



GANG PLOW.—WILLIAM T. ROGERS, Quincy, Ill.—This invention consists in so arranging a gang of plows on a carriage, that they may be easily unshipped, and cultivator teeth substituted for them. It further consists in an arrangement of devices applied to the driver's seat, rendering it adjustable to suit the inclination of the seat bars.

CHURN.—JOHN YOUNG, Adrian, Mich.—The cream is forced through apertures in the dasher, and made to circulate in grooves which are concentric with the dasher shaft, one of the grooves being in the upper and the other in the under surface of the dasher, the effect of which is to produce unusual agitation and friction.

CULTIVATOR.—JOHN N. ARVIN, Valparaiso, Ind.—This is a novel manner of arranging the inside shovels of the plow, which may be adjusted laterally by the action of the feet of the driver so as to conform to the sinuosities of the rows of plants, and all of which are capable of being raised out of the ground when required.

PLOW.—HUBBARD MARTIN, Taylorsville, Ky.—This invention relates to that class of plows in which metal is wholly used in the construction. The object is to obtain a plow with a beam and handles constructed of wrought iron, and in such a manner as to insure strength with lightness and durability.

SCREW PLATE.—NICHOLAS ZILLIER, New Castle, Del.—This is an improved screw plate for cutting the threads upon screws, simple in construction, and easily adjusted, so as to cut the threads upon screws of any desired size without changing the dies.

KNIFE AND SCISSORS SHARPENER COMBINED.—JAMES J. RUSS Worcester, Mass.—This invention consists in the combination, with a novel constructed stand, of a sharpener plate, which is so secured to one of its sides as to be adjustable thereon. Against the edges of this plate the knife or scissors blades are sharpened.

WIND WHEEL.—C. NICKERSON, county, Ill.—This invention consists in forming the wheel with two sets of vertical wings, leaving their upper and lower ends secured in circular heads, which are keyed on a vertical shaft, one set of wings projecting further out from the wheel shaft than the other, and the outer and inner wings being placed alternately in the wheel, whereby the wind acts first against the outer and then against the inner ones, and escapes through the wheel, so that the wheel requires no change in position to suit the direction in which the wind may be blowing.

MANUFACTURE OF WRENCHES.—HENRY W. PELL, Rome —This invention consists in subjecting a straight bar of iron of the requisite length, width, and thickness, to the action of a series of dies by which a head similar in shape to the ordinary heads of wrenches is formed thereon, with the full strength of the iron retained.

DRIVING WELL TUBES.—CALVIN SHEPARD, Kattelville, N. Y.—The object of this invention is to provide more efficient and speedy means for driving or sinking well tubes than have been known or used hitherto.

LADY'S GARTER HOLDER.—E. T. BURROWS, Mystic River, Conn.—This invention consists in a soft, flexible band, which is to be clasped around a lady's leg, next the skin, over which the stocking is to be drawn, and the usual elastic garter placed so as to encircle the stocking directly over the band, and thus all uneasiness occasioned by the elastic binding the leg too tightly is obviated; beside this, the stocking is held up more securely and neatly.

FILLING MACHINE.—OSCAR PLACE, Erocklyn, N. Y.—This is a machine for filling uniformly packages of farina and similar substances that will not clog in flowing through small apertures.

CLOTHES WASHING RUBBER.—HIRAM BURK, Mineral Point, Ohio.—The object of this invention is to furnish an improved clothes washing rubber, to be attached to a wash or rubbing board, to take the place of the hands in washing clothes.

POTATO WASHER.—JOSHUA H. WILLIAMS, East Craftsbury, Orleans County, Vt.—This invention has for its object to furnish a machine by means of which potatoes may be quickly and thoroughly washed.

PUMP.—JOSEPH W. DOUGLAS, Middletown, Conn.—With this invention a double-acting pump with only one side pipe is produced. The piston rod is hollow and receives the liquid, which is forced upward through the piston, while the liquid which enters the pump cylinder through the side pipe is received in the top of the piston, and forced thence through the piston rod to the top of the pump.

SULKY PLOW.—PETER YOUNG, El Paso, Ill.—This invention relates to the mode of operating sulky plows, whereby the movements of the plow are managed and controlled with the greatest facility.

