Frank W. Sterry, Morrisania, N. Y.—This invention relates to a nove compound, whereby fine cut or any other chewing tobacco is sweetened and colored without any dangerous ingredients.

SCAFFOLD BRACKET.—Charles Eddy, Grass Lake, Mich.—This invention consists in providing a bracket designed for scaffolds in shingling or roofing buildings.

REVOLVING HAY ELEVATOR.—Matthew Mitchell, Crown Point, Ind.—This invention consists in the construction of a derrick in such a form as to admit its standing near a haystack, and a revolving upright shaft and levers arranged in such a manner that hay can be elevated easily and expeditiously.

DEVICE FOR HOLDING THE SLATS OF WINDOW BLINDS.—Charles B. Francis, Newark, N. J.—This invention consists in the employment of a slotted bar or lever that has a turn at right angles, and around which a metallic strap passes and is secured to a window blind, in such a manner that the slats of the blind may be held in any desired position.

REAMER.—William Burlingame, Exeter, N. H.—This invention consists in uniting and casting steel cutters with the body of a reamer, so that a large quantity of steel may be saved; also large size taps may be cast in with the threads of steel upon the outside.

FASTENING SLEIGH BELLS.—J. H. Abell, East Hampton, Conn.—This invention consists in the arrangement of a T-shaped, double hook spring catch, in combination with a sleigh bell, provided with a slot or mortise to receive the hook-shaped ends of the spring catch, in such a manner that by passing the hooks of the catch through the strap or other material to which the bell is to be fastened, and forcing them into the slot of the bell, they spring apart over the inner edges of said slot, and the bell is firmly held in its place.

SAFETY ATTACHMENT TO CARRIAGES.—Claude Ducrux, New York City.—This invention relates to a new device, whereby a wagon can be instantaneously stopped and the horse detached therefrom in case the latter should try to run away.

COTTON SCRAPER.—Nicholas Gotten, Union Depot, Tenn.—This invention consists in constructing a cotton scraper in such a manner that the scraper may be adjusted to different angles and depths upon the frame as the nature of the work may require.

MANUFACTURE AND TINNING OF LEAD PIPES.—Frederick Bennett, Watford, England.—This invention applies to lead pipes manufactured by hydraulic pressure, and it consists of not only an improved process of manufacturing lead and composition pipes, but likewise of a new mode of tinning, silver tinning, or coating lead pipes with other non-corrosive metal or composition.

JOINT FOR PIPES.—James Bowden, New York City.—This invention relates to a joint for lead pipes or pipes of any other description, which is composed of two tapering or wedge-shaped thimbles, which are split or made in sections, in combination with a clamping nut screwed on the end of the inner thimble, in such a manner that when the thimbles are properly arranged on the end of a tube and the nut is screwed up, the inner thimble is firmly clamped to the pipe, and a union coupling, or a coupling of any other description, can be readily secured to the end of said inner thimble, and two pieces of lead pipe can be united without soldering or "wiping."

PROCESS FOR GLAZING PAPER.—Frederick Beck, New York City.—This invention consists in treating paper with stearic acid by applying the acid to it and then exposing it to the action of friction surfaces, in such a manner that the surface of the paper is coated with a thin layer of said acid, imparting to it a fine gloss, and rendering it soft, white, and impervious to water.

PAPER FILE.—Joseph Fleischl, New York City.—This invention relates to a paper file which can be used for one single paper or for a number of papers. For the purpose of securing a single paper a segmental cylinder is slipped over the side bar of the paper file and over the paper, so as to hold the paper without injuring it in the least. If two or more papers are to be filed in the paper file, adjustable spring clamps are secured to the side bar of the paper file, and the papers to be filed are held between the springs and the flattened surface of said bar.

WINDOW LATCH.—Ernst T. Hofmann, Poughkeepsie, N. Y.—This invention consists in the arrangement of a spring stop or catch in combination with an ordinary revolving latch, in such a manner that when the said latch is closed, it is securely locked by the spring stop, and it cannot be opened or forced back until said stop or catch is depressed or made to release the latch.

