperfections, such as the lamination of rails, blisters in boiler plates, and cold-shuts in heavy forgings.

Its tenacity is double that of wrought iron, considering the above-mentioned and unavoidable defects of wrought iron in welded masses. In the bar, it is one-half greater than that of wrought iron, or from 90,000 to 150,000 pounds per square inch, according to the degree of carbonization required for different purposes.

The nature of the Bessemer process renders the product more uniform than wrought iron can be, in all its qualities.

The stiffness of this steel, proportionate to its tenacity, adapts it to girder and ship building, and peculiarly fits it to resist compressive as well as tensile strains, as in piston rods.

While the elasticity, and hence the safe working load of the lowest steel is much greater than that of wrought iron, its ductility is equal to that of the best wrought iron. Two-inch bars may be bent double when cold under the steam hammer. This property insures its safety in the form of axles and tires.

The hardness of the material, as well as its homogeneity, increases its durability in the form of rails, guns, and parts subjected to abrasion.

This steel is peculiarly adapted to plates requiring intricate flanging, and subject to the immediate contact of fire. For a given strength it may be thinner than wrought iron; it does not blister, and the carbon in it protects it against corrosion.

We are also prepared to grant licenses, upon reasonable terms, for the manufacture of Bessemer Steel in the United States, and to furnish working drawings for the necessary plans and machinery.

We are aware that there are other claimants for this process of making Steel, but we have purchased the Bessemer Patents and erected Works, after a legal investigation, which satisfies us that these other claims are not well founded, and that both the process and the machinery necessary to practice the process successfully, are the inventions of Mr. Bessemer.

And we take this opportunity to caution all persons who are desirous of entering upon the manufacture of steel by this process, that should they employ it under cover of alleged rights of any parties, other than ourselves as the assignees in the United States of Mr. Bessemer, we shall hold them legally responsible to us in damages. [1] WINSLOW, GRISWOLD & HOLLEY.

ANDREWS' PATENT CENTRIFUGAL PUMPS—CAPACITY from 90 to 40,000 gallons per minute. For draining and irrigating lands, wrecking, coffer dams, condensers, cotton, wool and starch factories, paper mills, tanneries and all places where a large and constant supply of water is required, these pumps are unequalled. They are compact, require little power, and are not liable to get out of order. For descriptive pamplet address 19 4 WM. D. ANDREWS & BRO., No. 414 Water street, N. Y.

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FOR SALE—STATE RIGHTS OF MY PATENT Portable Musketo Bar. It is easy to manufacture and requires but little capital. The patent was issued last year, and a large quantity of them have been sold in this State. They weigh but two ounces and are better than any others in use. Any one introducing them in the South can realize a fortune. Address JOHN ZENGELER, Chicago, Ill. P. O. Box 2,682. 19 2*

PORTABLE ENGINES, SUITABLE FOR THE OIL regions, from 8 to 20-horse power, with large fire-place, independent steam feed pump, steam gage and improved water heater. The most complete and simple engines in the market. For particulars address WM. D. ANDREWS & BRO., 19 4 No. 414 Water street, N. Y.

SPECIAL NOTICE TO METAL WORKERS.—THE drills made by us are standard tools, and are sold at lower prices than they can be made by individuals. They are of all sizes from a knitting needle up to 1½ inches, and drill a hole that needs no rimming. Used in the U. S. Navy Yards and by machinists and metal workers generally. Can be seen in daily use in this city at CHAS. BROMBACHER'S, No. 77 Ann street, and at this office. Every metal worker needs them. Address MANHATTAN FIRE ARMS CO., Newark, N. J. 19 4

FOR SALE—A MACHINE SHOP, AND TOOLS FOR Manufacturing Carriage Bolts, Nuts and Washers together or separately. No competition, and large trade already established. A rare opportunity is offered. Address CHAS. H. RICE & CO., Chicago. 1*

TRAVELING AGENTS WANTED.—LARGE PROFITS and little capital required. A new invention. Samples free by mail for 50 cents. Inclose stamps for particulars to W. B. DIVON, No. 108 William street, N. Y. 1*

ONE MILLION DOLLARS.—VALUABLE RUBBER Patent and other inventions for sale. I am a cripple, and cannot get out to show my inventions, but if you wish to invest in a really valuable patent, or secure a monopoly in the use of Vulcanized Rubber, call and see my models and samples. I have a better Knob Door Latch than there is in market, and other things in the Hardware Line that will please you. Also a patent for Sash, Door and Blind makers. Call and see me or address GEO. J. COLBY, 1* No. 15 Laight street, N. Y.

CHEAP SOAP.—SAPONIFIER OR CONCENTRATED LYE—The Ready Family Soap-maker. Soap for three cents per pound. See SCIENTIFIC AMERICAN March 18, 1865. Caution—Original, Genuine and Patented article is put up in one-pound iron cans all others being counterfeit. Manufactured by PENNSYLVANIA SALT MANUFACTURING CO., Office Pitt street and Duquesne way, Pittsburgh, Pa. 1

MILLING MACHINE WANTED—OF LARGE SIZE and modern construction. Also a small Index Milling Machine. Address UNION VISE CO., No. 57 Haverhill street, Boston, Mass. 1*

INCRUSTATION.—W. E. RUTTER, ERIE R. R., Elmira, says of Winans's Powder: Have used it six years and find no injury, exceeding in efficiency anything I have seen tried in my forty years' experience. H. N. WINANS, N. Y. 19 3*

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ANDREWS' PATENT OSCILLATING ENGINES.—Double and Single Engines, from ¾ to 125-horse power, finished at short notice. These engines leave the shop ready for use, require no special foundation, are compact, light and simple, and economical of power. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO., 19 4 No. 414 Water street, N. Y.

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THE MOST VALUABLE MACHINE FOR BUILDERS and Carpenters, Furniture, Carriage, Agricultural Implement, Sash and Door, Waived and Straight, Molding and Piano Manufacturers, complete for all kinds of irregular and straight work in wood, hard or soft, superior to all others, having the capacity of twenty good mechanics, called the Variety Molding Machine. We own nine patents, covering the valuable inventions for machines with upright mandrels. Have them manufactured in one place only for the United States and Europe, viz: at Pass Iron Works, No. 110 East Twenty-ninth street, New York. We hear there are parties manufacturing machines infringing on some one or more of our patents. We caution the public from purchasing such infringements. Our patents secure to us the machine with either iron or wooden table, through which are two upright mandrels, having cutters in each head held by a screw nut, also combination collars, saving 75 per cent in cutters, feed table to plain and cut, irons outside the cutters, preventing wood from taking undue hold. Also guards acting as plain stocks, making it safe for a boy to run.

Agents solicited. Please send for circular giving full description. Information or orders for machine may be addressed COMBINATION MOLDING AND PLANING MACHINE COMPANY, New York City. 18 4*

BETTER THAN OIL OR GOLD STOCKS.—PATENT Rights for Sale.—The entire Right to the subscriber's Patent Plate Lamp Chimney, otherwise called the Perpetual Lamp Chimney, is offered for sale. The article is one of proved and acknowledged merit, and beyond doubt will come into general use. For circular or terms address E. S. BLAKE, Pittsburgh, Pa. 18 3*

FOR SALE—STATE, COUNTY OR SHOP RIGHTS for Embree & Speakman's Patent Swathing Machine for Grain. It is just the machine that every farmer needs. For particulars address Box 201 Westchester, Chester Co., Pa. 18 3*

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PATENT FOR SALE.—A NO. 1 PATENT FOR FLOURING Mills for Sale. Is widely recommended. Would exchange for 40-horse power Engine and Boilers. Address Box 27, Carrollton, Missouri. 18 2*

WANTED—TO CORRESPOND WITH INVENTORS or Manufacturers of machines for Racking Match Splints Address GREENLEAF & CO.,
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TO INVENTORS.—A COMPANY MANUFACTURING a patented article in general use, and having resident agents canvassing exclusively for them in nearly every city and town in the United States and Canada, thus possessing unequaled facilities for introducing a new invention, would treat with the patentee of some valuable article of general household use, and not very high priced, which could be introduced through their agents. Parties having such an article can address with particulars the B. G. R. CO., Lock Box No. 79, Bridgeport, Conn. 18 2

RUBBER MACHINERY FOR SALE.—ONE 3-ROLL Calender, 5 ft. face, 18 ½ in diameter; one 3-roll Calender, 5 ft. face, 21 in. diameter; 3 pair Grinders, 3 ft. face, 12 in. diameter; one Heater 5 ft. diameter, 12 ft. long, man hole in one end. Screws, Press, Gears and Machinery of all kinds. Two Portable Engines, 6 and 15-horse power at DAVIS'S MACHINERY YARD, Nos. 17 and 19 Morris st. Jersey City. 17 3*

WANTED—AGENTS.—$150 PER MONTH, TO SELL the Improved Common-sense Sewing Machine. The best and cheapest machine in use. Address A. GRANT & CO.,
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ONE GOOD SECOND-HAND DANIELS PLANER, 8 feet long, 24 inches wide, for sale, by THOMAS & CO., Worcester, Mass. 17 3*

2,000 BOLTS PER DAY CAN BE MADE ON our PATENT MACHINES. Also Rives and Spikes of all kinds.
HARDAWAY & SONS,
St. Louis.

REFERENCES.
Chouteau, Harrison & Valle, Laclede Rolling Mill.
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W. H. VAN GIESON, SUCCESSOR TO THE WATERBURY MACHINE CO., builder of every description of Machinery and Machinists' Tools, Pin and Hook and Eye Machines, Metallic Cartridge Machinery, Double and Single-acting Power Presses, Foot Presses, Etc., of new and Improved Patterns. Inventors' ideas carried out (when so requested) in the most private and confidential manner. Shop near the Depot, Waterbury, Conn Terms, Cash on delivery. 17 12*

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WILLIAM LILLY, Mauch Chunk, Pa.,
THOMAS BARBER, Allentown, Pa., or
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Improved School Settee.

This engraving illustrates a new and peculiar style of settee intended for the use of schools. By the construction of it, it may be converted into a settee or desk at will, and the peculiar feature is, that while the desk is ample in width for all purposes, when turned down the same surface serves for a seat, although the space required for the latter is very much less than for a desk; unless, therefore, some peculiar arrangement was made the same part could not be made to serve two purposes. By carrying the end, A, Fig. 2, of the board back sufficient width is given for a desk when the top is turned up, as shown in the same figure, but the recession of this projecting part, when the top is used as a settee, allows the pupil to be seated with comfort and listen to the precepts of the venerable pedagogue in spectacles, who is represented in Fig. 1 in the act of cautioning the young man never to write yellow-covered novels or make copy that printers cannot decipher.

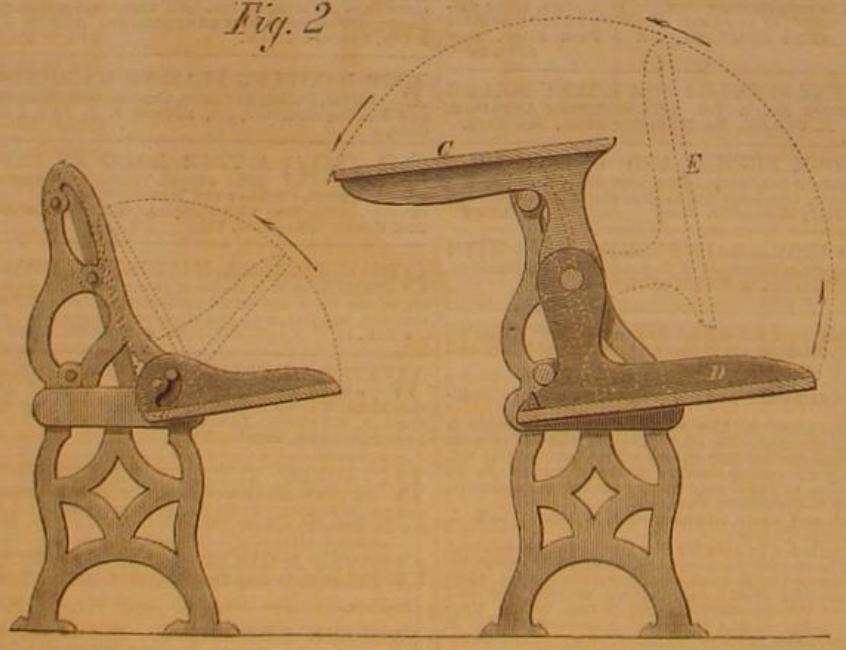
In the same figure the position of the parts is shown very clearly; the back, B, Fig. 1, is permanently fixed and never moves, while the top, C, turns under it as at D; the dotted lines, E, Fig. 2, show the position of the top in the act of being turned. A rack for books, slates, etc., is constructed immediately under the top, behind the back at F, Fig. 1, and free passage can be had at all times between the seats in different parts of the room.

This piece of school furniture is light, strong, and neat in appearance, and well worthy the attention of those about refitting or constructing educational institutions. It was patented on the 16th of November, 1864, through the Scientific American Patent Agency; for further information address D. I. Stagg, 94 Crosby street, New York.

Fig. 1.



Fig. 2



STAGG'S SCHOOL SETTEE.

Ilmenite Ore.

This ore, which is now coming greatly into use in England, and the exhibition of samples of which has excited much attention, is the product of valuable mines of titanium ore, or ilmenite, at Egersund, in Norway, extending over five miles. These have been purchased by the Titanium Ore Company, who are now raising nearly 1,000 tuns per week of the ore. Ilmenite is used in the puddling furnace, both as a fettling material and as an improver of the iron. As a fettling material it is much more durable than any yet employed; the furnace only requiring to be fettled once a week, while with Lancashire ore the furnace requires fettling twice or more each turn. It is now generally admitted that the introduction of ores of titanium into the blast furnace with the ordinary burden of iron ore, produces a great improvement in the iron made, and very extraordinary results have been obtained. The tensile strength of the iron thus made has been unprecedented. In steel, manufactured with an addition of titanium ore, the strength obtained bears a strain of from 10 to 20 tuns, and in some instances even 30 tuns per square inch beyond that sustained by other steel, and the manufacturer is thereby enabled to produce a superior quality of steel for all purposes from materials of a much cheaper class than those ordinarily employed. Eminent iron making firms, who are manufacturing hematite and other pig iron, have used with their iron ores a mixture of titanium ore for some time, and are now purchasing large quantities for more extended operations.—*Ryland's Iron Trade Circular, London.*

Musk.—The Empress Josephine was very fond of perfumes, and, above all, of musk. Her dressing-room at Malmaison was filled with it, in spite of Napoleon's frequent remonstrances. Forty years have elapsed since her death, and the present owner of Malmaison has had the walls of that dressing-room repeatedly washed and painted; but neither scrubbing, aquafortis, nor paint, has been sufficient to remove the smell of the good empress's musk, which continues as strong as if the bottle which contained it had been but yesterday removed.

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NEW YORK, MAY 13, 1865.

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Improved System for Trestle Bridges.

The transit of streams in military operations is often one of the most embarrassing incidents of a campaign. Where the channel can be forded no delay usually occurs, yet even then when the banks are precipitous, or the approaches marshy, some means must be provided for the safe passage of artillery trains and wagons. During the whole of the present war, and up to the ignominious flight of the rebel leaders from their capital, bridges have always been destroyed where practicable, and no means have been left unessayed to detain pursuit by the destruction of them. If time permitted and materials were at hand, a structure might be made for the service required, but when pursuit is hot, and an enemy follows vengefully behind, there is but little time to construct even, setting aside planning, a suitable structure. In such an emergency the bridge here shown will prove a most valuable acquisition, for with the aid of a chisel and an axe, the trestles and floor timbers can be got out most speedily, and the several parts put together rapidly and substantially. The following description will render its construction plain to every one.



DERROM'S SYSTEM FOR TRESTLE BRIDGES.

The floor is supported by the beams, A. These are mortised and fitted over the uprights or stanchions, B, the latter being hewed square on the top side. A key, C, driven from below, serves to sustain the weight of the floor and superincumbent burdens, and also to bind the whole firmly together. Cross braces are then inserted in notches in the stanchions, and the trestles are complete. The bridge is ballasted against lateral disturbance by stones piled against the bases of the stanchions, and the radial arms, D, serve to prevent the stones from scattering. An uneven bottom is made fair by placing a hewed timber on the ground, and any minor exigencies that may arise are easily provided for in a similar way. The bridge is one of the simplest and strongest for a temporary structure we have ever seen. Its principle can be adopted for scaffolds used in erecting buildings, and the saving of time, nails and material generally, should induce builders and capitalists to examine it. No charge is made for the use of it by the Government in whose interest it has already been successfully used. At the time when Suffolk, Va., was besieged by General Longstreet, one of these bridges was thrown over a wide stream having marshy approaches, in a few hours. Another one was also thrown across the Passaic river rapids, below the Passaic Falls, near Paterson, N. J., where it was temporarily left. Col. Andrew Derrom, of the 25th Regiment New Jersey Volunteer Infantry, is the inventor of this system of bridges, and a patent is now pending on it through the Scientific American Patent Agency. For further information and for rights to use this system for bridges or other purposes, address Col. A. Derrom, at Paterson, N. J.

South American Jerked Beef.

Jerked beef, or beef dried in the air, is being largely exported to England, where it is consumed by the poorer classes; it being sold at 6 to 10 cents per pound, or three pence, English money. It is not very delicate food, being tough and stringy, but is said to be better than going without meat altogether.

Captain Basil Hall, in his "Journal in Chili, Peru, and Mexico," gives a very detailed and interesting account of the ox-slaughtering in those countries, and describes the mode in which the jerked beef is prepared. The three men (he says) who had been employed in cutting up the bullocks now commenced an operation peculiar, I believe, to South America—namely, the preparation of what is called by us jerked beef, a term probably derived from the local name *charque*. The men seated themselves on low stools in the different cells, and began cutting off the detached portions of meat into long strips, or ribands, uniform in size from end to end; some of these, which were cut from the larger pieces, being several yards in length, and about two inches in width. To perform this operation requires considerable expertness. The piece of meat is held in the left hand, and at each slice is hitched round, so as to offer a new place to the knife, and in this way the strip of meat seems to unwind itself like a broad tape from a ball, till at last nothing remains. We tried to perform this ourselves, but continually cut the strip across before it had attained any length. When the whole had been treated in this manner it is allowed to hang under cover for a certain time, during which it acquires a black color, and owing to the heat and dryness of the air speedily loses much of its moisture. The meat is afterwards exposed to the sun till throughly dried, and being then made up into great bales, strongly tied around with a net work of thongs, becomes the jerked beef of commerce.

The Use of Soda in Boiler Incrustations.

As the character of the incrustations which are deposited in steam boilers varies greatly with the locality, it follows that no one substance can be recommended as a specific for all cases. In an article on the preservation of steam boilers, the London *Mechanics' Magazine* mentions, incidentally, a case where soda was used with good effect:—

"But incrustation is sometimes formed under peculiar circumstances and cannot be entirely removed by the blowing-out apparatus alone. In general a small quantity of carbonate of soda introduced into the boiler is found to have a very wholesome effect, but soda should only be used in boilers provided with a scum-pipe, as otherwise the soda, combining with the grease in the boiler, produces foaming in the water, which leads to priming. We have previously stated our views with regard to 'boiler compounds,' and we find the general testimony to be against them. As a rule they are found to be expensive, some useless, and others injurious. It would, however, be unfair to close the question with such a general sweeping condemnation, when exceptions do here and there crop out. But these exceptions are very rare, and only become such by the compound being used in cases to which it is specially applicable, and not as an indiscriminate remedy for corrosion.

"One instance of the efficacy of a boiler compound which has come under our notice is that of the boilers at the Phenix Iron Works, Manchester, belonging to Messrs. Elce. The water used is drawn from the Ashton canal and is strongly acidulated, giving much trouble. After several months' use of a boiler compound (Wood & Hall's) it is stated that a very successful result ensued. One of the principial ingredients in this compound is a strong caustic alkali, which converts the acid in the water to a sulphate of soda, the lime, from which the acid has been liberated, falling as a powder to the bottom of the boiler to be blown out, or being carried off by the scum-pipe or other means. There are a few other compounds well spoken of, but in any case the utmost caution should be observed in their use."

We learn that the iron-clad *Dictator*, having completed some alterations, is nearly ready for a trial trip.

MUSHET ON CAST IRON.

We find the following letter in the London *Engineer:*—

SIR :—In your article last week on cast-iron ordnance are some remarks on the nature of cast iron, and the means of improving that substance for purposes where tenacity and great strength are essential, and you suggest that such an improvement may be effected by partially decarbonizing pig iron in a Bessemer converter.

In the years 1846-1847 I made a series of experiments on this subject with a Bessemer converter, operating upon various brands of pig iron. The irons I employed were of the following kinds of gray, No. 1 quality:—Cleator hematite, Workington hematite, Barrow hematite, Tow Law gray pig, Cinderford, and Parkend. Victoria, Nos. 1, 2, 3 and 4 pig irons:—Blanavon, Pontypool. Russell's Hall and Westphalian gray pig.

The melted pig iron was blown in the converter until it had thrown off the frothy silicious slag which is eliminated during the first stage of the pneumatic process.

The gray iron thus deprived of its silicium, and some of its carbon, was cast into ingots of about 4 in. square. The fracture of these showed a very uniform grain of gray cast iron, the grains being small, and the texture very compact, but in no instance was the strength of the iron found to be nearly so great as that of the original pig iron from which it was prepared. These results I was prepared to anticipate from my previous knowledge of the nature of pig iron and of the cause to which its strength is due. There is no difficulty in thus treating cast iron, for the sides of the converter are not attacked by the silicious slag, and the operation can be carried on in converters of small size, which can be charged twice in an hour, and kept going night and day if required.

The iron thus operated upon is exceedingly fluid and lively, and can be run into the finest moldings; but the castings thus made are weak and brittle. Nothing in the way of improving the strength of cast iron can be expected from thus operating upon it. The reasons are, to me, quite obvious; but so long as the public are shackled by the empirical dogmas of chemists respecting the nature of cast iron, the matter must be more or less obscure to those who rely upon these dogmas.

Cast iron is not what chemists would have us to believe it to be, namely, a carburet or carbide of iron. Gray cast iron is an alloy of carburet of iron, steel, and malleable iron, with a mechanical mixture of graphite; white cast iron is an alloy of carburet of iron, steel and malleable iron, in which the first two substances largely predominate.

In the blast furnace the ores of iron descend into the zone of fusion in various conditions. These conditions are the following:—

1st. Iron ore partially deoxydized, but not yet metallized. When this comes into the zone of fusion it is reduced to a black slag, and none of it is metallized; when an excess of ore comes down in this state the blast furnace cinder is black, the iron white, and the furnace scours.

2ndly. Iron ore fully, deoxydized, but only in the nascent state of metallic iron.

3rdly. Iron ore completely deoxydized but not carbonized. This is in the state of malleable iron.

4thly. Iron ore deoxydized, metallized and carbonized so as to be in the state of crude steel.

5thly. Iron ore deoxydized and carbonized, so as to constitute carburet of iron.

6thly. Iron ore deoxydized and carbonized, so as to contain graphite mechanically mixed with it. When the bulk of the ore coming down into the zone of fusion is of this class the pig iron produced is very rich in carbon. Such is the Scotch pig iron, in which, from the nature of the black band ironstones, the iron and carbon of which are intimately mixed, and from the hight and size of the blast furnaces, the ore is almost wholly brought into the gray carbonized condition before it reaches the melting zone.

Iron ores, therefore, when passing through the blast furnace, are deoxydized and carbonized so as to form six distinct classes of material, when they descend into the melting zone of the blast furnace. The proportionate quantities of each class will depend upon the nature of the fuel, the nature of the blast (whether hot or cold), the weight and capacity of the furnace, and the nature and composition of the ores themselves, and the fluxes with which they are smelted.

The strength of cast iron depends almost wholly upon the quantity of malleable iron it contains; and therefore, when in any blast furnace a large portion of the ore, class No. 3 comes down to the melting zone, the pig iron produced will be proportionately strong. On the other hand, when classes No. 4 and 5 predominate, the pig iron is white and brittle, for crude steel and carburet of iron are brittle, as is also any mixture of these substances. When class No. 6 predominates the iron is gray, such as Scotch pig iron; but it is brittle, containing but little malleable iron. It is not, however, so brittle as white pig iron, because its texture is granular and not crystalline.

The effect of silica in the blast furnace is to retard or prevent the carbonization of the iron ore. Therefore, pure silicious iron ores, such as hematites and magnetic ores, when they come down to the zone of fusion, are more or less largely in the condition of class No. 3, and in small cold blast furnaces almost wholly so. Therefore rich silicious hematites and magnetic iron ores, smelted in small cold blast furnaces, have a strong tendency to fill the hearth with malleable iron, unless an excessive quantity of fuel is used to guard against this; but in any case a large portion of the ore of class No. 3 always comes down to the melting zone, and hence hematite and magnetic ore pig irons, when gray, are exceedingly strong, their strength being due to the large alloy of malleable iron which they contain. Gray pig iron is often rendered stronger by re-melting, and the cause of this is that the loss of carbon which takes place in melting increases the proportion of the malleable iron present in the alloy.

By partially decarbonizing cast iron in the Bessemer converter its strength is diminished for the following reason :—The malleable iron present being highly combustible is at once attacked by the oxygen of the blast, before the less combustible carburet of iron, steel, or gray carbonized iron is at all acted upon; so that the quantity of malleable iron which imparts strength to the cast iron is reduced, and the strength of the cast iron is, therefore, proportionately reduced also.

I am not aware that Mr. Morries Stirling was acquainted with the true composition of cast iron as I have here described it; but it is certain he was aware that cast iron could be strengthened by alloying it with malleable iron, and hence his patents for effecting that improvement.

On September 3d, 1863, I took out a patent for increasing the strength of cast iron by alloying it with Bessemer metal, decarbonized so as to be in the condition of malleable iron. Like most other great improvements, no notice has as yet been taken of this process, by which in all probability the strength of cast iron may be quadrupled. Inventions relating to iron and steel appear to require a probation of a series of years before the public are able to recognize their efficiency and importance. Thus the hot blast patent was scarcely named for the first ten years of its term. My own spiegeleisen patent, on which hangs the very existence of the Bessemer process in this country, was put aside for six years. The rotary puddling furnace is only now beginning to attract proper attention, after remaining for years in abeyance.

Of my process for strengthening cast iron, which has been now nearly two years before the public, I have heard nothing, except the opinion of a leading ironmaster, to the effect that my process was not worth a trial. Opinions such as these, confidently given by men who have never devoted a moment's thought to the subject they speak of, tend more than anything else to retard the progress of improvements in iron metallurgy. When my spiegeleisen patent was taken out, eight years ago, it was pronounced to be of no value, and a mere theoretical bagatelle. Yet this bagatelle is yielding Mr. Bessemer over £100,000, and his present licenses probably one million sterling, per annum, and a few years will see these returns increased probably tenfold. R. MUSHET.

Belgrave House, Cheltenham, April 18, 1865.

MACHINES for seeding currants and stoning raisins are in common use in England.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening April 27, 1865, the President, S. D. Tillman, Esq., in the chair.

METALS—SOLID AND MELTED.

Dr. Rowell gave an account of some experiments which he had made to test the relative specific gravity of solid and molten lead. He took a hydrometer tube, which is a glass tube with two bulbs blown in it, a small one at the bottom and a larger one above, and introducing a small quantity of lead he melted the metal with an alchohol lamp. The quantity of lead was sufficient to fill the lower bulb and half the upper bulb. Dr. Rowell supposed that if the metal shrank in hardening it would draw the two bulbs together and break the glass at the neck, while if it expanded it would burst the lower bulb. The glass was not broken; he, therefore, concluded that lead in hardening neither expands nor contracts, at all events not more than glass.

Another experiment resulted in the same conclusion. Having a kettle with a hemispherical bottom he filled it with molten lead and allowed it to cool. He then melted it all except a little lump at the center of the surface, and observed that the upper part of this lump was precisely at the level of the surface of the molten mass. But if the temperature of the molten lead be raised a few degrees above the melting point, the solid lump sinks; lead, whether molten or solid, being subject to the law of expansion like other bodies.

The case is different with iron. Visiting an iron foundery a few days before, he took the opportunity to drop a small ball of nearly red hot cast-iron into a ladle of the molten metal, and the ball floated with about one-tenth of its mass above the surface. One of the workmen dropped a leaden bullet into the ladle, when it went to the bottom instantly.

Mr. Blanchard said that he had tried the experiment of throwing solid cast-iron into molten cast-iron a thousand times, and it will always float.

Mr. Norman Wiard observed that there was some deception practiced in relation to the lead bullet; as every foundery man knows that if lead be mixed with molten cast-iron an explosion follows. The iron may all be thrown out of a ladle at any time by placing a little lead in the bottom of the ladle before the iron is drawn in.

Mr. Bird said that in melting lead he had tried the experiment many times of pushing with a stick a solid lump of lead to the bottom of a molten mass, and it would invariably rise again to the surface.

The Chairman explained that he was present at the experiments made by Professor Everett, an account of which was given at the time, and it was found that a pig of solid lead would sink in a kettle of molten lead, but whether the temperature of the molten lead was not considerably above the melting point, was not carefully observed. Had the solid and the molten lead been of about the same temperature perhaps the result would have been different.

Mr. Garvey remarked that the fact of the solid floating upon the molten metal was not conclusive proof of a lower specific gravity, as there were mysteries connected with the behavior of the substances under these conditions that had not yet been unraveled.

Dr. Parmelee observed that water, sulphur and some other substances when they change from the solid to the liquid state crystalize, and the crystals arrange themselves in such way as to have interstices between them, in this way diminishing the specific gravity of the substances. But substances which have not this property, increase their specific gravity in passing from the solid to the liquid state. If the experiment be properly and fairly tried it will be found that solid lead or iron will always sink in the same metal melted.

THE VANDERBILT MEDAL.

Mr. Norman Wiard presented the designs and plaster casts of the gold medal voted by Congress to Commodore Vanderbilt in recognition of his munificent gift of his superb steamship, the *Vanderbilt*, to the nation in her hour of need. The design was by Leutze and the medal is being executed by Mr. Salathiel Ellis. On one side is a likeness of the Commo-

dore in bas relief, and on the other an allegorical design; a female figure representing commerce is kneeling to another meant for America, standing upright, with a huge two-handed sword on her shoulder, and with her left hand resting upon a shield, while the back ground is filled with the spars and hull of the great ship. The medal will be three inches in diameter, and will cost $3,000. The ship is of 5,000 tuns burden; she was built in the most thorough and careful manner, and cost $800,000.

DECOMPOSITION OF OXYGEN.

The President read an extract from a foreign paper stating that Schonbein had succeeded in decomposing oxygen, but expressed doubt in regard to the truth of the statement.

INJURY TO CLOTH FROM SILICATE OF SODA.

The President also read a statement that Mr. Calvert, of England, had been examining some damaged cotton cloth, and had come to the conclusion that it was injured by the silicate of soda employed in finishing it. The conclusion seemed to be that the crystals formed from the silicate used in connection with lead had broken the fiber of the cotton.

PRODUCTION OF HEAT IN STRETCHING INDIA-RUBBER.

The effect of stretching on the temperature of wire being spoken of,

Dr. Parmelee called attention to the fact that india-rubber is heated by being stretched, and if held a moment to allow the heat to radiate, and then suffered to contract, it is very perceptibly cooled. By frequent repetition of the process the temperature may be lowered a great many degrees. Dr. Parmelee supposed that he was the first to observe this curious phenomenon. His theory to account for it is, that in stretching the india-rubber is in fact condensed, the fibers being drawn together somewhat as the strands of a net are when it is stretched.

MANUFACTURE OF INDIA-RUBBER COMBS.

Mr. Parmelee, being called upon to open the regular subject of the evening, the manufacture of combs, remarked that he had designed to speak only of combs made from hard rubber. Exhibiting a black mass, he said that it was a specimen of the rubber after being masticated—that is, passed between hot rollers one of which revolves a little more rapidly than the other, and thus grinds and kneads the substance into a homogeneous mass. He then exhibited a specimen of the rubber after being mixed with the sulphur. It was a light colored, limber, elastic sheet. The speaker remarked that hard rubber differs from soft vulcanized rubber only in containing a larger proportion of sulphur, and being subjected to a higher temperature and for a longer period. It was invented by a younger brother of Mr. Charles Goodyear, the author of the great discovery of vulcanized rubber. The materials are mixed in various proportions, ranging from 4 to 16 ounces of sulphur to the pound of rubber. The best proportion is that of equal parts of sulphur and rubber. After the two ingredients are thoroughly incorporated the sheets are rolled down to about one-sixteenth of an inch in thickness, and are then subject to a temperature of 280° for 8 hours. In order to keep the surfaces of the sheets smooth they are oiled on both sides with a solution of lard in petroleum, and covered with a very thin sheet of block tin. They are then placed either in a pan of water or in a tight soapstone box, and enclosed in a strong air-tight cylinder, where they are heated to the required temperature.

The speaker stated that hard rubber may be softened by immersing it in boiling water, or otherwise raising its temperature to 212°. It can then be stamped, pressed, or molded into any desired form. Combs are made by pressing the substance into the proper form, while it is thus softened, and then cutting the teeth. There are three processes for cutting the teeth. By one process each tooth is cut separately by a circular saw. A small machine has been invented by which the comb is fed to the saw, drawn back automatically and carried forward to the next tooth, till the comb is completed, when the feed motion stops, and the machine gives notice by sounding an alarm.

The machines are ranged in a row, and one girl can attend some 20 of them. By another process, a piece of hard rubber is pressed into the proper form for two combs with the backs at the two edges, and then the teeth are all formed at a single stroke of a press, each tooth of one comb coming from out the space between two teeth of the other comb. The third process is employed in cutting the finest teeth. A very thin blade of steel has a rapid reciprocating vertical motion, over an anvil of block tin, and the comb to be cut is fed along horizontally under the cutter, one tooth being formed at each stroke. In this operation the rubber is kept warm, and no material is cut out, the tooth being formed by pushing aside a portion of the substance.

After the teeth are cut the combs are polished by hand, the work being done mostly by girls. The combs are first ground upon a stone, and the polishing is finished upon a buffer of cotton and oil. They are then packed and sent to market. The business is large, and great fortunes have been made from the manufacture.

An Inventor Buried under Twenty Tuns of Iron.

John Wilkinson, an eccentric English inventor, was the inventor also of the art of boring cannon and cylinders, and contracted for, and supplied, all the iron pipes for the celebrated Paris Water Works. He was a most eccentric man. In his will he ordered at his death that his body should be buried in his own garden grounds at Castlehead; where for many years he had kept a large iron coffin to be ready. It stood amongst the laurel trees near the house, along with many other smaller ones, which he took a delight in showing to and offering to his friends gratis, to their utter horror and dismay. When he died (about 1807) his body was brought to Castlehead, according to his own request, but owing to the length and bulk of the lead and wood coffins in which he was encased, the iron coffin which he had so long kept for the purpose was found to be too small, and in consequence, his body was temporarily deposited in the garden walk till such time as a much larger iron coffin could be made at the Works in Wales and sent to Castlehead. When the new coffin at length arrived, the body was disinterred and placed therein, and again buried in the grave originally intended for it. Here it remained a short time, but as the size of the coffin was very great it stood up above the ground and looked unsightly, so that it was thought desirable to take it up again and sink the grave about three feet into the solid rock, which accordingly was done, when it was again buried, and over the grave was erected a pyramidal tomb of iron, in one piece, twenty tuns in weight, with a medallion containing an excellent likeness of the deceased, and the following inscription, written by himself:—

"Delivered from Persecution, Malice and Envy, here rests John Wilkinson, Iron Master,

In certain hopes of a better state and heavenly mansion, as promulgated by Jesus Christ, in whose gospel he was a firm believer. His life was spent in action for the benefit of man, and he trusts in some degree to the glory of God."

Within the last two months the mausoleum has been broken up and sold for old iron.

New English Nursing Chair.

This invention, is a chair or other seat combined with receptacles in such manner that a person seated thereon may open and close the receptacles and place articles therein, or withdraw them therefrom without rising or removing from his seat. The receptacles are fixed in a chamber or frame attached to the framework of the chair below the seat in the space usually left vacant between the legs. They are divided into compartments, and preferably closed by spring fastenings. The chair may be adapted with great advantage as a nursery chair, being in that case fitted with arrangements for receiving the clothes and various articles required in tending infants, so as to avoid the necessity of the nurse or mother rising and leaving the children in order to get the desired wardrobes from somewhere else. This article is patent in England.

How to Raise Mushrooms.

The *Irish Agricultural Review* gives the following instructions for raising mushrooms:—

The usual width for a bed of this description is five feet at bottom, four feet high, sloping from either side, and ending in the form of a ridge or roof of a house. As soon as the foundation is laid to your satisfaction, the remainder ought to be stacked up, as it were, and firmly beaten down, so as to make it somewhat solid, by the aid of a three-pronged fork, as the final result mainly depends upon its solidity. Small sticks should then be placed in it at intervals, and examined daily, for the purpose of ascertaining the heat, which when mild is ready for work, and then the spawn may be freely inserted or planted. The heat is merely requisite to incite or start the spawn, and, therefore, it is not necessary that it should be very great. Some beds, after making up, will need a fortnight for the heat to diminish or subside; but, as a rule, when it averages 45 deg. or 50 deg., the spawn may with safty be inserted. As soon as the spawn is planted, the bed or beds must be earthed up with a three-inch thickness of good soil, which, after being pressed down smooth with a spade, should be covered with at least eight inches of dry straw.

Area of Roofing to Supply Tanks of Given Dimensions with Rain Water.

Our rain fall averages 25 inches per annum, being rather more than two cubical feet for every square foot of horizontal surfaces employed in catching it; or, say, 200 cubical feet of water to the square. Each foot contains 6¼ gallons bf water. A tank, 15 ft. × 9 ft. × 7½ ft., will hold 6,581 gallons, and about 5¼ squares of horizontal surface would catch enough rain water to fill it in the year at the above rate of rainfall. In estimating the area of roof, the level area only must be calculated and not the surface area, which is often half as much again. Hence the simple method is to take the area of ground plan and double the number of feet contained in it, which will give the amount in cubical feet of water that, on the average, may be collected in each year.

Detection of Fires in Ships.

An exhibition of a very interesting character was made on the 6th of April, at Blackwall, England, the object being to indicate and announce the presence of fire. An indicator, with an alarm bell, was placed in a part of the building supposed to represent the Captain's cabin, connected with a battery, with wires leading to the calormetres fixed in the hole and other parts of the vessel. Some of these wires also led to the water apparatus placed in the well of the ship. The first experiment was made by increasing the water in the hold, and immediately upon its rising a few inches the alarm bell was rung, and the indicator showed that the cause of the alarm was from "water;" the continual increase of water caused the indicator again to show "water two feet." The second experiment was made upon some jute which was supposed to be in the hold and in the act of heating, which, when the temperature rose to only 100 deg., caused the apparatus to ring the alarm in the captain's cabin, while the indicator denoted "Fire—Hold." The heat was generated upon this occasion by pouring a quantity of warm water upon the jute. The other experiments were made from calormeters supposed to be placed in various other parts of the ship, the indicator showing in what part of the vessel the fire was generating; the heat in these cases also being from a tumbler of water heated only to 100 deg., applied to the several calormetres.

To Remove Flies from Rooms.

Now that hot weather approaches, the following method of trapping flies, as practiced and indorsed by a correspondent of the *Irish Agricultural Gazette*, will be found useful:—A hand glass, commonly used by gardeners (a square one is the best), is the instrument to be used. This has to be tightly covered at the bottom with thick white paper. A circular hole, 6½ inches in diameter, is then cut in the center of the paper, and the glass is placed on three bricks over a plate filled with beer, sugar, and a little rum, a moderate distance from the infested spot. The effect is magical; in a few hours the glass is crammed with flies, which, having tasted the sweets, fly upward to the light. A common sulphur match, made by dipping brown paper into melted brimstone, will destroy thousands. The constant hum of insect life will attract all to the glass, and the scent of the rum is sure to induce the most fastidious wasp to enter, as no insect can resist its powerful attraction. This is stated to be effectual in alluring hornets and wasps from fruit trees, though we imagine it would take a large glass to hold all we have seen in some neighborhoods.