ROTARY BLOWER.—P. H. & F. M. ROOTS, Connersville, Ind.—This invention consists in the peculiar construction of the revolving abutments of a rotary blower, each of the abutments being composed of two pistons which form arcs of circles in combination with intervening recesses, which also form arcs of circles, so that four essential points are formed at which the abutments come in contact during their revolution, and that by rendering the contact at these points air-tight, the revolving abutments are enabled to produce the desired effect; it consists also in constructing each of the revolving abutments of two or more metallic crossheads fastened on a suitable shaft, and made square, polygonal, etc., in combination with wooden staves, which are bolted to the crossheads, and then dressed to the proper shape.

MARINE CAR.—GEORGE H. YOUNG, Charlestown, Mass.—This invention consists in the application, for the purposes of marine locomotion, of a system of articulated pontoons in the form of one or more endless belts, in combination with a suitable vessel, in such a manner that the pontoons serve the double purpose of buoys and also of buckets or propellers, and thereby the resistance of the vessel moving in the water is greatly reduced.

HORSE RAKE.—JOHN N. BAXTER, Greensburg, Ind.—The object of the invention is to obtain a revolving horse rake which will operate with but little friction, be simple in construction, and economical to manufacture.

NEW PUBLICATIONS.

NEW MUSIC.—Oliver Ditson & Co., of Boston, the well-known publishers of Music, have just issued the following new pieces for the piano:—Il Balen, Trovatore, Soldiers' Chorus, Kathleen Aroon, Nocturne, Crispino e Comare. Gems from the German. Bring forth the Bride. Harmonica. Dance Music, etc.

J. B. H., of N. Y.—The term "cupola" is applied to those furnaces used for the second fusion of iron, so named from the dome which formerly was placed at their tops to lead the smoke to the chimney. The common blast furnace for reducing the ores is much more entitled, from its form, to the distinctive term "cupola" than the common foundry furnace. But that which is used in ordinary iron casting is commonly called a cupola furnace.

E. A. W., of Philadelphia.—The offensive smell of lard oil may be removed by straining it, and agitating it at the same time with water containing about one per cent caustic soda.

L. P. L., of N. Y.—You are correct in your supposition that the heat of the blood does not materially vary in summer or winter.

R. M. Du B., of N. J.—Use good hydraulic cement. It is the only cheap substance that will make a wall, exposed to water, safe and sound.

V. MCG., of—Your coloring extracts ferment in this hot weather; keep them in a refrigerator or prepare them oftener and they will not smell badly.

N. J. Co., of N. H.—Hardened steel can be etched by any acid which bites iron. A mixture of nitric and sulphuric acid, equal parts, bulk for bulk, with an equivalent, in bulk, of water will be found to be what you want.

E. H. H., of Ohio.—Copper bears a proportion of tensile strain, to boiler iron of 17 to 31, or about one-half. It does require "heavier material," or rather, thicker material, for larger surfaces than for small, to resist pressure. "Bourne's Catechism" will give you the proportions.

M. E., of N. Y.—We do not think glass would answer your purpose as a step to your turbine. The shaft is probably cast iron, and great friction would be created between cast iron and glass, working in water. Rock maple, lignum-vitae, or hickory prepared by boiling in oil and used with the grain parallel with the shaft, or vertical, would make as good a step as you can obtain. Try it.

S. F. W., of Iowa, finds a difficulty in getting a molder to draw the patterns for sheet metal swages without disturbing the sand and injuring the molds, and asks if some better material than sand cannot be used which will withstand the heat of melted iron and preserve a rigid mold. He suggests plaster of Paris. A good molder can draw a properly made pattern right. The molds may be made more delicate and perfect by a mixture of loam with your sand. Plaster of Paris will not stand molten iron. It crumbles and loses shape. Try loam with your sand, making sure of having vents for your gases, then dry your mold by a fire of shavings, and if your patterns are properly made and your molders conscientious and capable, you will have no trouble.

P. C. S., of R. I.—The force of expansion of any body is evidently equal to the force required to effect a compression to the same amount. In the larger treatises on physics you will find tables of compressibility, 1 atmosphere of pressure condenses mercury .00000295. Another way of determining the expansive force of mercury is based on the dynamic theory of heat; the expansive force due to a unit of heat is 773 foot lbs. The expansive force of mercury appears to be about twice that of water, and greater than that of any other liquid yet tested; of course it is practically irresistible.

W. B. S., of Mich.—There is no difficulty in keeping the gases separate when decomposing water by the battery and thus we are sorry to find that your ingenuity has been misdirected. The real trouble in the case is the cost of materials consumed. To decompose a pound of water by the battery requires at least 32 lbs. of zinc and about 60 lbs. of acid.