LOCK.—Rudolph Vollschwitz, New York City.—This invention relates to a lock, the mechanism of which is inclosed in a cylindrical case, said mechanism being composed of three (more or less) tumblers, which are provided with slots to admit the key, so that by turning said key the heads of the tumblers arrange themselves in the proper position to allow the tumbler to move in or out. An elastic pad or spring which bears on the ends of said tumblers, has a tendency to keep the same in such a position that their slots coincide to admit the key, and that their heads prevent the bolt from moving, the whole mechanism being so arranged that it takes but little room, and that a safe lock, with a small and convenient key, can be produced at a comparatively small cost.

MACHINE FOR PRESSING PEAT.—N. H. Barber, New York City.—This invention relates to a peat machine composed of a revolving annular cylinder, provided with a number of holes and with a series of plungers which revolve with the cylinder, and move back and forth in the holes by the action of cams, which draw them out to receive the feed and force them in at the proper time for the purpose of compressing the peat while the cylinder is in motion.

MANUFACTURE OF STEEL-HEADED RAILS.—L. M. Hart, Troy, N. Y.—This invention consists, first, in uniting the steel slab with the slab of iron by welding or other means, previous to the operation of rolling, in such a manner that the steel is prevented from scaling off when the rail is ready. It consists, second, in securing the steel slab to the pile by screws or hook bolts, or other means, in such a manner that the steel is prevented from curling during the operation of rolling, and steel-headed rails can be produced which are durable, and from which the steel is not liable to separate itself.

REFINING OIL, ETC.—Max H. Kruger, New York City.—This invention relates to an apparatus which is intended for deodorizing and refining petroleum and other hydrocarbon liquids. It consists of a series of filters which are filled with powdered charcoal or other suitable material, and hung on rods in the interior of a chamber or box which can be filled with steam, in such a manner that the petroleum or other hydrocarbon liquid, while passing through the filtering material, are kept at a sufficiently high temperature to prevent the resinous parts in said oil from choking up the filters, and the operation of filtering can be conducted with ease and facility.

MANUFACTURE OF WOOL FROM PINE LEAVES.—Adolphe Rogue, Brire, France.—This invention relates to a new mode of producing from pine leaves a sort of hygienic wool, capable of replacing to some extent common wool or hair in their various applications, and particularly fit to be employed in certain diseases such as rheumatism, gout, pulmonic affections, neuralgia, and so forth.

CENTERING TOOL.—Nathan Puckett, Terre Haute, Ind.—This invention relates to a novel and convenient device for drilling a center hole accurately in a bar of iron or any piece of timber to be turned in a turning lathe.

RAILROAD FREIGHT CARS.—Richard Eaton, Montreal, Canada.—This improvement relates to the construction of railroad freight cars, and is designed for increasing largely the capacity of a car for carrying freight.

RAILROAD CAR BRAKES.—Charles Bemis, Mishawaka, Md.—This invention relates to a new and improved arrangement of a brake apparatus for railroad cars.

SPRING CRUPPER.—Edward Powell, Spring, Penn.—This improved crupper is provided with a spring supporter which exerts a constant upward pressure under the tail of the horse so as to induce a habit of carrying the tail in a higher and more graceful position.

SAWS.—Asa Bee, White Oak, West Va. (patented January 1st, 1867).—This invention relates to the application of plane-irons or bits to the ordinary mill-saw, for the purpose of removing the roughness or projecting fibre from the face of the plank as the saw passes through the kerf; and the improvement consists in grooving the cutting edge of the plane-iron, the better to adapt it to discharge the cuttings which it removes from the wood.

SPRING HOLDER FOR WIPING CLOTHS.—Patented January 1st, 1867.—Henry Johnson, Chicago, Ill.—This invention consists of an arrangement of spring fingers, adapted to be furnished with a wet or dry cloth, to be used in cleansing exterior or interior surfaces, dishes, bottles, lamp-chimneys, and other hollow articles, especially those difficult to be reached by the hand and of varying interior diameter.

CULTIVATOR.—J. C. Hoffeditz, Mercersburg, Penn.—The invention consists of a cultivator or marker, having adjustable spring standards and handle, and with shovels, adapted to different kinds of work, or removable for the purpose of adapting the machine to a different class of work. "Rights for all the States except Pennsylvania for sale."