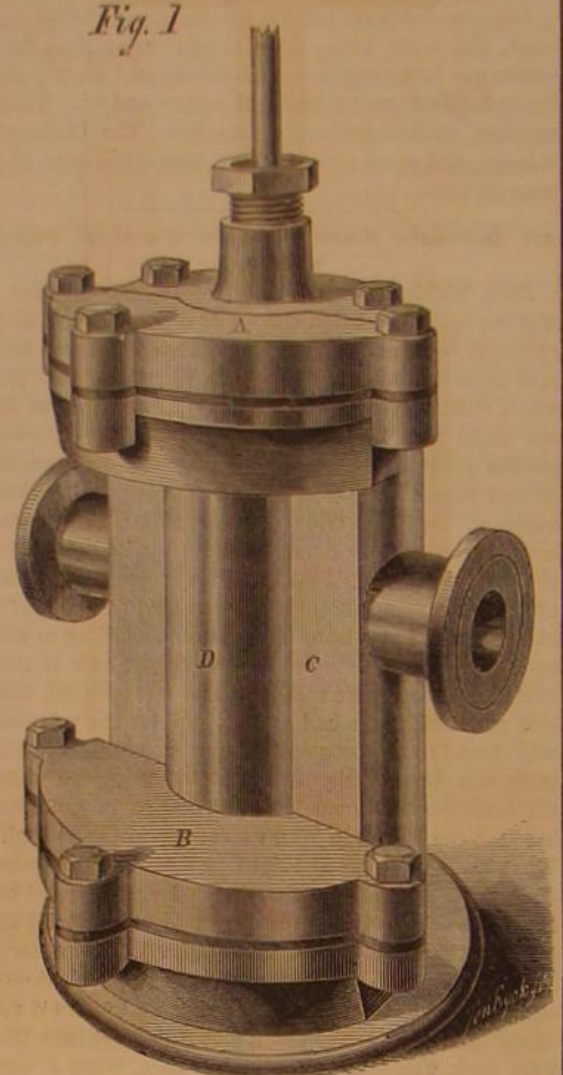
Fire-damp in Collieries.

A beautiful application of that mechanical power which resides on the surface of bodies, and which is especially developed in those having a porous structure, known to us as exosmose and endosmose, has been made by Mr. G. F. Ansell, of her Majesty's Mint. It will be well known to most of our readers that Professor Graham has been engaged for many years in examining all the phenomena connected with the action of porous bodies, organic or inorganic, upon gases or liquids. As the phenomena which Mr. Graham groups under the general term of osmose force may not be familiar to all, a brief explanation may be desirable. If salt and water be placed in a bladder, and this be placed in a vessel containing pure water, the salt will pass out of the bladder into the water. Recently an application of this experiment has been made in Glasgow with much success. In salting meat a large quantity of albuminous fluid flows out of it with the diliquescing salt, and this, a valuable because nutritive portion of the animal matter, is lost. Now, this albuminous brine is placed in a bladder, and this again in a vessel of water; by virtue of osmose force all the salt passes through the animal membrane, and pure albumen, of considerable commercial value, is left behind. If in the place of a membrane of this kind we employ a porous diaphragm of baked clay, of plaster of Paris, or the like, the same action takes place. By this means we may separate bodies from each other which are mechanically mixed, and even in many cases when mechanically combined. Pursuing inquiries of this character, Mr. Ansell has been led to a discovery which promises, above all others, to give us easy methods by which we may determine the presence of carbureted hydrogen in our coal mines, and he has invented a simple apparatus which promises to indicate the accumulation of fire-damp before it becomes and either to give the miner notice of it, or to convey that notice to the surface by its connection with some simple electro-telegraphic arrangement. Mr. Ansell has given two or three forms to his apparatus. The first is that of a thin india-rubber ball, which is filled with ordinary atmospheric air, and is placed on a stand under a lever which slightly presses its upper surface. This lever is connected with a spring, which it liberates when from any cause the lever is raised, and the liberation of the spring sets a bell in vibration. This arrangement being placed in a vessel containing but five per cent of ordinary coal gas exhibits the phenomenon of endosmose with much rapidity. By the passing in of the carbureted hydrogen, the india-rubber ball swells, the lever is of course raised, and the bell is rung. Experiments made with the light carbureted hydrogen gas of the coal mines show that the action is precisely the same in character. This little apparatus, the cost of which will be very trifling, may be placed in any part of a colliery with the certainty of its indicating the presence of fire-damp when yet in small quantities, and before there is any real danger. If the spring of this little instrument be so arranged that it makes or breakes connection with an electrical battery, the signal of accumulating danger may be at once conveyed by wires into the office, or any house on the surface of the colliery, and, either by ringing a bell or moving a magnetic needle, give the necessary warning to the owner or manager. Another form of arrangement assumes the shape of a barometer. A glass tube is bent into the form of a U, and upon one of the arms is fixed either a porous earthenware cell or a slice of graphite. The lower portion of the tube U holds a few inches of mercury. The moment a current of air, mixed with either heavy or light carbureted hydrogen gas, even in small proportions, passes over the graphite diaphragm, or blows against the porous cell, the mercury is depressed in one arm of the tube, and consequently raised in the other. By an arrangement precisely similar to that which is adopted in the wheel barometer, an index may be moved over a dial, and made thus to indicate with accuracy the appearance of dangerous gas in a colliery, and register its accumulation. It is not often that a more refined application of a scientific discovery than this has been made, while the arrangements, which have been patented by the inventor (Mr. G. F. Ansell), are so simple that they may be placed with confidence in the hands of any man to whom a safety lamp would be intrusted. As an unfailing indicator of the presence of the collier's deadly enemy—fire-damp—we cannot but regard this invention as one of the highest value.—*London Engineer.*

SMITH'S LIFT AND FORCE PUMP.

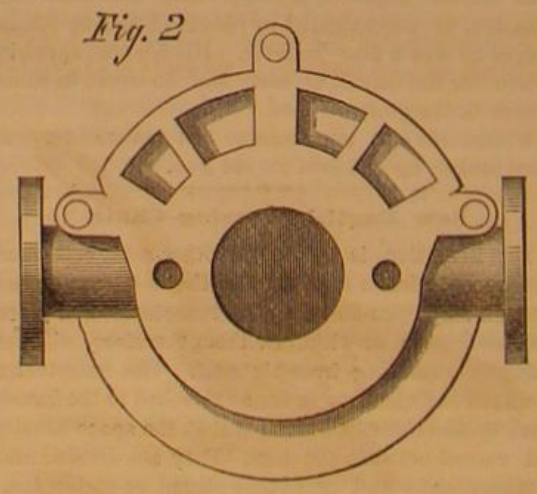
It is well known to mechanics, or other persons using pumps, that they are frequently inoperative from derangement of the valves. It is a simple matter to inspect these when accessible, but very many

Fig. 1



manufacturers seem to take special pains to put them in the most inconvenient and difficult positions; as also to fasten the bonnets, covering them with innumerable bolts, so that it is an hour's work to break the joints.

Fig. 2



These engravings represent a simple lift and force pump, which is conveniently arranged with regard to its valves. The bonnets, A and B, cover, respectively, the top and bottom suction and discharge valves, and communicate with the channels, C, and the pump barrel, D, in the usual manner. By merely unscrewing three nuts, the valves can be examined at any time, or renewed with facility when worn out. Fig. 2 represents a plan of the valve seats, which are both alike at the top and bottom. A patent is now pending on this invention through the Scientific American Patent Agency, by T. C. Smith; for further information address him at Chicago, Ill.

The Bergen tunnel, on the Erie Railroad, which has been the scene of so many accidents, is now lighted with a calcium light.

Purification of Petroleum.

In treating for disinfecting and removing the impurities from petroleum and products thereof, it has been usual to employ chloride of lime in a dry state and in combination with other matters, but which, however, is very imperfect in its action and far from obtaining the desired results. According to an invention which has been patented by Mr. B. Azular, of Rotherhithe, the oils are treated with a saturated solution of chloride of lime, and, as it were, washed in the solution. For this purpose the oil is placed in a suitable vat or vessel and the solution poured over it, the solution sinks through the oil, and is drawn up from the bottom, and by a pump or other means is elevated again to the top, and so a circulation of the solution in the oil is kept up, and the impurities thus abstracted from the oil, which is rendered clean and quite free from offensive smell, besides enhancing its lighting properties. If the oil is not very bad the same solution may be used again. If the oil is bad the solution will be found to have acquired the taint of the oil and must not be used again. If the oil is very bad it may be found necessary to repeat the process with a fresh solution, in that case a second vat is provided, the top of which would reach the oil tap of the first vat; the treated oil is then drawn from the first into the second vat and washed in water. After the oil has been separated from the water, the latter is drawn off and a second solution is then thrown on the oil, and the process proceeds as before. Instead of the solution of chloride of lime being applied at the top and drawn up from the bottom of a vessel, the oil may be forced in at the bottom of a vessel containing the solution of chloride of lime, when it will rise through the solution and may be drawn off at the top, repeating the operation as often as may be necessary according to the quality of the oil operated upon.—*Mechanics' Magazine.*

Death of a Distinguished Naval Officer.

Edwin J. De Haven, a lieutenant in the United States Navy, died at Philadelphia on the 2d inst., in the forty-sixth year of his age. He has been repeatedly noticed for his gallantry and skill, and was also celebrated for his fine scientific attainments. He was attached to the Washington Observatory, and constructed the famous ocean charts for which the rebel Maury received so much credit. He was selected to command the Grinnell Expedition to the North Sea in 1850, and, on his return, was employed in the Survey Department on the Southern coast. In 1857 his eye-sight became so much impaired that he was compelled to retire from active service.

NOTES AND QUERIES.

We are continually in receipt of letters from parties inclosing three cents, accompanied with a request to write them by return mail on the size of boiler flues, where to obtain bolts, and all sorts of miscellaneous information. We are pleased to answer these letters, but not by return mail, and all replies to such correspondence will be found in the "Notes and Queries" column at the back part of each paper.

SPECIAL NOTICE.

Geo. W. Otis, Lynn, Mass., has petitioned for the extension of a patent granted to him on the 20th day of August, 1851, for an improvement in insulators for lightning rods.

Parties wishing to oppose the above extension must appear and show cause on the 7th day of August next, at 12 o'clock, M., when the petition will be heard.

At the last sitting of the Academy of Sciences, MM. Engard and Philippon sent in a new hygrometer, formed out of a flat piece of ivory cut out of the tusk perpendicularly of its axis, and then formed into a spiral. The instrument it extremely sensitive, the spiral either being dilated or contracted circularly, but it has not yet been compared with other hygrometers.

In consequence of the increasing difficulties in the tunneling operations at Mont Cenis, it is now computed that the works cannot be completed within the former estimate of ten years, instead of four or five years. Geologists predict that a stratum of granite will sadly interfere with the progress of the work.

Common-sense Political Economy.

We find the following in an exchange. The writer displays rare common sense:—It is very common for agricultural writers to lament the decline of domestic manufacturing, and to advise farmers to raise as great a variety of crops as possible, on the assumption that the nearer a family can come to the production, by their own skill and industry, of all they need, the more prosperous and independent it will be. In reply to an article written for the purpose of recommending a return to the good old customs of our fathers in this respect, we find the following off-hand comments in the *Prairie Farmer:*—As "revolutions never go backward," we like the "bright side" view of the writer.

"Now, when I was a boy, fifty years ago, I went through this mill, and know exactly how it grinds, and from such a farmer's life may the good Lord deliver us. My father had a large family, and I do not think his store bill amounted to twenty-five dollars a year.

"We made our own sugar from the maple grove, we grew our own wool and flax, and it was manufactured in the house. The shoemaker and tailor came twice a year and made our shoes and clothes; the girls did the spinning and weaving, made the straw hats, bonnets, etc. By the most diligent industry of every member of the family, young and old, and the most frugal economy, we made a plain, substantial living, and were coarsely but warmly clad. But by doing so many things, we must necessarily do everything on a small scale, and in consequence had very little to sell, and the end of the year found us with very little if any profit. The wealth of men as well communities depends upon the amount they produce more than they consume, and to do this we must have a division of labor. I want to furnish some man that has machinery driven by water or steam with the raw material, and let him do the manufacturing while I feed him. If farmers turn mechanics manufacturers must of necessity turn farmers. I should be sorry to see the day when farmers were obliged again to use the hand-loom in their domestic economy.

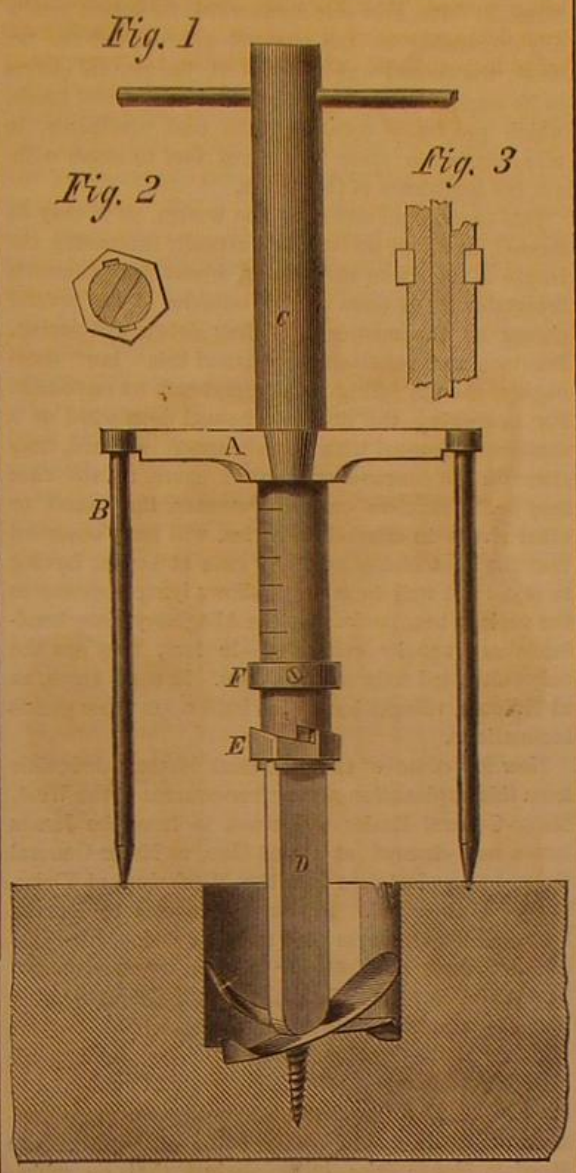
"I can grow a bushel of wheat or a pound of wool much easier than I could make a jack-knife or cambric needle. They are both articles I need, and the man that makes them needs my wheat and wool, and as long as needles and knives are made I have no fear about getting them, provided always that I have the wheat and wool.

"If the broad prairies of Iowa and Illinois were not calculated for grazing and woolgrowing on a large scale, I cannot understand what they were intended for. If every farmer pursued the course suggested you would have no such city as Chicago, and very little use for your magnificent network of railroads."

GILLETTE'S IMPROVED AUGER.

Boring holes with ordinary augers or bits is not a very satisfactory performance, for after going a certain depth the chips jam in the twists, causing a great deal of labor to overcome the resistance caused thereby, and frequently heating the cutting edges so that the temper is drawn; besides this, time is wasted in raising the tool so as to clear the hole out and complete the work. For want of a guide, also, the operator has no way of determining whether the tool is going straight or not, and holes are often bored untrue from this cause.

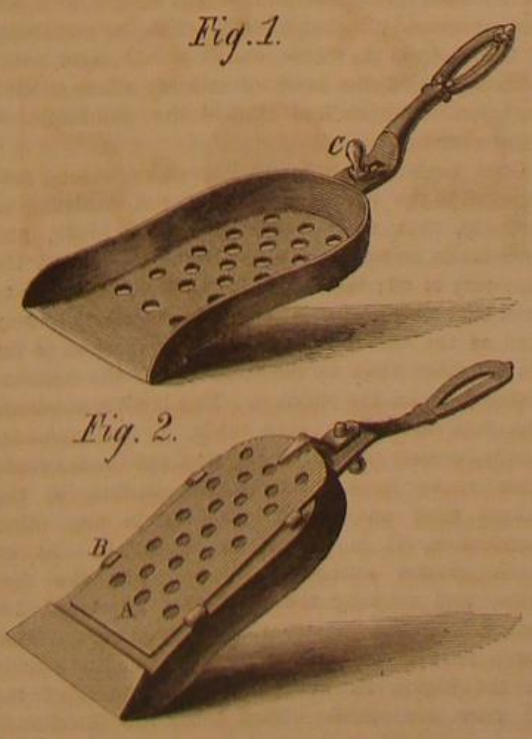
The object of the improvements illustrated in this connection, is to provide means for boring holes perfectly true and to relieve the unnecessary friction caused by carrying the chips around. To attain these objects, the inventor provides a guide, consisting of a bar, A, supported by legs, B; this bar carries the shaft, C, in the end of which the bit, D, is fitted. This bit is merely a straight flat bar, notched on one end where it fits in the shank, and armed on the cutting end with blades, which act as the common auger does. On the auger shaft there is a sleeve, E, which has stops, so that it cannot be turned too far. When in the right position, that is, so that the slots in it coincide with one in the auger shaft, Fig. 2, the tool can be inserted, and by turning the sleeve, E, held firmly in place; the top of said bit being held by another sleeve, F. Figure 3 shows the adjustment of the sleeve on the shaft so that it cannot slip. By making a graduated scale on the auger shaft, a hole can be bored to any depth without removing the auger until the work is done to try the distance. This tool will cut remarkably free, easy and true, and is desirable in framing houses, ship-building, or any



place where similar tools are used. It was patented on March 14, 1865, through the Scientific American Patent Agency, by E. C. Gillette, a resident of San Francisco, Cal. For further information address Henry Lyon, 119 Nassau street, New York.

SCHAAP'S FIRE SHOVEL AND SIFTER.

This utensil is designed to be employed as a shovel or scoop, and, on occasion, to sift ashes to extract the



cinders therefrom, so that they may be again used for fuel. Scoops with perforated bottoms are not new, but the manner of constructing the one here shown is novel and ingenious. With common perforated scoops, the contents are apt to fall through in the act of carrying them from the stove to the ash box; live coals also drop out, and damage the rug or carpet if they fall upon it. This scoop is made with a sliding bottom, A, which is retained in place by clasps, B; in the handle of the scoop is a slot through which a knob, C, projects, said knob being fastened to the plate below. When this knob is pushed down, as in Fig. 1, the holes in the scoop and plate coincide, so that it may be used as a sifter; but when the plate is reversed the holes, are closed and the bottom is solid, allowing nothing to fall through. This invention was patented March 21, 1865, through the Scientific American Patent Agency. The patent is for sale; orders for shovels supplied. For further information address the patentee, Richard Schaap, Jr., 128 Myrtle avenue, Brooklyn, N. Y.

MISCELLANEOUS SUMMARY.

The Hardening of Hydraulic Cement.—Dr. Feichtinger, in a paper "On Winker's Theory of the Hardening of Portland Cement," states his opinion that the hardening results from the formation of chemical compound of lime and silica, or lime and a silicate. In all hydraulic limes, he states, free lime is contained. He has already shown that, when Portland cement is made up with a strong solution of carbonate of ammonia, no hardening takes place, even when the excess of ammonia is washed out, in consequence of the lime becoming converted into carbonate; but if some hydrate of lime is added, the cement hardens, as well as fresh cement.

Bell Music for Paris.—The tower of the church of St. Germain L'Auxerroix is about to receive a very perfect chime, consisting of no less than forty bells, which will play twice every day; and the machinery setting them in motion is so arranged that any number of tunes may be played upon them. The well-known mechanician, Collin, has constructed a gas engine, in which the air is condensed to twenty-one atmospheres, and thus sets in motion a number of small cylinders, which act upon the bells, on the musical-box principle. M. Collin is engaged upon a series of experiments in which elasticity forms the motive power.—*Builder.*

Oil Tank with a Water Bottom.—A Cincinnatian, now in the Venango oil regions, is stated to have become short of barrels to secure the fluid. His ingenuity was set to work, and he immediately put a bottomless tank into the water and directed the stream from his flowing well into it. The lighter quality of the oil kept it above the water, and when the receptacle became filled the enterprising miner cut loose his moorings and floated down the river to the refinery.

The funeral procession of Abraham Lincoln in the length of its passage, in the number of mourners, in solemnity, depth and extent of grief, surpassed all that had preceded it. The one that came nearest to it in previous history was that of Alexander the Great, whose body was borne on a golden chariot from Babylon in Asia to Alexandria in Egypt.

Reduction in Coal.—The coal trade is unusually depressed, and owners find it impossible to effect sales at present high prices. A large reduction has therefore taken place in wholesale prices, which will or ought to cause a reduction of two dollars a tun to consumers, with a prospect of a further decline soon.

The Wheeler & Wilson Sewing Machine Co., located at Bridgeport, Conn., turn out a machine every three minutes, or twenty in a working hour! There are nine hundred men employed, and an invested capital of $1,000,000.

One hundred barrels of crude oil will yield from seventy to eighty barrels of refined, according to the skill of the refiner, and the perfection of machinery employed for such work.

The present rate of wages in the Pennsylvania oil regions is moderate. Drillers and engineers get from $2 to $2 50 per day, and board; mechanics get from $3 to $5.

The manufacture of American flags has been commenced in Lowell. Hitherto such flags have been made of foreign bunting.

The *Herald* of the 6th inst. says, the Government has reduced its coal orders from 10,000 tuns per day to 9,000 tuns per week.

RIVER COURSES—CANALS—OIL VEINS.

[For the Scientific American.]

In a previous article on the oil regions of Pennsylvania, the position was taken that the rivers and creeks had dug their own channels to the depths at which they are now found below the general table lands above, instead of the latter having been individually upheaved, as most persons appear to believe. After having formed this theory by a personal examination of the country, it was some satisfaction to the writer to find this view sustained by such an authority as Professor W. D. Rogers, in his geological report on that State. "The Alleghany River," he observes, "flows through a deep and narrow trench, excavated in the north-western plateau and western coal basin of the State, entering the north-west margin of the coal basin at Warren." Again: "It is evident that while the main discharge of the eroding wave was south-westward, one large influx of eroding waters swept north-westward of the Appalachian Mountains, and another south-eastward from the regions of the lakes." It is to these several agencies that he attributes the remarkable course of that river—now northward into New York, next south-west, then south-east, and finally south-west to Pittsburgh, beyond which the Ohio proceeds north-west, and then westward, before passing out of Pennsylvania. Yet on all this distance the river has never been once deflected from its course by what can be styled a chain of mountains; and the hills are nothing but bluffs through which it has excavated its own channel.

That the entire oil regions, in common with the great Mississippi basin, were upheaved from the ocean bed is a point which admits of no reasonable doubt. As the several layers of sedimentary rocks composing it (nearly all which are absent in New England and Eastern New York and New Jersey) were formed, the sea would appear to have gradually kept sinking to enable the masses of sand to become sand-stone rocks, clays to become shales, peat bogs and forests to become coal beds, gravel beds to become conglomerates, etc. This done, each layer having received its own collections of plants and marine or fresh-water shell-fishes, as the case might be, the whole country was gradually and gently upheaved to its present elevation, the operation being so easy as scarcely to disturb the beds of rocks composing the different strata of the Great West. Traveling along the lines of the Erie and the Pennsylvania Central Railroads, one may observe, on approaching the Alleghanies, synclinal and anti-clinal beds of perhaps ten miles in width, and in places twenty degrees from the horizontal; but along the Alleghany and the Ohio the dip is scarcely perceptible—seldom as much as three or four degrees. The lines of sand-stone and shale are arranged as regularly as the leaves of a book. In the course of more than two hundred miles' travel on foot through the oil region of Pennsylvania, the writer has not been able to observe one violent dislocation in the rocks beyond that produced by huge masses sliding from the summits. He was told, indeed, that such irregularities existed, but failed to find an example. Perhaps to the exception stated should be added the contortions made in the soft shale by huge trees, now petrified, around whose stems of thirty or forty inches diameter the clay had been bent and twisted, so that the horizontal lines were broken.

Before discussing the practical bearings of this subject, it may be proper to explain another feature in the physical formation of the valleys of the Alleghany, Oil Creek, French Creek, etc. In traversing their tortuous courses, which are often loops rather than mere bends, the visitor will observe that the bluffs opposite each convexity are high and precipitous, while the headlands embraced within the curve or concave side of the river slope gradually and gently down to its margin. Illustrations of this may be found every mile or two, and the rule may be set down as general, if not universal. The explanation of that phenomenon is manifestly this: Like every other substance, water has a tendency to move in straight lines. The slight undulations originally existing on the surface of the plateau, together with the agencies alluded to by Professor Rogers, caused the currents to bend this way and that, instead of pursuing a direct course. As the waters were deflected by one elevation, they turned off at an angle, and struck against the next opposing hight, undermining it more or less, and causing its upper series of rocks or clays to fall down to the river bed, in which they were gradually dissolved or ground together and carried away. Thus it came to pass that a double action was carried on during the thousands of years or of centuries in which these water-courses were forming. The first was downward, its action gradually decreasing as the channel approached the sea level; the second was outward at the several curves in its course, by striking against the elevated lands, which gradually became bluffs and precipices, in many cases too steep for human foot to climb without the assistance of the hands.

This centrifugal action of the waters, as it may be termed, has kept on for ages, actually increasing the length of the rivers and creeks, whose deep channels invariably lie as close on the outsides of the several curves as the masses of falling debris will permit. Boatmen and raftsmen understand this "law" thoroughly, though failing to comprehend its *rationale*. For in seeking the deepest channel downward or a shallower channel with little current upward, they steer for the concave or convex shore, as the case may be. Travelers on the Potomac, the James, or other rivers in alluvial countries, will have observed that the boat makes no short cuts at bends, having to stand out well from the shallows lying opposite to the various headlands. On the Alleghany these headlands are usually cultivated—in fact, they are the only cultivated soils on the slopes. In some cases, as at Tidioute, villages have been built upon these gentle inclinations.

Now for some of the practical lessons deducible from this explanation of the river-courses of the West. Major-General Butler undertook to force the James into a new channel at Dutch Gap, as Major-General Grant had undertaken with the Mississippi at Vicksburg. Both failed. The current refused to forsake its round-about course and seek the bed of the cut-off, or adopt any other "modern improvement." The trouble lay here: In both cases the river coming down by a pretty straight line struck a bluff a short distance above the upper end of the proposed canal. There the stream was deflected from its course, and struck off at nearly a right angle—one in the direction of another bluff (undermined) known as the Howlett House, the other against that on which Vicksburg stands (also undermined). Had the artificial channels been constructed further inland, or been so bent that their upper termini would have set up against the current of the river, as it struck off toward the opposite shore, there can be no doubt that both projects would have proved successful. In the case of the Dutch Gap work, if it had been located only two hundred yards nearer Bermuda, or if, instead of a straight course, it had adopted the serpentine, its northern entrance opening to receive the waters as they struck the bluff, the James would have rushed through it, and in the course of a few hours removed all obstructions. Yet the possibility of failure, from the cause stated, would seem never to have entered the head of military officer or civil engineer. Neither had studied the philosophy of water-courses.

Once more: There is an impression among men engaged in the oil regions, though not so strong as formerly, that river beds, headlands, bluffs, and table-lands, as such, have something to do with the discovery of oil; that, aside from the veins known to exist beneath the surface, one is more likely to succeed on the east than on the west side; close to the bluffs rather than by the streams; on the bottoms rather than on the plateaus. This is all moonshine. The first discoveries were made in bottom-lands, simply because the oil of the first sand-rocks could more easily force itself to the surface in the valleys than on the hights. As to any other distribution, it is absurd to expect it. At so much greater outlay for drilling, in the first place, and working the machinery afterward, together with the greater risk to seed-bags, tubes, pump fixtures, etc., oil can be obtained as readily on the hights as in the hollows, provided the oil veins are struck. That these are distributed pretty equally throughout what is known as the oil basin, without any reference whatever to upland or lowland, is manifest to all who have studied the physical formation of the country. In the writer's judgment, they have no connection or relation whatever to the coal-beds, which are many hundreds of feet higher geologically; while the structure of the rocks is such that it were impossible for oil, salt water and gas to have percolated downward through one thousand feet of solid rock—a depth to which fresh water is never found to penetrate without artificial channels. If we could even suppose that the oil had first worked its way downward, the gas being formed subsequently, an answer can readily be found in the fact that in the process of distillation the salt water would have become decomposed, and carbonic acid gas, instead of carbureted hydrogen, been evolved from the combination. If there is one truth more than another evident from the oil discoveries, it is that petroleum is as much an older formation than coal as coal is older than wood or peat. To comprehend it aright, we must study it from this point of view.

Correspondence

The Harrison Steam Boiler.

MESSRS. EDITORS:—Referring to your remarks on the Harrison steam boiler, published in your number of April 29th, I wish to say a word in regard to the *strength* of this boiler. In making many experiments to test the bursting strength of the spheres under hydraulic pressure, no sound casting ever gave way under *fifteen hundred pounds* to the square inch; it was not unusual for them to resist *two thousand pounds*, and this, too, when made of iron of no greater strength than the best brands of Scotch pig metal In a practical experience of several years with boilers varying from 5 to 200 horse power, explosions have never happened under any circumstances. Extreme pressure will open its joints before any thing gives way, thus making each joint a safety valve. A cracked sphere may produce a leak, but a boiler under pressure has never been suddenly emptied from such a cause. Instances have once or twice occurred where a cracked sphere has been continued for some time after the fracture was discovered, with no troublesome consequences from the leakage, and no necessity for instant repairs.

There have been but four fractures of spheres in all the boilers mentioned in the advertisement now in your journal, and in every case these could be fairly traced to special causes not connected with pressure. In my experience with this boiler, several have been *burnt*, or, in other words, rendered unfit for service for the moment by overheating after the water had fallen too low. The result in such case is obvious; spheres with no water inside and intense heat outside, are soon heated to redness and warped so much that the integrity of the joints is destroyed, causing the boiler at the injured parts to leak badly, but nothing like an explosion occurs. With great facility and little cost of time or money, the injured parts, in such a case, can be taken out and replaced by new ones, without even the use of highly-skilled workmen, after which the boiler is as good as before the accident. Some of these boilers are working daily at 180 pounds pressure to the square inch; and a good evidence of their value is shown in the fact that several parties, who have used the boiler longest in this country, have already in use, or have sent me orders for, a second one.

With this boiler on our Western steamboats, to which it can be easily adapted, such wholesale destruction of human life as took place on the *Sultana* a few days ago, *cannot possibly occur*.

JOSEPH HARRISON, JR., patentee.

Philadelphia, Pa., May 2, 1865.

Saleratus and the Teeth.

MESSRS. EDITORS:—The ground taken by a recent writer in your journal is not well founded. He asserts that saleratus or soda will dissolve the teeth or render them carious. His experiments do not prove it, though his deductions are true to a certain extent. It is true that a strong alkali will dissolve, or has affinity for, the lower part or root of the tooth, for this part of the tooth, together with lime, is composed of gelatine and albumen, which an alkali will dissolve. But the enamel is composed almost entirely of

phosphate of lime, with a small portion of earthy matter; therefore I cannot see how he can support his assertions, notwithstanding his experiments. I am satisfied, from a long study of the nature of the teeth, that acid is the only antagonist with which the teeth has to contend. The teeth are never injured by an alkali, except it comes in contact with the lower part (the roots) of the teeth—that part of the tooth usually covered by the gum; and until chemical affinities are changed I cannot be made to believe that an alkali will injure the crown, or that part of the tooth covered by enamel. No sensation is felt by the teeth coming in contact with the strongest alkali, but we receive warning of the injurious effects of acid, however weak, by setting the teeth on edge and producing tenderness.

H. E. SCHOONMAKER, Dentist.

New York, May 1, 1865.

The Best Detergent.

MESSRS. EDITORS:—There is a "washing compound" sold about the country here in which I have invested to the extent of a family right. I want to inquire of you if the component parts are injurious to clothes. It is made of sal soda, borax and lime. Having read the SCIENTIFIC AMERICAN for fourteen years past, I feel that I may be privileged to ask a question. W. C. A.

St. Louis, April 15, 1865.

[Sal soda is the carbonate of soda, and if dissolved and brought in contact with lime, it is decomposed, giving up its carbonic acid to the lime, and leaving caustic soda in solution. Soda has a powerful affinity for grease, and will remove it from cloth, but a strong solution of soda is injurious both to the cloth and to the hands. Borax is a detergent, and therefore would not be wholly useless in this mixture. The best material to be used, however, in washing is good soap. It will remove grease almost as well as caustic soda, it is the best general detergent known, and it is perfectly harmless to the cloth or hands. For full directions for making soap cheaply, see page 183 of our current volume.—EDS.

The Manufacture of French Leather.

The process employed for the tanning of cow hides is similar to that employed in the manufacture of sole leather. Instead, however, of sweating it, hot ashes are rubbed over it, but the mode in which it is prepared in France gives it a far different and better appearance. After the hides have been placed into bark three times, take them out of the vat, cut them with a knife into two parts, from the tail to the head and mark each side at the tail so that they may be easily put together again. Then rinse them in water, spread them on a tree, and strike them out with a blunt iron. If they are not previously well scrubbed, so as to be thoroughly clean, they are at this stage spread on a large tree, and over another hide, and then well grooved with a groove of fish bone. Then spread the halves on a board, with the grain upwards, and grease them slightly with pure train oil, or linseed oil mixed with a small quantity of tallow. Then hang them across poles, with the grain still upwards, and let them dry thoroughly. After they have become perfectly dry, put them into a tub, and cover them all over with clean spring water. In about an hour take them out for awhile, and then put them in again to remain there over night. They are then taken and rolled upon a strong piece of wood, beginning the rolling from the tail, with the grain inside. By this process of rolling, the claws are all beaten in. Each half makes one roll, which is strongly tied up at both ends. The rolls are now beaten with notched sticks till they attain a very soft touch. In order to perfect the softening, and at the same time to separate the attached bark fluid, crisp well with a piece of wood, and then spread them flat. It is as well to have two persons engaged in this work at the same time, as also in the operation which follows. Now lay each half on a inclined plane, either of wood or marble, which must correspond in length to the whole hide and in width to the half. At first the grain side is put downwards. Have a pail of water near at hand, in which repeatedly dip a scrubbing brush, and rub it until the flesh is quite soft, so that when touched with the finger the mark is quite visible. Then turn the hide with the flesh side to the board, adjusting the back exactly to the edge of the board; press it over with the hand to make it stick to the board, and then rub it with the brush as before. It is now slightly smoothed over with a smoothing iron, in order that formed folds may not remain permanent. First, the back is smoothed, then the down part of the claws. After the folds are perfectly removed, the pressure may be applied with greater force for the removal of the bark pits.

As soon as one-half is smoothed, hang it in the drying loft, and if it is so high as to admit its hanging lengthwise without touching the floor, nail the claws and tail to short, strong pieces of wood, or make slits and put the sticks through, and fix them between two strong poles. But if the loft is low-roofed, then nail the back part to straight, strong poles, hang the poles up, and bind up with strings the tail and claws, so that they cannot hang down and form folds. Should the hides be too much withered by the air, then put each of them on the board, wetting the withered places well upon both sides. Do the same with the other hides, and lay them one upon the other, and pack them all together for a while. Then take the one first wetted again on the board; put the back part upon the edge, and fasten in with some wooden braces. These must be removed after a short time. The hollows caused by the bark and the deposits within them are now pressed out, and the hide is rubbed over with a damp woolen rag, and is again hung up. Before they are completely dry, fit the two halves together, and place them one upon the other, grain to grain, flesh to flesh, till they have formed a pile. Then put some planks upon the top, and a weight. Leave them for 12 hours, and then hang them on poles, cross-ways, till they are dry. After that they may be rolled up, each by itself, or five together, and then bound up with strings.

It must be observed that all the above work must be carefully performed, with the utmost regard to cleanliness. Leather manufactured as above answers all requirements, and in beauty and quality surpasses the Franktort leather. The French term it *vachen* leather.

Reduction of Government Expenses.

The Government is proceeding vigorously in the work of retrenchment. A number of ships hired on contract have been discharged in Washington, Philadelphia and New York. A large number of sailors have also been discharged. At the Springfield (Mass.) Armory orders have been received by Major Laidly announcing that the daily product of the armory would within ten days or two weeks be decreased to two hundred and fifty guns, thus necessitating the discharge of about nine hundred more men. This will leave between nine and ten hundred, or only one third the number employed when the armory was busiest and turning out nearly or quite one thousand guns per day. No machinists will be discharged, as they will soon be needed on the preparations for the new breech-loader. The fortnight's notice is gvien the men so that they can have an opportunity to obtain work elsewhere, and all who can are advised by Major Laidly to do so. No further diminution of the working force is apprehended for the present, at least. All the men previously discharged but not fully paid, will be paid to-day up to the day of leaving, as the long-expected funds have arrived from Washington. As soon as the discharged men are paid, payment will begin for February to those remaining. The exact number of muskets in the arsenal is now 333,924.

Major-General Meigs, Quartermaster General, has issued an order requiring all the department officers and agents to forward to headquarters special reports of the number of persons employed, and the quantity and value of the supplies stored at the respective depots, and the means of reduction. They are also required to give an estimate of the stores necessary for a three month's supply, and the disposition recommended to be made of the balance, whether by sale, transfer, or otherwise.

Within a few weeks the Government expenses will probably be reduced to the extent of a million a day. A hundred million of dollars will be paid out to discharged soldiers and sailors during the current month.

IT takes two thousand feet of lumber to make a freight car. A well-built platform car is worth $1,000.

Ship-building in Philadelphia.

At the ship-yard of Mr. John W. Lynn, foot of Reed street, a handsomely modelled brig, of 600 tuns, is on the stocks, which will be launched shortly. She is to be called *Henry and Louisa*, and is being built for the firm of Henry Becker & Co., of New York City, and is destined for the West India trade. The vessel will be launched full-rigged, which will be a novelty in these parts. Last season Mr. Lynn built a large steamship for a Baltimore house, and a steamship previously for a New York firm, all showing that the reputation of Philadelphia shipwrights has extended to other cities. Besides the brig there is a large steamship on the stocks of about 1,700 tuns, built for Messrs. E. A. Souder & Co., of this city. This will be about the best steamship ever constructed for commercial purposes at this port. Her length is 250 feet, beam 38, and 26 feet depth of hold. She is destined to trade between New York and New Orleans. It is expected that she will be ready for launching in about two months.—*Ledger*.

[Mr. Lynn is the patentee of a remarkably fine machine for sawing out ship timber, and is in every sense a first-class mechanic. We have had at our office a number of his inventions, all of which are both ingenious and practical.—EDS.

Constitution of Steel.

The *Mining Journal* says:—The Royal Academy of Sciences of Belgium has awarded the gold medal proposed to be given to the author of the best work on the Constitution of Steel to Capt. Caron, so well known for his researches on this subject. M. Stas, the principal of the persons appointed to examine the essays, in commenting on Capt. Caron's work, expresses his own entire concurrence in his opinion, that iron in passing into the condition of steel does not take up any nitrogen in addition to that which it originally contained. Steel, he says, is essentially composed of iron and carbon, and owes its qualities or its defects to two different causes—the state of the carbon in the metal, or the nature of the foreign bodies which debase it. Whenever steel is good its carbon can, under the influence of tempering, combine with the metal, and gives us a hard, brittle metal, which further tempering renders supple and elastic. When steel becomes bad after undergoing several heatings it is due to its carbon having been burnt or separated from the iron, and tempering will not then regenerate the combination. This separation is due to the presence of foreign bodies, more especially silicium. These bodies also give to the metal defects varying with their nature and the impurities they contain.

The Maple-sugar Season in Vermont.

The sugar harvest in Vermont is just ended. The flow of sap was about an average, though greater than that of last season. Sugaring came on early and in earnest—taking most of our sugar-makers unawares. Sap began to flow about the 18th of March, and continued for 12 or 14 days in succession, affording an extraordinary and almost unprecedented run. The most and the best sugar of the season was made during these two weeks. The sugar made is of unusual whiteness, nearly as fair in many instances as the "coffee crushed" of foreign manufacture. This is owing in part to the continued flow of sap for days in succession (nights of course excepted,) thus preventing sourness in the tubs, and to the absence of storms, so that the sap has been free from rain and snow water, either of which very much injures the quality of the sugar.

The sugar season has been "short and sweet," four weeks scarcely intervening from first to last.

THE following should have been published in our issue of May 6th, in connection with the illustration of the "Improved School Settee:"—Three patents have been obtained through the Scientific American Patent Agency on the above articles of school furniture, dated respectively Sept. 29, 1863; Oct. 13, 1863, and Nov. 15, 1864. For further particulars address Jas. Monteith, Washington Hights, New York City, or D. I. Stagg, No. 15 Morton Street, New York City.

WHITEWASH.—Whitewash is not only one of the cheapest and easiest modes of rendering rough woodwork sightly, but is also a capital reflector of light, so that all dark passages, alley-ways, stairs, workshops, etc., are greatly improved by coats of it.

Breech-loading Rifle.

If the Government does not decide to adopt breech-loading weapons, it will not be for lack of variety to choose from; for, during the last few years, inventors have been active in this field, and very many breech-loaders of different patterns and principles of action are the result.