R. O., of N. Y.—You are correct in supposing there is more heat in a cubic foot of water than in a cubic foot of air, both being of the same temperature. If you represent the heat in 1 lb. of water by 1, the quantity in 1 lb. of air would be .237. But as water is about 800 times heavier than air, it follows that the heat in the cubic foot of water must be over 3,000 times that in the cubic foot of air.

C. L., of Pa., wants information on the use of belts for polishing wood.

J. H. A., of Pa.—We have not received the minerals in question.

E. F. S., of Pa., supposes two cylinders of the same diameter and length; one of the cylinders is solid and the other is hollow and contains a smaller cylinder which can easily roll in it; the solid cylinder is of the same weight as the other two. Query: If the solid cylinder and the hollow one with its contents be placed upon a level plane which would require the greater force to roll it? We answer: the force required in both cases would be the same for the reason that there is the same weight of matter to be moved and the same friction surface. Over an uneven road it would probably be more troublesome to roll the hollow cylinder, it would go along by jerks like a barrel half filled with water.

J. F. L., of Ohio.—In evaporating sirup it is advantageous to have the sirup as shallow as possible, and in motion; in such circumstances the sirup boils at a lower temperature, and there is an economy of fuel. We understand that metals, as well as all other substances, when they are solid invariably contract with cold. The point of maximum density of water is about 37 deg.; from this point to solidifying it expands by cold, but as soon as it has become solid it contracts by cold.

Van K. & Co., of Ill.—It seems rather strange that men should keep on inventing water wheels to pump their own

water, which is the case in the drawing you send us. A ram is to throw water up on to a wheel, and the wheel is to pump water into a tank for the ram. This is a mechanical illustration of what politicians call the balance of power.

L., of N. Y.—It is not unusual for boiler plates to crack along the line of rivets. It is often caused by using a drift pin to bring the sheets fair, and is as likely to be the inner as the outer plate. If the driving belt slips on a large pulley it must be owing to some local peculiarity which can be found by search.

SPECIAL NOTICES.

Oliver Nichols, of West Roxbury, Mass., has petitioned for the extension of a patent granted to him Oct. 12th, 1852, to which additional improvements were annexed March 30th, 1854, for an improvement in Grinding Mills. The petition will be heard on Monday the 24th day of September next.

Peter Geiser, of Greencastle, Pa., has petitioned for the extension of a patent granted to him on the 19th day of October, 1852, for an improvement in Grain Separators. The petition will be heard on Monday, the 1st day of October, 1866.

D. D. Allen, of Adams, Mass., has petitioned for the extension of a patent granted to him on the 19th day of October, 1852, for an improvement in Tool for Cutting Pegs out of Boot soles. The petition will be heard on Monday, the 8th day of October next.

Alber Gardner, for himself, and as Administrator of William L. Hunter, of Cincinnati, Ohio, has petitioned for the extension of a patent granted to the said Gardner, as said Administrator, and to himself, October 26, 1852, for an improvement in Plows. The petition will be heard on Monday, the 8th day of October next.

PATENT OFFICE.

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 twenty years. Statistics show that nearly ONE-HALF 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 so many 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.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the Office, I always observed a marked degree of promptness, skill, and fidelity to the interests of your clients."

Ex-Commissioner Holt says:—"Your business was very large, and you sustained and justly deserved the reputation of marked ability and uncompromising fidelity to the interests of your clients."

Ex-Commissioner Bishop says:—"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."

EXAMINATIONS.—If an Inventor wishes our opinion in regard to the probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an Opinion, without examination at the Patent Office, we make no charge, but if a

PRELIMINARY EXAMINATION AT THE PATENT OFFICE is desired, we charge the small fee of \$5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over TWELVE THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us, by express (charges prepaid) a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

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

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

In addition to which there are some small revenue-stamp taxes. Canadians have to pay \$500.

FOREIGN PATENTS.—Messrs. MUNN & CO. have had more experience than any other solicitors in this country in procuring foreign patents, and have old-established agencies in London, Paris, Brussels, Berlin, Vienna, and other large cities. Foreign business should never be intrusted to other than experienced agents.