CULTIVATOR TOOTH.—J. C. Hoffeditz, Mercersburg, Penn.—The standard is pivoted in the hanger by a bolt, and is restrained from vibration by a wooden pin, which breaks when the share comes in collision with an immovable obstacle, the standard being replaced in position, after passing the obstacle, and a new pin inserted. "Rights for all the States except Pennsylvania for sale."

BURGLAR ALARM-GUN.—Peter Sinsher, Versailles, Ohio.—This invention relates to an improved compound gun, having several barrels so connected and arranged as to be fired simultaneously in different directions, as a defence against burglars.

SELF-LUBRICATING ATTACHMENT FOR JOURNALS OF MACHINERY.—George M. Morris, Cohoes, N. Y.—This invention relates to an improvement in self-lubricating or oiling apparatus for journals of machinery, and consists in attaching an oil-cup to the journal-box in such manner that any excess of oil flows back into the oil-cup from the journal-box. Thus the journal is kept constantly lubricated; heating is prevented and there is no waste of oil.

COTTON-CLEANING AND RELINTING MACHINE.—Robert J. Clay, New York City.—This invention relates to a machine for cleaning and relinting cotton wool which has been damaged by matting the fibres together and becoming foul with dirt or any extraneous substance.

TRUSS FOR HERNIA.—John A. W. Justi, Savannah, Ga.—This invention consists in the peculiar conformation of the pad-plate, which is not a simple flat spring, but is curved and arched in such manner that the pads may be fitted accurately against the person of the patient, securing ease and comfort in the movements of the body.

FIRE-GRATE FOR STEAM BOILER.—Richard Eaton, Lee, England.—This invention relates to an improved mode of constructing fire-grates and furnaces for locomotive and other steam boilers, to burn wood or peat, and consists in the arrangement of grate-bars, which overlap and underlap each other in steps or terraces, with horizontal divisions between the bars, directing the air laterally towards the sides of the fire-box.

STREET CAR HEATER.—John Gibson, Albany, N. Y.—The object of this invention is to warm street cars: it is accomplished by placing one or more stoves under the seat, and conducting the smoke under the flooring and up to the roof, where it escapes without giving any annoyance, after radiating its heat into the car in its passage through the pipe.

VALVES.—Samuel J. Peet, New York City.—This invention relates to an improvement in valves for steam, gas, air, water, and all other fluids, where valves, cocks, faucets, gates or traps are used, and consists in a pair of metal discs or plates fitted in a box or shell, in such a manner as to close against the seats by being spread apart with a conical wedge, or a straight wedge turning on a swivel screwed between the discs, or which may be operated on by a sliding wedge.

STREET RAILROAD CARS.—Joseph S. Fairfax, Wheeling, W. Va.—This invention relates to improvements in a street railroad car, the principal object of which is to enable the car to turn curves easily, so that it may be stopped on the curve if desired, and be started again without difficulty.

SPOKE-DRIVING BENCH.—F. M. Lemmon, Shelbyville, Ill.—This invention relates to a new and improved machine for driving spokes in wagon-wheel hubs, and consists in a bench having a hub-clamping device by which the hub is firmly secured to the bench, and an adjustable rest for holding the spokes as they are driven, and also a binding device for holding the spokes down snug in the said rest, the whole making a very simple and desirable machine for the purpose mentioned.

CANE STRIPPER.—Melcher Mellinger, Dayton, Ohio.—This invention consists in the employment of two or more spring cutters which with a stationary plate form the device for cutting off the heads of the canes and with the further addition of a self-adjusting plate or plates form the stripping device.

REST FOR TURNING LATHES.—Henry K. Smith, Norwich, Conn.—This invention consists principally in a novel arrangement of gearing whereby the movement of the rest can be changed in direction at pleasure, that is, made to move either toward the right or left on the lathe bed and also in a novel manner of constructing the rest whereby it can be raised and lowered according as may be desired.