The gun here shown is of that class provided with magazines from which continuous rounds of ammunitions are forced out by springs or equivalent devices.

Fig. 1

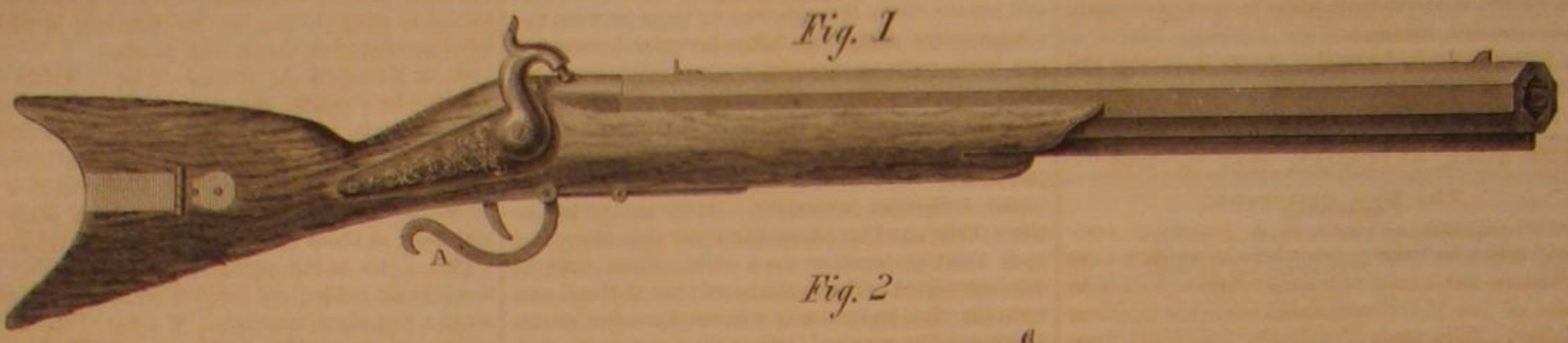
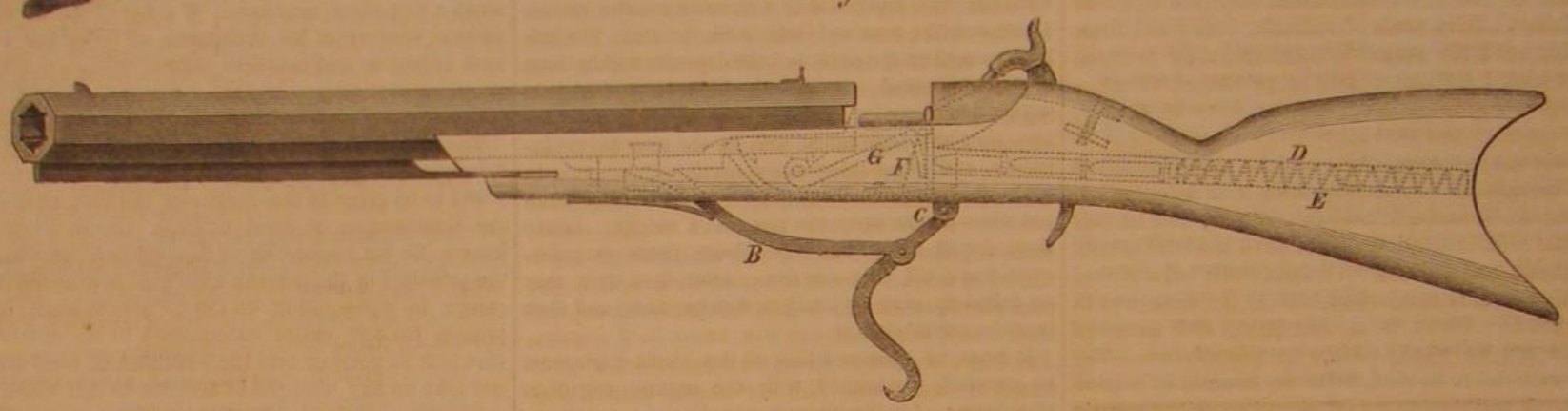


Fig. 2



ROBERTS'S BREECH-LOADING RIFLE.

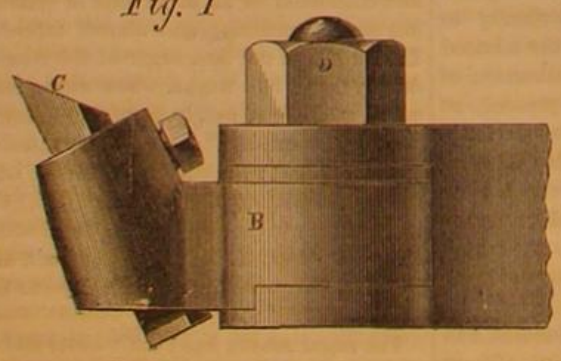
This weapon is peculiar in some details, one being that the barrel is removed from the breech piece in order to insert the charge instead of the reverse, as is generally the case. This action is obtained by working the lever, A, which is connected to the barrel by a bar, B. This bar being fastened to a lug, C, causes the barrel, when the lever, A, is worked, to be thrown forward; when the lever is reversed and brought close up to the under side of the stock, the barrel is firmly held up to the breech pin and magazine, so that no leakage of gas can occur.

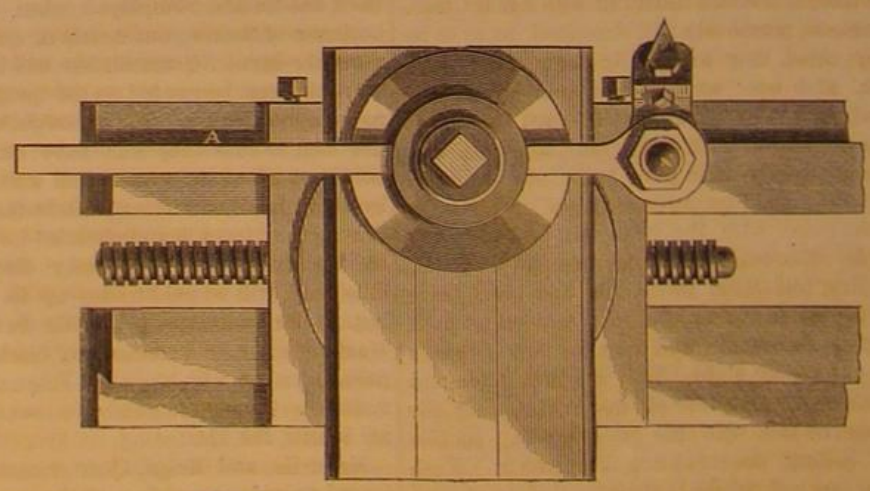
Fig. 2 shows the magazine, D, in dotted lines, as also the spring, E, which forces the cartridges up to the jaw, F; this jaw, in connection with the cam lever, G, guides the cartridges and elevates them to the level of the bore of the weapon. It also serves to expel the empty shell of the cartridge when the charge has been exploded and to prevent the premature issue of the charges from the magazine. These details comprise the whole of the weapon, and it is both simple in design and cheap to construct. The inventor is a soldier in the Army of the Potomac, and his practical experience and observation have guided him in designing this rifle. It can be used with fixed or loose ammunition as emergency requires. It was patented through the Scientific American Patent Agency on the 27th of Dec., 1864, by R. Roberts; for further information address him at Utica, N. Y.

Improved Tool Holder.

Lathemen, who work metals, are well aware that boring tools sometimes require to be made very long —to reach through a pulley, for instance, or a fly-wheel with a deep boss. For such work, a bar is generally provided with a square hole in one end, to which is fitted a short cutter. This bar is not adjustable, except in its length, and the cutter in it can only be used at right angles. The accompanying engravings represent a useful improvement in this class of tools, which adds very much to their efficiency. The change consists in simply furnishing the bar, A, with a short joint, B; this joint is formed into a socket at one end in which the cutter, C, is set and held by the set screw. This arrangement permits the tool to be moved at any angle and there secured, and will save much time in grinding the same, for it frequently happens that more has to be cut off one end of the hole than the other, owing to the draft on the core, so that the tool binds or strikes sideways, unless unusual clearance is given; by running the tool-post carriage back, and setting the cutter on one side, this difficulty is obviated, and the work can proceed. It is also applicable to planers or other machines, and in working around the hubs of rock-shaft arms or cranks, it would be very useful. By tightening the nut, D, the joint can be secured in place. A patent on this tool bar was procured Feb. 21, 1865, through the Scientific American Patent Agency. For further information address the inventor, Chas. Pelet Benoit, Detroit, Mich.

Fig. 1





BENOIT'S TOOL HOLDER.

SECRET PLANS FOR EXTRACTING GOLD.

The writer of this once saw in Marysville, California, a New York baker who had sold out his ovens and wagons in this city to purchase and practically apply a secret process for extracting gold from quartz by melting the rock. He had tried the plan and was describing the result. He had succeeded in melting the quartz, but was astonished at the intense heat required.

"When the rock cooled," he said, "it looked just like glass!"

We remarked that the secret probably consisted in using potash, as glass is made by melting together silex and potash.

But the man, having paid solid money for the secret, did not choose to continue explanations which might lead to its more complete revelation.

At the present time there are a great many men in this city who are dabbling in mining stocks and mining adventures of all sorts. Priding themselves on their keen shrewdness, they are the most fit subjects for sharpers, and are constantly making large losses, which they conceal insilent mortification, while their occasional lucky speculations are sure to be generally made known.

Not long since a quiet individual from the country was mysteriously intimating among these eager speculators that he had a secret for dissolving gold from crushed quartz, in place of extracting it with mercury in the usual manner, by which the yield could be very largely increased. After considerable negotiation, and after showing one of the shrewdest and most cautions of the speculators that the liquid would actually dissolve gold as completely as water will dissolve salt, he sold the secret for $500, cash in hand. It was not long before the lucky purchaser found that he had paid $500 for a receipt for making *agua regia*, a receipt to be found in every hand book of chemistry, which could be purchased for $1.

In nearly every case where a secret is offered for sale it is either something well known to those familiar to the art, or it is a plausible novelty, which for some reason is impracticable and worthless.

Coffee in Pods.—An exchange, noticing the fact that coffee had been raised in this State, says, "it was planted in rows similar to peas, and the berry was contained in pods in the same manner." Coffee does not grow in pods, but in berries, of which the kernel, or the pit, as it might be called, is the berry. Coffee on the tree looks much like a cranberry or cherry.

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VOL. XII. NO. 20...| NEW SERIES. |.... *Twentieth Year.*

NEW YORK, SATURDAY, MAY 13, 1865.

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PURIFICATION OF LUBRICATING OIL.

Oil for lubricating purposes is very high at the present time, and should be carefully used. Much of it is not only lost by improper use, but is actually thrown away by persons who are too reckless or naturally too wasteful and regardless of their own property to take any care of that belonging to others. It is a little singular that men who are thought unfit for higher positions are generally made to oil the shafting in factories, where they can waste a gallon every day by slovenly and stupid use of it.

When oil is poured on a bearing, if the shaft be in motion, it takes up a supply enough to cover the surface, while the superfluity runs off at the nearest outlet. If there happens to be a drip pan underneath the hanger, the oil is caught, and when the pan gets full, the contents are summarily thrown out of doors into the nearest waste hole.

Although much of this oil is full of metallic dust, the result of wear, that does not prevent it from being used again when properly treated to remove the foreign matters. This can be done so simply and so easily, that we think much economy to manufacturers will result from the adoption of the following process:—

When the oil is taken from the drip pan, it should be poured off carefully, so that the heaviest part of it, which settles at the bottom, may be treated separately. The lightest or upper portion should be put in a vessel and heated gradually to a little below the boiling point of water. From this vessel it should run through flannel, to filter it, which will remove the finest metallic dust held in suspension by the oil. From this filter the oil will come out semi-transparent, but in a great measure free from the grosser impurities. A filter of *animal* charcoal, or coal made by burning bones, should then be used, which will detain the dirt that still remains behind, and render the oil fit for use again for most purposes.

Oil thus treated will not have the bright and clear appearance of that bought in barrels, but it will be very good, and may be used over and over again with comparatively small waste. Animal charcoal can be had of all wholesale druggists.

For large works, it would be profitable to have a place prepared particularly for the object of purifying the waste oil by the means above described. Other and more complicated processes are employed by refiners to extract impurities from oils, but they are obviously unsuited to persons not acquainted with chemical changes and affinities, and would be useless to our readers. We do not see why it would not be a profitable scheme for those versed in such matters, to collect the waste oil from drip pans and render it pure again for a small sum per gallon. It is not only the spent oil which falls into these drip pans, but that lavishly poured over the hanger by the oiler, so that the contents are very different from common slush. The process above described has been tried on a large scale and is not a mere experiment.

GOOD WILL.

Among the many contrasts between aristocratic and democratic communities, one of the most important in its effect upon human happiness is the great difference in the degree of sympathy between individuals who chance to be in different positions or pursuits.

One of the most impressive pictures in the Dusseldorf gallery was that representing the grinding tyranny in which the poor weavers of Silesia are held by their employers. The famous poet, James Hogg—the "Ettrick Shepherd"—was invited by some of the nobility of England to visit them at their houses, and he said that while, in directly addressing him, they were perfectly polite, he could see, in their talking with each other, that they regarded all those belonging to the non-noble classes as an entirely distinct people—as distinct as the planters in our Southern States regarded their negro slaves. No one can come in contact with any portion of English society without perceiving that it is pervaded with this sentiment of class. The universal feeling is, that persons should be taught to know their place, and that they should not attempt to rise above their position. The desire is quite as strong to keep others down as to get up themselves. This is seen even in their charities, which take the form of alms-giving, and degrade the recipients.

On the other hand, in democratic communities, the general spirit is to give every man a free chance to rise just as high as he can; and even in many cases to give him a friendly lift upward. How uniformly have the great sums, so lavishly given away in this country, been directed to elevate in the scale of humanity the least favored portions of the community! See the wealth of the country everywhere voluntarily burdened with a heavy tax to provide free schools for the children of all. See the Cooper Institute, in this city, with its magnificent reading-room and its admirable lectures, free to all comers. See the Astor Library, the Lawrence Scientific School, and hundreds of similar establishments scattered over the country, all designed to aid the poor and friendless in elevating their nature and position.

Along with this kindly feeling their is one also of mutual respect. Generally the native born American who employs men in his manufactory or his business, looks upon them as fellow citizens, and not as hostile and degraded enemies. He has an instinctive consciousness that the practice of petty tyranny is degrading to the one who practices it, as well as to the one upon whom it is inflicted; and that there is infinite dignity in the observance of manly courtesy towards all with whom he has to deal. There is also a quiet self-respect among workmen, in striking contrast with the extreme severity generally observed abroad.

We have sometimes thought that the rapid growth of wealth, the increasing congregation of people in large cities, and the influence of foreign immigration, both of employers and employed, were tending to build up a hostile class-feeling in this country; but it is probable that these influences are more than counteracted by those of an opposite tendency—that the steady growth of democratic principles, the equality of all men before the law, popular suffrage and free schools, are spreading more and more widely among the millions of our people the spirit of universal good will.

STARCH AND SUGAR.

One of the principal ingredients of grain, seeds, roots and tubers, is starch. It is found more or less in all plants and trees. Nearly four-fifths of the solid part of the bread we eat is starch.

Mix common flour and water; strain through muslin; the milky strained fluid contains starch, which soon settles as a white powder. Rasped potatoes yield starch in the same manner. The substance remaining upon the muslin, after straining, is gluten, which gives cohesion to the flour in bread.

Water does not dissolve starch, but the granules absorb water, causing them to swell and unite into the form of a jelly. It is this swelling of the starch in rice, beans, peas, etc., that causes this enlargement during cooking.

If roasted to a yellowish brown color starch is so changed as to be soluble in water, and is then called dextrine, which is extensively used to thicken colors by calico printers; also by confectioners in making fig paste and other sweet compounds.

To make sugar out of starch heat it hotter than for dextrine; then make it into paste with water; then gradually add a small quantity of water slightly acidulated with sulphuric acid; then boil till transformation is complete, the result being sugar sirup. To remove the acid, add slaked lime, filter, evaporate the sirup, and you have grape sugar. An infusion of malt may be used instead of the dilute acid.

As a sweetener, cane sugar is far superior to grape sugar—1 pound of the former is equal to 2½ pounds of the latter. But the manufacture of grape sugar is so easy that it is extensively used in Europe to adulterate cane sugar.

Grape sugar can be readily made from cotton and linen rags, and also from saw-dust; 5 pounds of poplar wood will yield 4 pounds of grape sugar.

Chemical research indicates that starch and wood ought to be more easily converted into cane sugar than into grape sugar, but no method of making cane sugar from the above substances has yet been discovered. Such a discovery would be of immense value. Here is a grand subject for invention.

SAFES.

English business circles are just now agitated over the success of burglars in breaking into their strong boxes and rifling them of their contents at short notice. The principal agents used by the rogues in effecting an entrance are wedges. These are made of steel drawn down as thin as a knife edge at the point and very slow in taper; a small crevice where the door shuts in is sufficient to enter the wedge, when a few blows of the hammer and the subsequent insertion of stronger wedges forces the crack open so far that a crowbar can be used, and the door is wrenched open in a twinkling.

Simple though it may appear, the construction of safes which are thief and fire proof has involved much thought and kept a great deal of capital employed. The expedients adopted to secure both ends are various and need not be adverted to in detail since the citation of them would be tedious. Chilled iron safes have been proposed and are now in use in many cases, but these, although proof against a drill, are not against a sledge or percussive force of any kind. Steel plates alternately interposed between wrought or chilled iron have also been used, and are good defenses against drilling, for the time required to soften a hardened steel plate, so that a drill would cut it, is too great and too tedious to be undertaken by burglars.

Moreover thieves are not the class of men who are fond of industry, as a rule. If a sufficient reward is set before them they strain every sinew to win it in the shortest time, but with a limited prospect of success not many steel-plate safes will be drilled or softened by a blow pipe, as a foreign contemporary suggests they may be, at the point of attack.

Safes with small balls placed beneath the exterior plates have been invented, the idea being that when the drill penetrates the outer sheet the point striking one of the balls causes the latter to turn so that any penetration is impossible. So far as drilling is concerned there is a possible barrier to it, but a hole once made in the outside affords an entrance for gunpowder, so that in this respect such safes are extremely vulnerable. Besides when a hole is drilled in the outer plate the balls might be taken out.

The principal modes of rifling safes in this country is by this latter method—powder; and as yet we have had but little loss from bursting or prying open safe doors. As ill news travels fast, the success of thieves across the sea, in breaking open safes in the manner previously spoken of, will soon reach members of that ancient but not honorable profession here; we should

be glad to know that our safes are free from danger in this respect, as inspection of many of them convinces us that a few blows would do the business for them effectually.

THE CIRCUMLOCUTION OFFICE.

The great fiction writers of modern times have become popular not merely by their forcible imaginations and power of description, but by taking some public wrong and making it clear and plain before men, so that the correction comes naturally and necessarily; in so doing they have wrought great good. Charles Read, in his latest work, "Hard Cash," unmasked the iniquities of private mad houses. Thackeray held the mirror up to society; and Dickens, the great master, has rebuked official imbecility and dilatoriness scathingly.

In none of his works is his caustic and vigorous criticism more noticeable than in "Little Dorritt," where he speaks of the Circumlocution Office. Possibly a parallel might be found to it in this country, and many Daniel Doyces among our inventive friends. He says, in relation to the trial of an invention for the Government:—

"Mr. Clennam, will you do me the favor to look at this man? His name is Doyce—Daniel Doyce. You wouldn't suppose this man to be a notorious rascal, would you?"

"I certainly should not." It was really a disconcerting question, with the man there.

"No. You would not. I know you would not. You wouldn't suppose him to be a public offender, would you?"

"No."

"No. But he is. He is a public offender. What has he been guilty of? Murder, manslaughter, arson, forgery, swindling, house-breaking, highway robbery, larceny, conspiracy, fraud? Which should you say now?"

"I should say," returned Arthur Clennam, observing a faint smile in Daniel Doyce's face, "not one of them."

"You are right," said Mr. Meagles. "But he has been ingenious, and he has been trying to turn his ingenuity to his country's service."

[And after the hearing was finally granted, Mr. Dickens says] :—

How, after interminable attendance and correspondence, after infinite impertinences, ignorances, and insults, my lords made a minute, number three thousand four hundred and seventy-two, allowing the culprit to make certain trials of his invention at his own expense. How the trials were made in the presence of a board of six, of whom two ancient members were too blind to see it, two other ancient members were too deaf to hear it, one other ancient member was too lame to get near it, and the final ancient member was too pig-headed to look at it. How there were more years, more impertinences, ignorances and insults. How my lords then made a minute, number five thousand one hundred and three, whereby they resigned the business to the Circumlocution Office. How the Circumlocution Office, in course of time, took up the business as if it were a bran new thing of yesterday, which had never been heard of before; muddled the business, addled the business, tossed the business in a wet blanket. How the impertinences, ignorances, and insults went through the multiplication table. How there was a reference of the invention to three Barnacles and a Stiltstalking, who knew nothing about it; into whose heads nothing could be hammered about it; who got bored about it, and reported physical impossibilities about it. How the Circumlocution Office, in a minute, number eight thousand seven hundred and forty, "saw no reason to reverse the decision at which my lords had arrived." How the Circumlocution Office, being reminded that my lords had arrived at no decision, shelved the business. How there had been a final interview with the head of the Circumlocution Office that very morning, and how the Brazen Head had spoken, and had been, upon the whole, and under all the circumstances, and looking at it from the various points of view, of opinion that one of two courses was to be pursued in respect of the business: that was to say, either to leave it alone for evermore, or to begin it all over again.

"Upon which," said Mr. Meagles, "as a practical man, I then and there, in that presence, took Doyce by the collar, and told him it was plain to me that he was an infamous rascal, and treasonable disturber of the Government peace, and took him away. I brought him out at the office door by the collar, that the very porter might know I was a practical man who appreciated the official estimate of such characters; and here we are!"

DEATH OF DR. MOTT.

Valentine Mott, M.D., LL.D., died at his residence in this city on the 26th of April, in the 80th year of his age. Dr Mott was the most eminent of American surgeons, and his operations have never been surpassed in any part of the world. He was born at Glen Cove, Long Island, on the 20th of August, 1785, being descended from an English family that settled on the island in 1667. After studying medicine in this country he went to England and finished his studies under the tuition of Sir Astley Cooper. In 1809 he commenced the practice of his profession in the city of New York, directing his attention especially to surgery, in which he rose very rapidly to the highest position.

His first great achievement was in 1816, when he successfully performed an amputation at the hip joint. In 1818 he performed the difficult and delicate operation of placing a ligature around the bracheocephalic trunk or arteria innominata, only two inches from the heart, for aneurism of the right subclavian artery. This was the first operation of the kind in history, and the patient lived twenty-six days after. When Sir Astley Cooper heard of this wonderful achievement of his pupil, he remarked:—"I would rather be the author of that one operation than of all I have ever originated." This great triumph has since been imitated only by the first surgeons of the world.

His operation on the great arteries were unparalleled in the annals of surgery. He tied the common carotid forty-six times, the subclavian seven times—every one of them successful; the external iliac seven times—four successful—and the femoral fifty-two times; cut for stone one hundred and sixty-five times, and amputated nearly one thousand limbs. In 1827 he tied the primitive iliac artery. It was the first time this operation was performed in any country, and was perfectly successful. The subject of it, in 1856, was still living, his life then having been extended nearly thirty years. From 1818 to 1824 Dr. Mott performed a variety of original operations on the jaws, both upper and lower, which mark a distinct era in the annals of surgery. On the lower jaw he has performed sixteen capital operations—in four instances removing the bone at its temporo-maxillary articulation. On the 17th of June, 1827, he extirpated the entire clavicle for osteo-sarcoma, which is altogether the most formidable undertaking in surgery. This operation originated with him, and has been performed but twice since—once by Warren, of Boston, and once by Travers, of London. The subject, a distinguished clergyman of the South, was still living a few years before the rebellion.

He was the author of a number of medical works, and had a great many honors conferred upon him by learned societies at home and abroad.

THE MANUFACTURE OF CHEAP JEWELRY.

PROVIDENCE, April 23, 1865.

MESSRS. EDITORS:—Through the politeness of Mr. Steere, of this city, I have had an opportunity of visiting his large manufactory of rings, pins, bracelets, and other ornaments, and purpose in a few words to lay the principal processes before your readers in the clearest manner possible.

MIXING THE METALS.

The first step is to make the proper alloy. In former times the gold was procured by drawing a check on the bank where the proprietor of the works had a deposit, and marking it "gold," when the amount came in double eagles. Now coin is purchased at the current rate of premium, whatever that may be. Two or three hundred dollars of coin is placed in a crucible, with the proper proportion of copper and silver, and melted. Mr. Steere remarked, smiling, that they use no more gold than is necessary, still that they do use some may be inferred from the fact, that a few years since the man employed at his works in melting had abstracted $20,000 of it before the theft was detected.

ROLLING.

The next step is to roll the alloy down to the thickness required for the work. To illustrate this operation, Mr. Steere took a nickel cent from his pocket and presented it to the rollers, but they refused to draw it in till he dipped the edge in spirits of turpentine, thus increasing the friction, when it was instantly drawn through. It was *elongated* into an oval form, and by repeated passages, the rollers being screwed more closely together each time, it was drawn to a length of six or eight inches in a direction transverse to the rollers, while its width in a line parallel with their axes was hardly increased at all.

STRIKING UP.

The pieces are next cut from the plates of metal, generally by a punching process, and where anchors, crosses or other figures are raised on them, this is done by striking up. A steel die has the figure formed in it by the usual method of die-sinking, and a corresponding figure is raised upon a steel bed or anvil, the upper die being attached to the lower side of a heavy mass of iron which is secured between two vertical slides. The workman raises the heavy mass of iron with the die which is attached to it, lays the bit of thin alloy on the anvil, and lets the upper die fall upon it. The blow presses the thin plate of metal between the dies, imparting to it the figure which is engraved upon them.

When the figure is very much raised, it is impossible to produce it at one blow without breaking the metal. In this case it is necessary to employ two or three pairs of dies, raising the figure partially in the first, and completing it in the last.

SOLDERING.

At a long bench running down one side of the shop, opposite a row of windows, were seated some 20 or 30 high-priced workmen, engaged in putting together the fashioned pieces of metal and finishing the articles. One man was soldering rings. He had about two dozen placed in small slits in a plate, so as to hold them conveniently, with a little solder and borax on the joint to be soldered, and with a blowpipe in his mouth he was directing the tip of the flame upon one ring long enough to melt the solder, when he moved the plate so as to bring another ring under the flame.

FINISHING.

Some of the workmen were soldering stones into breastpins, and others were putting the final polish to the ornaments. After this they were packed in cases and laid away in massive iron safes. Mr. Steere took from one of these safes a lump of gold weighing perhaps four ounces, and stated that it was absolutely pure, having been reduced from the chloride. Its color was the clear yellow characteristic of pure gold.

During the first two years of the war the manufacture of this class of jewelry was almost wholly suspended, but within the last two years the business has been resumed, and large quantities are now being made and sold.

Dickerson's Boiler.

The steam boiler of Mr. E. N. Dickerson, of this city, of which we gave an illustration on page 51 of the SCIENTIFIC AMERICAN, current volume, and on which there has been considerable discussion among engineers, is coming into use rapidly, and, from inquiry, we find that our principal engineering firms and engineers speak of it with great favor. The results obtained by this boiler are remarkable in point of economy and efficiency. It is also so compact in form that a boiler of 10-horse power is but little larger, externally, than a common dry-goods case, while, for accessibility and ease of examination, it is most conveniently arranged.

This boiler does not work on any miraculous principle, but simply brings the water in contact with hot iron, where it ought to be. In other words, by rapid circulation of the contents the heat is not only taken up from the surfaces through which it passes, or impinges against, but the mechanical disengagement of the steam from the water is very much facilitated from the same cause. This latter point is one of importance in the rapid production of vapor. We look upon this boiler as a great improvement in steam generators, and are pleased to know that many of them are now in use and being made; as also to accord Mr. Dickerson the credit of having obtained a result he has so long labored for.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Photographic Picture Holder.—This invention consists in a revolving or movable cylinder or prisma the surface of which is divided off into a large number of parts, each capable of holding a photographic or other picture of that size generally used for photographic picture cards or of any other desirable size, in combination with a movable or stationary case surrounding said movable cylinder and provided with windows corresponding severally in size and position to the several tiers of panels in the cylinder in such a manner that, by revolving or moving said cylinder or case, several rows of pictures, one after the other, can be brought opposite the observer, and a large number of pictures can thus be exhibited in a simple and convenient way. James Bucket, of Harlem, N. Y., is the inventor.

Improvement in Fifes and Flutes—The object of this invention is to produce a fife or flute which is so constructed that it serves to play on two or more keys, This object is effected by the application of a revolving finger piece with one or more sets of finger holes, in combination with a long slot extending through the main barrel, in such a manner that by turning the finger piece different sets of finger holes can be brought into action, and the fife or flute is lengthened or shortened for different keys. The length of the barrel is still further adjusted by the use of an adjustable mouth-piece, which is made to slide up or down on the main barrel, said barrel being provided with an oblong hole, so that, by sliding the mouth-piece up or down, the communication between its mouth-hole and the interior of the barrel is not interrupted. The plug which stops up the end of the barrel close over the mouth hole, is connected to the sliding mouth-piece, so that by adjusting said mouth-piece the plug is also adjusted. A. H. Stratton, 31 Maiden Lane, New York, is the inventor.

Pump for Deep Wells.

We call attention to the pump patented by Kingston Goddard, of Philadelphia, Pa., on the 11th of April, 1865. This pump is said to be very efficient, and appears to utilize, in the best manner possible, a given weight of metal in the production of a pump rod for deep wells. The piston or pump rod is tubular, and is lightened by the removal of portions, leaving openings, which do not materially detract from its efficiency in other respects.

How is it Done?—A foreign exchange mentions a magic toy figure of a man which, when on the ground, immediately commences dancing in perfect time to any tune, astonishing all present, and defying detection. It is sold at 6 pence and 1 shilling, English money. They have also a donkey which dances on a similar principle. Inventors on the watch for novelties for the holidays should look into this subject.

TO OUR READERS.

Patent Claims.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

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47,507.—Churn.—Charles T. Anderson, Clarksburg, Md.:

First, I claim the combination of the rod, C, arm, D, link, G, and handle, H, the parts being so arranged that the motion of the handle will be transmitted to both the bellows and dasher, substantially as set forth.

Second, In a churn of the description herein given, I claim the pin, g, and perforations, d, employed as and for the object specified.

47,508.—Letter Envelope.—James G. Arnold, Worcester, Mass.:

I claim cutting envelope blanks, in the manner and for the purposes substantially as set forth and described.

47,509.—Sick Chair.—Charles H. Bagley, Waltham, Mass.:

I claim the sliding box, B, provided with the lid, H, and hole, G, in connection with the vessel, K, cover, L, slide, I', and the bar, J, provided with the slotted arm, N, all arranged in connection with a case, A, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved sick chair, designed for bed-rooms, and constructed and arranged in such a manner that all unpleasant odor or smell is effectually prevented from escaping therefrom, either while the device is in use or when closed, and the chamber also prevented from emitting any unpleasant odor while being removed from the chair.]

47,510.—Manufacture of Steel.—Julius Baur, Brooklyn, N. Y.:

I claim the above-described process, consisting of combining aluminum with iron in the manufacture of steel, substantially as set forth.

47,511.—Evaporating Pan.—George Bez, Mokena, Ill.:

I claim the combination of fire and steam pans and pipes, as herein set forth and shown, for evaporating sirups.

47,512.—Sofa Bedstead.—Elijah Brady, New York City:

I claim the combination and arrangement of a sofa with the bed and drawer, substantially as described, for the purposes specified.

47,513.—Shoe Lacing.—Mellen Bray, Boston, Mass.:

I claim the employment of staples, arranged in opposite pairs, each pair overlapping or interlocking, in combination with a cord, string or wire, or other such flexible or non-flexible locking device.

47,514.—Corn-planter.—Joseph T. Bryan, Lebanon, Ind.:

I claim, First, The arrangement of the boxes, H H, with their slides, I I, and apertures, d d, the cross pieces, b b, bar, J, lever, K, and tubes in front-shovel-posts, P P, in combination with the plows, Q Q Q Q P P, and set piece, F, for hilling.

Second, The attachment of the rods, R R, to the machine, for the purpose of plowing and planting corn.

47,515.—Photographic Picture-holder.—James Buckett, Harlem, N. Y.:

I claim, First, The movable cylinder or prism, A, or its equivalent, containing a series of panels, b, in combination with a movable or stationary case, B, constructed and operating substantially as and for the purpose set forth.

Second, The bay windows applied to the case, B, in the manner and for the purpose substantially as described.

47,516.—Machine for Printing Hats.—Thomas Byrne and Thomas Henry, New York City:

We claim the employment or use of the conical printing roller, F, in combination with a suitable pattern roller, B, of any desirable form or shape, and with a mechanism for supplying color, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use of a conical printing roller, in combination with a suitable pattern roller, to which color is supplied by an endless apron or other mechanism, in such a manner that hats and other articles secured to the conical printing roller, and revolved with it, are brought in contact with the pattern rollers, and continuous stripes or other designs can be produced on said hats or other material, with little loss of time.]

47,517.—Picker Motion for Looms.—John Cady, Staffordsville, Conn.:

First, I claim the stop, L, constructed and fastened to the bed, H, in the manner substantially as above shown.

Second, I also claim making the bed, H, of a concave form, by means of adjustable ends or inclined planes, substantially as described.

Third, I also claim the mode substantially as above described of attaching the picker staff and its strap to each other, and to the shoe, C.

Fourth, I also claim forming longitudinal grooves, o, inclining in the direction shown on the periphery of the part, q, of the box, Q, for the purpose of lubricating its axis, substantially as shown.

Fifth, I also claim the notched flanch, M', of the part, q, of the box, in combination with the key, f, substantially as above described.

Sixth, I also claim arranging the slot, g, in the bed, H, which receives the key, f, so that the box and its axis can be lubricated from above the said bed, substantially as described.

[This invention consists in a novel mode of constructing and operating the devices which guide the motions of the picker staff.]

47,518.—Seeding Machine.—Cyrus C. Carter, Exeter, Ill.:

I claim, First, The adjustable tubes, C, fitted in the turining axle, A, and provided with the funnel, G, in combination with the seed-box, E, provided with the reciprocating slide, H, having the pendant plates, i, attached, and the perforated plates, g h, all arranged to operate as set forth.

Second, The combination of the adjustable tubes, C, turning axle, A, seed-box, E, provided with the slides, f g h, the scattering board, M, and the spring lever, K, and notched bar, L, all arranged substantially as set forth.

[This invention relates to a new and improved machine for sowing seed broadcast and in drills, and it consists in a novel arrangement of parts, whereby it is believed many advantages are obtained over the ordinary machines in use.]

47,519.—Horse Rake.—P. S. Carver, Honeoye Falls, N. Y.:

I claim inclosing the pawls, H I, in the groove, b, of the joint rim, D, by means of the strap, G, in such a manner as to prevent obstruction, said strap also serving to form the joint and retain the parts together, and used in connection with a single handle, E, the whole arranged, combined and operating substantially as and for the purpose herein set forth.

47,520.—Coupling for Thills.—E. D. Clapp, Auburn, N. Y.:

I claim the thill iron, constructed in two parts, and with conical perforated bearings, the said two parts being pivoted together and made to overlap one another under the thill, in combination with the clip iron, constructed and arranged as described, all operating in the manner and for the purpose set forth.

47,521.—Boot and Shoe.—George P. Clark, Brooklyn, N. Y.:

I claim inserting within or attaching to the sole and heel of a boot or shoe, or in and to any desired portion of the same, a series of elastic studs or projections, made of any suitable flexible and elastic material, and of any desired number, size and shape, substantially as described and for the purposes specified.

[This invention consists in fastening within the sole or treading surface of a boot or shoe, a series of projecting elastic india-rubber or gutta-percha studs, the principal object of which is to give an elastic, light and soft-treading surface thereto, as well as to keep the feet warm and dry.]

47,522.—Crank-wrist Connections.—James Clayton, Brooklyn, N. Y.:

First, I claim the combination of the lining pieces, c c, having their exterior sides of sloping form, the independent wedge-shaped side pieces, b b, the screws, d d, and the nuts, e e, substantially as and for the purpose herein set forth.

Second, In combination with the said lining pieces, side pieces, screws and nuts, applied within a cross-head, I claim the guides, a a, provided for the cross-head, substantially as and for the purpose herein described.

47,523.—Ox Yoke.—W. R. Close, Bangor, Maine:

I claim my improved yoke-ring adjusting mechanism, as constructed of the supporting saddle, F, the vibrating hanger, C, its catch block, b, its confining screw and nut or nuts, and the curved rack, D, arranged together and applied to the yoke, in manner and so as to operate therewith, substantially as and for the purpose specified.

47,524.—Awning and Reflector.—Jos. Cordnan, Brooklyn, N. Y.:

I claim the combined awning and reflector, constructed and applied substantially as specified.

47,525.—Chimney Cap.—George W. Demond, Boston, Mass.:

I claim combining with the vanes, e, the blades, f, extending down into the cylinder, and having open spaces between their inner wedges, substantially as herein set forth.

47,526.—Paper Fastener.—Z. W. Denham, Washington, D. C.:

I claim the fastener, A B C, substantially in the manner and for the purposes described.

47,527.—Grinding and Polishing Metals.—Jas. Dodge, Waterford, N. Y.:

First, I claim the method of and machinery apparatus for grinding and polishing spindles, tools, filed blanks and other regular or irregular-shaped articles, substantially as herein described; that is to say, by the employment of two revolving grindstones or polishing wheels, in combination with a mechanism for moving, in accordance with a patten, the said stones or wheels, or either of them, while revolving to and from each other, substantially as herein set forth.

Second, For grinding and polishing round articles, I claim, in combination with the above causing the said articles, to revolve in contact with the guide stone or polishing wheels, substantially as set forth.

47,528.—Lock Joint for Railroads.—Aaron Douglass, Paterson, N. J.:

I claim the combination of the three laps, A B C, two formed of portions of the base and head of the rail, and one of a portion of the neck thereof, by dividing the rail in vertical and horizontal plains, and offsetting the neck in a lateral direction between the said horizontal planes, substantially in the form and manner herein specified.

47,529.—Kerosene Stove.—Wm. H. Elliot, Plattsburgh, N. Y.:

First, I claim so constructing a lamp with its connecting piece, g, and the lower plate of the stove, that the connection between the lamp and stove may be made by sliding the lamp under the stove substantially as described.

Second, Joining the several rings of said connecting piece together substantially as represented at, g, for the purpose set forth.

47,530.—Oil Pump.—Wm. H. Elliot, Plattsburgh, N. Y.:

First, I claim the main pump, b, applied to the elevation of oil from the well, and the auxiliary pumps, g, applied to the exhaustion of gas or air from a higher position in said well cooperating substantially as described.

Second, The auxiliary pumps, g, arranged in relation to the foregoing substantially as shown and described.

Third, A suction or gas pump, g, and gas separator, f, the one arranged above the surface of the earth and the other below the seed-bag or packing, substantially as described.

Fourth, A reversible suction and force gas pump, g, and lifting pump, b, so arranged in relation to the seed-bag or packing and to the surface of the earth substantially as set forth.

47,531.—Grading Scrapers.—Charles Evans and Wm. C. Bartlett, Morton, Ill.:

We claim the revolving scraper, G, in combination with the stationary mounted frame, A, and lever, E, all arranged substantially as and for the purpose set forth.

We further claim the lever, J, in connection with the wheel, H, or their equivalents, for the purpose specified.

47,532.—Manufacture of Boxes, Packages, Etc.—H. Everett, Philadelphia, Pa.:

I claim the bent strip, D, applied to the formation of the joints of boxes, packages or other vessels, in the manner described, for the purpose specified.

47,533.—Fanning Mill.—Abram Fanckboner, Schoolcraft, Mich.:

I claim, First, The arrangement in relation to each other above described of the double screen, B, the inclined board, P, and the divisions, F and G, of the receiving box, E, when the parts are so constructed as to operate in conjunction with each other as herein set forth.

Second, The construction and arrangement of the receiving box, E, substantially as and for the purpose set forth.

47,534.—Cultivator Plow.—Jas. R. Finley, Delphi, Ind.:

I claim the equal or symmetrical mold boards, when said parts form a continuation of the share, and have the peculiar form and configuration, as set forth and described.

47,535.—Heat Radiator.—Darius G. Fletcher, Racine, Wis.:

I claim, First, The cast-iron ring, c, and arms, d, for supporting the chamber, B, within the case, A, substantially as and for the purpose specified.