If an inventor wishes to apply for a patent, all he has to do is to write to us freely for advice and instruction, and he will receive prompt attention. If his invention contains any patentable features, he can depend upon getting his Letters Patent. All communications considered confidential. Send models and fees addressed to

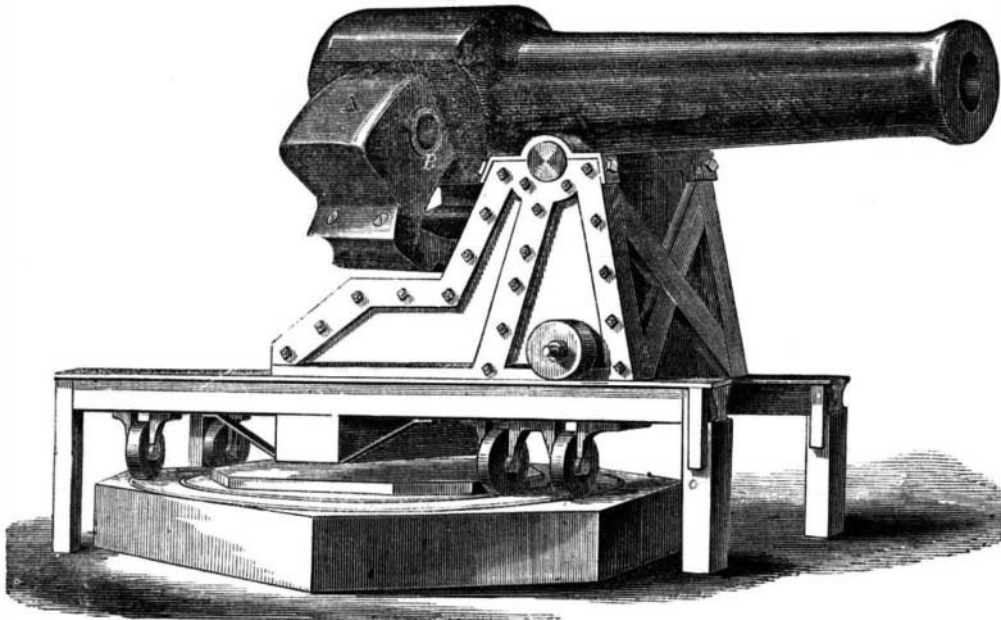
MUNN & CO.,
No. 37 Park Row, New York

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 inclosing \$1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Improved Breech-loading Cannon.

This method of loading cannon at the breech consists in having a movable arm, A, jointed to the cannon so that it swings freely on its axis. In this arm are the chambers, B, which contain the charge. Figs. 1 and 2 show the arrangement. The vents are in the side of the chambers where they can be easily

Fig. 1



manipulated at each discharge, and are also convenient for firing.

As each shot is fired, or as one chamber is brought into line with the bore, the other is thrown back far enough to allow it to be loaded, so that a continuous discharge can be kept up so long as the temperature of the gun permits. The dotted lines in Fig. 2 show the position of the vibrating arm when moved so as to bring one chamber in line with the barrel of the gun.

One half the right may be bought on reasonable terms by addressing the inventor, John A. Miller, of Paducah, Ky., by whom it was patented Feb. 7, 1865.

New Oxide of Magnesium Light.

It is well known that the oxide of magnesium is practically infusible, and that it has the property of being volatilized, but in the smallest quantity, in a flame of oxygen and hydrogen mixed together, and without imparting any color to that flame. The oxide has also the property of spreading, on being placed within the flame, an intense, bright, and constant light, and which is admirably suitable to photography. Many magnesium salts, and particularly chloride of magnesium and carbonate of magnesia, have the property of leaving some oxide of spongy magnesium on being decomposed by the oxyhydrogen flame. Availing himself of a knowledge of these principles, Prof. Prospero Carlevaris, of Genoa, proposes to employ the process now to be described. A piece of chloride of magnesium, larger or smaller, according to the effects of light required, is placed upon a small prism of gas-retort coal, and upon it, through a small tube purposely made, the flame of the oxyhydrogen gas (the mixture of oxygen and hydrogen) is directed; or a prism, or even a small and well-compressed cylinder of carbonate of magnesia is placed within the flame from the same mixed gases. The chloride of magnesium or the carbonate of magnesia is directly decomposed and resolved into oxide of spongy magnesium, from which the intense, bright, fixed and constant light comes forth, causing all the chemical phenomena of diffused sun light. The gases of the said combination, which are pure hydrogen, or even ordinary illuminating gas, and pure oxygen, or even atmospheric air, flow separately from two different gasometers, and are mixed only in a very small tube at the end of the pipes. They can be prepared in the ordinary way when wanted in small quantities; if wanted on a large scale, pure hydrogen is prepared by causing steam to pass over incandescent charcoal. Oxygen is prepared with manganese, and

hypochlorate of lime with manganese and silicic acid, or with dry sulphate of iron, the product of whose decomposition is caused to pass upon platinated pumice stone, turning to profit the sulphurous acid resulting from the process to the preparation of sulphites. The invention, is, therefore, essentially the production of light, by placing the oxide of spongy