MACHINE FOR CUTTING FILES.—Isaac Goodspeed, Norwich, Conn.—This invention relates to a new and improved machine for cutting files, and has for its object simplicity of construction and the obtaining of all the advantages attending more expensive and pretentious machines hitherto devised for the purpose.

CAR COUPLING.—James McLaughlin, Duncannon, Pa.—This invention relates to a new and improved car coupling of that class which are self connecting or self-coupling, and it consists in a novel construction and arrangement of parts, whereby a very simple and efficient car coupling of the class specified is obtained.

COMBINATION OF A SQUARE, LEVEL, BEVEL AND PLUMB.—G. L. Chamberlin, Marietta, Ohio.—This invention relates to a new and useful combination of a square, level, bevel and plumb, whereby the several tools above specified are combined in one and either rendered capable of being used by a very simple adjustment of a part partaining to the device.

SHUTTER AND BLIND FASTENING.—Robert Hutton, Brooklyn, N. Y.—This invention consists of a fastening constructed and applied to a window shutter or blind, in such a manner as to admit of the shutter or blind being secured in a more or less open state as desired, and also admit of being readily manipulated to secure the shutter or blind in any position between a fully open and nearly a closed state.

BLACKING BOX HOLDER.—George W. Taylor, Springfield, Vt.—This invention relates to a new and improved device for holding blacking boxes, so that the hands of a person in blacking boots or shoes will not be soiled in rubbing the brush over the moistened blacking in the box. The device also admitting of the box being suspended on a nail or hook convenient for use at any time.

MACHINE FOR MAKING EYELETS.—Levi Richards, Providence, R. I.—This invention relates to a new and improved machine for making metallic eyelets, and it consists of a cutter and dies arranged and operated in such a manner that they will cut the plate in circular form and swage it into cup or tube shape. The invention also consists of a conveyer or carrier for taking the cup or tube from the dies above mentioned, and conveying it to a second pair of dies operating in connection with a punch, and in such manner that the cup or tube, formed by the first pair of dies, will be swaged into proper form and punched, so as to complete the eyelet.

CULTIVATOR.—A. P. Hammon, J. H. Lincoln, S. Lincoln, T. W. Hammon, Montfort, Wis.—This invention relates to a new and improved device for cultivating plants grown in hills or drills, and it relates to a new and improved manner of arranging the plows, whereby the same are made to penetrate the earth at a uniform depth whether the device is passing over horizontal or inclined ground, and it also consists in a novel means for guiding the machine whereby the plows may, with the greatest facility be made to conform to the sinuosities of the rows of plants.

LOCK.—E. L. Gaylord, Litchfield, Conn.—This invention more especially applies to drawer locks and small locks generally which are placed upon parts adjacent to each other, such, for instance, as the drawers of a bureau, the small doors of a secretary, etc., and which should be provided with different keys so that one key cannot unlock more than one lock.

HOISTING TACKLE.—J. C. Pierce, New Philadelphia, Ohio.—This invention relates to a new and improved tackle for hoisting articles, generally such, for instance, as hay from wagons into the bays of barns, goods in warehouses, etc. Its object is to obtain a device for the purpose specified, which will admit of the articles being hoisted and also conveyed, when in an elevated state, to the place where it is to be deposited.

GRINDING MILL.—Gilbert D. Jones, New York City.—This invention relates to a new and improved grinding mill, of the kind commonly termed the Chilian mill, and it consists in having the peripheries of the wheels or rollers of V-form, and the bed on which the wheels or rollers work provided with an annular V-groove for the peripheries of the wheels or rollers to work or run in. The invention also consists in the employment or use of scrapers applied to the machine in such a manner that by a very simple adjustment the material to be ground may be kept within the path of the wheels or rollers, and when sufficiently ground discharged from the bed plate.

HOLLOW AUGER.—Joseph Ward, New York City.—This invention relates to a new and improved hollow auger, for cutting tenons on the ends of spokes, and also on the ends of tool handles to receive the ferules, the holes in the handles to receive the tangs of the tools being bored at the same time. The object of the invention is to obtain an implement for the purpose specified, which will be capable of being adapted to cut tenons of different diameters as may be required.

Answers to Correspondents.