Second, The rectangular openings, e f, of the upper register of the chamber, B, for the purpose of facilitating the construction of the device.

Third, The cast-iron ring or cover, E, for the space between the chamber, B, and cylinder, as set forth.

[This invention relates to a new and improved heat radiator for stove pipes, and is an improvement on a similar radiator for which letters patent were granted to this inventor, bearing date April 17, 1860.]

47,536.—Shovel Plow.—C. Ford, Forest City, Ill.:

I claim, First, The mode of making an even-draft two-horse shovel plow, as herein described, with the shafts, F, attached to the frame plow, as herein described, with the shafts, F, attached to the frame by the hinges, m and n, and connected by the coupling bar, H, which arrangement, while it holds the shovels evenly, enables the operator to change the face of the shovels at will, and thereby guide the plow.

Second, The false cutters, K, in connection with the braces, I, made to slide in the groove in the head-piece, D, and secured by the clamps,

J, as herein set forth, in such manner that the operator, by loosing the clamps, J, may change the width between the shovels by sliding the tops of the braces in the groove.

Third, The ring-headed bolt, O, for holding the double trees on the plow, substantially as herein set forth, in such manner that when the plow is thrown on its slide they will balance, remaining parallel to the neck yoke.

47,537.—Window Lock.—F. G. Ford, Washington, D. C.:

I claim the face plate, to which is attached the double right angle slotted tube, the semi-rotating sliding spring bolt, the recessed guiding plate, and the double inclined recessed plate catch, the same being applied and operating in the manner as and for the purposes herein specified.

47,538.—Preparing Hemp, Flax, Etc., for Spinning.—Jim B. Fuller and James P. Upham, Claremont, N. H.:

We claim drawing or separating the vegetable fiber in the manner specified, previous to a carding, picking, or beating operation, for the purposes and as set forth.

We also claim carding the fibers of flax, hemp, etc., in a moist condition, for the purposes specified.

47,539.—Process for Separating the Fibers of Hemp, Flax, Etc.—Jim B. Fuller and James P. Upham, Claremont, N. H. Antedated April 18, 1865:

We claim the mode herein specified of separating vegetable fibers while retained in a suitable vessel, by subjecting such vegetable fiber to the action of steam under pressure, and then to a series of expansions derived from the sudden discharge of steam (but not fiber) from such vessel, as and for the purpose specified.

47,540.—Instrument for Curing Piles.—J. P. Gilbert, M. D., Long Island City, N. Y.:

I claim, First, The cold body, A provided with a nipple, B, constructed and operating substantially as and for the purpose specified.

Second, The grooves, A, in the nipple, B, applied and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use of any cold body provided with a nipple to enter the rectum in such a manner that by said cold body the blood in the tumor is deprived of its superfluous heat and returned to its regular channels. The nipple serves to keep the cold body in its place, and in order to allow the blood to circulate from the tumor, said nipple is provided with grooves near its base. By applying suitable ointment to the nipple, the effect of this instrument can be improved, and the ointment is kept in a box placed in the cold body, which is made hollow for this purpose, and provided with a cover that can be readily removed and replaced.]

47,541.—Mode of Mounting Drills.—Herman Haupt, Cambridge, Mass.:

I claim, First, Mounting drilling, boring, or other like machinery, when arranged for operation by steam, compressed air, or other fluid, upon a columnar frame, whether solid or tubular, and whether steam or other fluid is conveyed to said machinery by independent pipes or through the columns, substantially as set forth.

Second, In combination with the columnar frame for the support of machinery for drilling or boring rocks or other subterranean operations, I claim the pointed set screws, or the equivalent thereof, to brace and steady the said frame, in the manner substantially as set forth.

Third, In combination with columnar frame, which, for the purpose of conveying steam or other fluid, is hollow, I claim the thimbles incasing the set screws to protect the same and prevent leakage, substantially as set forth.

Fourth, The combination of the columnar frame with adjustable supports for the bearings of the trunnions of drills or other like machinery, so as to admit of adjustment of said drills at any hight and at any angle in the plane perpendicular to the axis of the trunnions.

Fifth, Making the supports of a segmental form, and forming the bearing therein adjustable, so as to admit of universal motion of the drills, substantially as set forth.

47,542.—Chair and Cradle.—George W. Hawk, Chicago, Ill.:

First, I claim the combination and arrangement of the two sections, A A, the ends, C C, and the rockers, B B, operating substantially as and for the purposes herein shown and described.

Second, I claim constructing the bottom of the cradle of five parts, D E F G H, when arranged and operating as and for the purposes specified and shown.

47,543.—Die for Cutting Screw Threads.—Benjamin S. Hill, New York City:

I claim the arrangement of the chasing or cutting points of a die or chaser for cutting male screw threads in a line or lines diagonally across the cutting faces or edges, or spiral to the axis, substantially as and for the purpose herein set forth.

47,544.—Explosive Shells.—B. B. Hotchkiss, New York City:

I claim the employment of the webs, B and C, or either of them, arranged to extend from the inner surface of a shell nearly to the center or axis, substantially in the manner and so as to serve the double purposes herein set forth.

47,545.—Tomato Soup.—James H. W. Huckins, Boston, Mass.:

I claim the composition made in manner and of materials substantially as hereinbefore specified.

47,546.—Rotating Stop Cocks.—Daniel Hurd, Chicago, Ill.:

First, I claim the combination and arrangement of the jacket, E, and the barrel, F, provided with the three series of holes, a' a'' and g, operating as and for the purposes specified and shown.

Second, I claim, in combination with the above, the employment of the dial and pointer, arranged as and for the purposes described.

47,547.—Jacks and Mules for Spinning Yarns.—John Goulding, Worcester, Mass.:

First, I claim the combination of a series of prostrate spindles, roller jaws, a movable carriage, and upright guides for the carriage, substantially as set forth.

Second, The combination of a series of prostrate spindles, roller jaws, turning spool support, movable carriage, and upright guides for the carriage, substantially as set forth.

Third, The combination of the rising and descending carriage and roller jaws with upright guides for the carriage and a rack, substantially as set forth.

Fourth, The combination of the rising and descending carriage, roller jaws and turning spool support with upright guides for the carriage and a rack, substantially as set forth.

Fifth, The combination of the rising and descending carriage, the roller jaws and their gearing, with instrumentalities for stopping the revolution of said jaws, when the length of rovings required for one spinning operation has been delivered, substantially as set forth.

Sixth, The combination of the rising and descending carriage, the roller jaws, turning spool support, and the gearing for transmitting motion to roller jaws and turning spool support, with instrumentalities for stopping the revolution of said jaws and spool support, when the length of rovings required for one spinning operation has been unwound and delivered, substantially as set forth.

Seventh, The combination of a series of prostrate spindles with two trains of driving mechanism and with shifting mechanism to put the spindles in connection with one or other train of driving mechanism and disconnect them therefrom, substantially as set forth.

Eighth, The combination of a series of prostrate spindles with a train of mechanism for turning them backwards, and with shifting mechanism to connect and disconnect the spindles therefrom, substantially as set forth.

Ninth, The combination of a series of prostrate spindles and the train of backing-off mechanism, with mechanism for varying the extent of the backing-off movement, substantially as set forth.

Tenth, The combination in a jack of the backing-off mechanism, the faller mechanism and the devices for varying the extent of movement of these two mechanisms substantially as set forth.

Eleventh, The combination of a series of prostrate spindles and the train of driving mechanism for impelling them with varying speed during winding, with mechanism for changing the varying speed substantially as set forth.

Twelfth, The combination of two series of prostrate spindles and their appurtenances arranged back to back with one set of driving mechanism, substantially as set forth.

47,548.—Machinery for Making Screws.—H. A. Harvey, New York City:

First, I claim the combination substantially as described herein of hoppers or receptacles, forwarding ways, delivering apparatus and two setts of conveyors or elevators with shaving, nicking and threading machines whereby headed blocks may be thrown into a hopper and converted into screws without manual labor, as described, the blanks being transferred from one machine to the hopper or receptacle of another by elevators or conveyors operating in the combination substantially as specified.

Second, The combination of a shaving machine and a nicking machine with an elevator and a hopper and its accessories, substantially as described, whereby headed blanks may be converted into nicked blanks, substantially as specified.

Third, The combination of a nicking machine and a threading machine with an elevator and a hopper and its accessories, substantially as described, whereby shaved blanks may be converted into screws substantially as set forth.

Fourth, I claim a pyramidal hopper or receptacle provided with an oscillating agitator constructed and operating substantially as specified.

47,549.—Machinery for Making Screws.—H. A. Harvey, New York City:

I claim, First, The combination substantially as described herein of hoppers or receptacles, forwarding ways, delivering apparatus, and shaving, nicking and threading machines, whereby headed blanks may be thrown into a hopper and converted into screws without manuel labor, the machine operating on the blanks, being arranged on different levels as described, and the blanks descending from one machine to another substantially as set forth.

Second, The combination of a nicking and shaving machine, on different levels, and in working connection with each other by means of apparatus, substantially such as described, the whole arranged and operating substantially as set forth.

Third, I claim the combination of a nicking machine, with a threading machine, on different levels and in working connection with each other, by means of apparatus, substantially such as described, the whole arranged and operating substantially as specified

I also claim arranging, shaving and nicking, also nicking and threading and also shaving, nicking and threading machines, on different levels, in such manner substantially as described, that blanks may be transferred from one machine to another without handling, substantially as set forth.

47,550.—Apparatus for Carbureting Air.—Daniel Hurd (assignor to himself, Edwin K. Hurd and Amasa E. Swift, Jr.), Chicago, Ill.:

I claim the peculiar combination and arrangement of the cylindrical vessel, A, the floors, g h i, the peculiar curved vertical partitions, a, and the barriers, c d e f, constructed and operating as and for the purposes specified and shown.

47,551.—Lantern.—John H. Irwin, Chicago, Ill.:

First, I claim dividing the guard of a lantern, in two or more parts by a horizontal section, substantially as and for the purposes herein specified and shown.

Second, I claim connecting the parts of the guard by a hinge upon one side and the catch, F, or its equivalent upon the other, substantially as shown and described.

Third, I claim providing the parts of said guards with the curved projections, a', substantially as and for the purposes specified and shown.

Fourth, I claim the combination and arrangement of the guards, a and b, etc., the rings, c d, substantially as shown and set forth.

47,552.—Toy.—H. C. Ketcham, Bloomfield, N. J.:

I claim the apparatus called the mystic cord constructed and operating as above described, as an improved article of manufacture.

[This invention consists in the construction of a toy called the mystic cord, the cord being concealed in the sides of two or more blocks connected at their lower ends so as to allow their upper ends to pass each other.]

47,553.—Horse Hay Rake.—George W. King, Greenville, N. Y.:

I claim, First, The lever, N, in combination with plate, h, and arm, Y, provided with wheel, C, the whole arranged and operated in the manner substantially as and for the purposes herein set forth.

Second, The lever, D, in combination with lever, E, arranged and operating as and for the purpose herein specified.

47,554.—Coupling Shafts of Boring Tools.—Robert H. Lecky, Allegheny City, Pa.:

I claim the use of the coniformed base, E, and angular groove, R, either separate or combined, when used in connection, with the screw, A, or male part of the socket joints for oil, tools, etc., the nut, B, or female part of the joint being fitted and adapted to the male part. The whole being constructed, arranged and operating substantially in the manner herein described and for the purpose set forth.

47,555.—Coupling Shafts for Boring Tools.—Robert H. Lecky, Allegheny City, Pa.:

I claim constructing the screwthreads of socket joints for oil tools, etc., in the manner substantially herein described and for the purpose set forth.

47,556.—Belt Buckle.—Ferdinand and Charles Lemme, San Francisco, Cal.:

We claim the arrangement of the cross-bar and flange, D and E, with the tongue, F, in combination with the main plate or shield, A B C, when the parts are connected and filled to produce the result substantially as described.

47,557.—Gold Separator.—Wm. H. Long, Mountain City, Colorado Ter.:

First, I claim conveying [the] productof the battery through the mercury and discharging it beneath the same, by creating a vacuum at the end of the conveying tubes, D' D', substantially as and for the purposes herein specified and shown.

Second, I claim the employment of one or more tubes, D D', arranged and operating substantially as and for the purposes set forth and described.

Third, I claim the combination of one or more air tubes, C C', with the tubes, D D', arranged and operating as and for the purposes shown and set forth.

Fourth, I claim the combination and arrangement of the aprons, S, with the tubes, C' D', as and for the purposes described.

Fifth, I claim the combination of the shaft, F, the funnel, E, tubes, C C' D D', and aprons, S, arranged and operating as and for the purposes described.

47,558.—Pulley Block.—Peter Luck, Williamsburg, N. Y.

I claim the movable side wing or wings applied in combination with the locking pin and with the axle of the sheave or sheaves of a pulley block substantially as and for the purpose set forth.

[This invention consists in the application to a pulley block of one or more movable side wings in combination with a locking pin and hung upon the axle of the sheave or sheaves in the pulley block in such a manner that by withdrawing the locking pin said movable side wing or wings are liberated and free to turn down, and thereby free access is given to the sheave or sheaves in the block. By this arrangement much time is saved in hitching up the rope.]

47,559.—Lunch Box.—John F. Morgan, Boston, Mass.:

I claim a folding box made substantially as herein shown and described either with or without a bottom receptacle.

[This invention principally relates to a peculiar construction of a lunch box whereby when empty it can be folded into a very compact and convenient shape for being carried.]

47,560.—Means for Adjusting the Driving Wheel of Sewing Machines.—Nicholas Niederpruem, Buffalo, N. Y.:

I claim the arrangement of the sliding frame, F, thumb screw, E, and jounal boxes, e e, in combination with the table top of a sewing machine substantially as and for the purpose herein set forth.

47,561.—Lubricator.—L. H. Olmsted, Newark, N. J.:

I claim a hollow shaft with an aperture or apertures open from the interior to the exterior, said apertures being closed with leather or any other substance that will produce the intended effect, for the purpose set forth.

47,562.—Preparation of Nitrate of Potassa.—H. S. Osborn, Belvidere, N. J.:

I claim the manufacture of nitrate of potassa form the lixivum of wood ashes, in the manner substantially as described.

47,563.—Animal Trap.—George W. Pagett, Adam's Trap, Ind.:

I claim the combination of the catch and head board, thereby holding a poised platform stationary until the treadle is depressed. Also the stationary bait pans in combination with the self adjusting lever treadle, so arranged that the rat must come in contact with the treadle before it is in reach of the bait, consequently the platform falls, leaving the bait untouched.

47,564.—Apparatus for Preparing Peat for Fuel.—Nathaniel F. Potter, Providence, R. I.:

First, I claim the combination of a mill for tempering peat, as described, with a movable carriage, for the purposes specified.

Second the combination of the clutch, H, with the pinions, F F', and the toothed gears, G G', for the purpose of imparting motion to the shaft, B, in either direction as desirable for the purposes specified.

Third, The combination of the endless apron, L, with a cylinder where surface is provided with cells or its equivalents, substantially as described for the purposes specified.

47,565.—Globe Cock.—James Powell, Cincinnati, Ohio:

I claim the combined valve and valve stem constructed and guided substantially as herein set forth.

47,566.—Stone Gatherer.—J. L. Quinby, Pleasant Grove, Pa. Antedated April 26, 1865:

First, I claim the endless apron, K, in connection with the rotating toothed cylinder, N, and the scoop, L, arranged with the bars, I I, and arms, M M, applied to the mounted frame, A, substantially as and for the purpose herein set forth.

Second, The shaft, H, the bars, I I, arms, M M, and cords, q, in combination with the lever, d, bearing, a, shaft, E, and lever, G, all arranged substantially as shown.

[This invention relates to a new and improved machine for gathering stones from a field and depositing them in a proper receptacle from which they may be readily discharged at the will of the driver.]

47,567.—Cooking Stove.—Lewis Rathbone and William Hailes, Albany, N. Y.:

We claim grating the back plate of a stove so that the draft flue will cause air to circulate through the bed of partially ignited coals from a point near the base to the top thereof, from a chamber in rear of said back plate, in such manner that the refractory particles of coal are caused to burn, substantially as described.

Second, The combination of a front passage, f, a grated back, D, and a cross passage, f, substantially as described.

Third, The combination of the front passage, i, and passages, F F, cross passage f, grated back, D, and draft flue, b, substantially as described.

47,568.—Cultivator.—William Rhodes and Moses Porter, Lovington, Ill. Antedated April 29, 1865

First, We claim the roller, F, mounted upon the tongue, E, and adapted to move simultaneously therewith so as to change the line of draft in the manner and for the purpose herein set forth.

Second, We claim the slot, e, whereby the draft may be shifted at will from the tongue, E, to the roller, F, in the manner and for the purpose described.

47,569.—Apparatus for Heating Buildings.—Hamilton Richardson, Janesville, Wis.:

First, I claim the series of radiating pipes, 1 2 3, etc., arranged in a hot air chamber within the chimney and so provided with cross or connecting pipes and valves that the draft may be varied at pleasure from a direct to an up and down draft substantially as and for the purposes herein set forth.

Second, In combination with the hot air chamber above described, I claim the flues or passages, d and e, constructed and arranged to operate substantially as and for the purpose set forth.

Third, In combination with the hot air chamber above described, I claim the flues or passages, g and h, for the purpose of admitting cold or fresh air from the room or from outside of the building, as herein set forth.

47,570.—Tug Buckle.—Clark D. W. Ries, Edwards, N. Y.:

I claim the combination of the hinged bar, I, with the tongue, K, projecting from the inner bar of the buckle, substantially as described, and for the purpose set forth.

47,571.—Tool for Marking Dice, Etc.—Calvin B. Rogers, Deep River, Conn.:

I claim the implement, A, constructed and operated substantially as above described, for the purpose of blacking dice tablets and other articles.

[This invention consists in the construction of an implement for blacking dice and other articles, whereby great facility can be attained in the work, and whereby also the same can be done with greater neatness than has been possible with the implements heretofore used.]

47,572.—Machine for Cutting Ivory.—Calvin B. Rogers, Deep River, Conn.:

First, I claim the cutter, H operated from below the bed upon the under side of the work while it is held upon the bed, substantially as above described.

Second, I also claim the combination in machines for cutting ivory and other substances of a holding rod applied within the kerf of a cutter with a cutter which divides the work from the stuff, and with a drill or centering or marking cutter operated from below the work, substautially as described.

[This invention consists in various improvements in machines for cutting ivory, bone, and similar substances, which enable the workman to cut out his work with perfect edges and with great facility.]

47,573.—Bucket Ear.—Lynford Rowland, Philadelphia, Pa.:

I claim as an improved article of manufacture a bail ear for buckets and other vessels, made substantially as herein shown and described.

[This invention relates to a peculiar construction of bail ears for buckets, etc., whereby they can be set upon the buckets in such a manner as to allow the handle to swing entirely below the top of the same, the advantages of which are manifest.]

47,574.—Harness Buckle.—Cyrus W. Saladee, Putnam, Ohio:

First, I claim constructing a buckle so as to be unbuckled without slackening the strap in the manner described.

Second, The buckle, G, in continuation with the tongue, F.

Third, Pivoting the buckle to the tongue in the manner described.

Fourth, Forming the tongue, F, as a combination of plate, A, in the manner described.

Fifth, The stud, i, or its equivalent, operating as described, in combination with the indentation, V.

47,575.—Lock.—James Sargent and H. W. Covert, Rochester, N. Y.:

We claim a magnet, employed in combination with the mechanism of a lock, in such a manner as to disconnect the action of the dog, or equivalent, that releases the bolt from the operating shaft or key, substantially as herein set forth.

In combination with the magnet, E, we also claim the employment of the armatures, G H, the former having the dog, g, attached, and so operating in relation to the purmutation wheels that when the connection of H is broken, that of G will be formed, to allow the dog to enter the notches, substantially as set forth.

In combination with the gate, I, we also claim the shoulders, m and the cam pin, o, arranged and operating substantially scribed.

We also claim the tumbler, K, in combination with the armature G, substantially as herein set forth.

We also claim retaining the permutation wheels in place on their bearing, and preventing them from coming in contact with each other, by means of the grooves, J J, and pins, Z Z, or equivalent, substantially as herein set forth.

We also claim the combination of the spring ring, u, and center, w, constituting the permutation wheels, substantially as and for the purpose herein set forth.

47,576.—Machine for Boring Hubs.—Peter Schuttler, Chicago, Ill.:

First, I claim the employment, in combination with a machine designed for boring, taper eyes or holes in hubs, of a horizontal

pivoted bed, C, or its equivalent, substantially in the manner and for the purpose described.

Second, The employment, in combination with a machine designed for boring taper holes or eyes in hubs, of a laterally adjustable carriage, E, and a longitudinally movable carriage, D, and a pivoted bed, C, all constructed, applied and operating substantially as and for the purpose set forth.

Third, The employment of rack and pinion, r p, in combination with a feeding screw, B, and contrivances for throwing this screw into and out of gear with the carriage, D, substantially as described.

Fourth, The vertically sliding half nut, h, toe lever, i, weight, w, shaft, l, and feeding screw, B, in combination with the tool carriage of a hub-boring machine, substantially as described.

Fifth, In combination with the lever, i, and half nut, h, I claim the adjustable stop, H, substantially as described.

Sixth, The boring tool, E, constructed with a cutter, f, spiral flange, and a shoulder cutter, g, substantially as described.

47,577.—Mode of Amalgamating the Precious Metals.—Charles A. Seely, New York City:

I claim the injection of steam or water, or both, at the bottom of the mercury in an amalgamating vessel, substantially as described

47,578.—Steam Gage.—Thomas Shaw, Philadelphia, Pa.:

I claim the employment of a gum tube in the manner specified, or the purpose set forth.

47,579.—Circular Knitting Machine.—Charles Shirtcliff, Philadelphia, Pa.:

I claim the plate, G, and plate, G', with its depressions, d, arranged and operating in respect to the levers, H, of a circular knitting machine, substantially as and for the purpose described.

47,580.—Sleds or Carriages.—Henry Smith, Naubuc, Conn.:

I claim the combination of the lever, segment, gears, h and g, pawl and ratchet wheel, k and l, and creaper wheel, m, with the carriage, substantially as described.

I claim with the above the combination of the guide, n, plate, o, and foot lever, q, with the carriage, substantially as described.

47,581.—Lining for Petroleum Barrels.—Wm. H. Stone, Brooklyn, N. Y.:

I claim the within described process of rendering barrels or other packages impervious to petroleum or other similar liquids, by treating them in the manner substantially as herein set forth.

[This solution consists in furnishing barrels with a lining of pure wax, procured by heating said barrels or packages to 180 or 200 degrees, with a quantity of wax in them, so that the wood will absorb quantity of wax, and the surplus can be readily made to run off, leaving the inner pores of the wood saturated with the wax.]

47,582.—Fifes and Flutes.—A. H. Stratton, New York City:

First, I claim the revolving finger-piece, B, with two or more sets of finger holes, in combination with the main barrel, A, of a flute or fife, constructed and operating substantially as and for the purpose set forth.

Second, The longitudinally adjustable mouth-piece, C, in combination with the main barrel, A, of a flute or fife, constructed and operating substantially as and for the purpose described.

Third, The self-adjusting plug, e, applied to the sliding mouth-piece, C, in the manner and for the purpose substantially as set forth.

47,583.—Apparatus for Shifting Sugar Pans.—Milbern Tibbets, Lancaster, Ind.:

First, I claim, in the described combination with a furnace and railway, the mode of elevating the evaporating pan on to the ways by means of the arms, D d D' d', wheels, E e E' e', levers, F G F' G, and catches, H H', or devices substantially equivalent.

Second, I claim in this connection the removable sections, c and c', arranged and adapted as set forth.

47,584.—Globe Time Piece.—Theodore R. Timby, Saratoga Springs, N. Y.:

I claim attaching the axis of a terrestrial globe to a dial, and revolving both once in twenty-four hours, substantially for the purposes herein specified, with or without an ordinary clock dial.

[This invention consists in attaching the axis of a terrestrial globe to a dial, and revolving both once in twenty-four hours, in such a manner that the globe stands out beyond the front of the clock case, and the effect of the time-piece is materially enhanced, while it serves at the same time to show at a glance the difference of time in places of different longitude, or the difference of the time between any place on the whole globe, and the place where the clock is used, without being compelled to turn the clock round or to look behind the case.]

47,585.—Globe Clock.—Theo. R. Timby, Saratoga Springs, N. Y.:

I claim a globe revolving once in twenty-four hours, in combination with a fixed dial and moving hands, substantially in the manner and for the purpose herein shown and described.

[This invention consists in combining with a globe revolving once in twenty-four hours, under a stationary index, one or more hands, revolving upon a clock dial in such a manner that by said clock dial and revolving hands the local time is indicated in the usual manner, and at the same time the globe and the stationary index affords the means to read off the difference of time in places of different longitude, or the difference of time between any place on the globe and the place where the clock is used.]

47,586.—Timing Explosive Shells by Clock-work.—Frederic Toggenburger, Chicago, Ill.:

First, I claim exploding a bombshell by means of a clock-work applied within said shell, substantially in the manner described.

Second, Providing the clock-work used within a bombshell for exploding the same with a regulating apparatus, by means of which said clock-work can be set to explode the shell at a given time.

Third, Starting the clock-work within a shell, and by which it is to be exploded by the action of the powder charge, which is used in firing the shell from the gun.

Fourth, The combination of the clock-work movement with the rod, M, and the fulminating capsule for exploding the shell, substantially in the manner described.

Fifth, The combination with the clock-work and the exploding device within the shell of the yielding plug, H, by means of which the clock-work is set in motion by the firing of the shell, substantially as herein described.

47,587.—Horse-rake.—H. Tunison, Whitehall Grove, Ill.:

I claim a horse hay-rake, consisting of the body, A, provided with the series of teeth, a a, and provided with the reversible rods, d, or their equivalents, attached separately, as shown, for the purpose of enabling it to be drawn and operated by animals acting independently at each end, substantially as herein shown and described.

47,588.—Lock.—Conrad P. Wagner, New York City:

First, I claim the movable stop, H H, in combination with the longitudinally movable central spindle, F, rotating tumblers, B B' B2 B3 B4, permutation plates, G' G2 G3 G4, and tumbler box, C C*, substantially as and for the purpose herein specified.

Second, The tumbler box, C C*, inclosing the tumblers separately from the other parts of the lock, forming a guide for the bolt, D, and a bearing for the tumblers and their central spindle substantially as herein specified.

Third, The sleeve, M, with one or more slotted flanges or tumblers, M*, and the pin, r, in the yoke, L, or its equivalent, applied in combination with the bolt of the lock and with the spindle, K, substantially as and for the purpose herein specified.

Fourth, The cover, Y, for inclosing the permutation plates, secured by means of two or more revolving buttons, Q, and catches, u, substantially as and for the purpose herein specified.

47,589.—Blank for Scythes.—Hervey Waters, Northbridge, Mass.:

I claim the double rod or blank for two, four or more plates, when shaped and arranged substantially as and for the purposes specified

47,590.—Machine for Rolling Metal.—Hervey Waters, Northbridge, Mass.:

I claim a system of grooves for drawing and shaping, substantially as and for the purposes specified.

47,591.—Horizontal Baling Press.—John D. Wilber, Pleasant Plains, N. Y.:

First, I claim the employment or use of two press boxes, placed or arranged in line with each other, in connection with a single follower, operated by four screws, all arranged as herein set forth.

Second, The opening, e, employed in the described combination, with and relation to the follower, D, and slots, c and d, to admit of the introduction of the material into the press boxes, without the use of doors, as explained.

[This invention relates to a new and improved baling press, of that class in which two horizontal press boxes are employed, in order that the material to be compressed and baled may be placed in one press box, while the material which was previously placed in the other press box is being compressed within it.]

47,592.—Ox Yoke.—Erastus S. Woodford, Winsted, Conn.:

I claim the spirally grooved rod, D, by which their simultaneous movement is directed, thus adjusting the length of bow by which each ox works.

47,593.—Seed Planter.—Lum Woodruff, Ann Arbor, Mich.:

First, I claim the conical dropping tube, A, consisting of the cone, a a, with the partitions, b b, separating the space between the cone, a a, and its concentric outer covering, A, into several grooves or channels, for the more effectual scattering of the seed, the whole being constructed and arranged substantially in the manner and for the purpose above specified

Second, I claim the arrangement of the small triangular drag, B B, with the teeth, t t, when placed on each side and in front of the furrow tooth, d, and the covering teeth, e e, substantially in the manner and for the purposes set forth in the above specification.

Third, I claim the adjustable cross bar or gage, c, when movably attached behind the teeth, e e, so that it may be raised or lowered to control the depth of working of the teeth, e e, as described in the specification.

47,594.—Spring Bedstead.—Wm. Woods and E. Smith. Worcester, Mass.:

We claim the combination of the two sets of springs, intervening cross bars and sockets, when constructed and operating in the manner and for the purpose of giving ease and buoyancy to the slats, substantially as described.

47,595.—Chain for Water Elevators.—Philander Anderson (assignor to himself and P. K. Bronson), East Avon, N. Y.:

I claim as an improved article of manufacture, the malleable iron square, or flat link chain, the links and swivel being constructed and connected in the manner shown and for the purposes specified.

47,596.—Grain Dryer.—Lewis S. Chichester (assignor to himself and Clark W. Mills), Brooklyn, N. Y. Antedated April 15, 1865:

I claim, First, The combination with a drying or cooling apparatus for grain, of two or more elevators, substantially as specified, so that the grain can be passed through the drying apparatus, and again elevated and delivered, or elevated and delivered at once, substantially as specified.

Second, I claim a series of flat drying tables for grain, inclined in alternate opposite directions, and receiving the grain from the bottom of one set of tables upon the apex of the tables below, substantially as specified.

Third, I claim the combination of the series of tables, o p, inclined in alternate opposite directions with the hollow walls, q t, forming the inlets and outlets of the air, as set forth.

47,597.—Hanging Circular Saws.—W. R. Close (assignor to himself and G. W. Merrell), Bangor, Maine:

I claim as my improvement or invention, for centering a circular saw, or applying it to its arbor, the combination described, the same consisting of the head, b, the screw, e, the nut, C, and the hub, B, with its screw, f, and the shoulder, h, such nut, C, and hub, B, being provided with the recess, i, and the polygonal head, k, or their equivalents, and the whole being arranged substantially as specified.

47,598.—Pulley Block.—Robert P. Fuller, Machias, Maine, assignor to Henry Richmond, San Francisco, Cal.:

I claim the combination of the grooved cheeks, A A, strips, C C, metallic strap, a a b b', and hook, D, all constructed and arranged as and for the purpose herein specified.

[The object of this invention is to construct ships' blocks in such a manner that the cheeks of the same will be prevented from splitting, and to this end the cheeks are arranged with the grain of the wood, at right angles with the metallic strap which encompasses the block, the strap being fitted in grooves in the cheeks, so that the outer surfaces of the former will be flush with the outer surfaces of the latter.]

47,599.—Borer for Wells.—Thomas J. Lovegrove (assignor to himself and Henry Raldwin, Jr.), Philadelphia, Pa.:

I claim, First, A drill, with two or more cutting edges, sloped from toe to heel, at an angle to its line of vibration, substantially in the manner described, for the purpose of boring a hole of larger diameter than the drill, as set forth.

Second, The combination with the drill of the inclined wings or flanges, E E', substantially as described, for the purposes of turning the drill automatically, and of smoothing and rounding the hole, as set forth.

Third, A tubular jar, so constructed as to serve as a pump for removing detritus from the well.

Fourth, A cylinder containing a chamber which serves the double purpose of an air cylinder and a detritus chamber

Fifth, The combination of a tubular jar and a sand pump, in such manner that one of the tubes of the jar shall form the induction pipe of the sand chamber.

Sixth, The combination in an instrument for boring wells, of a hollow drill and a tubular jar.

Seventh, The combination of a hollow drill, a tubular jar, a sand pump, and a flexible hose or discharge pipe.

Eighth, The combination with a drill of flanges, E E', to turn it, and ratchets, d d', to prevent its backward movement, substantially as described.

47,600.—Borer for Wells.—T. J. Lovegrove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim, First, Rotating a boring tool by hydraulic pressure, substantially in the manner described.

Second, The combination with a drill of a tubular jar, rotated by the fluid passing through it, substantially as described.

Third, The combination with a tubular jar, rotated in one direction by hydraulic pressure of a ratchet or other detent, to prevent its rotation in the opposite direction, substantially as described.

Fourth, The combination of a rotating drill with a discharge pipe with a swiveling joint, substantially in the manner described, for the purpose of rotating the drill without twisting the pipe, as set forth.

Fifth, Suspending and vibrating a rock drill by two ropes, substantially in the manner described, for the purpose of rotating the drill by the reacting twist of the ropes, as set forth.

Sixth, The combination of an automatically revolving drill, with an automatically rotating jar, substantially as and for the purpose set forth.

47,601.—Rock Drill.—T. J. Lovegrove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim a rock drill, perforated from its face to its head, and having cutting edges around the perforation, in combination with a valve, substantially as described, for the purpose of removing the detritus through the drill.

Second, A drill having part of its cutting surface radial to its center, and at a right angle to its line of vibration, and the other part sloped downward from hub to toe, at an obtuse angle to its line of vibration, substantially in the manner described, for the purpose of cutting a hole of a diameter greater than that of the drill, as set forth.

Third, A drill having two or more cutting surfaces on one side, and a single cutting surface in a higher plane on the other, substantially as described, for the purpose of cutting a core with the polygonal surfaces to be removed by the single cutter.

Fourth, A drill having cutting edges on different planes, the one horizontal and the other at an obtuse angle thereto, substantially as described.

Fifth, The combination with a drill, having its cutting edges in different horizontal planes, of the wings or flanges for rotating the drill, substantially as described.

47,602.—Machinery for Forming Baskets.—John W. Millet, Bachelorsville, N. Y., assignor to Benjamin R. Jenkins and Cyrus Sumner, Edinburgh, N. Y.:

First, I claim the conical drum, F, provided with the channels or grooves, f f f f, and alternate projections, g g g g, in combination with the chuck, G, and flange plate, L, substantially as shown.

Second, I claim the follower, M, in the movable rest pressed against the movable drum by means of weights in the manner described.

Third, I claim the vibrating lever, R, and the guide spring, T, substantially and for the purpose specified.

47,603.—Device for Securing Grain Bands.—John Nelson (assignor to himself and Wales Needham), Rockford, Ill.:

I claim securing the ends of the twine or cord bands used for binding sheaves of grain by means of metallic clamps, applied in the manner, without any knotting of the band in fastening, as hereinbefore set forth.

47,604.—Machine for Cleansing, Dressing, and Cutting Flax, Etc.—Ezekiel Phillips, Blackstone, Mass., assignor to himself and Daniel B. Pond, Woonsocket, R. I.:

I claim the combination or machine as consisting not only of the intermittent feeding mechanism, and the movable knife or mechanism for cutting off the fibers, in manner as described, but a stationary grid or grating (arranged in the case as set forth) and a rotary beater, so arranged as not only to operate with the knife and cause it to cut off the flax or fibrous material, as explained, but to beat and comb or dress it, and subsequently discharge it from the machine, substantially as specified.

And furthermore I claim for use in this particular class of machines the sectional driving gear, i, as made not only with an arc of teeth, but with an auxiliary tooth, supported by a spring, arranged with respect to such arc substantially in manner and for the purpose as hereinbefore explained.

47,605.—Machine for Cutting Nails.—Edwin Reynolds, Mansfield, Conn., assignor to himself and Benjamin Gage, Boston, Mass.:

I claim as my improvement in nail-cutting machines their organization with two pairs of cutter heads, each one of which carries two or more cutters, the whole being so arranged as to operate across the entire width of a sheet of metal, to cut from the end thereof, simultaneously, two or more nails, without giving to the nail plate any other movement than its progression or feed

47,606.—Manufacture of Metal Boxes.—Wm. T. Slocum (assignor to James S. Mason & Co.), Philadelphia, Pa.:

I claim connecting together the ends of a strip, A, by inserting the lips, a a', at one end of the strip through the slots, e e', at the opposite end, and bending them down against the inner side of the slotted end, when the said lips and slots are formed substantially as described.

47,607.—Pneumatic Churns.—Abbie J. Smith, Litchfield, Conn., Administratrix of the Estate of Andrew P. Smith, deceased.

I claim, First, The double-action bellows, operated by a crank and pitman from the driving shaft, the vertical rotating hollow shaft having holes in its lower bearing to receive the wind from the bellows and distribute it in the cream, in the manner herein described.

Second, I claim the valve, i i, in the recess, b, and the air chamber, g, in combination with the induction holes, o o, in the bearing of the hollow shaft, F, for the purposes set forth.

Third, I claim the horizontal air tube, I, with its openings, n n, in combination with the beaters, m m, operating in the manner herein described for the purposes specified.

REISSUES.

1,943.—Magazine or Self-loading Fire-arm.—G. W. Hughes, Bloomington, Ill. Patented Nov. 15, 1864:

First, I claim pivoting the rolling breech-piece, C, upon the circular head of the lever bar, as shown and described.

Second, I claim the sliding breech block, D, when constructed with the flange, having an opening for the hammer to strike through, and operating in connection with block, e, as herein set forth.

Third, I claim pivoting the lever guard, b, breech-piece, C, hammer, E, and the independent cocking device, all upon a single bolt, as substantially shown and described.

Fourth, I claim the retractors, g g, when constructed and operating as set forth.

Fifth, I claim the use in a magazine gun of a chain, constructed and operating substantially as set forth.

Sixth, I claim the plate, G, or its equivalent, constructed and operating as and for the purpose herein set forth.

Seventh, I claim the independent cocking device, when constructed and operating as shown and described.

Eighth, I claim dividing the rear portion of the stock longitudinally and horizontally, for the purpose of constructing a magazine therein, and obtaining access to the same, substantially as and for the purpose herein set forth.

1,944.—Feathering Paddle Wheel.—Manley Paddle Wheel Company, New York City. Patented June 24, 1862:

We claim the combination and arrangement of the paddle of a feathering paddle wheel, with its rock shaft, and the frame work of the paddle wheel, in such manner that the center of the paddle is situated in such position that the pressure at the end of the paddle adjacent to the feathering mechanism is divided equally, or substantially so, between the adjacent side frame of the paddle wheel and the frame of the feathering mechanism, substantially as set forth.

1,945.—Mode of Preparing Concentrated Food.—John H. Schenck, St. Louis, Mo. Patented Nov. 22, 1864. Antedated July 15, 1863:

First, I claim the process herein described of preparing, cooking, dessicating and pressing concentrated food, substantially as set forth.

Second, I claim as a new article of food the compound herein described, namely, a compound of corn, oats and barley, when cooked by steam or otherwise, dessicated, and pressed or unpressed.

1,946.—Barrel Machinery.—Wm. Trapp, Jr., Elmira, N. Y. Patented Oct. 1, 1845. Reissued March 10, 1849, and extended:

I claim, First, The combination of the slide rest, k, guided in the manner set forth with the tool, L, for turning off the cask, constructed and arranged in the manner set forth.

Second, The combination of the cylinder, E, open at both ends, so that both ends of the cask may be worked off without changing with the ring chucks, O, for fastening the cask into the cylinder, and with the tools herein described for chamfering and howeling.

Third, The crozing tool, V, with the changeable face plate, w, as herein set forth.

Fourth, The combination of the stock, l, cutter, l', made adjustable, and the gauge plate, l2, constituting the tool for turning and smoothing the outside of the cask, as above described and represented.

Fifth, I likewise claim the peculiar construction of the tool for howeling the cask, substantially as described.

Sixth, Also, the peculiar construction of the tool for chamfering the end of the barrel, as above described.

1,947.—Barrel Machinery.—Wm. Trapp, Jr., Elmira, N. Y. Patented Oct. 1, 1845. Reissued March 10, 1849, and extended:

First, In barrel machinery I claim jointing the edges of staves, substantially in the manner above described.

Second, In machinery for beveling the edges of staves of varying widths while bent into the proper bilge form, I claim providing for retaining the plane of cut in the same position relative to the stave that a radial plane passing through the imaginary axis of the cask and the beveled edge of the stave will occupy when the cask is completed, substantially in the manner described

Third, In barrel machinery I claim the jointing of a stave of the proper bevel and shape by a straight jointer, while the stave is so bent that the joint, when it shall be placed in the cask, will be in a radial plane passing through the axis of the cask, substantially in the manner above shown.



PATENTS

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FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesmant Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

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Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

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Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

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Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO's Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

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Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

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Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

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UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model, is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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Notes and Queries

D. P. K., of Ohio.—It may be that petroleum has been transported from one place to another in the form of vapor, after being evaporated by the internal heat of the earth, but that it was formed from oxygen, hydrogen and carbon vapors is improbable, from the fact that there is no oxygen in its composition. It is composed of hydrogen and carbon, but these two elements do not combine by simple contact, and it is in the highest degree probable that their combination in petroleum was first effected by animal or vegetable growth.