MILLER'S BREECH-LOADING CANNON.

magnesium in a flame produced by a mixture of oxygen and hydrogen.—*London Mining Journal.*

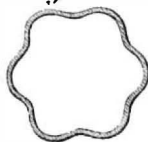
APPLEBY AND GOULD'S LAMP CHIMNEY.

"If it were not for the chimney," said a friend to us recently, "the kerosene lamp would be perfect."

Fig. 1



Fig. 2



It gives a whiter light than gas, it is more steady, it is far cheaper, and there are no insolent collectors about it sticking red bills in your face every month."

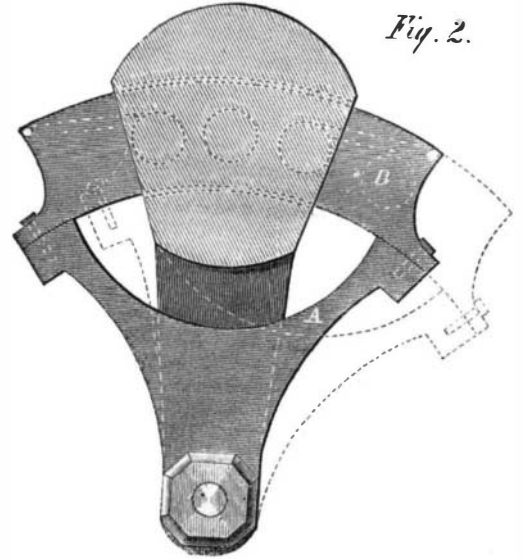
The advantages mentioned are certainly obtained, and if we are ever to have a chimney that will not

crack from unequal expansion, we shall owe it to the perseverance of inventors.

The latest invention in this line is illustrated herewith. It is a glass chimney with spiral grooves extending from top to bottom, the object being to equalize the expansion of the glass when heated, and prevent it from breaking.

The engraving shows the invention very clearly. The small figure underneath the principal indicates the amount of corrugation. Patented by H. C.

Fig. 2.



Appleby through the Scientific American Patent Agency June 12, 1866. Address Appleby & Gould, Conneaut, Ohio.

Report on the Springfield Rifle.

The *Springfield Republican* says the military board, appointed for an examination of the various fire-arms now in use by different nations, have carefully examined sixty-one different rifles and muskets and have reported that the most effective, safe, and substantial arm, is the Springfield rifle with the Berdan improvement, which changes it to a breech-loading rifle. The board consisted of Major-Gens. Hancock, Buchanan and Griffin, Brig-Gen. Haynes, and Cols. Owens, Benton and Porter, and it is unofficially stated that the members were unanimous in their recommendation of the Springfield rifle. It is not alone in this country that the Springfield rifle is now in favor. Louis Napoleon, while casting about for the most effective arm for his army, came to the same conclusion with our own board of examination; an agent of the French Government, lately bought of a Philadelphia machinist a full set of the machinery needed for the manufacture of the Springfield rifle for 100,000 francs in gold, and shipped it to France. This was before the report of our examiners recommending the addition of the Eerdan improvement had been made, and one of the rifles with that improvement is now being made, and will be sent to France at once as a pattern. When the French Emperor fights he wants to fight successfully, and he seems to have full confidence in the value of our fire-arms and in the ingenuity of American mechanics.

The "Lord Warden's" Engines.

The *London Engineer* publishes a supplement to its issue of the 29th June, wherein working drawings, in plan section and elevation of the *Lord Warden's* engines, are given; the scale is one-fourth of an inch to the foot.

The engines have three cylinders each 90 inches diameter, 48 inches stroke, and are of the back-acting variety. There are many novelties in detail, but the most striking one appears to be the use of gearing to drive the main valves instead of eccentrics. There are four large gear wheels, each about 42 inches in diameter, between the main valves and the shaft, and these, through the intervention of a crank shaft, perform the work. It seems rather a perilous reliance to put faith in the teeth of gears to do such work, but we console ourselves with the reflection that the builders, Messrs. Maudslay & Field, probably know what they are about.