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

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

C. L. K., of Ill., asks:—Will there be any loss of water from a steam boiler with 75 lbs. pressure, supplying by means of a coil, steam for heating cold water or syrup, if the discharge of the coil is turned back to the boiler: and will the flow be kept up? We reply: If the coil is placed at a higher elevation than the boiler, the condensed water will be forced back to the water space of the boiler by the steam pressure, but not otherwise, as gravitation as well as the friction of the pipe must be overcome.

E. R. B., of N. Y., inquires why, when repeated hardenings of steel have cracked the metal, heating it to a low red and plunging in water will toughen it. Ede accounts for it by stating that repeated heating of steel abstracts the carbon and tends to return the steel to the condition of wrought iron.

A. P. H. D., of Wis.—There is no instrument corresponding in attractive power to a magnet, which has any value in discovering the precious metals. The "divining rod" is a relic of superstition and ignorance.

W. L. G., of N. Y., A. E., of Wis., and R. J. S. of O., suggest that W. F. D., of Conn. (page 406, Vol. XV.) has not taken care to remove the air from the upper angles or bends of his conduit pipes. Bubbles of air so confined have been the source of much annoyance. They are pretty sure to be found when the water is first let into an undulating pipe. The best way to remove them, is to close the delivery end of the pipe, and make small holes at the tops of the angles: as soon as the water flows out of the holes they are plugged up. If any of the angles are higher than the source, a suction pump must be used for them. When the water is highly aerated, as is often the case with spring water, the upper bends of the pipe should be provided with air chambers, each having a stopcock. This subject has been before discussed in this paper, and we took it for granted in our reply to W. F. D., that he was well informed on it.

H. W. H. of——.—Any person may call an article patented, or unpatented, in an advertisement. The law imposes a specific penalty only, when an article is stamped patented upon which no patent exists. If any person were to suffer by the deceptive advertisement he would have a remedy by writ at common law.

F. N. B., of Wis.—The bubble of air is to be removed from your barometer by inverting the tube and then dexterously moving it till the bubble escapes. But preliminary to this manipulation you must completely fill the well with distilled mercury and cork it up that the mercury may not be spilled. But if the instrument is valuable you will do better to send it to the manufacturer.

F. S., of O.—The mineral you send is iron pyrites or sulphide of iron. It is sometimes called fool's gold, and in small quantities it is worthless.

W. L. O., of Pa.—We know of no treatise on the gaging of casks. There is the gaging rod to be obtained at any tool store, which can be procured with directions for use. The contents of a cask can be approximately ascertained by measuring the various dimensions of the vessel and then performing a simple arithmetical calculation explained in almost any mechanical handbook.

J. Q. E., of Mass., asks how the wheels of a car rigidly secured to a common axle can turn a curve the inner rail of which is twenty feet shorter than the outer, without slipping. We answer, we do not know. We never supposed anybody thought they did. It is evident that either the outer wheel must drag or the inner one slip.

C. Oswego, N. Y.—Common gum copal varnish will preserve gun barrels from rust. A little boiled linseed oil may be mixed with it, and then it can be removed by turpentine.

Business and Personal.

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

Felix W. Robertson, of Galveston, Texas, wants to know where he can obtain a quick-setting and durable cement for cisterns. He builds cisterns of shells, sand, and Rosendale cement, which in the place where he operates will not harden except after an "inconvenient period."

I. T. J., 31 S. 3d street, Reading, Pa., wants descriptive circulars of spinning gins, hand looms, etc., for farm use. Also powder-drying machine, machine for making cigarettes, and most approved wind mills.

H. L. See back numbers of SCIENTIFIC AMERICAN as to steam plows.

E. H. Bell, Antestown, Pa., desires to know where he can obtain philosophical callipers.

The address of Mr. Rogers, the patentee of the "Naphtha Lamp," is wanted by Geo. H. Baker, Morenci, Mich.

B. and C., Canada, desire to know where they can obtain machinery for making solid-head pins. Also who owns the patent for tinning wire for pins.

Geo. P. Peck, Evansville, Ind., wishes to communicate with the agents or owners of Rodgers's Patent Gas Lamp, or Burner.