W. F. R., of Ind.—Augurs for boring port-holes are in common use. If you have any novelty in that line, doubtless a patent can be obtained.

R. H., of Pa.—The book you require is the "Practical Draughtsman." H. C Baird, No. 406 Walnut street, Philadelphia, is the publisher.

E. M., of Mass.—The cheapest varnish in the present state of the market is copal—made by dissolving copal gum in linseed oil.

A. M. P., of Conn.—A good hydraulic ram will raise water to any hight, but the greater the hight the smaller the proportion of water which can be raised. This correspondent wishes the address of some manufacturer of hydraulic rams. Direct to A. M. Perkins, West Winsted, Conn.

J. B., of Ill.—Steel is hardened by heating it a bright cherry red, and plunging it in cold water; its temper is then drawn by warming it over a charcoal fire. Weights to balance each other on a lever must be in inverse proportion to their distance from the fulcrum.

P. Z. J., of Mich.—There are several patents for gumming machines; for the address of patentees see back numbers of the SCIENTIFIC AMERICAN.

N. H., of Ill.—You had better write to H. C. Baird, of Philadelphia, for a treatise on optics.

G. W. S., of Md.—Scotch whetstone is used in polishing scagliola. It is also polished with tripoli, charcoal and a piece of fine linen, afterwards with a piece of felt dipped in tripoli, and finished with pure oil laid on with cotton.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

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TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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Improved Mist Forge.

All persons who have watched a blacksmith at his work must have noticed that he occasionally throws water on the fire. By a singular contradiction, when he wishes to increase the heat he throws on cold water. The object of this proceeding is gained in a different way from that generally supposed; the heat is augmented by preventing radiation, not by the decomposition of the water, and adding the resultant gases, oxygen and hydrogen, to the products of combustion. This check, for the time, increases the heat very rapidly and is attended with corresponding gain of time.

The forge here shown is intended to apply the water is kept cool by the additional pipe, J, which allows a few drops to trickle down on it, and prevent it from burning out. This auxiliary sprinkler is to be used with the common tweer only, not with the water tweer, where it is not required. Fig. 2 shows the tank, K, used in connection with this common tweer, and the mode of attaching it to the forge back. When not in use it can be laid on one side.

The inventor asserts that the use of this arrangement, by its regular and steady action, causes a saving of fuel, and that the "heat" on the iron is taken in one-third less time than with a common forge. It can also be used without charring the coal, and the fine dust and small cinders which are forced by the

Fig. 2.

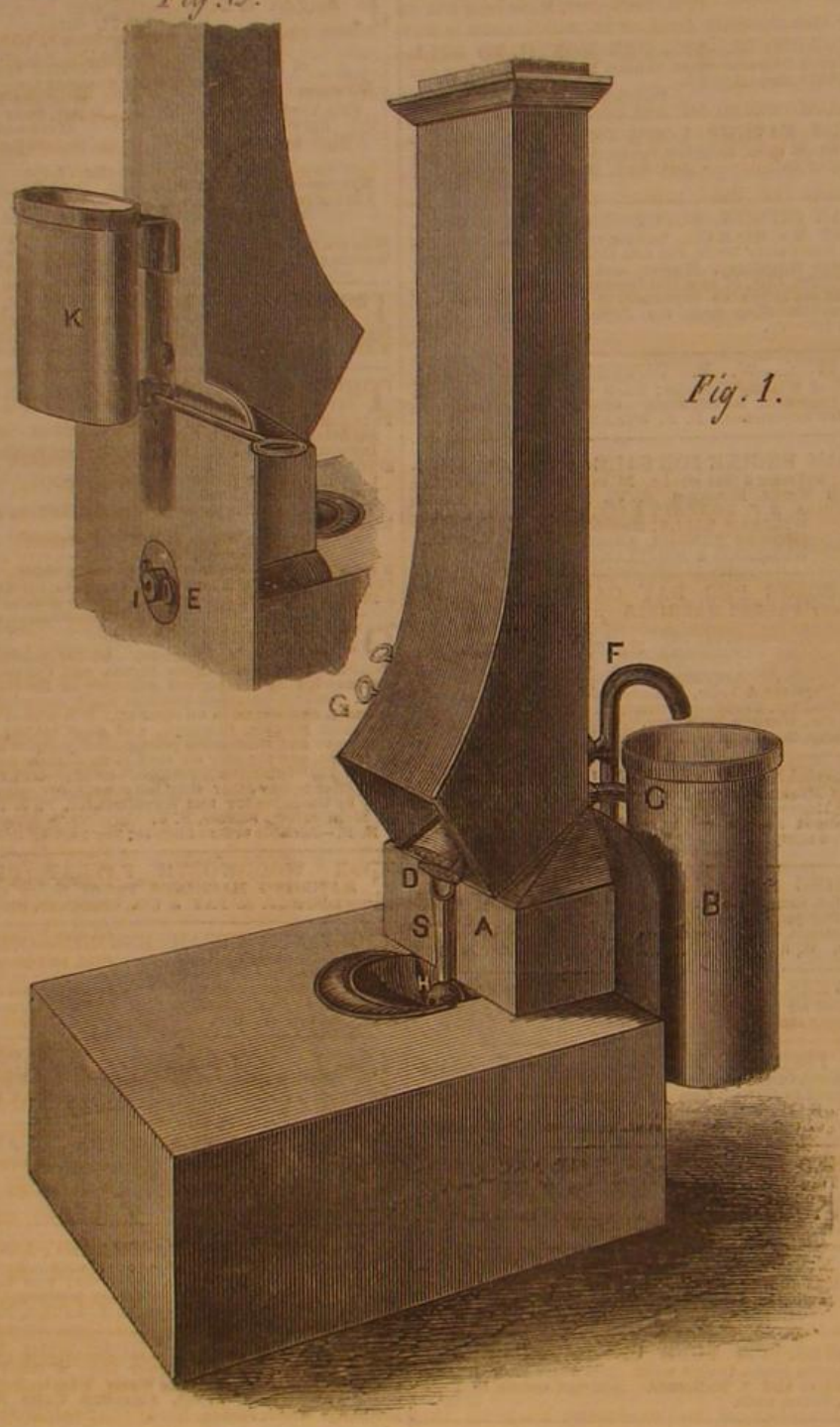


Fig. 1.

GOULD'S MIST FORGE.

itself at any time at the will of the blacksmith, and is constructed with a water back, A, as usual, and additionally a tank, B. There are pipes in this tank at the top and bottom, as at C, the latter being in communication with the sprinkler, D. The lower pipe enters through the opening, E, in the water back, and the upper pipe, F, enters the other opening. If there is a pressure of steam in the water back, the water in *it* enters the bottom of the tank, B, and forces water up through the pipe, C, from whence it runs into the sprinkler over the hearth, when the cock, which the handle, G, communicates with, is opened. Thus the water can be thrown on at will by opening or shutting the communication between it and the tank, and in greater or less quantities, according to the work to be done and the heat to be taken. A common water tuyere, or "tweer," as generally called, is shown at H; the blast enters this through the orifice, I, Fig. 2, and the front of it blast over every thing in the vicinity of the fire, or else carried up the flues and out on the roof of the building, are entirely confined by the use of this sprinkler, rendering the business much healthier and the shop more agreeable to work in. A patent on this forge was procured through the Scientific American Patent Agency on the 14th of March, 1865, by J. H. Gould, of Cincinnati, Ohio; for further information address him at that place, Box 2,445.

A Coal-wheeling Stoic.—A boiler explosion took place recently in the Missouri Iron Mills, Wheeling, while an old man named Whitmore was engaged wheeling in coal. The boiler passed close beside him, but he went on with the regularity of a pendulum, back and forward with his barrow loads of coal. The next day he assisted in clearing up the wreck. Since then the old man has died, and it was found that his legs were so severely scalded as to cause his death.

The First Iron Ship.

According to the Worcester (Eng.) *Advertiser*, Mr. John Wilkinson was the inventor and original builder of iron ships. The authority for this statement is an old letter found by his descendants. One of them thus speaks of it:—"This letter is dated Broseley, July 14, 1787, and the following is an extract:—'Yesterday week my iron boat was launched; it answers all my expectations, and has convinced the unbelievers, who were 999 in 1000. It will be a nine days' wonder, and then be like Columbus's egg.' The letter is signed 'John Wilkinson.' In another part of the same letter John Wilkinson says:—'My coinage I expect will be out shortly,' and accordingly it did appear in 1790, as evidenced by coins still existing, on the field of the reverse of which is pictured the iron ship alluded to. Now, I think it will be perceived frem what has been stated above, that John Wilkinson, of Broseley, in Shropshire, and Castlehead, in Cartmel, Lancashire, and not Mr. Ramsden, was the inventor of iron ship-building. This vessel was built at Willey, in Shropshire, and afterwards traded between several ports in the Severn."

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Vol. XII.---No. 21. (NEW SERIES.)

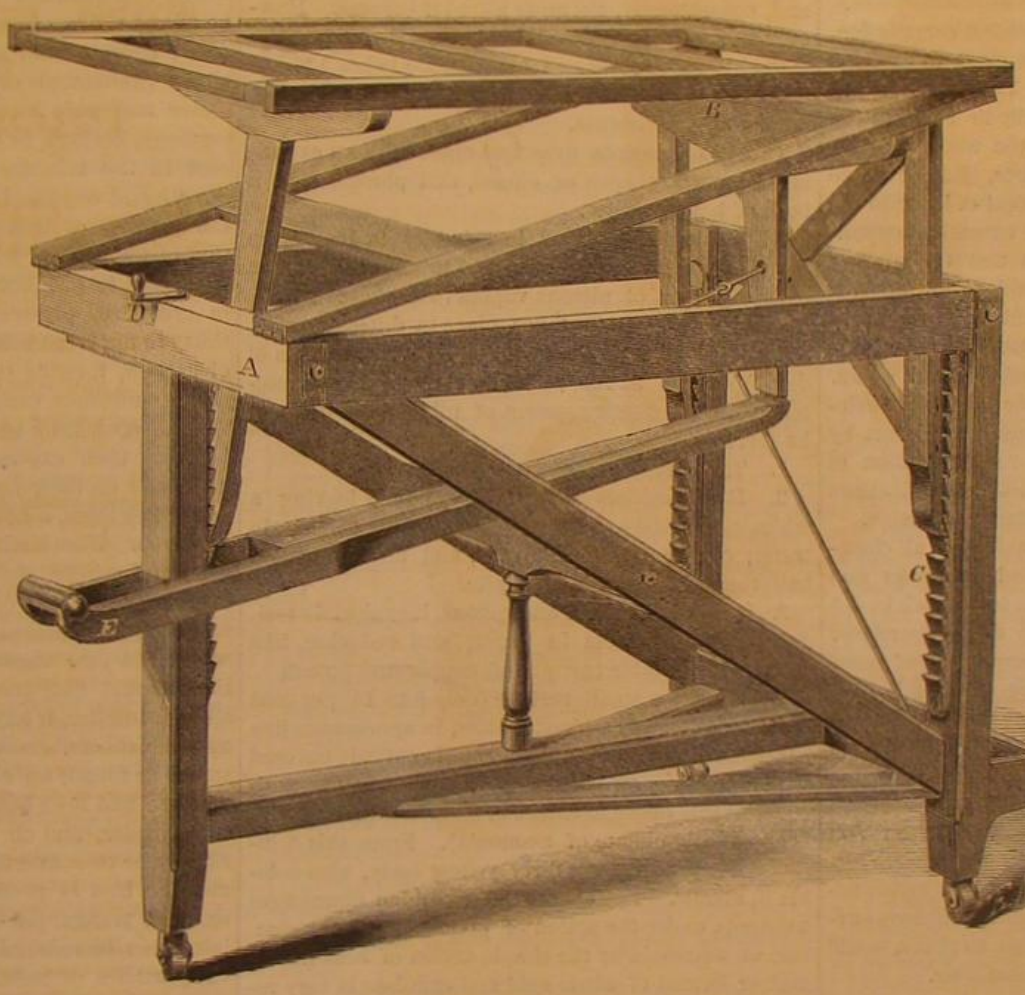
NEW YORK, MAY 20, 1865.

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Improved Camera Stand.

Individuals who are seized with a desire to transmit their interesting countenances to posterity often purchase the distinction by an expenditure of much time and patience; besides the wear on the nerves is so great, to sensitive people, that the pictures show it, and the operator is blamed for causes, as bankrupts say, "wholly beyond his control."

We call the attention of the photographic fraternity to this improvement in stands. When they approach their victim, twist his head on one side and apply the tongs behind, which are intended to hold him rigidly immovable, they say, "put on a pleasant expression if you please," which is highly probable, with two pincers nipping one in the neck. The victim, therefore, looks anguish unutterable, and by the time the operator has reached his camera again, the pleasant expression which he imparted by twisting the neck of the patient, has wholly vanished, so that he has to go back and do his work all over again; by constant twisting and turning, the neck of the unfortunate victim gets so pliable and his brain so addled, that he resigns himself to his fate, and his face expresses such exquisite imbecility that his family indignantly disown the prototype.



SCOULER'S CAMERA STAND.

The stand here shown is designed to facilitate the business of adjustment, and is conveniently arranged for its purpose, and will put an end to the sufferings we have set forth above. The inventor provides a frame, A, which has a supplementary frame, B, inside. This latter has legs or pawls which work in racks, C, on the legs of the frame, A. These pawls serve to sustain the camera in place, and the forward set are united by a cross, against which a spring bears to keep them in gear, so that they cannot become displaced accidentally. They may, at any time, be removed from the rack for purposes of adjustment by acting the knob, D. The vertical adjustment of the camera is further aided by moving the projecting lever, E, which causes the back part of the frame to be elevated. Thus all the necessary movements are provided for, and the business of the photographer will be much improved by the adoption of it. This invention was patented through the Scientific American Patent Agency on the 14th of February, 1865, by James Scouler, 830 Vallejo street, San Francisco, Cal., address him at that place for further information.

Mobile bay was cleared of obstructions by means of torpedoes and a galvanic battery. The topedoes were let down among the obstructions, and then exploded by means of an electric wire. About a mile of sunken barges and boats, filled with stones and old iron, were blown up in this way

How Corn is Reaped in Brazil.

A traveler writing from Brazil gives the following account of the slovenly manner in which corn is harvested there. It would seem as if a few reapers would not be amiss.

"Instead of cutting off and carting away the crop, or shocking and husking it on the field, when the grain is fit for harvesting, the whole force of the *estancia* take the field, falling upon the corn with their knives just wherever they happen to fall into the field—some in the centre, some on the skirts; some this side, some that; one cutting a dozen stalks, with which he marches off to the house, hugging them under one arm; another, making up a respectable bundle, poises it upon his head, and bears it away. A third one, lashing together with his lasso fifty or so of the stalks, by the butts, starts off houseward, dragging his bundle along the ground, tearing off leaves and husks, and very likely shelling off quite one half the corn from the cob.

"The fourth harvester does something better. He makes up two respectable bundles, and slinging them over a mule, he trudges off to the house, supplying himself, at a single jaunt, with a day's work at stripping the ears; while others are continually coming and going, and cutting and husking. Thus is the labor continued until the crop is harvested."

Failure of the Ames Gun.

We learn from the Boston *Advertiser* that three more of the Ames heavy guns were tested in the same manner as the first, by firing ten rounds from each gun, with a charge of 25 pounds of powder and a 125-pound shot. The third gun was blown apart at the first round, in precisely the same manner as the one which exploded at the trial of the first eleven guns. The breech, including the vent and six inches in length of the cannon, was blown off in one solid mass, showing, as before, an imperfect weld.

Preservation of the Remains of Extinct Species.

The following extract is from the highly interesting work of "Huxley on the Origin of Species":—

"Almost all the hard parts of animals—the bones and so on—are composed chiefly of phosphate of lime and carbonate of lime. Some years ago I had to make an inquiry into the nature of some very curious fossils sent to me from the north of Scotland. Fossils are usually hard bony structures that have become imbedded in the way I have described, and have gradually acquired the nature and solidity of the body with which they are associated; but in this case I had a series of *holes* in some pieces of rock, and nothing else. Those holes, however, had a certain definite shape about them, and when I got a skillful workman to mak castings of the interior of these holes, I found that they were the impressions of the joints of a back bone and of the armor of a great reptile, twelve or more feet long. This great beast had died and got buried in the sand, the sand had gradually hardened over the bones, but remained porous. Water had trickled through it, and that water being probably charged with a superfluity of carbonic acid, had dissolved all the phosphate and carbonate of lime. and the bones themselves had thus decayed and entirely disappeared; but as the sandstone happened to have consolidated by that time, the precise shape of the bones was retained. If that sandstone had remained soft a little longer, we should have known nothing whatsoever of the existence of the reptile whose bones it had incased.

How certain it is that a vast number of animals which have existed at one period on this earth have entirely perished, and left no trace whatever of their forms may be proved to you by other considerations. There are large tracts of sandstone in various parts of the world, in which nobody has yet found anything but footsteps. Not a bone of any description, but an enormous number of traces of footsteps There is no question about them. There is a whole valley in Connecticut covered with these footsteps, and not a single fragment of the animals which made them have yet been found. Let me mention another case while upon that matter, which is even more surprising than those to which I have yet referred. There is a limestone formation near Oxford, at a place called Stonesfield, which has yielded the remains of certain very interesting mammalian animals, and up to this time, if I recollect rightly, there have been found seven specimens of its lower jaws, and not a bit of any

thing else, neither limb bones nor skull, or any part whatever; not a fragment of the whole system! Of course, it would be preposterous to imagine that the beasts had nothing else but a lower jaw! The probability is, as Dr. Buckland showed, as the result of his observations on dead dogs in the River Thames, that the lower jaw, not being secured by very firm ligaments to the bones of the head, and being a weighty affair, would easily be knocked off, or might drop away from the body as it floated in water in a state of decomposition. The jaw would thus be deposited immediately, while the rest of the body would float and drift away altogether, ultimately reaching the sea, and perhaps becoming destroyed. The jaw becomes covered up and preserved in the river silt, and thus it comes that we have such a curious circumstance as that of the lower jaws in the Stonesfield slates. So that, you see, faulty as these layers of stone in the earth's crust are, defective as they necessarily are as a record, the account of contemporaneous vital phenomena presented by them is, by the necessity of the case, infinitely more defective and fragmentary."

FRENCH CHEMISTS ON AUSTRIAN GUN-COTTON

It will be remembered that a chemical commission, appointed by the Austrian Government to examine the gun-cotton prepared by Baron Von Lenk, reported that the article differed materially in composition and properties from that made by the usual process. As some eminent French chemists, MM. Pelouze and Maurey, have devoted a great deal of labor to the examination of gun-cotton, and extensive experiments had been made in France to test the applicability of this new material to artillery purposes, it was to be expected that these chemists, if not mortified at the better success of the Austrians, should at least, be prompted to go over their ground again, and either abandon or confirm their previous conclusions. The London *Chemical News* has a report by MM. Pelouze and Maurey of a re-examination of gun-cotton, in which they contradict the statements of Baron Von Lenk and the Austrian commission.

Cotton is almost pure cellulose, and while all chemists agree that cellulose is composed of carbon and the elements of water, there seems to be a slight difference of opinion in regard to the proportions. Some good authorities state the composition of cellulose, $C_{12}H_{10}O_{10}$, and hold that by treating it with nitric acid both the cellulose and the acid are decomposed, the nitric acid losing one element of oxygen and becoming NO_4, which displaces a portion of the hydrogen in the cellulose, and thus forms gun-cotton. The Austrian chemists have held that in Baron Von Lenk's gun-cotton three atoms of hydrogen were displaced by three of NO_4, making what they called trinitro cellulose. This would contain sufficient oxygen to effect its complete combustion, so that it would burn without the access of atmospheric air.

Other chemists have taken the view that the nitric acid is not decomposed in making gun-cotton, but that it displaces a portion of the elements of water. This seems to be the position of M. M. Pelouze and Maurey, and we infer that they take the composition of cellulose before it is acted on by nitric acid to be $C_{24}H_{22}O_{22}$. They say:—

In 1847 we determined the composition of pyroxylin, and represented it by the following formula—$C_{24}H_{17}O_{17}.5NO_5$.

We must first find out whether we operated on a product different to Lenk's pyroxylin, and if the two are chemically identical, whether this formula is correct.

We have conducted these researches with the greatest possible care, and believe we have surmounted the difficulties of the combustion of pyroxylin. We found the pyroxylin of Hirtenberg and Bouchet chemically identical, and found for them a formula differing from the previous one by only one equivalent of water.

This formula is $C_{24}H_{18}O_{18}.5NO$.

It is so like the previous formula—$C_{24}H_{17}O_{17}.5NO_5$—that analysis alone would not be sufficient to justify the alteration without being supported by the amount of the yield. In fact, the new formula supposes a yield of 177·78 of pyroxylin for 100 of cotton, while the old formula corresponds to a yield of only 175. The direct experiments described above gave the figure 178.

All the gun-cottons we analyzed were previously washed in a mixture of alcohol and ether, to remove some milliemes of fatty and soluble matters, then dried for several hours in a stove at a temperature between 40 and 50°.

All were of the composition above described, and gave the following figures :—

Carbon	25·00
Hydrogen	3·13
Oxygen	59·72
Nitrogen	12·15
Total	100·00

The Action of Heat on Pyroxylin.—General Lenk ascribes the unsatisfactory results obtained in France by the Commission of 1846 to the fact that not sufficient attention was paid to the manner in which the pyroxylin was prepared, and to operating upon an insufficiently defined nitred product. By taking advantage of conditions most favorable to nitrogenization, he believes he has obtained a pyroxylin very difficult to decompose.

We will not discuss the theoretical value of this assertion, which does not seem to us to be very great. It is, on the contrary, more probable that gun-cotton would decompose more readily the less like cellulose, and, consequently, the more nitred it became. However this may be, General Lenk says that pyroxylin made by his process will not explode below 136° C.

We have made this important point the subject of numerous experiments.

These experiments were first made with an experimental matrass, open or closed, and plunged into a bath of boiling water.

All the samples heated in this way to 100° were sooner or later decomposed, and in a few minutes a disengagement of nitrous vapors took place.

The decomposition takes place in different ways, and cannot be reproduced at will. Four methods of decomposition at 100°, having the common characteristic of the disengagement of nitrous vapors, may be given:—

1. The pyroxylin detonates violently.

2. It decomposes without detonating, leaving a white, pulverulent, acid residue, partially soluble in water, containing no nitrogen, and forming about half the weight of the pyroxylin.

3. It leaves a yellow, amorphous, inexplosible residue, partially soluble in water, and reducing, like glucose, the double tartrate of copper and potash.

4. It gives a small residue (only 8 to 10 per cent of its weight), and a black matter, in appearance like charcoal. In this case the matrass is entirely covered with a yellow powder, which dissolves in alkali with considerable disengagement of ammonia (this matter is apparently ulmate of ammonia). From this solution acids precipitate a dirty yellow body, also soluble in alkalis. The charcoal-like residue disengages ammonia under the action of potash. This production of ammonia by the simple action of heat from a matter formed of nitric acid and cellulose is very remarkable.

Other experiments made on various pyroxylin at 90° and then at 80° gave exactly the same results, except that decomposition took place after several hours instead of a few minutes.

At 60°, and even at 55°, pyroxylin is still decomposed. After a few days the matrass becomes full of dense reddish vapors, and the same non-nitrogenized pulverulent residue of which we have already spoken is obtained. No combustion was observed in these latter experiments.

They conclude further from experiments that Baron Von Lenk's gun-cotton decomposes at ordinary temperatures, that it has no more propulsive power than that tested in France, and finally that the objections to its employment in warfare are conclusive.

Detection of Burglars.

We take the following from the London *Builder:*—

"Allow me to suggest a contrivance for the better security of property, and by which a burglar might be detected at his work. A common gas lamp, provided with a red shade, similar to those used on the railways, should be suspended in the street in front of the bank or shop, where valuable articles are kept; the red shade should be held up above the lamp by a magnet, worked by a small battery, situate at any convenient place on the premises; the wire from the battery to the magnet should pass through the safe, doors, and drawers containing valuable articles; and as long as the connection is complete between the battery and the magnet, the red shade would be held up in its place above the lamp, showing a white light; but as soon as the connection was broken by opening any of the doors or cases, the magnet would immediately lose its power, and allow the shade to fall in front of the lamp, thus showing a red light, and giving notice to any one in the street that something was wrong inside; and when once the shade had fallen, it could not be replaced by the burglar. These magnets are very simple, being made of a piece of soft iron, bent in the form of a horse-shoe, with a coil of copper wire round the ends; and the cost of working the battery would be a trifle."

A Metal Harder than Steel.

Dr. O. E. Prieger, of Bonne, in Rhenish Prussia, has for some little time past been practising on a great scale a cheap and simple method of producing alloys of manganese and iron and manganese and copper, containing considerable proportions of manganese. Alloys of manganese and iron he calls "ferro-manganese," and alloys of manganese and copper "cupro-manganese." To produce ferro-manganese he mixes oxide of manganese in powder with powdered charcoal and malleable iron, the latter being either granulated or pulverized cast iron, or else either malleable iron or steel in the form of filings, turnings, borings, or the like. The quantity of charcoal in the mixture should be equivalent to the quantity of oxygen in the oxide of manganese, and the quantity of iron in accordance with the proportion of that metal required in the particular alloy it is desired to produce. The triple mixture is placed in crucibles, preferably of graphite, holding from thirty to forty pounds each, and covered with a layer of carbon, fluoride of calcium, common salt, or any other substance capable of preserving the mixture, when heated, from the action of the air. The crucibles are then exposed for several hours to a white heat, and on their being cooled there is found at the bottom of them a homogeneous alloy of manganese and iron. Were a mixture simply of oxide of manganese and carbon similarly treated, the oxide would be reduced by the carbon, just as when iron is present, but the liberated particles of metallic manganese would not fuse together into one mass. Some of them would combine with the silicon of whatever silicious matter, if any, were contained in the mixture, and the others, combined with more or less carbon, would be found, on cooling the crucible in which the mixture had been heated, in the form of exceedingly fine powder, and on exposure to the air would very rapidly be re-converted into oxide. When, however, metallic iron is present in a mixture of carbon and oxide of manganese exposed to a heat at which the latter can be reduced by the former, the iron seizes the particles of metallic manganese as they are set free, and prevents them from combining with more than a trace of carbon, or with more than a very minute quantity of silicon, if that body be present, and at an alloy of iron and manganese containing scarcely any appreciable admixture of any foreign substance collects in one mass, of uniform composition throughout. By this means, alloys of manganese and iron containing almost any desired proportion of manganese may be produced with ease. The particular alloys of these metals which Dr. Prieger considers most likely to be of use in the arts are two which contain their constituents in atomic proportions, one of them consisting of two atoms of manganese and one of iron, and the other of four atoms of manganese and one of iron. The proportions of manganese contained in these alloys are 66·3 and 79·7 per cent, respectively. Both these alloys are harder that the hardest steel, and take an exquisite polish, their color being between that of steel and of silver. They fuse at a red heat, and are well adapted for casting. Exposure to the atmosphere does not in the least oxidize them, and even exposure to water oxidizes them only at the surface. In this non-liability to oxidise they differ remarkably from unalloyed manganese, which is oxidized by exposure to air but little less readily than potassium and sodium, and which decomposes water with great rapidity, at all temperatures—combining with its oxygen and setting its hydrogen free.

The method of producing cupro-manganese differs

from that of producing ferro-manganese only in metallic copper, instead of metallic iron, being added to the mixture of oxide of manganese and carbon. If, instead of copper, an alloy of copper and some other metal be used, an alloy of cupro-manganese with that metal will be obtained. The varieties of cupro-manganese resemble those of bronze, but are much harder and more tenacious. The alloys of cupro-manganese with zinc are readily fusible, possess great tenacity, work very easily, and are of a color and luster approaching those of fine silver. These and other alloys of cupro-manganese, and also the varieties of cupro-manganese itself, promise to be very useful for artistic purposes. As regards ferro-manganese, what Dr. Prieger seems to value it most highly for is the ready means which it affords of adding definite quantities of manganese to ordinary iron and steel. He makes some very remarkable statements respecting the advantages which he has found to result from the addition to these metals of proportions of ferro-manganese varying from one-tenth per cent to five per cent. Should these statements be borne out by the experience of others, ferro-manganese will come largely into demand for the purpose indicated. In any case, uses of some kind are certain to be found for it. Meanwhile, we may congratulate Dr. Prieger on having virtually introduced a new metal into commerce—for metallic manganese has hitherto been obtained only in exceedingly minute quantities, at a cost exceeding that of gold, whereas Dr. Prieger has already produced some hundreds of tuns of an alloy containing eighty per cent of it at a cost of not more than about ninepence a pound.

INVISIBLE RADIATION OF THE ELECTRIC LIGHT.

It is well known that the sunbeam is composed of three elements—light, heat and the chemical or actinic rays. When the sunbeam is passed through a triangular prism it is bent from its straight track, the several parts of the light rays being bent in different degrees—the red rays the least, then the orange, yellow, green, blue, indigo, and, lastly, the violet the most. The heat rays are bent less than those of light, and the actinic more, so that in the solar spectrum the hottest part is in the dark portion below the red, while chemical effects are produced in the dark portion at the other end, beyond the violet.

Dark heat differs in some of its properties from heat that is accompanied by light; for instance, it has less power of passing through certain bodies. Plate glass an inch in thickness transmits 39 per cent of the heat coming from a naked flame, and only six per cent of that radiating from a surface of copper at a temperature of 750°. But rock-salt, while it transmits a larger portion of the heat striking upon it than any other substance, has the peculiar property of permitting the passage of the same proportion of the heat coming from all substances and at all temperatures. In measuring the dark rays of the spectrum, therefore, prisms and lenses of rock-salt are employed.

John Tyndall, F.R.S., has been making a series of observations on the spectrum of the electric light, to ascertain whether it has the same properties in these respects as the solar spectrum, and has given the results in the following paper read before the Royal Society:—

"Pending the preparation of my complete memoir, which may occupy me for some time to come, I would ask permission of the Royal Society to lay before the fellows a brief and partial summary of the results of my experiments on the invisble radiation of the electric light.

"The distribution of heat in the spectrum of the electric light was examined by means of the linear thermo-electric pile, applied to the solar spectrum by Melloni, Franz Muller, and others. The electric spectrum was formed by lenses and prisms of pure rock-salt, its width being equal to the length of the row of elements forming the pile. The latter, standing at right angles to the length of the spectrum, was caused to pass through its various colors in succession, and to search the spaces beyond the region of color in both directions.

"As in the case of the solar spectrum, the heat was found to augment from the violet to the red, while the maximum heating effect was observed beyond the red, and at a distance from the red, in one direction, equal to that of the green of the spectrum in the other.

"The augmentation of temperature beyond the red in the case of the electric light is sudden and enormous. Plotting from a datum line the thermal intensity of the various portions of the spectrum, the ordinates suddenly increase in length beyond the red, reach a maximum, and then fall somewhat more suddenly on the other side. When the ends of the ordinates are united, the curve beyond the red rises in a steep and massive peak, which quite dwarfs the luminous portion of the spectrum.

"The comparative hight and steepness of this peak are much greater than those obtained by Prof. Muller for the solar spectrum. Aqueous vapor acts powerfully upon the invisible rays, and, doubtless, the action of this substance in our atmosphere has toned down the eminence beyond the red in Professor Muller's diagram. A solar spectrum, produced beyond the limits of the atmosphere, would probably exhibit as steep a peak as that of the electric light.

"In the experiments now to be referred to, the rays from the electric light were converged by a small concave mirror. The glass mirror silvered at the back, which usually accompanies the camera of Duboscq's electric lamp, was one of the first employed. It was brought so near the electric light as to cast an image of the coal-points five or six inches in advance of the light. A solution of iodine in bisulphide of carbon, contained in a rock-salt cell, was then placed in front of the lamp: the light was thereby cut off, but the focus of dark rays remained, and various effects of combustion and incandescence were obtained at the focus. A mirror four inches in diameter, and silvered in front, will enable an experimenter to obtain most, if not all, the results now to be mentioned. I also employ a mirror eight inches in diameter, and having a focal length of eight inches, with excellent effect.

"It is not necessary to inclose the opaque solution in a rock-salt cell. The vessel intended for a solution of alum, which usually accompanies the lamp of Duboscq, and the sides of which are of glass, answers admirably. It is not, however, quite deep enough for the several tests to which I have subjected it, and in crucial experiments I employ a deeper vessel with rock-salt sides.

"With the eight-inch mirror just referred to behind the electric light, the opaque solution in front, and the focus of invisible rays about six inches distant from the electric light, the following effects have been obtained:—

1. Wood, painted black, when brought into the dark focus, emits copious volumes of smoke, and is soon kindled at the two spots on which the images of the two coal-points fall.

2. A piece of brown paper placed near the focus soon shows a burning surface, which spreads over a considerable space, the paper finally bursting into flame.

3. Black paper brought into the focus is immediately inflamed.

4. The wood of a hat box similarly placed is rapidly burnt through, and usually bursts into flame.

5. The end of a cigar, placed at the dark focus, is instantly ignited.

6. Disks of charred paper, placed in the focus, are raised to brilliant incandescence, surfaces of considerable extent being brought to a vivid glow. Charcoal is also ignited.

7. A piece of charcoal, suspended in a receiver of oxygen, is ignited in the dark focus and caused to burn brilliantly, the rays after crossing the glass of the receiver being still sufficiently powerful to heat the coal up to incandescence.

8. A mixture of oxygen and hydrogen is exploded in the dark focus by the ignition of its envelope.

9. A piece of zinc-foil, blackened on one side to diminish reflection, is pierced and inflamed. By gradually drawing the strip, once inflamed, across the focus, it may be kept blazing for a considerable length of time. This is a particularly beautiful experiment.

10. Magnesium wire, presented suitably to the focus, burns with its intensely luminous flame.

"In all these cases the effect was due, in part, to chemical action; this, however, may be excluded.

11. A plate of any refractory metal, sufficiently thin, and with its reflective power suitably diminished, is raised to incandescence in the dark focus. Gold, silver, copper, aluminum, and platinum have been thus rendered incandescent.

12. Platinized platinum shows the effect best; in a thin leaf it may be rendered white-hot, and on it is depicted an incandescent image of the coal-points. When the points are drawn apart, or caused to approach each other, their incandescent images conform to their motion.

"The assemblage of phenomena here described, and others to be referred to in my complete memoirs, may, I think, be properly expressed by the term "calorescence." This word involves no hypothesis, and it harmonizes well with the term fluorescence, now universally employed with reference to the more refrangible end of the spectrum."

A Powerful Locomotive.

The dimensions of a locomotive, designed by Mr. Jones, which has performed remarkably well, are thus given by the *Railway Times* :—

"A train of seven passenger coaches were drawn from Schenectady to Albany, a distance of 17 miles, in 23 minutes, running time, the fire not having been stoked during the passage over the road.

"I will here give some of the principal dimensions of this locomotive. Fire surface of fire-box, 98·5 feet; fire surface of flues, 920 feet; diameter of cylinders, 15 in.; stroke, 26 in.; diameter of drivers, 5 feet 8 inches.

"The most peculiar feature of this engine is the manner in which the grates are constructed and operated, so that they cannot 'choke up' by cinder or clinker, as is the case with most other coal burners.

"Mr. Jones has devoted a great deal of his time to the careful study of the principles which govern the use of coal fuel as applied to locomotives, and has succeeded admirably in many very satisfactory experiments which have been adopted from time to time."

Action of the Air on Vegetable Fatty Oils.

It may be asked under what form the carbon and hydrogen are eliminated in the course of the oxidation of oils. I agree with Saussure, that a portion of the carbon passes to the state of carbonic acid, but I have, moreover, ascertained that the amount of carbonic acid produced does not nearly represent the whole of the carbon which has disappeared.

In the same way with hydrogen, part is disengaged as water, but it is also eliminated under some other form.

These facts are easily explained by the production of a carbonized volatile compound, the pungent odor of which greatly resembles that of acrolein; this is a substance which browns the sheets of unsized paper, serving to recover the oils exposed to the air.

Some old books are colored in the same way, and I believe that this coloration is the result of the slow oxidation of the oil used in the printing ink, and the formation of a product possessing a stifling odor, similar to that which I have recognized in air which has been for about ten days in contact with a siccativeoil.—M. S. Gloeg, in the *Chemical News*.

Pittsburgh Machine Shops.

There are twenty-four machine shops in Pittsburgh engaged in and fitted for making machinery. Fourteen of these are establishments of magnitude, and eight of them at the present time especially adapted to the manufacture of the largest size marine engines. There are also twelve boiler yards capable of manufacturing any description of boilers. There are also ten establishments locally known as river blacksmith and forge shops, at which all the heavy iron work of steamboats is wrought, from the largest wrought shaft, chain cables and anchors, to the smallest iron work required. Also, three very heavy establishments manufacturing nuts and washers and similar line of articles.

CONTRIVANCE FOR RETARDING RAPID EBULLITION.—Dr. Erlenmeyer finds that ebullition of solutions having a high boiling point proceeds quietly and regularly in a vessel surrounded with asbestos tolerably short in the fiber. The asbestos is kept in its position by bending a piece of wire gauze to the shape of the vessel. In evaporating liquids, which are apt to boil in a fitful manner, and in performing fractional distillation, "this asbestos bath" has been found most useful.

Interesting Experiments.

Mr. William Loughbridge, of No. 362 North Eutaw street, Baltimore, is engaged in prosecuting a series of experiments "for testing the laws of friction as they relate practically to rolling stock on railways," and, in the course of them, has developed some incidental facts which are curious and interesting. The laws governing the friction of different bodies have, as Mr. Loughbridge knows and acknowledges in his circular, been definitely settled by Morin and Coulomb. It is not proposed to controvert these broadly, but to observe more particulary the action of the friction brake on wheels of cars, with a view to the adoption of the best one for the purpose.

We extract a portion of Mr. Loughbridge's circular, which is worthy of attention:—

"I have commenced making experiments on the effect of friction on 'rolling stock,' and find them very interesting and profitable, resulting in developments which with all my former experience are new to me.

"I have tested the Dynamometer one trip to Harrisburg and return, and find that by it many of the laws of friction, as it relates practically to pulling and retarding trains, can be fully and clearly demonstrated. Its capacity is ten thousand pounds, and it can be used in pulling and backing the train. I first put it between the two last cars of eight composing the train, when it fully and clearly indicated the effect of any degree of pressure on the brakes and the power required to pull the car.

"The finger of the indicator vibrates very much when running, showing great irregularity in the tractive power, or that the lateral impingement of the wheels against the rails occasioned intermittent friction. I then put the indicator between the baggage car and the tender, when the power required to pull the train was clearly shown when running, as well as the effect of the brakes when about to stop. By this device (as well as by time and distance), 'the brake' that will show or produce the greatest retarding power or tendency to stop a train without sliding wheels can be clearly demonstrated—patents, circulars and certificates to the contrary notwithstanding.

"As I had not weighed the cars I will not give the results in this report. During the trip one of the connecting rods gave way, when the locomotive was run with one cylinder only. The irregularity of the crank was then clearly shown. In starting, when it was at right angles with the connecting rod, the indicator showed nearly the same power as when both cylinders were working, but when parallel it fell nearly back to nothing.

"When we arrived at a grade too heavy for the crippled engine, a second engine was added to the train, when the indicator showed a compromise, and that a perfect and crippled engine were at work."

SCHLEIER'S INDENTED RAIL.

Great difficulty and loss of time are now experienced in getting the wheels of vehicles over street railroads when presented obliquely to them. When the wheels are inside of the rails they are frequently strained in crossing in consequence of the barrier which the rails oppose, and often axles are sprung and springs broken in the act of crossing rail tracks—a difficulty which is fully obviated by this invention. It consists in constructing the rails with indentations in their edges, as at A, so as to form a series of short inclined planes at both sides of each rail, thus enabling the wheels of common vehicles to release themselves from the track, or pass over it when approaching the same obliquely.

Fig. 1 represents a perspective view, and Fig. 2 a plan or top view of a portion of a rail. The rails may be of the usual or any proper form, and they are provided at each side with indentations, forming inclined planes, against which the wheels of a vehicle may catch and pass upon or over the surface of the rails. These inclined planes have an oblique position with a transverse section of the rails, and the other side of the indentations are comparatively long so as to extend gradually inward from the outer surfaces of the rails to the inner ends of the inclined planes, A. These indentations are made in the edges of the rails in reverse positions consecutively, the alternate indentations, when looking over the rails in either direction, coinciding with each other in position. By this plan the wheels of vehicles will be assisted over the rails when moving in either direction.

In Fig. 1, one of the back wheels of a vehicle is represented as passing up an inclined plane, A, from the inside of the rail. For further information, address the inventor, T. M. Schleier, Nashville, Tenn., Box 609, by whom it was patented through the Scientific American Patent Agency, Dec. 20, 1864.

Fig. 1



Fig. 2.



EGAN'S KEROSENE OIL BURNER.

As we have frequently remarked in the columns of the Scientific American, chimneys are the one great objection to the use of kerosene oil, for when they do not crack from the intense heat, they topple off from defective fastenings, are troublesome to clean, and are in other respects a plague, as all know who have ever tried them. Inventors accordingly, with a laudable desire to help the public, and themselves also, have endeavored to dispense with the chimney, and have made some alterations in the burners to effect their object. The chimney is necessary to create a draft and confine the air inside so that it will be rarified by heat and brought in contact with the vapor of the oil, so as to obtain perfect combustion and clear white light.

Fig. 1

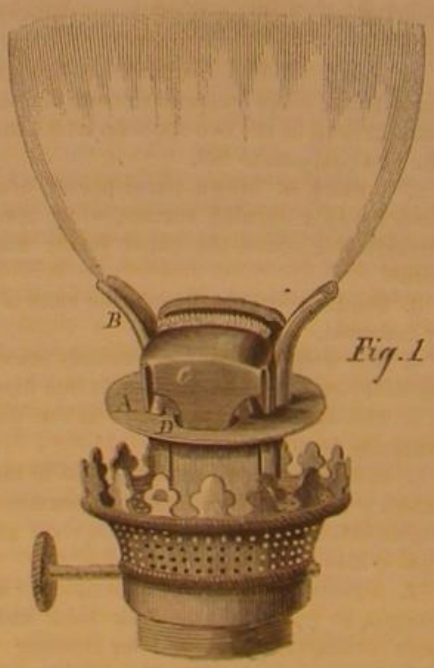


Fig. 2.



The invention here illustrated consists in providing the wick tube of a lamp with a circular plate, A. This plate has two projecting parts, B, which run up each side. On the sides of the wick are two walls of sheet metal, C, which cover apertures, D, for the supply of air to the wick. Fig. 2 shows a plan view, wherein the walls, C, are removed to disclose the air-holes, D. The air is thus forced to go directly to the flame, into which the upper currents through the openings are delivered, thus promoting combustion and performing essentially the same office as a chimney. The hight of the flame may be regulated at will as in all lamps with chimneys.

A patent was issued May 9, 1865, through the Scientific American Patent Agency, to James Egan, whom address for further information, at Zanesville, Ohio.

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute on Tuesday afternoon, May 9th, the President, N. C. Ely, Esq., in the chair.

From the several subjects discussed we select the following:—

CURIOUS AFFECTION OF HENS.

The President remarked that about a year ago the *Horticulturist* published a plan for a hen-house, with boxes for the nests, so arranged that when the fowls wished to sit the boxes could be pushed through into a separate room, where the sitting hens would be protected from the encroachments of those wishing to lay, and could be provided with an ample supply of food and water. Mr. Ely said that he had a house made exactly in accordance with the directions, and it worked admirably until some of the eggs became so advanced that the chickens in them began to peep. Then the hens upon the other nests, moved by their maternal instincts, immediately left their own nests and hovered about the peeping chicks, neglecting their own eggs and allowing them to become addled.

Professor Mapes remarked that only about fifty hens can be kept in one flock with advantage. Hens may be fenced in inclosures by making a close board fence, 5½ feet high, and stretching over this, on posts, at a hight of 15 feet, a small wire. The fowls in trying to fly out will always attempt to alight on the wire, but if it is small they will not be able to hold on upon it, and will fall back into the inclosure.

CAUSTIC SODA FOR FRUIT TREES.

Professor Mapes gave an account of a series of experiments which showed that a saturated solution of caustic soda is not injurious to the most tender living vegetable, while it dissolves all dead vegetable matter. For several years he has made extensive use of this strong solution for fruit trees, always with the best effect. It destroys great numbers of insects, and keeps the bark clean and bright. A pound to a gallon of water makes a saturated solution.

SALT AS A FERTILIZER.

Professor Mapes remarked, in the course of a discussion on this subject, that in the reign of George III., the farmers of England paid half a guinea a bushel for salt to be used as a fertilizer, and laws were passed that no turnpike should charge toll on wagons loaded with salt designed for this use. To this day these laws are in force, and even railroads are required to transport salt for manure at less than their other merchandize freight.

On the Erie canal the tolls on salt are so excessive that they are regarded by the farmers as prohibitory, and the legislature of this State could take no action better calculated to increase the prosperity, at least of all the region in proximity to the canal, than the reduction of the tolls on salt.

CURLED LEAF IN PEACH TREES.

Dr. Trimble exhibited some branches of peach trees, on which the leaves were all very much curled and blistered. He said that he had been observing them very closely, and had come to the conclusion that there are two causes of the curled leaf. One is the presence of aphides—plant lice—on the lower side of the leaf early in the season; but the lice are soon

eaten up by the lady bugs, and the leaves recover. This blistered leaf is one of the symptoms of the disease called the yellows.

Mr. Bergen and Mr. Williams thought that the blistered leaf occurs in trees not affected with yellows.

THE WAY TO USE BONE.

The President inquired if any one could tell him the best way to apply ground bone.

Professor Mapes replied, "Let a man who knows all about the trade tell you that it is almost impossible to get any pure ground bone in this city."

Mr. Ely:—I bought mine of Peter Cooper, and he gave me his guaranty that every particle of it was pure bone; I have examined it carefully with a glass and am satisfied that it is an unadulterated article.

Professor Mapes:—I have not a doubt of it; you have cited the only exception that I could have named. Peter Cooper's treatment of bone gives a pure phosphatic result, but if our farmers used as much bone manure as they ought, Mr. Cooper could not supply one-tenth part of a single county. More than 99 per cent of the crushed bone sold in this market comes from the soap makers. They buy the bones with a good deal of meat on them, and boil them down till they are so soft that you can mash them right down with your foot. Then they mix, as they say a "little" lime with the bones so they will crush. The "little" lime is generally a good deal, and the bones contain all the gelatin, which is of no use to a farmer if he has 10,000 tuns of it. Bones prepared in this way are uncommonly rich if they contain 30 per cent of phosphate of lime.

Mr. Bergen:—You have not said how you would apply crushed bone.

Professor Mapes:—I would add to it from one-fourth to one-third its weight of agricultural sulphuric acid; which is sulphuric acid as it comes from the lead before it is concentrated. The principal expense in manufacturing sulphuric acid is in the process of concentration, and it is foolish for the farmer to pay for this when he wants it diluted. Then I would mix it with compost in order to spread it more evenly over the land. A few years ago the farmers of England were in the practice of applying what they called inch bone to the land—that is, bone in pieces an inch in diameter. They spread it at the rate of 400 bushels to the acre. At length some one suggested half-inch bone, and it was found that 250 bushels of half-inch bone would produce quite as well as 400 bushels of inch bone. Then the experiment was made of grinding it to meal, when 50 bushels proved as efficient as 400 bushels of the coarsest application. Finally Liebig showed how five bushels might be made as productive as any of the previous applications. His plan was the treatment with sulphuric acid and compost as I have described. The only difference is that while the small application is efficient for three or four years, the effects of the coarse bone applied in large quantities are observed for fifty years or more. But the interest on the cost of 400 bushels would, of course, much more than pay for five bushels *once* in three years.

A Sea-going Turret Ship to be Built in England.

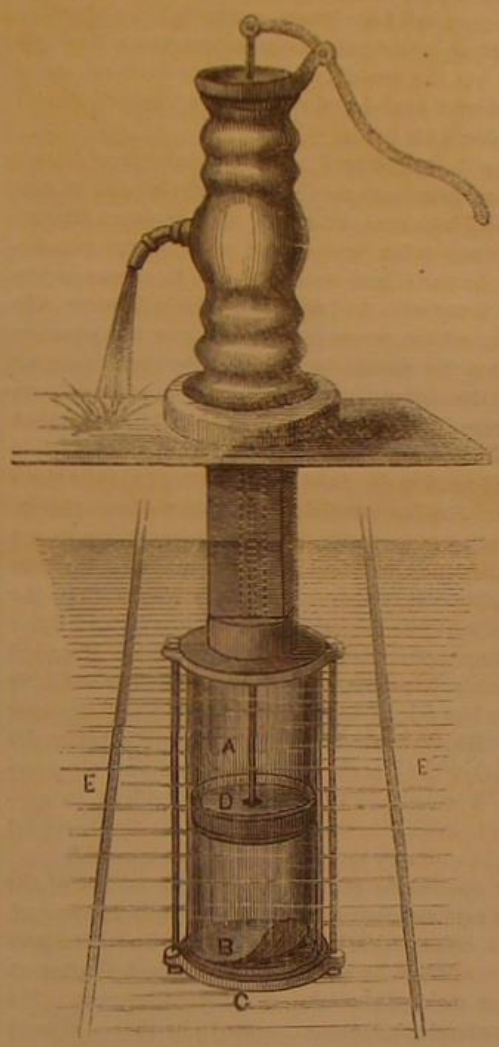
The London *Engineer* of April 28th says:—"In accordance with the instructions issued from the Admiralty to captain Cowper P. Coles, R. N., and to the Master Shipwright's Department of Portsmouth Dockyard, the chief draughtsman of the Portsmouth yard has prepared a set of drawings, under Captain Coles's supervision and direction, of a sea-going turret ship embodying Captain Coles's ideas in full of the turret principle as applicable to a sea-going ship. The vessel is designed to carry 600-pounder guns or 'Big Wills' in her turrets, and the drawings, complete in all their details, were sent in to the Admiralty by Captain Coles during the first week in the present month."

CURTAIN PINS.—In England a pin used for fastening curtain to rods, or for similar purposes, which is in appearance like a common diaper pin, with an eye in the middle of the shank or back, so that the pin may be run through the material hooked like a diaper pin, and leave a ring at the top to suspend the curtain by. The advantage is that the rings can be taken off in a minute when the curtain is washed, need no sewing, and last forever.

CARLETON'S SUBMERGED GLASS PUMP.

A good pump for domestic purposes is an exceedingly valuable thing, for being used constantly, and, by persons who are unacquainted with the care of machinery, it requires to be strongly made, free from complexity, and not liable to become deranged. The manufacturer of the pump here shown claims that all these points are obtained in his invention, and, that having been in use in a large part of Maine for some time, it has demonstrated its merits in a practical manner.

It is claimed for this pump that by constructing the cylinder of glass, corrosion is obviated, and the wear which results from this cause, as well as the injury to the water drawn, is not experienced. It is entirely submerged, and by allowing the water to be drawn off from the tube above the chamber and



below the surface, freezing of the contents of the tube never occurs, neither does the pump lose water. It is not liable to derangement from leakage, for as the pump lifts its water instead of raising it by atmospheric pressure, or "suction," as it is erroneously called, no injury beyond a slight loss of water would ensue if the tube above the chamber was cracked all the way up. Since the valves are always under water and attached without nails, they and their fastenings cannot be prematurely destroyed by the alternate action of the air and water. This pump can be used in wells of any depth, and is sold at a low price.

The construction of it is similar to all other pumps; A being the glass chamber, half an inch thick; B, the lower valve of leather, confined by being held between the valve-seat, C, and the chamber, A, and D the upper valve in the piston. All the fastenings and working parts of iron, where they are under or in water, are of galvanized iron, and in other respects the pump is strong and well made.

This invention was patented on January 7, 1862, through the Scientific American Patent Agency, and is manufactured by G. E. Carleton, at Dayton, Ohio. For further information, address him at that place.

AN arrangement has been invented in Philadelphia to prevent horse cars running over anybody. The inventor attached it to a car and then laid down on the track, and was thrust aside without injury.

IT is a remarkable fact that the late President had not a blood relation, save his two boys. Mrs. Lincoln has relatives, but her husband had none living.

RESISTANCE OF VESSELS IN WATER.

As we have had frequent inquiry of late for information of the kind conveyed below, we reprint the following article from Bourne, which will be found interesting:—

Q.—How do you determine the resistance encountered by a vessel moving in water?

A.—The resistance experienced by vessels moving in water varies as the square of the velocity of their motion, or nearly so; and the power necessary to impart an increased velocity varies nearly as the cube of such increased velocity. To double the velocity of a steam vessel, therefore, will require four times the amount of tractive force, and as that quadrupled force must act through twice the distance in the same time, an engine capable of exerting eight times the original power will be required.

[This statement supposes that there is no difference of level between the water at the bow and the water at the stern. In the experiments on the steamer *Pelican*, the resistance was found to vary, as the 2·28th power of the velocity, but the deviation from the recognized law was imputed to a difference in the level of the water at the bow and stern.]

Q.—In the case of a board moving in water in the manner of a paddle float, or in the case of moving water impinging on a stationary board, what will be the pressure produced by the impact?

A.—The pressure produced upon a flat board, by striking water at right angles to the surface of the board, will be equal to the weight of a column of water having the surface struck as a base, and for its altitude twice the hight due to the velocity with which the board moves through the water. If the board strike the water obliquely, the resistance will be less, but no very reliable law has yet been discovered to determine its amount.

Q.—Will not the resistance of a vessel in moving through the water be much less than that of a flat board of the area of the cross section.

A.—It will be very much less, as is manifest from the comparatively small area of paddle board, and the small area of the circle described by the screw, relatively with the area of the immersed midship section of the vessel. The absolute speed of a vessel, with any given amount of power, will depend very much upon her shape.

Q.—In what way is it that the shape of a vessel influences her speed, since the vessels of the same sectional area must manifestly put in motion a column of the same magnitude, and with the same velocity?

A.—A vessel will not strike the water with the same velocity when the bow lines are sharp as when they are otherwise; for a very sharp bow has the effect of enabling the vessel to move through a great distance, while the particles of water are moved aside but a small distance; or, in other words, it causes the velocity with which the water is moved to be very small relatively with the velocity of the vessel; and as the resistance increases as the square of the velocity with which the water is moved, it is conceivable enough in what way a sharp bow may diminish the resistance.

Q.—Is the whole power expended in the propulsion of a vessel consumed in moving aside the water to enable the vessel to pass?

A.—By no means; only a portion, and in well-formed vessels only a small portion of the power is thus consumed. In the majority of cases, the greater part of the power is expended in overcoming the friction of the water upon the bottom of the vessel; and the problem chiefly claiming consideration is, in what way we may diminish the friction.

Q.—Does the resistance produced by this friction increase with the velocity?

A.—It increases nearly as the square of the velocity. At two nautical miles per hour, the thrust necessary to overcome the friction varies as the 1·823 power of the velocity; and at eight nautical miles per hour, the thrust necessary to overcome the friction varies as the 1·713 power of the velocity. It is hardly proper, perhaps, to call this resistance by the name of friction; it is partly, perhaps mainly, due to the viscidity or adhesion of the water.

Q.—Perhaps at high velocities this resistance may become less?

A.—That appears very probable. It may happen that at high velocities the adhesion is overcome, so

that the water is dragged off the vessel, and the friction thereafter follows the law which obtains in the case of solid bodies. But any such conclusion is mere speculation, since no experiments illustrative of this question have yet been made.

Q.—Will a vessel experience more resistance in moving in salt water than in moving in fresh?

A.—If the immersion be the same in both cases a vessel will experience more resistance in moving in salt water than in moving in fresh, on account of the greater density of salt water; but as the flotation is proportionably greater in the salt water the resistance will be the same with the same weight carried.

Q.—Discarding for the present the subject of friction, and looking merely to the question of bow and stern resistance, in what manner should the hull of a vessel be formed so as to make these resistances a minimum?

A.—The hull should be so formed that the water, instead of being driven away forcibly from the bow, is opened gradually, so that every particle of water may be moved aside, slowly at first and then faster, like the ball of a pendulum, until it reaches the position of the midship frame, at which point it will have come to a state of rest, and then again, like a returning pendulum, vibrate back in the same way, until it comes to rest at the stern. It is not difficult to describe mechanically the line which the water should pursue. If an endless web of paper be put into uniform motion, and a pendulum carrying a pencil or brush be hung in front of it, then such pendulum will trace on the paper the proper water line of the ship, or the line which the water should pursue in order that no power may be lost except that which is lost in friction. It is found, however, in practice, that vessels formed with water lines on this principle are not much superior to ordinary vessels in the facility with which they pass through the water: and this points to the conclusion that in ordinary vessels of good form, the amount of power consumed in overcoming the resistance due to the wave at the bow and the partial vacuity at the stern is not so great as has heretofore been supposed, and that, in fact, the main resistance is that due to the friction.

Correspondence

Red of Sorgho.

Messrs. Editors:—Some papers give, as a new discovery, the fabrication of a red coloring matter obtained from the stalks of the sorgho. This fact is not new, as the process to obtain it was described by Mr. Winter in the *Bulletin de la Societé d'Encouragement*, June, 1860, and I reproduced it in the *Industrial Chemist*, June, 1862, page 12. As it must interest many of your readers to know how to prepare it, I send you a copy of the article in question:—

"It is a fact long known that the sorgho contains a red coloring matter. The following is the process used by Mr. Winter to extract it: The trunks of the sorgho are stripped of their leaves and reduced to pulp in a rolling mill, and well pressed to extract the juice from them. This juice is used to make sugar or alcohol. The ligneous tissue is left some time to itself; it begins to ferment rapidly. Care must be taken that the fermentation is not too active, because by an elevation of temperature it will undergo putrid fermentation. When the operation has proceeded well, the mass, after fifteen days, has acquired a red or red-brown color. Stop the fermentation in drying well, and grind the matter to divide it.

"To isolate the coloring matter, infuse the powder in cold water, which dissolves a little coloring matter. Press the mass very strongly, and put it to macerate in a weak caustic lye. Filter, press and saturate the alkali by sulphuric acid; the coloring matter is separated in red flakes, which are collected on a filter, washed and dried. That color is nearly pure, very soluble in alcohol, alkalies, weak acids, etc.

"To dye wool and silk with it, use the ordinary tin mordant. The dyes made with that will resist the action of the light and a bath of soap moderately warm. The extraction and uses of that coloring matter are known and practiced in China, where the culture of the sorgho is carried on on a large scale."

Hoping this information will lead to the use of this coloring matter in industry, I remain, gentlemen, yours truly, H. Dussauce.

New Lebanon, N. Y., May 8, 1865.

Copper Cartridges Unreliable in Cold Weather.

Messrs. Editors:—My attention has been recently called to a fact which I had not previously observed, but of the truth of which I am entirely convinced, and one that constitutes a very serious objection to the fixed ammunition which has come into such general use in the form of copper cartridges having the fulminate in the base. The fault I allude to is, that in cold weather they are very liable to miss fire. My conviction of this fact rests but partially on my own observation, for I have never used this ammunition in the field; and though I have experimented freely with it, my trials have been conducted in a shooting room, where a tolerably even temperature was preserved; but the testimony I have received comes to me from such varied and respectable sources that I cannot doubt its truth.

During last winter I received numerous letters from correspondents in Canada complaining of ammunition I had sent them for the Spencer, Ballard and Wesson rifles, saying that a very large proportion of the cartridges missed fire. An officer of the English army who had sent to me for a Spencer rifle and ammunition, wrote me that the gun was so much liked that he should have had orders for a number but for the defects of the ammunition, of which, on an average, one cartridge in four missed fire, and that unless I could send him some that were more reliable he would send to England and get Eley to make them for him. Similar complaints reached me from others, and puzzled me greatly, as being so contrary to my own experience, as I had found them almost invariably reliable. It is only within a few weeks that the explanation was suggested to me in a letter from a gentleman who wished me to get him a Maynard rifle, as his experience with the copper cartridges had put him out of conceit with the guns which used them. He says:—"If the temperature is many degrees below the freezing point they are entirely unreliable. I have known five or six cartridges in succession to miss fire, though taken from the same lot which, in ordinary temperature, never missed."

This opened my eyes at once to the source of the trouble my Canadian correspondents had experienced, and on communicating with them I find the statement confirmed by several who have had the opportunity of making the trial at different seasons. The most natural explanation seems to be that a change of temperature causes a condensation of the moisture in the air contained in the cartridge, which so dampens the fulminate as to destroy its explosive power. But, whatever may be the cause, the fact comes to me from so many sources and from men who could have no interest in making misstatements, that I cannot doubt it, and as it is one which interests every man who uses a gun it ought to be known. The trouble of capping is a trifling matter compared to the annoyance of continual missfires.

H. W. S. Cleveland.

Danvers, Mass., May 6, 1865.

Washing Wool with Glycerin.

Messrs. Editors:—In reading an article in No. 15, current volume, of your valuable paper, on "Applications of Glycerin," I notice that it is used by "manufacturers of woolen goods" in place of oil. As soon as I read the article I procured some from one Gasco, and tried it for oiling wool for carding. It seemed to work well, except that it gummed up the cards more than oil will do, and the cards would not clear of wool as readily as they ought. I reduced it with water but it did not seem to obviate the difficulty. Can you inform me if anything is mixed with the glycerin to make it applicable to lubricating wool? If not I fear I shall not be able to do anything with it. I was really in hopes when I read the article that the difficulty of scouring woolen goods could be obviated.

J. H. Smith.

Newark, Ohio, May 10, 1865.

[We have no knowledge on this matter further than was stated in the extract referred to. Perhaps some of our readers may give the information sought.—Eds.

Paper on Damp Walls.

Messrs. Editors:—Will you be kind enough to inform me what I can do to keep paper on damp walls. I thought of saturating good hardware or manilla paper in coal tar, and drying, and then put it on the wall, and if it dried, have the wall paper put over it. A Subscriber.

Louisville, Ky., May 3, 1865.

[Perhaps some of our correspondents can give the desired information.—Eds.

Iron Manufacturers among the Africans.

The nodules of ore are generally smelted in the forests, and brought in a lump to the smith, who by means of stone anvils and stones as sledge hammers, converts it into a long rod; and finally, by a hand vice and grease from a small pot he carries, it is tied between two posts and drawn till it becomes a thread. It is now fit, after being once heated, for being twisted nearly, with the finger and thumb, round a few hairs from the tail of a cow, or the thicker hair of a giraffe. In this state it is worn in rings ornamenting the ankles of men and women, fifteen of them costing one string of beads, value one half-penny, and fifteen copper or brass ones being double price. Iron hoes, adzes, grass hooks, small knives, pincers, etc., are all made up by the natives, in the above rude way, and this is the extent of their knowledge in iron work.—*A Walk across Africa, by Captain Grant.*

Novelty in Iron Smelting.

On Thursday, April 27, in the presence of Sir R. Brisco, Bart., Messrs. W. Galloway, Jr., W. Higgins, and others interested in iron smelting and founding, a new and very successful system of smelting was exhibited at Messrs. Woodward's, Queen Foundery, Ancoats, Manchester. The ordinary method of smelting iron is by blowing through two or more tuyeres a powerful blast of air into the cupola which has been charged with pig iron and coke. To produce the blast in the cupola exhibited on the old method, a 4-ft. fan, requiring eight horses' power, was employed. By the new method, invented by the Messrs. Woodward, that fan, and all its usual accompaniments of shafting, strapping, oil, and wear and tear have been dispensed with. The cupola shown was 2ft. 4in. diameter, and of the usual hight. At its upper portion, immediately above the part where the charge is put into the cupola, a steam pipe $1\frac{1}{4}$-in. bore, is inserted into a wrought-iron chimney, about equal in length to the depth of the cupola below. The action of the jet of steam thence projected is to create a partial vacuum below it, and, as a consequence, a strong draught of air through the mass below. The working of the furnace is described as follows:—"The fire is lighted and the charge thrown on in the usual manner, after which the door at the charging hole is closed; the steam is then turned on and admitted into the funnel. The column of steam now rushing along carries or draws with it a quantity of air from below, thus producing a partial vacuum immediately above the fuel and metal to be acted upon. All being closed at the top the only place left for the air to enter is ten openings at the bottom, through which it flows in one constant and unbroken stream, acting on all parts of the fuel alike, thus securing a general and uniform heat throughout the furnace, consequently a more perfect combustion of the fuel." It was stated that the new method saves a large quantity of coke and that a much better kind of casting is now obtained from a common class of pig iron than could possibly have been got formerly. For smelting a tun of iron little over a cwt. of coke is required, while the bringing down of the molten metal is performed much quicker. An advantage to persons outside the works is the absence of glaring blaze and shower of fiery sparks always found in the old method. In fact a little steam issuing from the chimney top, or top of the cupola, was the only external indication that the blast furnace was at work. The extreme simplicity of this invention strikes one with wonder that so valuable a discovery had not been made long since, especially when we remember that in our locomotives a jet of steam has long been projected into the fire-box to increase combustion, and by its aid to raise steam from a pressure of 30 lbs. to one of 120 lbs. in twenty minutes. Another advantage of this invention consists in its easily allowing cupolas to be worked in situations where it is inconvenient to have

steam engines, as on men of war, and in warfare for casting shell, etc., and in many other situations. In foundries where it is found requisite in cases of "breakdowns" to work unexpectedly late at night, this invention will be of great value, as it can be got to work within a very brief time without any engine power. A further improvement in this apparatus will shortly be completed, by means of which the upper portion of the cupola will be surrounded by a boiler, which will supply steam to the cupolas at a still further reduction on the present trifling cost. Several of the largest ironworks in Manchester are applying the invention to their present cupolas; and there is little doubt that in a few years this mode of smelting iron from the ironstone as well as from the pig will become general.—*Iron Trade Circular.*

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Hernia Truss.—This truss is a very superior one for ordinary inguinal hernia, whether by the oblique or direct descent. The pad is of an elongated, conoidal form, and is so arranged as to adapt itself most perfectly to the groin and thigh, to which it is secured by means of a soft, buckskin strap. The spring extends as far as the spine, where it is connected with a band carried round above the opposite hip, and fastened to the pad in front. The device is well suited for cavalrymen, mechanics and laborers, who are obliged to perform varied and sudden movements and contortions of the body, as it does not shift its position upon the parts. Its merits have been confirmed by reports of investigation by adepts in the medical profession. The inventor of the above is Dr. C. W. Betzel, of Philadelphia, Pa.

Illuminated Sign.—The object of this invention is to obtain a sign with transparent letters so constructed and arranged that it may be inserted in a sidewalk flush with the pavement or upper surface thereof, and be sufficiently strong to sustain the weight of persons passing over it, and admit of having a light placed under it to render the letters visible during the night. J. L. Tarbox, New Orleans, La., is the inventor.

Mouthpiece for Cigarettes and Cigars.—This invention consists in the use of short, rounded pieces of rattan or bamboo, which are purified before use by passing steam through the pores of the same. They are afterwards inserted in the ends of the cigarettes, which are filled with Killickinick or other tobacco, in the usual manner. The advantages of this mouthpiece are that it absorbs the oil of tobacco contained in the smoke, and prevents the fine particles of the tobacco from being drawn into the mouth, and it affords a clear draft, and its cooling properties are great, for the reason that the smoke is obliged to pass through so many small holes in the mouthpiece before it reaches the mouth, which tends to purify it as well as cool it. The same article is also used as a mouthpiece for cigars, which provides a firm bearing for the teeth while smoking. The advantages of cigarettes over cheap cigars are, that they last nearly as long, draw freely, and are of uniform quality. T. C. Richards, of New York city, is the inventor, and the cigarettes are manufactured by Richards & Co., of No. 97 William street, New York.

Shingle Machine.—This invention relates to a new and improved shingle machine of that class in which a circular saw is used, and it consists in having the bolt from which the shingles are cut fitted in a swinging frame, arranged in such relation with the saw, provided with a novel feed mechanism, and operated in such a manner that the shingles will be sawed from the bolt and the latter fed to the saw by an automatic arrangement throughout. Isaac N. Voris, Pescadora, Santa Cruz County, Cal., is the inventor.

Boring Wells.—This invention has for its object the boring of oil and other deep wells, and it consists, among other things, of a method of clearing the bore of the well of the debris produced by the action of the drill, by forcing water down through the drill rod, which is made hollow, and compelling it to ascend outside the rod to the surface of the earth, bringing with it the said debris from the bottom of the bore. Leonard Atwood, Norwich, Conn., is the inventor.

Fire-arms.—This invention promises to revolutionize the art of war, by placing in the ranks or in a defensible position an effective force equal to one hundred and fifty discharges per minute from each gun. From experiments made under the inspection of ordnance officers, a rate of three discharges per second was kept up, the penetration being superior to the Springfield rifle, and the range being varied from one hundred to eight hundred and fifty yards. It was conceded that one of Mr. Gatting's guns worked by two men would put a larger number of shots into an average target at four hundred yards than one hundred men. The shooting was performed under the inspection of the officers having charge of the experimental department. The barrels and locks rotate in concert and continuously, and each load is delivered as its barrel arrives at a certain point. Fixed ammunition is used, being fed to the gun from cases set into a hopper. R. J. Gatting is the inventor.

Loom.—This invention consists in the application of two endless screws gearing in wormwheels on the axles of the calendar rolls, which carry the warp threads and the finished fabric in such a manner that a positive and uniform strain is exerted on the fabric as well as on the warp threads, and no back motion is possible; also in a peculiar shedding motion, consisting of a rocking frame applied in combination with the rolls delivering the warp threads, in such a manner that by the rocking motion of said frame yarn is given to the tread at the proper intervals, and the strain exerted on the warp threads by the operation of producing the shed is materially reduced; further, in a peculiar device for producing the selvedge on both edges of the worm fabric by imparting to one or two threads, at each side of the loom, an up-and-down motion independent of the motion of the harness; also in a peculiar double stop-motion, consisting of a rockshaft which extends across the loom in front of the batten and which is provided with two hooks, one at either end, to operate in combination with an oscillating dog and with the belt shipper, in such a manner that when the weft thread breaks or gives out at either end of the shuttle race the oscillating dog engages with the tail of one of the hooks on the rockshaft and the belt is changed; but if the weft thread is intact in its place, the hooks by coming in contact with the same turn the rockshaft and the oscillating dog produces no change in the position of the belt. Wm. Tunstell, assignor to T. H. Conklin, No. 33 Courtland street, New York, is the inventor.

Improved Governor.—This invention consists in the use of two semicircular springs hinged to the top of the governor spindles, in combination with three balls, two of which, with the governor balls, are secured to the springs on opposite sides of the spindle, whereas the third ball or weight is connected to the lower ends of both springs, and also to the rising and falling rod, which connects with the throttle valve in such a manner that when the speed of the engine rises beyond a certain point, the gravity of the middle ball or weight and the force of the springs are overcome by the centrifugal force of the governor balls, and the valve is partially or wholly closed; and as the speed of the engine slackens, the gravity of the weight and the force of the springs cause the governor valves to recede and the valves open. The governor balls are secured to the springs by means of screw rods, so that they can be adjusted closer to or further from the center of rotation and the governor can be adapted for different speeds without changing its driving pulley. F. S. LaFrance, of Elmira, N. Y., is the inventor.

Sewing Machine.—This invention relates to certain improvements in that class of sewing machines which are used to sew on the soles to boots and shoes, and the mechanism is arranged to imitate the operation of sewing on the soles to turned round shoes, or to such shoes which are turned inside out in order to sew the soles to the upper. A curved hook needle inserted into a suitable head is made to pierce the sole and upper, which are secured to the last and held in the proper position by an adjustable gage. The last is adjustable on a movable platform, which is arranged to receive lasts of different size, and an adjustable feeder feeds the work along and determines the length of the stitches. The stitch is produced by the combined action of the hooked needle, of a looper which works side by side with the needle, and catches and retains each loop, until the needle with a new loop has passed through, and of a curved oscillating thread-guide, which delivers the thread at suitable intervals to the hooked needle. The stitch is drawn up tight as the needle recedes, and during the time the needle moves forward, and the thread is relieved from all strain, the feed takes place, which would be impracticable during the time the thread is subjected to a strain, or while the needle recedes. M. J. Stein, New York city, is the inventor.

Coal at Cost.

Hunt's Merchant's Magazine contains an article on the "Coal Fever," from which we extract a part referring to coal-at-cost companies: it gives an insight into the management of them:—

One day a man came into the office of the writer—an honest hard-working letter carrier, who had proved his thrift by laying up from such a slender business, a little sum of $200. He came to ask about one of these companies—whether he would better invest his $200 in ten shares of the stock, and so be insured an annual perpetuity of ten tuns of coal at cost. "Why do you think of it?" asked I.

"Because you fellows are making three or four dollars a tun out of me on coal."

"Speak for yourself, my friend—I have no interest in coal, though I know others who have. But how do you know that any one is making three or four dollars a tun out of you?"

"Because everybody says so. Didn't the ——— have an article last night saying that coal can be bought at Mauch Chunk at $3 50, and sent here for $3 50—making $7—and here," pulling out a receipt, "is Anthracite & Co.'s bill for my last at $12."

"True, and in another column of the same paper you find the notice of the 'Consumers-own-your-own-mines Company,' don't you?"

"Exactly, and as I thought you knew something about it, I just came in to ask you."

"Well," I suggested," I don't *know* that there is any connection between the two notices, and I'm sure the honest editor has no suspicion of it, but I happen to know something of the company spoken of, and advise you to turn over in your mind as you carry round your letters, the reason, if you can, why people are so anxious to sell their coal property, when they are getting five dollars a tun profit on the product."

The poor fellow scratched his head doubtfully; but suddenly a bright idea struck him.

"It is always the way with you fellows," he said—determined to class me with the capitalists—heaven send he be a prophet! "You are always keeping a fellow down. You are in the trade, and you want to keep me from getting coal cheap. I'll put into this company and try it."

"But," I replied, with missionary spirit, "suppose a time comes when coal is sold by all the dealers at considerably *less* than cost, as it will be, if they have any stock on hand when the war ends, and gold goes down—what then?"

"Well, then I won't buy my coal of my company, but get it as cheap as I can."

"But what will become of your stock, then, in a company that was 'watered' 100 per cent, and that has to sell coal under that disadvantage below cost?" Scratch.

"And then, suppose coal continues high and profitable, what is to prevent your company from passing a resolution some day that they find this supply of subscribers at cost a losing operation, and rescinding the whole arraugement?"

"But they can't do it."

"Don't trust them—that's my advice."

My friend gathered up his package of letters, smiling.

"Ah, you fellows are always down on a poor man—I believe I'll take the stock."

And so he will, and the fact may be a good enough comment on the uselessness of advising a man who has made up his mind.

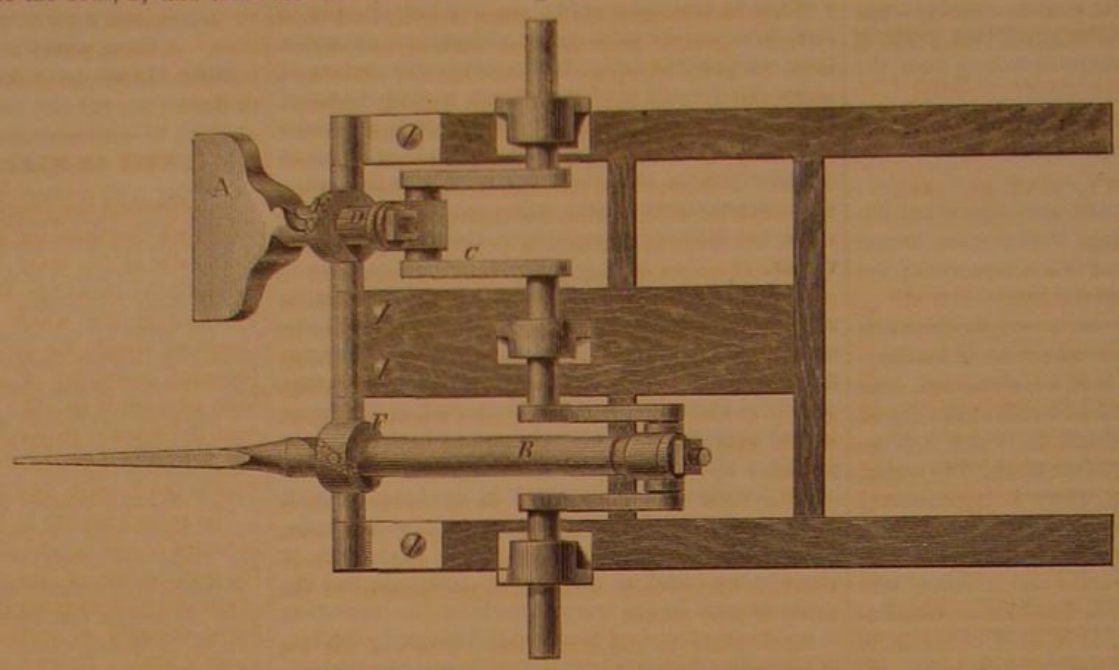
On the 31st December last there were 143 Lenoirs' gas engines working in Paris, and giving every satisfaction to the users. The Paris Gas Company state that the sale of their gas has increased in consequence of the use of these engines.

Improved Spading Machine.

This machine is intended to be attached to an ordinary wagon box or frame, and be operated from the wheels or axle of the same, so that by this attachment and an ordinary vehicle as much work can be done as with a heavier and more costly machine.

This device is so simple in its construction and action that it hardly needs a detailed description. That the reader may comprehend it clearly, however, we will state that the spades, A, which may be of any desired form, are fastened to the rods, B, and that these rods receive a thrusting motion from the crank shaft, C, which is to be driven by a pulley or gears from the wheels of the wagon. The rods, A, have slots or grooves, D, in them, in which there are pins, E; these pins have rollers, so that they work easily in the grooves.

The reader will observe that the groove is formed at the bottom (near the spade) into a spiral, so that when the rod, A, is forced through the stationary collar, F, on nearing the bottom the pin runs in the spiral and turns the rod, so that a twisting motion is given to the spade, such a movement, in fact, as is given by the laborer in turning up the ground. One of the spades, it will be seen, is shown turned edgeways; this is the position assumed in leaving the ground; that of entering is shown with its face forward. If deemed desirable, forks may be used instead of spades, and an attachment may be put on so as to distribute manure at the same time. This machine was patented through the Scientific American Patent Agency by Charles H. Stratton, of Towanda, Pa., Jan. 10, 1865. For further information concerning sale of rights, etc., address as above.



STRATTON'S SPADING MACHINE.

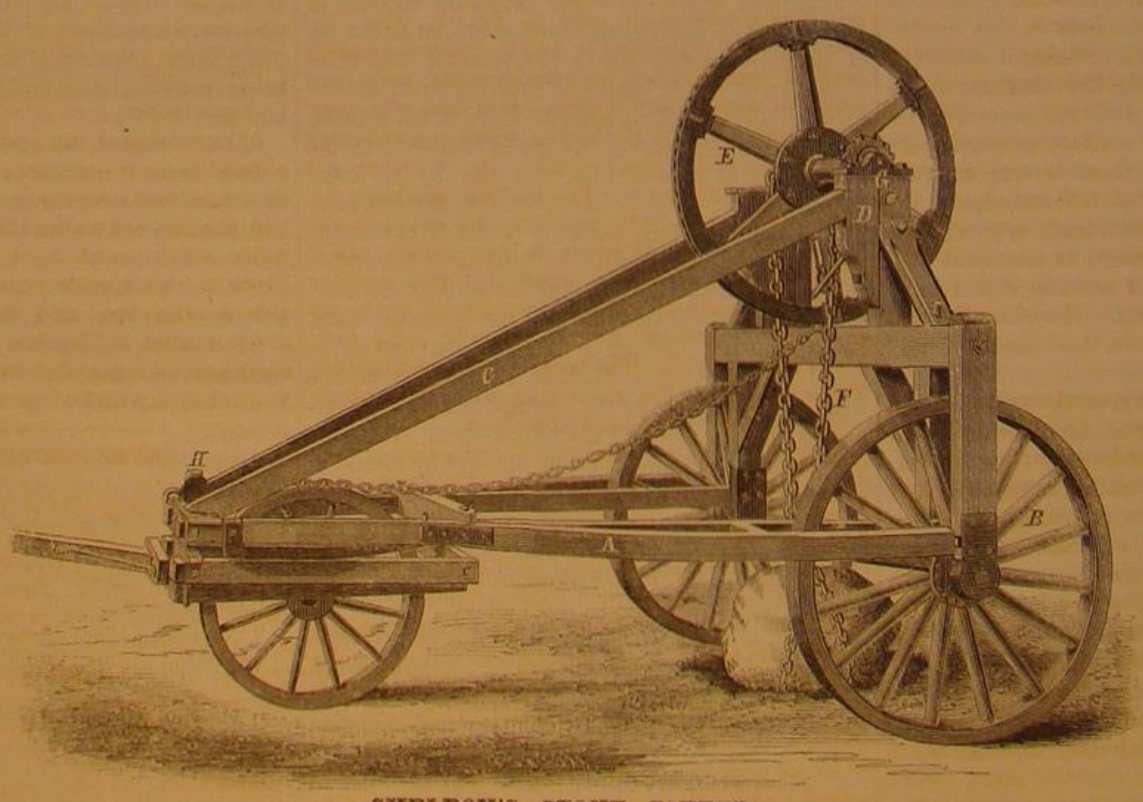
Improved Stone Lifter.