"Where can I get a Patent Chimney Jack," asks E. T. Barnum, Topeka, Kansas.

J. R. Lente, Blooming Grove, N. Y., desires to communicate with parties who drill wells through sandstone.

Makers of Wells's Patent Circular Saws are requested to communicate with J. A. Demuth, Forest City, Mo.

Inventions Patented in England by Americans.

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

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,007.—FLOOR COVERING.—James H. Spencer, Philadelphia, Pa. Nov. 16, 1866

3,009.—MANUFACTURE OF LADIES' SKIRTS.—Morris Opper, New York City. Nov. 16, 1866.

3,134.—MODE OF AND MEANS FOR REGULATING AND REGISTERING THE TENSION OF PIANOFORTE STRINGS.—Levi L. Tower, Boston, Mass. Nov. 28, 1866.

3,237.—MACHINE FOR PEGGING BOOTS AND SHOES.—Reuben W. Drew, Lowell, Mass. Dec. 8, 1866.

Improved Grinding Mill and Brick Press.

The advantages claimed for the machine herewith represented, are that it is equally well adapted for both common and pressed bricks, can be worked by hand, steam, or horse power, tempers and grinds the clay perfectly, and works with great rapidity.

Fig. 1, shows a perspective view, and Fig. 2 a view of the under side exhibiting the working parts of the press. The mill can be built either of wood or iron, or a combination of the two. Standing vertically in the center is a shaft armed with knives projecting radially from it in regular horizontal planes from the top to near the bottom. The bottom row consists of much broader knives, which act as scrapers. All these knives have their cutting edges turned upward at an angle of about thirty degrees, gradually forcing the clay downward while finely cutting and mixing it.

Fig. 1

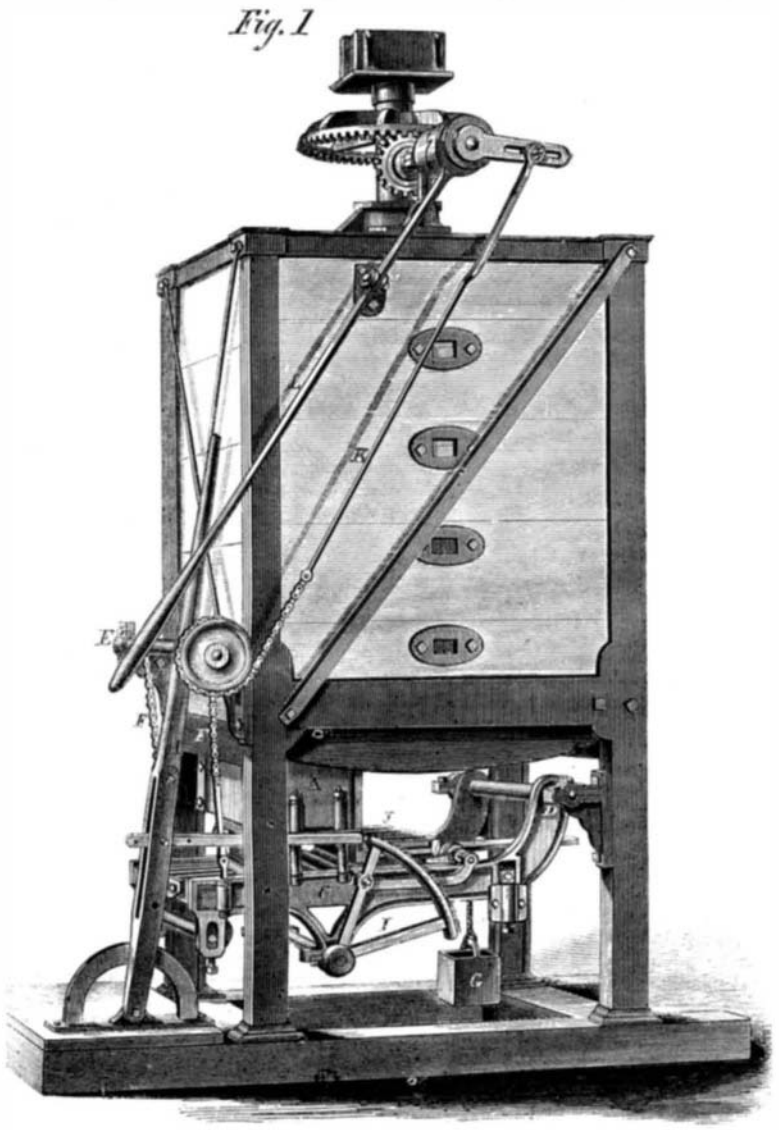
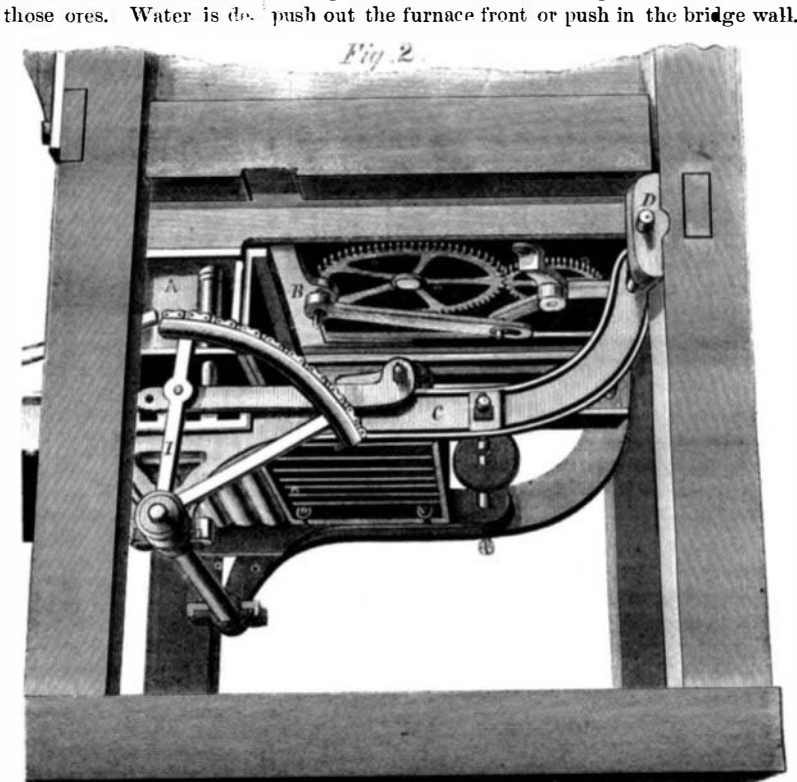