Farmers, road-contractors and others will appreciate the stone-lifting truck herewith engraved, for it is so simple in its construction, and withal so efficient, that rocks of great size and weight, which could not be moved on a "stone boat" or sledge, can be easily transported by it to any point and there thrown off. The expedition with which this can be done is one great point in its favor, for it adds very much to its utility. The appended description will enable every one to understand its construction and operation.

The truck has a strong wooden frame, A, well supported by bolts and braces, which is mounted on the wheels, B. These wheels run between the sides of the truck frame, which is so constructed as to afford a clear space in the middle to swing the stone in.

The forward end of the frame is carried on another truck with one wheel beneath, and two strong legs or braces, C, run from the truck frame to the upright, D, which carries the lifting machinery. This latter is simply a wheel and axle, E, one of the mechanical powers having a chain which is wound over the axle in opposite directions. This chain has a pulley wheel at the bottom to which is fixed a hook, which fastens in the sling around the stone to be lifted. By simply removing the team from the pole of the machine and attaching it to the chain, F, the stone is raised, and may be sustained by the pawl and ratchet, at G, while it is carried off the field to its final destination.

The peculiar feature in the forward wheel or wheels is, that by turning it or them at right angles with the other pair behind, the truck is firmly anchored without requiring any other attachment. The pulley receives the front end of the chain and guides it, at the same time obviating the necessity of using a snatch block, which takes time, and is a trouble to secure. Thus all the necessary qualities of a stone lifter are provided in this machine. An application for a patent is pending through the Scientific American Patent Agency. For further information, address Gilbert L. Sheldon, Hartsville, Mass.



SHELDON'S STONE LIFTER.

The Magnesium Light for Light-houses.

The London *Mechanics' Magazine* says:—An extensive series of experiments have recently been made in France with a view to testing the suitability of the magnesium light for light-house purposes, and for signalizing at sea. The result of these experiments appears to be that, for the applications in question, the light of burning magnesium is not only by far the most effective that we are yet acquainted with, but also the most convenient, and, even with magnesium at its present comparatively high price, by much the cheapest. The only light which in the least approaches it in power is the electric light, but, for equal apparent areas of light-giving surface, the electric arc does not give more than two-thirds as much light as a magnesium flame; and whereas the electric light requires for its production very complicated apparatus, difficult of transport, costly to work, and very liable to get out of order, all that is required for the production of the magnesium light is a supply of magnesium wire and a match to light it, while enough magnesium wire to supply a light-house for a whole night could easily be carried in a waistcoat pocket. As regards cost, M. Gaudin, of the Bureau des Longitudes, who has gone very minutely into that question, reports that, for signalizing at sea, with magnesium at thirty shillings an ounce—its price has been reduced within the last fortnight to twelve shillings an ounce—the magnesium light need cost only one penny per signal, for signals visible for twelve miles at noon-day, and for thirty-six miles at night. By means of burning magnesium, the commander of a ship at sea might illuminate the ocean on every side of him, as often as he chose per night, and at a cost of only a few shillings per time, sufficiently to enable him to see any object which at the same distance from him he could see by day, and might thus prevent any vessels which wished to elude him having any better chance of doing so at midnight than at broad noon.

ANCIENT MEXICAN ZODIAC.

Le Moniteur says that M. Montholon has just caused to be executed a copy of the great Mexican zodiac which was disinterred in the foundations of the grand temple of Mexitli in 1790, and which is now deposited against the northeast wall of the cathedral. This zodiac is an enormous stone of porphyritic trap, with a base of basalt, thirteen feet in diameter, and weighing 25 tuns.

The sculpture in relief has all the finish of Mexican works. The concentric circles, the divisions and subdivisions without number, are traced with mathematical exactness. The more this sculpture is examined in detail the more there is discovered that taste for the repetition of the same forms, that spirit of order, that sentiment of symmetry which, among semi-civilized people, replaces the sense of the beautiful.

This zodiac, to which is joined a calendar, shows that the civil year of the Aztecs—solar year—was 365 days. It was divided into 18 months, of 20 days each, after which there were added 5 complementary days before commencing a new year. As among the people of Benin and the ancient Javanese, 5 days constituted their week. They had periods of 13, 52 and 404 years. Their civil day, like that of the Persians, Egyptians, Babylonians, and for the most part the people of Asia, with the exception of the Chinese, commenced at the rising of the sun. As among the Romans, it was divided into eight intervals, four of which were determined by the rising and setting of the sun and his two passages of the meridian. The comparison of the Mexican zodiac with that of Denderah cannot fail to be of great interest for science. The copy made by M. Montholon is expected soon in Paris.

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SALT AS A FERTILIZER.

From 88 to 99 per cent of the substance of all trees and other vegetables is made up of the four organic elements—oxygen, hydrogen, nitrogen and carbon; the remaining 1 to 12 per cent consists of various mineral substances. The organic portion may all be derived from air and water; the mineral matter must come wholly from the earth. When a plant is burned, the organic portion passes away in the form of gases, and the mineral matter remains as ash.

The mineral substance of plants is made up of 12 elements, which are found in the plant in combination either with each other, with oxygen, or with some metal. These elements are—

Potassium	Chlorine
Sodium	Iodine
Calcium	Sulphur
Silicium	Phosphorus
Aluminum	Iron
Magnesium	Manganese.

The proportions in which these several elements occur in plants vary widely with different plants and in different parts of the same plant; with a given part of a given plant the proportions are pretty constant, though even in this they are subject to considerable modification by the age of the plant, the season of the year, the composition of the soil, and other influences.

Two of these elements—chlorine and sodium—chemically combined, form table salt. Chlorine occurs in plants in minute traces only, but sodium forms a considerable proportion of the ash. It is usually found as soda, which is a combination of sodium and oxygen. Chlorine is a green gas, extensively used for bleaching. Sodium is a metal, lighter than water. Its affinity for oxygen is so great that if thrown upon water, it decomposes the water, combining with the oxygen to form soda, and setting the hydrogen free.

Meyen and Sprengel ascertained that salt is decomposed in the leaves of plants, the chlorine being given off, and the sodium, combining instantly with oxygen to form soda, remaining in the plant. Perhaps the bleaching of cloth spread upon grass is in part due to the action of chlorine thus eliminated. This decomposition takes place only in the night.

Soda, resulting from the decomposition of salt, affects the growth of vegetation, not only by contributing its substance to build up the structure of the plant, but also in two or three less direct ways. One of these is by aiding in dissolving the mineral constituents of the soil. One of the principal ingredients in the ash of plants is silica; this mineral is abundant in nearly all soils, but it is not soluble in pure water. By the addition to water of potash or soda, its power of dissolving silica is materially increased.

Soda also exerts a powerful influence in dissolving the organic constituents of soils; it is therefore a valuable ingredient in compost heaps. In this application it may be obtained from salt, by adding quicklime to the heap, in about equal proportions with the salt.

It has been suggested that there is a third action of soda in vegetable growth—that curious and mysterious property which some bodies have of effecting a combination between other bodies without undergoing any change themselves. They perform the part of managing mammas, in making matches between others. It is supposed that salt in soda may perform this catalytic office within the tissues of the growing plant, but there is no positive proof of such action.

The influences of salt being thus various, and in part unknown, it is of course impossible for chemical science to determine whether in any given case its use would be profitable or otherwise. This can only be ascertained by experiments, carefully and intelligently conducted. But there are a few facts known which may be useful in giving direction to experiments.

Both soda and potash are found in the ashes of nearly all vegetables, but, as a general rule, soda predominates in the ashes of marine and sea-shore plants, while potash occurs in larger quantity in the ashes of land plants.

As districts in the immediate vicinity of the sea shore are watered by salt spray, the use of salt in these localities would be less likely to be beneficial than in inland situations.

From the different propotions of soda contained in the ashes of various plants, it is probable that some kinds of crops would be more benefitted by salt than others. Among those most likely to be benefitted are turnips, potatoes, clover and grasses.

Positive conclusions, however, are to be reached only by experiment, and there is perhaps no better subject for a liberal money prize from some of our agricultural societies than the best series of experiments to test the value of salt as a fertilizer.

THE LENOIR GAS ENGINE.

We have, in previous numbers of the SCIENTIFIC AMERICAN, adverted to this engine, describing its construction and general principles of action. It is now being extensively used in France, where the inventor first introduced it, and is gradually finding favor in this country, as arrangements have been made to manufacture it here. It is used with common street gas, and the boiler, which is a necessary appendage of the steam engine, is, of course, not needed. The practical utility of such machines depends solely upon their economy, and not upon the degree of ingenuity apparent in their details, and it is therefore interesting to know that this machine produces a horse-power for about twelve cents per hour, at the present rate of gas per cubic foot, which is very high. Half-horse power machines are built which run at the same rate, six cents per hour—this cannot be considered exorbitant.

A curious fact attending the introduction of this machine here is, that the heat generated by the combustion of a given quantity of gas is much higher than that given out by a similar quantity abroad. This occasioned some little mechanical difficulty, which has been remedied. These engines generally run at an average velocity of 175 revolutions per minute, and can be easily managed by any one. We look upon machines of this class as highly desirable for many purposes where steam is objectionable, and we learn that many of them are in use in different places for driving light machinery. Those interested in such things can see one of these engines in operation at the Dry Dock Iron Works, foot of Tenth street, East River, this city.

FOOT-POUNDS OF WORK.

Work is the overcoming of physical resistance, such as the crushing or breaking of bodies, the displacement of fluids, or the raising of weights. The simplest mode of measuring and expressing a given quantity of work is the raising of weights; and the raising of any body weighing one pound one foot in hight is called a foot-pound of work. The raising of 1 pound 10 feet high, or the raising of 10 pounds 1 foot high, is 10 foot-pounds of work.

It will be observed that the amount of work is entirely irrespective of the time in which it is accomplished. A foot-pound of work is the raising of 1 pound 1 foot in hight, whether one second or one hundred thousand years be occupied in the operation.

Power, on the other hand, is the energy competent to accomplish a given amount of work in a given time. A horse power is the constant force which can perform 33,000 foot-pounds of work in every minute of time.

A UNIT OF HEAT AND SPECIFIC HEAT.

In measuring the temperature of any substance or body by a thermometer, the quantity of the substance or the size of the body have no influence upon the indications; these are the same if we employ a pint of water or the whole ocean. Philosophers have, therefore, sought for some mode of measuring or expressing *quantities* of heat. The plan which has been adopted is to take as the unit of quantity of heat the amount required to raise the temperature of one pound of water one degree of Fahrenheit's scale. This is the English and American unit of heat.

The same quantity of heat that will raise the temperature of one pound of water one degree will raise the temperature of one pound of iron nine degrees, or of one pound of mercury thirty-three degrees. This different capacity of various bodies for heat is called specific heat. Water has the highest specific heat of any substance known, except hydrogen, and is taken as the standard; the specific heat of other substances being expressed in fractions. The following table is given by Prof. Silliman, most of the figures having been originally taken from the experiments of Regnault.

TABLE OF SPECIFIC HEAT—WATER—1·0000.

SOLIDS.			
Aluminum	0·2143	Platinum	0·0324
Sulphur	0·2026	Lead	0·0314
Iron	0·1138	Phosphorus	0·1887
Cobalt	0·1070	Arsenic	0·0814
Nickel	0·1086	Silver	0·0570
Copper	0·0952	Iodine	0·0541
Zinc	0·0956	Antimony	0·0508
Selenium	0·0762	Gold	0·0324
Tin	0·0562	Bismuth	0·0308
LIQUIDS.			
Mercury	0·03331	Bromine	0·11094
GASES AND VAPORS (equal weights.)			
Atmospheric Air	0·2379	Carbonic Acid	0·2164
Oxygen	0·2182	Sulphide of Carbon	0·1575
Nitrogen	0·2440	Sulphurous Acid	0·1553
Hydrogen	3·4046	Ammonia Gas	0·5080
Chlorine	0·1214	Olefiant Gas	0·3694
Bromine	0·0552	Water Vapor	0·4750
Nitrous Oxide	0·2238	Alcohol Vapor	0·4513
Nitric Oxide	0·2315	Ether Vapor	0·4810
Carbonic Oxide	0·2479	Chloroform	0·1568

A knowledge of the specific heat of substances is of value in many practical applications. For instance, on the railroad over the mountains from Italy to Austria, the cars are warmed by means of vessels of hot water, which are changed at the several stations. From its high specific heat water is peculiarly suitable for this use, as a pound of it, in cooling a given number of degrees, gives out nine times as much heat as a pound of iron, and thirty-three times as much as a pound of mercury.

CHEAP SOLVENT FOR GOLD.

It is well known that there is no single acid which will dissolve gold, but that this metal is readily soluble in a mixture in the proper proportions of nitric and muriatic acids. This mixture has long been known as *aqua regia*, royal water. It is composed of 1 part nitric acid of 32° Beaume=1·28 specific gravity, and 4 parts hydrochloric acid of 22° Beaume=1·178 specific gravity.

As the idea has been advanced of employing this liquid for extracting gold from quartz in place of the usual process of amalgamating with mercury, Professor Seely, without indorsing the plan, suggests that if any miners or mining companies wish to try it, *aqua regia* might be more cheaply prepared by using certain salts, containing one of the acids, than by employing both of the acids in their pure form.

One of these plans is to mix together a solution of salt—chloride of sodium—in water, and nitric acid. Under the action of the nitric acid both the salt and the water are decomposed; the sodium of the salt

combines with the oxygen of the water, forming soda, and setting free the hydrogen, which combines with the chlorine of the salt forming hydrochloric acid:

$$Na\ Cl + H\ O\ NO_5 = ClH + Na\ O,\ NO_5.$$

Thus we have hydrochloric acid, and the nitric acid must be in proper proportion to form with it *aqua regia*.

Another plan is to mix together saltpeter, nitrate of potash, and hydrochloric acid. A portion of the hydrochloric acid operates to decompose the saltpeter, setting free its nitric acid, which mingles with the remaining hydrochloric acid to form *aqua regia*.

$$ClH + KO,\ NO_5 = NO_5 + ClK + HO$$

Still a third method is to mix together salt, saltpeter and sulphuric acid, water also being present. The sulphuric acid decomposes both the salt and the saltpeter, setting free nitric acid and forming hydrochloric.

$$Na\ Cl + KO,\ NO_5 + 2SO_3 + HO =$$
$$Na,\ SO_3 + KO,\ SO_3 + ClH + NO_5 + O.$$

Gold may be percipitated from a solution in *aqua regia* by sulphate of iron.

THE GAME OF CROQUET.

From illustrations and remarks in *Punch* and other English papers, during the last two or three years, we have seen that the new game of Croquet was becoming very popular in England, and it is now being introduced into this country. Ten arches, each 12 inches in hight and 10 in width, formed of iron rods three-eighths of an inch in diameter, are arranged in various ways, and the game consists in driving wooden balls through these arches in prescribed order. Each player is provided with a ball of boxwood or maple about three inches in diameter, and with a long-handled wooden mallet for knocking the ball along the ground, and sides are chose of four or less in each party.

Messrs. Hurd & Houghton, No. 401 Broadway, New York, have published an exceedingly neat little pamphlet giving full directions and rules for playing this game. The following extract will give a good idea of the graceful and sprightly style in which the work is written:—

"The popularity of Croquet is easier to account for than its origin. All of a sudden there appear upon the surface of England, and now also here and there in America, numberless little arches and stakes, while excited people armed with mallets drive colored balls through the arches and at the stakes hour after hour. Nobody knows how the game started; they only know that it is great fun. Nobody even knows why this ingenious combination should be called *Croquet* at all. In vain the Frenchman bows to the Englishman and thanks him for the game, and would he be so kind as to say what possible connection there can be between knocking the balls about in the prescribed manner, and the process of crackling, of devouring, of making a first sketch in drawing, of filching or pilfering—all of which significations the verb *croquet* enjoys? The Englishman thanks the Frenchman for the word, and can only offer still more mysterious explanation afforded by the noun *croquet*, a hard gingerbread nut. *Roquet* serves us no better, for what likeness is there between a pug-dog and that musical sound of the clacking of two balls?

"We must leave the name and origin of the game to be fought over in 'Notes and Queries;' and as for the significance of it, we wait patiently for some philosopher to expound the subtle manner in which the game sets forth the epic course of life, where each player starts like the rest, each makes the arches of triumph or affliction, each passes the critical turning stake, and each at last goes out as a dead ball, while all friends or enemies, exert or are subject to influence from one another."

SPECIAL NOTICES.

George P. Gordon, Brooklyn, N. Y., has petitioned for the extension of a patent granted to him on the 5th day of August, 1851, (reissue No. 1,021), for an improvement in printing presses.

Geo. P. Gordon, Brooklyn, N. Y., has petitioned for the extension of a patent granted to him on the 5th day of August, 1851, (reissue No. 1,022), for an improvement in printing presses.

Wm. H. Akins, Dryden, N. Y., and Jacob D. Felthousen, Michigan City, Ind., have petitioned for the extension of a patent granted to them on the 5th day of August, 1851, for an improvement in sewing machines.

Parties wishing to oppose the above extensions must appear and show cause on the 17th day of July next, at 12 o'clock, M., when the petitions will be heard.

Allen B. Wilson, Waterbury, Conn., has petitioned for the extension of a patented granted to him on the 12th day of August, 1851, (reissue N. 913), for an improvement in process of forming stitches by machinery.

Allen B. Wilson, Waterbury, Conn., has petitioned for the extension of a patented granted to him on the 12th day of August, 1851, (reissue No. 914), for an improvement in process of forming stitches by machinery.

John McAdams, Brooklyn, N. Y., has petitioned for the extension of a patent granted to him on the 12th day of August, 1851, for an improvement in machine for numbering the pages of account books.

Parties wishing to oppose the above extensions must appear and show cause on the 24th day of July next, at 12 o'clock, M., when the petitions will be heard.

Hubbard Harris, administrator of Alpha Richardson, deceased, has petitioned for the extension of a patent granted to him on the 16th day of September, 1851, for an improvement in leather-splitting machines.

Parties wishing to oppose the above extension must appear and show cause on the 28th day of August next, at 12 o'clock, M., when the petition will be heard.

Notes on New Discoveries and New Applications of Science.

In the famous Inaugural Address which he delivered before the British Association for the Advancement of Science at its meeting at Newcastle in 1863, and which first drew the attention of the general public to the possibility of the eventual exhaustion of our coal-fields, Sir William Armstrong expressed his anticipation that a time will come when the water-power which so abounds in mountainous countries will be utilized by man to a far greater extent than it has ever been as yet. "There is another source of motive power," he said, after having alluded to the agency of the sun in originating coal, "to which I am induced to refer, as exhibiting a further instance in which solar influence affords the means of obtaining mechanical effects from inanimate agents. I allude to the power of water descending from hights to which it has been lifted by the evaporative action of the sun. . . . . Alpine regions abound in falls which, with the aid of artificial works to impound the surplus water and equalize the supply, would yield thousands of horse-power; and there is at least one great river in the world which, in a single plunge, develops sufficient power to carry on all the manufacturing operations of mankind, if concentrated in its neighborhood. Industrial populations have scarcely yet extended to those regions which afford this profusion of motive power, but we may anticipate the time when these natural falls will be brought into useful operation. In that day, the heat of the sun, by raising the water to hights from which to flow in these great rapids and cascades, will become the means of economizing the precious stores of motive power which the solar energy, differently directed, accumulated at a remote period of geological history, and which, when once expended, may probably never be replaced." M. Cazal, of Paris, has just suggested a novel method of turning to practical account the sources of motive power thus referred to. We recorded, a fortnight ago, a plan for converting the mechanical force of falling water into heat; M. Cazal would convert it into electricity. He would employ the water to work magneto electric machines, and, by means of insulated wires, would convey the currents thus obtained whithersoever he required work doing, and would there transform the electricity back into mechanical force again. Among a number of plans, all based on this principle, which he has devised for the accomplishment of special objects, is one for locomotion in mountainous regions, by means of railways, the trains upon which should be propelled by eletro-magnetic engines, similar to that of MM. Bellet and de Rouvre, the currents working these engines being generated in the way just indicated. He thinks that by this method the streams with which mountain districts usually abound might be made to supply the motive power for railway locomotion in such localities, at a cost very much less than that of steam, and he is at pains to show that railways to be worked on this principle might be constructed very cheaply, since electro-magnetic motors, propelled by means of a magnetic attraction between their driving-wheels and the rails, could ascend inclines quite impracticable for steam-locomotives. The idea is at least ingenious.

Looking-glass is ordinarily "silvered" by means of an amalgam of tin. A sheet of tin-foil is spread upon a level slab, and a suitable quantity of mercury is poured evenly over it. The glass plate which is to be converted into a mirror is then slid over the layer of mercury, and then pressed down by means of heavy weights. The pressure thus applied to the glass squeezes out any excess of mercury, and causes the amalgam formed by the action of the mercury on the tin-foil to adhere firmly to the glass. This is the usual method of coating glass for mirrors, but there has latterly been coming into use a process in which silver proper is employed. This process is a chemical one, the silver being precipitated on the glass from a solution of one of its salts. For application to small mirrors, this "pure silver process," as it is called, possesses no particular advantages, being, for mirrors below a certain size, although not more costly, yet not appreciably cheaper, than the old process, but for large mirrors it is very much cheaper indeed; its cost per given area of silvered surface, being just the same in the case of a large mirror as in that of a small one, whereas the cost of the old process, per given area of surface silvered by it, increases with the size of the mirror, owing to the production of sheets of tin-foil free from flaw being much more difficult, and consequently much more costly, the larger the sheets are. A modification of the "pure silver process" is now being introduced, in which platinum is used instead of silver. It is conducted as follows:—"Chloride of platinum is dissolved in water, and a certain quantity of oil of lavender is added to the solution. The platinum immediately leaves the aqueous solution and passes to the oil, which holds it in suspension in a finely-divided state. To the oil so charged litharge and borate of lead are added, and a thin coat of this mixture is painted over the surface of the glass, which is then carried to a proper furnace. At a red heat the litharge and borate of lead are fused, and cause the adhesion of the platinum to the softened glass." In mirrors coated with platinum by this method, the platinum coating, we are told, may be placed on the outer surface of the glass, and thus the imperfections of the latter be hidden, and inferior qualities of glass be made as serviceable, for the construction of mirrors, as much more costly qualities coated at the back.

A kind of silkworm which had not been heard of in Europe until lately is being a good deal talked about in France. It was first discovered in Montevideo, and hence received the name of Bombyx Platensis, but it has since been found in many other parts of the South American continent. It feeds upon the leaves of a species of mimosa, for which the name of Mimosa Platensis has been proposed, and to the growth of which certain French gentlemen well qualified to judge of such matters believe that both Algeria and the south of France are as well suited as the regions to which it is indigenous. Careful endeavors to acclimatize it will be made both in France and in Algeria, and there seems to be little doubt that they will be successful, and lead to results of great importance to the silk manufacture. We should add that the leaves on which the new silk-worm feeds are not the only valuable product yielded by the new mimosa. From its bark, especially in hot seasons, exudes a large quantity of gum, equal in quality to the very best gum-arabic, and its seed vessels are so rich in tannin that they will doubtless, when obtainable in quantity, receive numerous important practical applications.

M. Hozeau, of Rouen, has made a series of investigations, extending over four years, upon the amount of the action exerted by the atmosphere, at different seasons, upon the iodized paper used as a test for ozone. He finds that this action is always greater in spring than in summer, in summer than in autumn, and in autumn than in winter. It is least in February, begins to increase in March, and reaches its maximum in May and June.—*Mechanics' Magazine.*

MISCELLANEOUS SUMMARY.

ANCIENT PAPER.—Mr. Toulmin Smith, in examining a mass of rolls at the Record Office, dated 1388, made the discovery that linen paper was thus early used in England. The quality is peculiar, and is apparently an imitation of the texture of vellum. Mr. Smith, who has carefully examined the paper under the microscope, believes that he has found out the secret of its manufacture. It is as durable as vellum, and after five hundred years of very bad treatment it has proved itself to be equally valuable for the preservation of public records. This discovery raises the question as to the date of the first paper manufactured in England. —*The Reader, London.*

WATER ON COACH VARNISH.—It should be observed says a cotemporary, that the more vehicle varnish is exposed to the air, and sponged with cold water after completion and before delivery, the harder will the varnish become, and thus the more durable will be its brilliancy. It is also very desirable for new carriages to be carefully sponged with plenty of cold water immediately after being used, taking care that the surfaces are wiped nicely with a chamois leather to prevent spotting. Vehicles quickly become shabby when this caution is neglected, for the varnish remaining tender for some time is the more susceptible to injury from dirt and dust.

A NEW SUGAR CANE.—One of the U. S. officials in Japan has forwarded to the Government a specimen of sugar cane grown in that country resembling the sorghum which comes from China. It is grown from layers instead of seed. It is thought that the peculiarity of its propagation, should it prove otherwise successful, would give it an important advantage over sorghum, preventing hybridizing with millets, and consequent deterioration. A large portion of it was destroyed in the long voyage, but enough is sound and already sprouting to enable the Department, a year or two hence, to make a distribution of it.

A NEW color called "green cinnabar" is stated by a foreign cotemporary to be prepared in the following manner:—Prussian blue is dissolved in oxalic acid, chromate of potash is added to this solution, which is then precipitated with acetate of lead. The precipitate, well washed, dried, and levigated, gives a beautiful green powder. By varying the proportions of the three solutions, various shades of green may be procured. Coloride of barium or nitrate of bismuth may be used in place of sugar of lead.

THE total length of Atlantic telegraph cable made up to the close of last week, was 1,993 nautical miles, and of this quantity 1,400 have been shipped on board the hulks *Amethyst* and *Iris*, for coiling on board the *Great Eastern*, at Sheerness. The Telegraph Construction Company have announced that the *Great Eastern* steamship is now open to the inspection of visitors.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to the Office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt on their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired

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VOLUME IV., VII. AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MAY 9, 1865.

Reported Officially for the Scientific American.

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

47,608.—Corn Planter.—J. N. Adams, Birmingham, Iowa:

I claim the plungers, F, placed at the outer side of the wheels, B, and provided with the notches or seed cells, b, in connection with the springs, K, hoppers, G, and inclined planes or surfaces, H, all arranged to operate substantially as and for the purpose herein set forth.

[This invention relates to a new and improved corn planter of that class in which the seed-distributing apparatus is connected with or attached directly to the wheels, and it consists in a novel construction and arrangement of said seed-distributing apparatus, whereby it is believed that a very simple, efficient and desirable corn planter is obtained, and not liable to get out of repair or become deranged by use.]

47,609.—Oil-boring Apparatus.—Leonard Atwood, Norwich, Conn.:

I claim the combined pile driver and boring apparatus, when made, constructed and operated in the manner and for the purpose herein set forth.

Second, The combination of a hollow tube and drill attached thereto, through which water can be forced by any usual power, when said tube rod or drill has at its lower end slots or holes, through which the water is forced into the well, expelling therefrom the debris or detritus from the well upon the outside of the drill rod or tubes, when the same is combined with the gear wheels, C5 C5, drill rotating apparatus, F e f g, when constructed in the manner and for the purpose herein described.

Third, The movable cross-head, G, pitman rods, I, guides, G', and standards, B, in combination with the levers, J, in the manner and for the purpose herein described.

Fourth, The adjustable stops, H H, in combination with the levers, J J, in the manner and for the purpose herein described.

Fifth, The hinged clamps, K K, in combination with the cross-piece, U, and drill rod, D, in and for the purpose herein described.

Sixth, The movable collar, V, in drill rod, D, and combined therewith, and with the arm, F, ratchet and pawl, g, friction roller, e, and curved plate, E, in and for the purpose herein described.

47,610.—Mode of Manufacturing Superphosphate of Lime.—Edwin P. Baugh, Philadelphia, Pa.:

I claim, First, Converting bones and other offal and guano into superphosphate of lime, by causing the same to be thoroughly mixed with an acid in a closed, or nearly closed, tank, substantially in the manner described.

Second, The combination of the spiked roller and concave, or other equivalent, disintegrating mechanism with the said tank.

47,611.—Method of Treating Manure.—Edwin P. Baugh, Philadelphia, Pa.:

I claim drying the sewage of cities, poudrette, guano, and similar substances used as fertilizers, by passing through a mass of the material to be dried the products of combustion from any adjacent fireplace.

47,612.—Trusses.—Charles William Betzell, Philadelphia, Pa.:

First, I claim the pad, a, formed with a prolongation, b, and fitting the inguinal region in such a way and having such shape that the movements of the thigh or body cannot move it from its proper position, as herein set forth.

Second, I claim the spring, d, when employed in connection with the pad, a, in the manner and for the purpose herein described and represented.

Third, I claim the strap, b', extending from the prolongation of the pad between the thighs and across the gluteal muscle, and hitched or fastened to the button, c, on the spring, d, for the purpose of preventing any upward movement of the pad, substantially as set forth.

Fourth, I claim the strap or girdle, e f, occupying a position above the crest of the hip bone, extending across the abdomen, and fastened to the button, a', on the pad, a, to prevent the displacement of the pad in a downward direction, and operating in connection with the strap, b, to prevent lateral displacement.

47,613.—Coupling Shafts of Boring Tools.—Jesse N. Bolles, Baltimore, Md.:

I claim the adaptation of a safety joint to either round, square, hollow or solid boring or drilling rods (and the various tools connected therewith) for boring or drilling rods used in the construction of artesian wells, oil wells, and for other purposes, so adjusted with right and left-hand threads, or outer and inner screws of different sizes (whether right or left hand), with nipple, lock-nut and collar so as to render disconnection of the rods impossible while in operation, as herein described, or any other mode, substantially the same, which will produce the intended effect.

47,614.—Corn Planter.—William H. Boyle, Cazenovia, N. Y.:

I claim the two slides, E E, provided with the shoulders or projections, e, and acted upon by the springs, b, in connection with the drop composed of the pivoted block, I, in the slide, G, acted upon by the wheel, L, provided with an arm, i, and all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved device for planting corn in hills and in check rows, and it consists in the employment or use of two slides in connection with a drop bar, operated through the medium of its own gravity or a spring and wiper wheel or cam driven from one or both wheels of the machine, whereby the corn may be dropped at equal distances apart with certainty and precision.]

47,615.—Ash Sifter.—T. W. Brown, Cambridge, Mass.:

I claim the combination of the cover, B, hinged at e, and having a downwardly projecting front, A', the sieve, E, handle, F, and back door, D, all the said parts being constructed and arranged as and for the purpose herein specified.

[This invention consists in a novel arrangement of parts in an ash sifter, whereby the sieve is inclosed in a box whose top is hinged to form a cover, the lower part of the box being made a receptacle for the fine ashes and refuse.]

47,616.—Ink Well.—F. C. Brownell, East Orange, N. J. Antedated April 24, 1865:

I claim, First, Constructing an inkstand so that its lid or pen-hole cover cannot be opened without moving both vertically and horizontally, or in two different directions, substantially as set forth.

Second, Constructing an ink well so that its lid or cover for the pen hole may be locked or unlocked by means of a key or other suitable instrument, substantially as and for the purposes specified.

Third, The use of an oval-shaped flanged ring or socket, in combination with an ink well or its cover or top, constructed so as to be fastened to or loosened from a desk by turning, substantially as specified.

Fourth, Constructing an ink well whose top or cover can be fastened to or loosened from a desk or socket by turning, with a lid or pen-hole cover so constructed that it may be used as a means of turning the same, substantially as and for the purposes set forth.

47,617.—Refrigerator.—L. D. Bunn, Morristown, N. J.:

I claim, First, A refrigerator constructed with double air-inclosing walls, and adapted for refrigerating meats and other articles, when the exterior surface of the air-inclosing double wall is covered with felt, cloth or flock, or other similar material, substantially as and for the purpose described.

Second, The arrangement of chamber, G, ice chamber, E, and a cooling apartment, F, for containing the articles to be refrigerated, substantially as specified.

47,618.—Cultivator.—Peter S. Carhart, Collamer, N. Y.:

I claim the adjustable pivoted soles or plates, D, attached to two or more of the shares, B, of the cultivator, and arranged with levers, F, or their equivalents, substantially as and for the purpose specified.

[This invention relates to a new and useful improvement in a cultivator, for which letters patent were granted to this inventor on June 10, 1862.]

47,619.—Boiler Furnace.—Thomas H. Clark, St. Louis, Mo.:

I claim the combination in a boiler furnace, where several boilers are arranged in the same horizontal plane, of flues, B, made concentric in their cross-section with the bottoms of the boilers, and which extend beneath the boilers in the direction of their length, and are separated from each other by ridges, A, with the transverse channels, C C', and air channels, D D E E', substantially as above described.

[This invention consists, among other things, in causing the products of combustion to be equally distributed under the boilers of furnaces, and in preventing them, where several boilers are set in the same bench or block, from passing diagonally away from the boilers most remote from the chimney, and escaping without heating such distant boilers.]

47,620.—Knitting Machine Burr.—John Clute, Cohoes, N. Y.:

First, I claim making the wings of a knitting machine burr with shoulders, d, and parallel center tongues, c, substantially as and for the purpose set forth.

Second, The combination of the shoulders, d, and parallel tongues, c, of the wings with oblique radial slots, a, and a circular groove, b, in the wheel, A, said groove being turned in the wheel either from the inside or outside, substantially as and for the purpose described.

[This invention consists in the use of wings or sinkers, provided with a parallel projection or tongue, in combination with a wheel or bush, furnished with a series of oblique radial slots and with a circular groove turned or otherwise produced in the rim of the wheel from the inside or outside in such a manner that the shoulders of the wing formed on the sides of the tongue bear against the bottom of the radial slot, and the tongue fits into the circular groove, and by these means said wing is held securely in its position, and very little solder is needed to fasten it to the wheel or bush. The wings can be punched out, and if the radial slots are cut in to the same depth precisely, no turning of the wings is required after the same have been secured in the wheel.]

47,621.—Steam Engine.—Ebenezer Danford, Geneva, Ill.:

First, I claim attaching the hemispheres (or the upper and lower chambers of other form) to the upper and lower sides of the bed-plate.

Second, Placing the generator immediately over the fire, with the cylinder in immediate connection therewith, when the said generator is used as a chamber in which a portion of water is flashed into steam for the purpose described.

Third, The combination of the generator, the cylinder and the interposed slide-valve, which is actuated so as to open and close the passage, S, at the specified times, for the purpose described.

47,622.—Corn Planter.—John R. Davis, Bloomfield, Iowa:

I claim, in combination with the wheel frame, A, runner frame, B, rigid tongue, D, and rigid lever, E, the lever, F, fulcrumed by the link, e, to the rigid lever, E, connected loosely at its lower end to the frame, A, by the link, f, and held at its upper end by the notched bar, G g, spring, F', and catch, f, all the said parts being constructed and arranged to operate in the manner and for the purposes herein specified.

[The object of this invention has been to produce a contrivance whereby the runners of a corn planter may be more readily adjusted to work at any required depth, and effectually held in either of the various positions to which it may be raised or lowered.]

47,623.—Pattern for Cutting Boots.—Alvah D. Drew, Dixon, Ill.:

I claim an adjustable pattern composed of two parts or plates, connected together and arranged substantially as shown, for the purposes of cutting leather for boots, in the improved or patented form or style specified.

[This invention relates to a new and useful pattern for cutting leather for boots in such a manner as to form a continuous seam and at the same time avoid the labor of crimping. This mode of cutting boots, or rather cutting the leather for boots, was patented October 13, 1863, and the object of the invention is to obtain an adjustable pattern to facilitate the cutting of leather for boots in this manner.]

47,624.—Portfolio Stand.—L. Dubernet, New York City:

I claim a portfolio stand, A, with folding side wings, c, made adjustable by spring catches and serrated segments, or their equivalents, constructed and operating substantially as and for the purpose set forth.

[This invention consists in a portfolio stand, the side wings of which can be turned down and adjusted in any desired inclination in such a manner that whenever it is desired to examine the contents of one or more of the portfolios resting on the stand, one or both wings can be turned down to a horizontal or inclined position, and the portfolio can be opened without removing it from the stand, thereby saving much labor and time, and much tear and wear to the portfolios.]

47,625.—Lamp Burner.—James P. Egan, Zanesville, Ohio:

I claim the combination of the plate, A, provided with openings, l, and an oblong opening, a, with a corrugated lip, a*, at each side of the latter; the curved or floating channels or guides, B B, and the cap, C, having openings, d, at its sides and a slot, e, in its upper or face side, all constructed and arranged to be applied to a wick tube of a lamp, to operate substantially as and for the purpose herein set forth.

[This invention consists in a burner for lamps which is attached thereto by suspending it upon the wick so as to give the air which supports the flame the same access to the wick in all adjustments of the wick.

47,626.—Cotton Gin.—William B. Emery, Albany, N. Y. Antedated May 5, 1865:

I claim fastening the ribs of the breast to slotted plates or bars, in the manner and for the purpose substantially as described.

47,627.—Steam Generator.—Robert and Henry V. Farles, Indianapolis, Ind.,

First, We claim a steam generator constructed of rings of pipes

A, communicating with each other through transverse holes or eyes, a, in the manner and for the purpose substantially as set forth.

Second, The combination of two or more coils, A D, communicating with each other by eyes, a b', and pipes, c d, substantially as and for the purpose described.

Third, The deflecting plates, f g, in combination with the coils, A D, applied and operating substantially as and for the purpose specified.

Fourth, The dove-tailed flanges, l', and frame, l, in combination with the pipes, A, and fire door, F, constructed and operating substantially as and for the purpose set forth.

[This invention relates to steam generators, the distinguishing features of which consist in its being constructed principally of circular and semicircular pieces secured together by bolts and guarded with transverse openings or eyes which form the communication between the adjacent sections of pipes and give a free passage to water and steam through the entire structure. Two or more sets of pipes are arranged one inside the other and connected at the top and bottom so that steam and water can pass freely through the entire series of pipes. Suitable slats placed on the top of the inner and outer series or coils of wires serve to deflect and equalize the heat throughout the entire boiler, and those pipes opposite the fire door are cut off and their ends closed and provided with dove-tailed flanges, so that a frame can be attached thereto to support the fire door.]

47,628.—Carriage Jack.—Reuben Fink, Batavia, Ill.:

First, I claim the lever, C, in connection with a fixed bearing or a sliding one, F, bar, D and notches, b, in the base, A, all arranged substantially as and for the purpose specified.

Second, The cord or chain, E, connected to the bar, D, and lever, C, substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient jack which may be applied to the axles of either light or heavy wheel vehicles, and both to the front and back axles of the same vehicle, for the purpose of raising the axles to admit of the ready removal of the wheels and replacing the same for lubricating purposes.]

47,629.—Hemming Guide.—William Gaskill, Cincinnati, Ohio:

First, I claim the hemming guide or scroll composed of the attached inter convoluted and winged plates, A a and B b, for imparting a double tuck or fold to the edge of the stuff, substantially as set forth.

Second, The plate, A a and B a, and the central prolongation, G, frame, d, combined and operating as set forth.

47,630.—Hemming Guide.—Wm. Gaskill and George H. Knight, Cincinnati, Ohio:

First, We claim the provision at the receiving end of a hemming scroll of the abruptly shouldered axial head or knob, F, of diameter greater than that of the outer convolution of the scroll, for the automatic cross crimping of the cloth edge, in the act of entering the scroll, substantially as set forth.

Second, A hemming scroll provided, at its receiving end, with the screw threaded axial prolongation, f, having the adjustable head or knob, F, as set forth, or its equivalent.

47,631.—Battery Gun.—Richard J. Gatting, Indianapolis, Ind.:

First, I claim making the series of barrels with their appropriate locks and cartridge cavities to revolve on an axis, while the requisite motions to perform the loading directly into the rear end of the barrel, exploding, and the cartridge case retracting operations, are retained by the impingement of points on the revolving mechanism, upon fixed spirals, cams or inclined planes; these several operations being performed consecutively without stopping the rotation of the barrels, when the gun is in operation.

Second, I claim the locks, figures 12 and 13, which revolve with the barrels and breech and are operated by the cam faces and springs during their revolution.

Third, I claim the cam ring, figure 5, which is rigidly attached to the diaphragm of the stationary casing, and which by means of its cam faces controls the longitudinal reciprocating motions of the locks by means of the lugs and the impingement of the butt ends of the lock upon it, substantially as described.

Fourth, I claim the caps to be placed over the cavity in the carrier to shut of the feed, substantially as described.

47,632.—Hemmer for Sewing Machines.—Harvey Goebel, New York City:

I claim, in combination with a cone shaped scroll, the center guide, C, constructed and operated as and for the purposes specified, substantially as described.

47,633.—Apparatus for Ventilating.—Henry A. Gouge, Brooklyn, N. Y.:

First, I claim the apparatus described, when constructed to promote ventilation, with substantially the parts, operating in substantially the manner explained.

Second, the inclined plane, current controller, E, arranged substantially as and for the purposes shown.

47,634.—Apparatus for Generating Gas from Petroleum.—David M. Graham, Evansville, Ind.:

I claim, First, Heating the generating chamber, A, from the oil in the receiver, C, through an ordinary gas burner, a', for the purpose of generating gas for the continuation of heat by gas alone from the gasometer, D, through and by the same burner, substantially in the manner as herein set forth.

Second, The receiver, C, gas burner, a', and pipe, b, in combination with the generating chamber, A, whereby the same is heated by the oil, substantially in the manner and for the purpose as herein set forth.

Third, The gasometer, D, piping or tubes, c, and gas burner, a, in combination with the generating chamber, A, whereby the same is heated by gas, substantially in the manner and for the purpose as herein set forth.

Fourth, The cylindrical chamber, B, in combination with the generating chamber, A, whereby the heat is condensed and retained around the same, substantially in the manner as herein set forth.

Fifth, The gasometer, E, in combination with the generating chamber, A, whereby an additional power is given to force the gas through distributing pipes, in the manner as herein set forth.

47,635.—Horse-shoe.—Loring M. Guitean, Batavia, N. Y.:

I claim, First, A horse-shoe constructed of V-form in its transverse section, substantially as described.

Second, Constructing the shoe of two parts, A A, of V-form in their transverse section and connected by a pivot or joint to admit of the expansion of the shoe under the growth of the hoof, as set forth.

Third, The oblique nail holes, d, in combination with the transverse, V-form of the shoe and the two parts thereof, connected by a pivot or joint, substantially as specified.

[This invention consists in constructing a horse-shoe of V-form in its transverse section, so that a sharp edge will be formed all around the bottom of the shoe in order to prevent slipping and to avoid the use of calks; and having the shoe composed of two equal parts connected at their pent ends by a joint, which is at the center of the pent part of the hoof, in order to admit of the shoe expanding under the growth of the hoof, the shoe being formed with oblique holes through which the nails pass from the inner side of the shoe into the hoof, the heads of the nails being above the sharp bottom of the shoe.]

47,636.—Rotary Steam Engine.—Samuel Harris, Rochester, Mich.:

I claim, First, The combination of the arm, F, with the shaft, D, constructed and operating substantially as described.

Second, The arrangement of the arms, E E', on the shaft, D, with the cupped disc, C, its buckets and flange, C', the whole constructed and operated substantially as described.

47,637.—Seed Planter.—Martin Hayden, Rochester, Mich.:

I claim, First, The adjustable or movable bar, X, provided with the tooth, u, in combination with the pinion, G, having a vacant or absent tooth, and provided with a notched plate, H, for the purpose herein set forth.

Second, The lever, I, arranged and combined with the pinion, G, plunger rod, K, valve shaft, N, and seed cup, Q, to operate substantially as and for the purpose specified.

Third, The placing of the seed cup, Q, on an axis, e, provided at one end with a crank, i, in connection with the curved slot, j, in the bar, k, for the purpose of tilting the seed cup, as described.

Fourth, The combination of the valve, M, plunger rod, K, seed cup, Q, when arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved seed planter for planting seeds in hills and in check rows, and also in drills if desired.]

47,638.—Lamp Shade.—Amariah M. Hills, Hockanum, Conn.:

I claim a lamp shade, composed of paper or other suitable material, made in the form of a frustum of a cone or other approximate shape, and fitted on a horizontal metallic rim or band, which is secured to a vertical extension support, having a clamp at its lower end to fit upon the neck or socket of the lamp-burner thereof, substantially as herein set forth.

I further claim the particular manner of constructing the clamp, as herein shown and described, to wit: of a spring bent so as to form rather more than a semi-circle, and having levers or finger pieces attached for the ready adjustment of the clamp to the lamp or burner, as described.

[This invention relates to a new and improved shade or reflector for an ordinary portable lamp, to relieve the eyes from the flame, and to throw the light down upon the work or article looked upon. The object of this invention is to obtain a shade which may be readily applied to and detached from the lamp, and one which will not render the room so dark as the ordinary shades in use.]

47,639.—Harvester.—A. A. Heath, West Greenville, Pa.:

I claim, First, The combination of the collar, b, of the bevel wheel, H, pinion shaft, G G, and clutches, I I, arranged substantially as and for the purpose herein set forth.

Second, The caster wheel, C, attached to the frame, O, applied to the main frame, A, of the machine, substantially as shown, in combination with the lever, F, applied to the machine, substantially as shown, to operate in the manner as and for the purpose specified.

Third, The combination of the pitman, N, pendulous bar, X, standard, W, link, n, and sickle, Y, arranged and operated as and for the purpose described.

[This invention relates to an improvement in the sickle-driving mechanism, whereby the machine is rendered capable of being readily turned and backed, and the parts rendered durable and not liable to catch the cut grass or grain as the machine is drawn along in order to perform its work. The invention also relates to an improved means for raising and lowering the finger bar and sickle, and to an improvement in the construction and arrangement of the sickle and manner of applying the pitman thereto.]

47,640.—Washing Machine.—E. Hodgkins, Carthage, N. Y.:

I claim an oscillating tub, constructed and operated as described, in combination with radial arms, E, and fixed slats, b, and grating, a, with pivots, F F, as above set forth.

[This invention has for its object to construct a washing-machine, which can be made at a small cost, be operated with little labor, and by the use of which clothes will not be worn and injured by being rubbed between opposing surfaces.]

47,641.—Cultivator.—James Hollingsworth, Chicago, Ill.:

I claim, First, The use of spring shovel beam, which will admit of a lateral swinging movement of the shovels, substantially as described.

Second, Constructing cultivator shovel beams of wood and metal, substantially as described.

Third, The rock shaft, E, provided with loose arms, c d, and lever, E, for enabling the attendant to elevate the shovel beams singly or together, at pleasure, substantially as described.

47,642.—Mop Head.—Nelson Homes, Laona, N. Y.

I claim the screw, C, in connection with the nut, B, and sleeve, G, the latter being provided with ratchet teeth, c, and arranged on the part, F, of the screw rod with a spiral spring, H, the part, F, being provided with slots and notches to receive the spurs of the sleeve, and connected with the jaw, I, as shown, and the jaw provided with ratchet teeth, b, all arranged substantially as and for the purpose set forth.

[This invention relates to a new and improved means for moving the adjustable bar or jaw of the mop head, whereby the same may be readily moved for securing the mop in the head, and releasing it therefrom, and at the same time prevented from moving casually.]

47,643.—Lock Valve for Canal Gate.—Walter W. Jerome, Rochester, N. Y., and Lewis K. Cole, Syracuse, N. Y.:

We claim the combination and arrangement of the wheel, W, the two chains, C C', provided with screw shanks and nuts, the rod, R, and the lever, L, constructed and operating in the manner and for the purposes described.

47,644.—Horse-rake.—James D. Jones, Pittsburgh, Pa.:

I claim the arrangement of the flexible seat, g, levers, r s and t, ratchets, l l and j, adjustable set screw, n, regulating link, 5, axle, a, wheels, b and b', and teeth, l, the whole being constructed, arranged and operating substantially as and in the manner herein described and for the purpose set forth.

47,645.—Setting and Adjusting Glazier's Diamonds.—M. Kleeman, Columbus, Ohio:

I claim, First, Making the shoe adjustable, on the diamond holding bar, substantially as and for the purpose described.

Second, The furrow, k, on the shoe, substantially as and for the purpose set forth.

Third, The gage, g, in combination with the pin or pins, h, projecting from the bar, b, substantially as and for the purpose described.

[This machine is intended to apply a motive power upon the piston of an engine, by means of the instantaneous generation of steam, from water injected into a generator, which communicates immediately by means of a valved opening with the cylinder in which the piston works.

47,646.—Conductor's Check Box.—Thomas W. Knox, New York City:

I claim, First, A conductor's check box, whose top, E, is perforated, as shown at f, to receive passenger's tickets, whose bottom, f, is hinged, so as to be capable of being opened; both the top, E, and bottom, F, being inclosed respectively by outer covers, B B', substantially as above described.

I also claim the springs, a a, on either side of the slot or perforation, f, in combination with the partition, D, of the cover, B, substantially as and for the purpose above described.

[This invention consists of a box to receive checks issued to passengers by officers and conductors on railroad cars and other conveyances, and which is so secured that its contents cannot be removed without exposure.]

47,647.—Harness Saddle-tree.—Adolph Koehler, Holyoke, Mass.:

I claim securing the check rein hook, G, between the seat, C, and tree, A, by means of the lug or projection, a, combined with the screw, E, as described.

I also claim, in combination with the screw, E, the screw, D, passing through the lip, b, and into the pendant projection, c, for the purpose of securing the rear part of the seat to the tree, as described.

[This invention relates to an improved saddle tree, of that class which are constructed of cast metal, and it consists in casting the tree of such a form and securing the saddle and the hook to the same, in such a manner that a perfectly smooth surface will be obtained at the under side of the tree, and the back of the horse prevented from being injured or galled, as is more or less the case on account of projections, such as nuts, bolts, etc., extending below the under surface of the trees.]

47,648.—Governor.—T. S. LaFrance, Elmira, N. Y.:

I claim, First, The hinge joints, c, in combination with the springs, E E, spindle, C, balls, G G, and weight, F, constructed and operating substantially as and for the purpose described.

Second, The screw studs, g, or their equivalents, in combination with the balls, G G, and springs, E E, substantially as described, so that the distance of the balls from the center of rotation can be regulated at pleasure.

Third, The combination of the springs, E E, balls, G G, weight, F, and rod, f, all constructed and operating substantially as and for the purpose set forth.

47,649.—Kingsbury's Coal Stove.—Wm. E. Lane, Peekskill, N. Y.:

I claim the combination of the semi-jacket, C', with the empire heater of G. J. Kingsbury, for the purpose and in the manner substantially as set forth.

47,650.—Gas Cooking Stove.—Edwin A. Leland, New York City. Antedated April 26, 1865:

First, I claim the employment in a gas cooking stove of one or more burners, arranged directly under the oven, in combination with flues below, at the sides and on the top of the oven, substantially as herein specified.

Second, In combination with the burners under the oven, and the flues under and at the sides thereof, I claim the setting-in of the upper part of the oven, substantially as shown at d e, in Fig. 2, whereby the heat is enabled to be radiated downward on to the contents of the lower part of the oven, as herein set forth.

Third, I claim the employment of a system of burners so applied in the lower and upper parts of a gas cooking stove containing an oven that the products of combustion from the lower burner or burners pass through the upper burner or burners, and the latter is or are supplied with air through the former, substantially as herein specified.

Fourth, The arrangement of the upper burners and the partition, h, in relation to each other, and to the set-in upper partitions, d e, of the sides of the oven, substantially as herein described, whereby the products of combustion from the lower burner are caused to pass over the horizontal parts, d, of the said set-in portions, and so to produce a downward radiation of heat on the contents of the lower part of the oven, as herein set forth.

47,651.—Explosive Shell.—H. W. Libbey, Cleveland Ohio:

I claim the shell, A, having two chambers, B and C, when the side walls of the latter spring from the further and outer extremities of the former, forming a double cone-shaped chamber, constructed at the center.

47,652.—Pump.—Geo. Marshall, New York City:

I claim the combination of a perforated hollow piston, C, tubular piston rod, D, centrally perforated disk valve, F, and a pump cylinder, which is constructed with a chamber, B, beneath it, and a valve, c, leading into it, beneath the piston, substantially as described.

47,653.—Liniment.—B. Marsteller, Wolf Creek, Pa.:

I claim the within-described composition for a liniment, made in the manner set forth.

[This invention relates to a composition which has a superior healing effect on wounds or bruises caused with sharp instruments, or by blows or other means.]

47,654.—Fluid Ejector.—Robert McGrath, Philadelphia, Pa.:

I claim the reservoir for compressed air and its connecting pipe, with stop-cock attached, and the ring pierced in from, as described, at the bottom of the well.

47,655.—Cultivator.—Joseph Mills, Reading, Ill.:

I claim, First, The vertically adjustable and jointed posts, D D, and the vertically-adjustable jointed and swinging posts, E E, in combination with the rods, K, for the purpose of guiding and adjusting the shovels, substantially as described.

Second, The rotating axle, B, in combination with the jointed posts, D D E E, substantially as described.

Third, The double screw rod, F, and swinging nuts, G, in combination with the swinging posts, E E, substantially as described.

Fourth, The standard, M, in combination with the posts, D D E E, and the axle upon which they are mounted, substantially as described and for the purpose set forth.

47,656.—Casting Tackle Blocks.—Joseph W. Norcross, Middletown, Conn.:

I claim the within-described apparatus for forming the mold for casting the eyes of a tackle block and the eye of a hook or any other two eyes or rings together, or any equivalent means, constructed and operating substantially as herein set forth.

[The principal object of this invention is to cast the eye of a tackle block into the eye of a hook, in such a manner that the two cannot possibly be separated, neither by design nor by accident, except by cutting or splitting either of the eyes. It may, however, be applied for the purpose of casting two rings together, or for other similar purposes.]

47,657.—Canal Propeller.—N. P. Otis, Yonkers, N. Y.:

First, I claim the combination of the rack, J, wheel, I, pulleys, C E, and chairs, D, operating substantially as and for the purposes set forth.

Second, In combination with the above, I further claim mounting the shaft which carries the driving wheel or wheels in slides moving in segmental guide-ways, substantially as and for the purpose described.

Third, The flanged guide-wheel, K, in combination with the rising and falling slide, b, rack, J, and boat, A, constructed and operating substantially as and for the purpose specified.

[This invention consists in the application to a canal boat of one or two wheels mounted on the end or ends of a shaft, which has its bearings in rising and falling slides, moving in segmental guide-ways, and to which a rotary motion is imparted by an engine in the interior of the boat, in combination with a track extending on the side of the canal throughout its entire length, in such a manner that by the action of said wheel or wheels on the track the boat can be propelled with comparatively little power, and without any external power such as usually employed.]

47,658.—Mode of Fastening the Heads to Spools.—Levi N. Parks, Winchendon, Mass.:

I claim the combination and arrangement of the metallic cap, A, with the body, B, the head, C, and the gudgeon, E, of the spool, the said cap being fastened to the head and to the gudgeon and to the body, by means substantially as described.

And in combination with the body, B, head, C, metallic cap, A, and gudgeon, E, applied together as specified, I claim the metallic disk, D, arranged on the external surface of the head, and so as to receive the gudgeon, as specified.

47,659.—Animal Power.—C. M. & G. Richards, Harpersville, N. Y.:

We claim the frame, J, hung upon one or more journals, and provided with arms, d e, which constitute bearings for the shaft, I, of the treadwheel, H, to admit the adjustment of the latter, in the manner herein described.

Second, In combination with the suspended frame, J d e, we also claim the bar or lever, K, provided with friction rollers, f f, and attached to the frame, J, when used in connection with a treadwheel, H, for the purpose specified.

We further claim the mode of constructing the framing of the machine, to wit: of two metallic sides, connected by wooden reaches braced by a transverse metal bar, E, which serve as an inner bearing for the shaft, D, from which the power is taken, substantially as set forth.

[This invention relates to a new and improved animal power, intended either for a horse or a dog or other small animal. It is designed as an improvement on that class of animal powers in which an inclined treadwheel is used, and has for its object simplicity an

economy in construction and a ready adjustment of the treadwheel, as circumstances may require.]

47,660.—Cigarette.—T. C. Richards, New York City:
I claim manufacturing the mouthpieces of cigarettes of rattan or bamboo, in the manner and for the purposes described.

47,661.—Stud and Button.—Samuel S. Ritter, Philadelphia, Pa.:
I claim providing a stud and button with a spring or springs, a, and a notch or notches, b, permitting the two disks, A A, to be coupled and uncoupled at will, substantially as and for the purpose explained.

[This invention relates to a stud whose two disks are capable of being detached and connected, so that in putting it into the bosom or sleeve it will not be necessary to insert the stem or shank through the button-hole, and then apply the detached disk to the opposite side.]

47,662.—Horse Power.—E. P. Russell, Manlius, N. Y.:
I claim the combination and arrangement of the driving wheel, B, with the conical rollers, C, and the taper screw, D, when constructed, arranged and operating in the manner described, and for the purpose of forming a horse power.

47,663.—Spring.—Thomas Shaw, Philadelphia, Pa.:
I claim forming the nib under the groove, in the manner set forth, for the purpose specified.

47,664.—Flower Stand.—P. B. Sheldon, Prattsburg, N. Y. Antedated May 1, 1865:
I claim providing the bearings, b b b, of the arms and their support, D, with radial flutes and corrugations, or their equivalent, for the purpose of retaining the arms in place at any adjustment thereof, and also allowing them to turn when necessary action is applied, substantially as herein specified.

47,665.—Kiln for Burning Brick and Pottery Ware.—J. N. Stanley, Brooklyn, N. Y.:
I claim the employment in a kiln for burning brick pottery ware and like articles of a flue or flues, placed centrally, or thereabout, within the burning chamber of the kiln, and arranged in such a manner that the products of combustion from the furnaces which are placed around the lower part of the kiln will pass directly upward through the mass of bricks, pottery ware or other articles placed in said burning chamber, and thence descend through the central flue or flues down to a horizontal flue, and through the same to the smoke-stack.
I further claim a horizontal flue, E, extending to the smoke-stack, when said flue is used and made to communicate with one or more vertical or central flues in a kiln for the purpose of utilizing the heat which passes from said flues.

[The object of this invention is to economize in fuel in the burning of bricks, pottery ware, etc., and at the same time cause the whole mass of bricks or other articles placed in the kiln to be subjected to a uniform degree of heat throughout.]

47,666.—Sewing Machine.—Michael Joseph Stein, New York City:
First, Mounting the sewing mechanism upon a platform or frame which oscillates upon the driving shaft, substantially as herein set forth.
Second, The rest, R, applied in combination with the sewing mechanism, supported by the hinged platform, G, substantially as and for the purpose set forth.
Third, Giving to the needle, in addition to its usual motion for penetrating and withdrawing from the material, a slight falling and rising motion, by means substantially as herein described, or any other equivalent means, so as to depress its point while entering the material to be sewed, and raise the same when passing out of said material, for the purpose set forth.
Fourth, The hinged adjustable gage, H, applied in combination with the rest, R, and needle, n, substantially in the manner and for the purpose set forth.
Fifth, The last supporter, I, with a series of sockets, l, in combination with a sewing mechanism, constructed and operating substantially as and for the puspose set forth.
Sixth, The vertically-adjustable table, E, in combination with the last supporter, L, and with the sewing mechanism secured to a hinged platform, G, substantially as and for the purpose described.
Seventh, The combination of the hinged oscillating thread guide, t, looper, l, and needle, n, constructed and operating substantially as and for the purpose set forth.

47,667.—Drawing Frame Rolls.—J. M. Stone, North Andover, Mass.:
I claim the improvement in the construction of drawing frame and other similar rolls, substantially as specified.

47,668.—Carding Machines.—Daniel Tainter, Worcester, Mass.:
First, I claim the combination with the main frame of a machine for carding wool and cotton of a supplemental sliding frame for supporting the feed-rolls, burr and leading in cylinder, and operated by rack and pinion, as and for the purposes set forth.
Second, The combination with the sliding frame, H, of the racks, b, pinions, L, and crank shaft, d, for sliding in and out the frame, H, substantially in the manner herein described.

47,669.—Illuminated Sign.—J. L. Tarbox, New-Orleans, La.:
I claim the changable illuminated sign herein described, consisting of a grooved or rebated frame, B, glass plates, D, movable letter plates, C, and confining strip, d^s, all constructed and employed as and for the purposes specified.

47,670.—Air-tight Coal Stove.—Joseph S. Todd, Macon City, Mo.:
I claim the combination of an air-tight, sheet-iron stove, with the basket-shaped grate, and the horizontal cast-iron annular plate, g, as and for the purposes set forth.

46,671.—Hay Elevator.—E. J. Toof, Fort Madison, Iowa:
First, I claim The pivoted beam or pole, C, provided with a rope, D, in connection with and inclined guide bar, E, all being applied to a suitable framing, A, and arranged to operate in the manner substantially as and for the purpose set forth.
Second, The adjustable plate or stop, F, on the rope, D, when used in connection with the pivoted beam or pole, C, and inclosed bar, E, for the purpose specified.
Third, The short inclined plane or notch, f, at the under side of the inclined bar, E, for the purpose specified.

[This invention relates to a new and improved device for elevating articles, and is more especially designed for stacking hay and grain. The invention consists in the employment or use of a single pivoted beam or pole and a single rope applied to a framing, and all arranged in such a manner that the hay, grain or other article being raised will be elevated and deposited in the proper place by a single movement of the beam.

47,672.—Shingle Machine.—Isaac N. Voris, Pescadora, Cal.:
I claim, First, The swinging frame, D, provided with the clamp rollers, H F, arranged as shown and operated through the medium of the rack, h, on bar, R, the pinion, C, levers, S T, and the grooves, i i, in bar, R, substantially as and for the puipose set forth.
Second, The eccentric roller, J, in combination with the spring, I, sliding bar, G^s, lever, K, and fluted rollers, H F, for clamping or holding the bolt, as set forth.

47,673.—Means for Carrying and Operating the Shuttle in Sewing Machines.—James Wensley, New Brunswick, N. J.:
I claim the combination of the slide, H, pivoted traveler, I, pins, d e f, slot, M, horizontal groove, 1 and 3, and inclined groove, 2, employed in connection with the shuttle, B, supported and guided by the tongue, o, all the said parts being constructed and arranged to operate as herein specified.

[This invention consists in certain improvements in the manner of applying as well as in the mode of operating the shuttle in sewing machines, the usual race being dispensed with, and the shuttle being driven to and fro by means of a vibrating carrier or traveler, which has vertical motion to and from the shuttle during each time it traverses the machine.]

47,674.—Linchpin.—George Wright, Washington, D. C.:
First, I claim the safety or embracing arm, D.
Second, The arm, D, in combination with the pin, A, constructed and operated substantially as described for the purpose set forth.

47,675.—Cooking Apparatus.—John Zimmerman, Royalton, N. Y.:
First, I claim the combination of the inner perforated receptacle with the exterior shell or casing and the boiler, substantially as described.
Second, The general arrangement of the containing vessel, consisting of the perforated receptacle and its outer casing and the cooking utensils, as described and represented, adapted for special and characteristic purposes therein.

[This invention relates to a novel steam cooking apparatus, whereby a great variety of articles may be thoroughly cooked with unusual expedition.]

47,676.—Manufacturing of Blacking Boxes.—George W. Bentley (assignor to himself and Charles G. Hine) New York City:
First, The manufacturing of boxes or cases formed of tin or sheet metal with heads of wool or other suitable material I claim turning in at a right angle all round a portion of the metal,to form a seat or shoulder for the end of wool or other suitable material, inserted within the metal after said seat or shoulder has been formed.
Second, I claim inserting the heads of wool or other suitable material within the strips of metal previously soldered and provided with the seats as shown, and creasing the metal for the purposes described.

47,677.—Fuse for Blasting, Etc.—John S. Bickford, Tuckingmill, Great Britain, assignor to Joseph Toy, Sinsburg, Conn.:
I claim the employment in a fuse as a substitute for gunpowder of a central strand or core of gun-cotton, substantially as and for the purpose herein described.

47,678.—Washing Machine.—Henry L. Buckwater, Kimberton, Pa., assignor to himself, T. A. Buckwater, of Kimberton, Pa., and E. Price, Phœnixville, Pa.:
I claim, First, The convex roller bed, B, in connection with a reciprocating roller, C, composed of grooved slats arranged as shown, and controlled or guided in its movement by the slightly curved guides, E E, substantially as and for the purpose specified.
Second, The swivel heads or guide rollers, D, constructed and applied to the rubber and fitted on the guides, E E, substantially as and for the purpose set forth.
Third, The combination of the convex roller bed, B, reciprocating rubber, C, guides, E E, and swivel heads or guide rollers, D, all arranged to operate substantially as and for the purpose specified.
Fourth, The combination of the grooved bottom plate, B', and grooved rollers, B, with a reciprocating rubber, all being constructed and arranged to operate as herein set forth.

[This invention relates to a new and improved clothes-washing machine of that class in which a stationary bed of rollers is employed in connection with a reciprocating rubber.]

47,679.—Apparatus for Carbureting Air.—Edward Dunscomb (assignor to Wm. F. Perkins and L. L. Fuller), Boston, Mass.:
First, I claim the employment of the two air-forcing bells, filling alternately and automatically, thus supplying a constant air-blast, as hereinbefore set forth.
Second, I claim the arrangement and application of the cones and inverted cones, a a' a2, etc., placed base to base and apex to apex, with the lines of perforations, b b' (Figs. 6 and 7), alternating from center to circumference, essentially in manner and to operate as before explained.
Third, I claim the application of the air tube, E, in the generator to conduct the air through the top of the generator to the recess, T, at the bottom, to operate as before described.
Fourth, I claim the recess, T, at the bottom of the generator, making an air cushion, as before described.
Fifth, I claim taking the gas from the top of the generator through the air-bell, C, by means of an air-tight joint, made by the annular cup, O, and the inverted thimble, P, Fig. 5, substantially as herein-before described.

47,680.—Lamp.—Hiram W. Hayden, Waterbury, Conn., assignor to Holmes, Booth & Hayden:
I claim making the wick tube corrugated or fluted with channels in its interior surface, substantially as and so as to operate as specified.

47,681.—Lamp.—Edward M. Lang, Westbrook, Maine, and Isaiah Gilman, Portland, Maine, assignors to themselves, Jos. L. Winslow and E. Hersey:
We claim the above-described combination, as well as the arrangement of the wick tube, E, the two cones, A B, the metallic annular conduit, C, the conductors, D D, and the supports, D'' D'', or the equivalent of the latter.
We also claim the combination of the removable jacket, F, with the two cones, A B, the ring, C, and the wick tube, arranged and connected substantially as specified.
We also claim the contraction of the mouth of the inner cone at its middle, or its expansion in opposite directions therefrom, in combination with the expansion of the mouth of the outer cone at its middle or its diminution in opposite directions therefrom, n manner substantially as represented and hereinbefore described.

147,682.—Skate.—Edgar Murray, New York City, assignor to Fred'k. Wuesthoff, Newark, N. J.:
I claim the combination of the movable runner, c, link, h, and heel screw, k, with the sliding plate, e, and clamps, f f, taking the sides of the sole of the boot, as specified.

47,483.—Saw-filing Machine.—S. P. Ochiltree and E. C. Johnson (assignor to S. P. Ochiltree, W. S. Weir, N. P. Baymount), Monmouth, Ill.:
We claim, First, The shaft, M, provided with one or more toothed plates, N N^1 N^2, and attached to the under side of the slide, L, to which the saw clamps are secured, in connection with the pawl or arm, E', and lever, D^1, the latter being operated by the cam, C, or its equivalent, for the purpose of feeding the saw underneath the file, as set forth.
Second, Providing the lever, D, with an adjustable fulcrum, r, and having the pawl or arm, E', slotted longitudinally with a set screw, F^1, at its rear, for the purpose of regulating the movement of the pawl or arm to suit the size of the teeth of the plates of shaft, M, as described.
Third, The lever A^1, operated substantially as shown, with spring, B^1, applied to it, and connected with the rod, Y, having the plate, X, attached, for the purpose of raising the file during the backward movement of the same, and a spring keeping the file pressed down during its forward movement, as set forth.

[This invention relates to a new and improved device for filing saws, whereby the work may be done in an expeditious and perfect manner, the operation being perfectly automatic throughout, and the device being capable of filing saws with different-sized teeth.]

47,684.—Mode of Pressing Damp Clay.—John Steele, Buffalo, N. Y., assignor to Lawren C. Woodruff, Corydon Karr and himself:
I claim the mode herein described of pressing damp clay or other plastic material, to admit of the escape of the air and moisture therefrom, before the final pressure is imparted, substantially as and for the purposes described.
I also claim the method of pressing the clay for bricks, tiles, and other purposes, by applying the pressure simultaneously from two opposite directions, by means substantially as shown and for the purposes described.
I also claim ventilating the mold by means of the perforations, m m, in one of the parts thereof, which is exposed while being filled, but removed before the pressure is applied, substantially as set forth.

47,685.—Mode of Adjusting Bands on Hand-spinning Machines.—David B. Teter, Batavia Station, Iowa, assignor to himself and Samuel C. Dickinson, Van Beuren County, Iowa:
I claim the method of adjusting bands in spinning machines by means of screws and nuts, in combination with the manner of attaching the band to the pulley, T, as and for the purposes described.

47,686.—Gang Plow.—John E. Travis (assignor to himself and Elon Francisco), Greenville, Ill.:
I claim the combination of the plow frame, B, and its attached plows, with the fixed frame, A, by means of a fulcrum piece, X, or other similar hinged joint, substantially in the manner and for the purpose herein set forth.
I claim the employment of the levers, t and t^1, with their fulcrums, l and l^1, and their connecting links, e and e^1, and their bolt, f and f^1 when combined with the frame, B, substantially as and for the purposes set forth.

47,687.—Loom.—William Tunstill (assignor to Theodore H. Conkling), New York City:
I claim, First, The combination of the shaft, k, worms, g h, wheels, i j, rollers, a a^1 d d^1, rocking frame, b, arm, b2, and cam b^1, when constructed and arranged to operate as herein specified.
Second, The belts, l2 13, and drums, l^1 in combination with the crank, l5, and the heddle cords, l4, constructed and operating substantially as and for the purpose set forth.
Third, The devices above described for effecting the stop motion, arranged substantially as and for the purpose specified.

REISSUES.

1,948.—No. 1.—Machine for Making Cartridge Cases.—Ethan Allen, Worcester, Mass. Patented Feb. 14, 1860:
I claim the mandrel which carries the cartridge shell, in combination with the die, D, which admits the same, and against which the closed end of the cartridge shell is headed, substantially as described.
Second, I claim the die, D, constructed and operating for the heading of cartridge shells, substantially as described.

1,949.—No. 2.—Machine for Making Cartridge Cases.—Ethan Allen, Worcester, Mass.—Patented Feb. 14, 1860:
I claim the sliding mandrel, which advances and supports the shell, in combination with the revolving chuck, which grips and revolves the shell against the action of the cutting tool, substantially as described.
Second, I claim the combination of the sliding and revolving mandrel, C, the revolving chuck, S, and the automatic tool, Q, substantially as described.
Third, I claim operating the cutting tool by the supplemental motion of the mandrel carrier or slide, L, as described.

1,950.—Roving Frame.—George Chatterton, Providence, R. I, assignee of Thomas Mayor, Pawtucket, R. I.:
I claim the construction and mode of arranging the bolster, with the spindle and the transverse rail, or its equivalent, substantially as described, for the purpose specified.

1,951.—Method of Preserving Wood Railroad Ties, Etc. R. S. Foreman, Morrison, Ill. Patented June 21, 1864:
I claim the application to all wood materials liable to rot or take fire, be eaten witk grubs or insects, a composition made of the materials, and applied as and for the purposes herein set forth.

1,952.—Breech-loading Fire-arm.—William Cleveland Hicks, New York City. Patented March 10, 1857:
I claim, First, The combination in a breech-loading fire-arm, with an internally flanged cartridge or cartridge case, a hooked or barbed instrument, under such an arrangement in relation to an outside lever operating the breech as that by opening the breech the cartridge or its case is withdrawn from the barrel.
Second, The employment in breech-loading fire-arms of a breech-piece provided with a hooked prong or prongs, when said prongs are constructed as herein described, to perform the functions of picking the cartridge and striking the percussion primer, and of grasping and extracting the cartridge from the barrel, as set forth.
Third, The employment in breech-loading fire-arms, in which primed cartridges are used and exploded by means of the breech pin, of two or more prongs to insure the explosion of the charge, substantially as set forth.

1,953.—Machine for Making Cement Pipe.—Humphrey Holden, New Haven, Conn. Patented May 9, 1865:
I claim the employment or use in a machine for making cement pipe of a series of rolls, or their equivalents, arranged in connection with a mold; that is, a case and core, in such a manner that the cement will be gradually compressed, or compacted in the mold, from the bottom toward the upper end of the latter, substantially as and for the purpose herein set forth.

1,954.—Hay and Cotton Press.—Ira James, Mattoon, Ill. Patented Feb. 16, 1864:
I claim, First, The provision in a vertically acting beater hay press of sleeve, P, ratchet and brake movements, W and W X, and pulley and toggle movements, a S T, the whole being combined and operating substantially as set forth.
Second, The employment or use of clamps, so constructed and arranged that the hay after being compressed may be removed from the press and retained in its compacted or compressed state, and the bale bound or hooped outside of the press, substantially as set forth.

1,955.—Tanning Hides and Skins.—Simon H. Kennedy and Henry L. Elder, Philadelphia, Pa., assignees of Wm. Fields and Israel Townsend, Wilmington, Del. Patented June 7, 1864. Reissued Jan. 10, 1865:
We claim, First, The within-described method of treating hides, preparatory or during the process of tanning, by exposing them to the action of liquor of any described description, by the aid of an air-tight vat, and of gaseous fluid under pressure, introduced into said vat, so as to agitate the liquor and cause the same to act on the hides and skins with increased effect.
Second, The employment or use for the purpose of tanning hides or skins of a current of air or other gas applied to said hides or skins under a pressure of from five to twenty or more pounds to the square inch, acting in combination with the ordinary or other tanning liquors, substantially as and for the purpose set forth.
Third, The arrangement of one or more pipes extending to the interior of an air-tight vat, in combination with said vat, with a pump and loaded valve, constructed and operating substantially as and for the purpose described.

1,956.—Leather-splitting Machine.—J. A. Safford, Boston, Mass. Patented Feb. 2, 1864:
I claim, First, The spring, C, constructed and operating substantially as set forth.
Second, The spring, C, in combination with the feed roll, B, the whole being constructed and operating substantially as and for the purpose described.
Third, The knife, a, constructed with two bevels, and having the cutting edge beyond the center, of the thickness of the knife, as set forth, when combined with the feed roll, B, substantially as described.
Fourth, Making the under bevel of the knife, a, concave, to conform generally with the convex surface of the feed-roll, B, substantially as and for the purpose described.

DESIGNS.

2,055.—Top-plate and Balance-cock of a Watch.—Frederick A. Giles, New York City.
2,056.—Shoe.—A. A. Gould, Melrose, Mass.
2,057.—Clock Case.—S. B. Jerome, New Haven, Conn.
2,058.—Stove.—Benj. F. Johnson (assignor to Wager & Falls), Troy, N. Y.
2,059.—Piano Stool.—Hiram T. Merrill and John H. Brennan, Chicago, Ill.
2,060.—Clock Front.—Nicholas Muller, New York City.
2,061.—Spoon and Fork Handle.—John Polhamus, New York City.
2,062.—Group of Figures.—John Rogers, New York City.
2,063.—Trade Mark to be used on Lead Pencils.—Joseph Schedler, New York City, assignor to American Lead-pencil Company, Hudson City, N. Y.
2,064.—Coffin Handle.—Clark Strong, Chatham, Conn.
2,065.—Floor Oil-cloth.—John Taylor Webster, New York City, assignor to Edward Harvey, Brooklyn, N. Y.

NOTE.—In the above list of ninety-nine patents we notice the names of FORTY-TWO inventors whose applications were made through the Scientific American Patent Agency.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. the Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention is susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

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Improved Gang Plow.

Keeping a plow straight in the furrow and lifting it in and out at the end of each row, as well as over roots or big stones that happen to be in the way, is the hardest part of that hard task—plowing; for if the plow is properly made, it will hold its own cut and never require bearing down.

The engraving published herewith shows a machine for rendering hard work easy. All the labor above alluded to is avoided by the employment of simple mechanism, which can be easily seen by referring to the engraving. The arrangement consists in fixing a gang of plows, A, of any desired form, to several frames, B, which are independent of each other, and so contrived that they can be adjusted sideways in order to suit crops of different kinds that may be planted in different ways. One end—the forward one—of the frame is connected to the draught pole of the machine by suitable fixtures, and at the latter, or hinder parts, by chains to a transverse shaft, C; this shaft has a lever, D, in it, which is close to the driver's seat, and which, being grasped, enables him to elevate the plows at will whenever it is necessary to do so. They are not only lifted easier by this method, but quicker and straighter, so that they may run close up to a stone or stump, be lifted up by the side of it, and let down again opposite with but little loss of space.

It will be seen that by setting the plows under the center of the machine, and connecting them under the draught pole, they hold their furrow and never jump out or miss. When desired, the plows can be taken off and cultivators substituted.

This arrangement gives a very neat and efficient machine for the purpose. It was patented Feb. 14th, 1865, by S. H. Mitchell, of El Paso, Ill., through the Scientific American Patent Agency; for further information address him at that place.



MITCHELL'S GANG PLOW.

Fig. 1

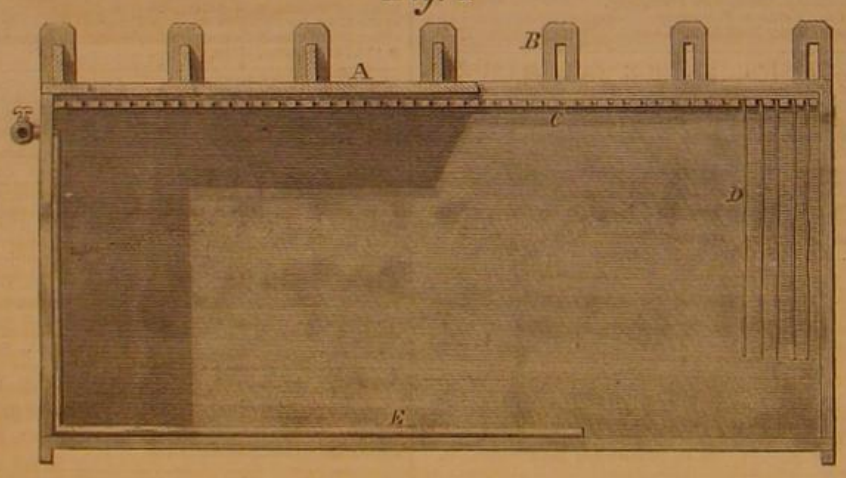
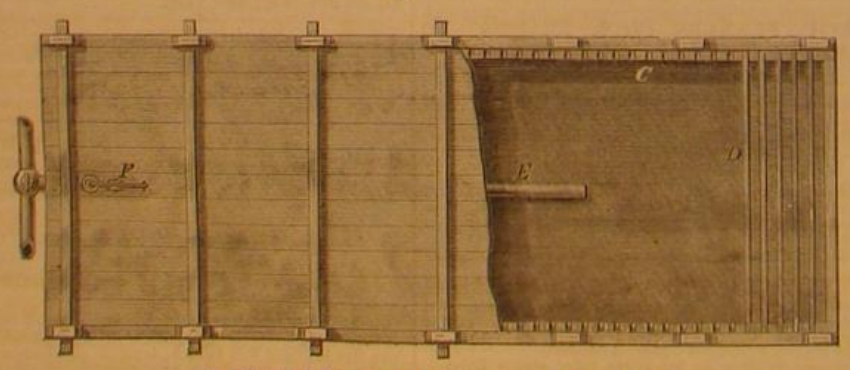


Fig. 2



KENNEDY & ELDER'S TAN VAT.

Improved Tan Vat.

Very great improvements in tanning hides have been made of late years. Where it formerly required months to effect the object, it is now attained in as many days. The tan vat here illustrated is intended to facilitate the process and improve the quality of the material; very good results are said to be obtained from it. In detail the vat is constructed with an air-tight cover, A, held down by clamps, B; the inner surface near the top being provided with racks, C, so that rods can be placed therein and the hides suspended from them, as at D. These hides are continually immersed in the tanning liquid up to the top, or nearly so.

The improvement further consists in agitating the tanning liquor by a current of air or other gas under pressure, and the tank is therefore furnished with a pipe, E, through which a continuous current of air is forced at a pressure varying from 5 to 20 pounds per square inch; this causes the tanning liquor to be violently agitated, and to act on the surface and enter the pores of the skin, so as to penetrate it with great effect. There is a safety valve at F, Fig. 2, through which the superabundant pressure passes off.

By this method all handling of the hides is obviated, and the process completed in a few days.

A patent on this invention was procured through the Scientific American Patent Agency on the 10th January, 1865, and application for a reissue is now pending. For further information, address Messrs. Kennedy & Elder, 205½ Walnut street, Philadelphia, Pa.

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