Fig. 2



LAFLER'S GRINDING MILL AND BRICK PRESS.

The press box, A, is secured rigidly to the under side of the frame. It is a box of metal, having enclosed sides and ends and open at the top and bottom, the aperture at the top communicating with the interior of the mill. A slide partly seen at B, Fig. 2, when the press box is filled, advances across the top of the box on slides, and closes communication between the box and the mill. Fitting into the press-box is a clod-crusher or plunger, open at top and bottom, and divided by partitions to form the bricks. This plunger is secured to the frame, C, which is pivoted at D, and has a vertical motion by means of the shaft, E, and chains, F, in combination with the weight, G, (shown in Fig. 1). The upright lever, H, in the front of the machine, same figure, operates the segment, I, which advances the follower, J, and pushes the filled molds to the front of the frame.

The operation is as follows: A bottom board, with pallets for each brick, is placed upon rollers in the frame, C, the press box being filled with clay, when the slide, B, moves forward and makes a base for the follower or plunger, which is forced up into the box, pressing the clay into five separate bricks. The frame, C, is then lowered, and the slide, B, receded, the bricks by the downward action of the plunger are deposited upon the pallet boards and pushed forward by the follower, J. They may then be removed and set on edge in hakes or on shelving for drying. For nice pressed bricks, a hand-wheel with radial levers may be placed upon the shaft, E, for raising the frame, C, and any amount of pressure required be exerted. For ordinary bricks the machine works automatically, the frame being raised by the rod and chain, K, attached to the lifting shaft, E. This chain and shaft are worked by the bevel gears at the top of the mill, the connection being made by a clutch and lever, L, the action of the slide, B, being controlled and regulated by the gears and levers at the bottom of the mill, seen in Fig. 2.

The plunger is sustained in position by rubber springs surrounding bolts at each end of the box, A. This secures against the breaking of this portion of the machine if any foreign substances should by accident get into the clay. The hight of the frame, C, can be regulated by a shaft under its front end, having an eccentric cam secured to each end of it.

The change from the conditions required for pressed brick to those for common brick can be made in a few minutes. The machine is highly recommended by those who have used it, and on trial has made 6,300 bricks in one hour, and is said to work ordinarily at the rate of from 35,000 to 40,000 bricks per day of ten hours. It is claimed that the pressed bricks made by it are superior to those made in the usual way. The action of the plunger leaves no vacuum in the press box, the clay filling the box instantly, as soon as the plunger is withdrawn. It was patented by J. A. Lafler, Jan. 6, 1863. For information relative to rights to use, or for territory, address the patentee at Albion, Orleans Co., N. Y.

Magnesium.

The usefulness of magnesium as a re-agent, is of peculiar importance. Iron, zinc and cobalt are precipitated from their oxides in a highly magnetic and brilliant condition, by immersing magnesium in an acidulated solution of those ores. Water is decomposed and pure hydrogen is evolved with great rapidity, in consequence of the eager affinity of this metal for oxygen, by simply dissolving in the liquid in which it is immersed, a little sea salt, sal ammoniac, or acid of any kind. Gold, silver, platinum, bismuth, tin, mercury, copper, lead, cadmium, thalium, and other metals, are also precipitated by magnesium, which is therefore valuable for the detection of mineral poisons: but the metallic bases of arsenic and antimony are not precipitated from their acid solution, because they combine instantly with the hydrogen evolved. As an element of the galvanic battery, and an illuminating agent, these properties of magnesium render it highly effective. A grain and a half of magnesium, with a similar plate of copper, immersed in acidulated water in a glass tube, is sufficient to keep a small electro-magnetic apparatus in motion for nearly ten minutes, and to produce an illuminating jet about four inches in length.

Small Inventions.

In a recent trial in England, Mr. Nasmyth made the following observations on the influence of a small modification on the success of greater inventions. He remarked that "One of the most successful inventions of the day is that, in sugar refining, of the application of the apparatus which used to be applied for drying cloth and getting rid of water from textile fabrics. It was a patent of Mr. Bessemer's for getting rid of the molasses from sugar, by the rapid whirling of this vessel. It was found that the outside of the vessel being covered with wire cloth so as to allow the molasses to escape and yet retain the sugar, the molasses gathered on the outside of the wire cloth and collected there in a coating. After some of the most ingenious minds had been applied to it, and one of the most ingenious men of the day, Mr. Bessemer, the whole thing failed on account of the simple difficulty that remained, a difficulty which stood for some years. But another inventive man suggested that by blowing a small stream of steam on on the outside of the wire cloth, it would just so much dilute the treacle as to allow the treacle to be operated upon by centrifugal action. That small jet of steam made the invention entirely successful. It was one of those trifling little things that it surprises one it should not have been thought of, but it sometimes requires the most profound philosophers to do these things. It was thus with Watt's separate condenser."

A Workingmen's Supply Association.

In No. 20 of Vol. XIV. of the Scientific American we described the plan of a supply store established by the employees of the Novelty Iron Works, in this city. We now have before us the annual report, which presents a very gratifying exhibit. The goods—articles in common use for families—are bought by wholesale and sold at a retail price to the employees of the Novelty Works alone. Once in four months a percentage—the profits over expenses—is divided among the purchasers in a rate proportioned to the amount of their purchases. A dividend of five per cent was made Dec. 22d, 1866. The enterprise has proved to be eminently successful, giving complete satisfaction to all, and enabling the workmen to obtain their household necessaries and comforts at the lowest market prices, in addition to receiving a percentage on their purchases. In the article referred to we fully described the *modus operandi*, but if the employees of other establishments desire further information, with a view of starting a similar store, we refer them to John L. Smith, Secretary of the Association, at the Novelty Works.

Sagging of Grate Bars.

Alluding to the complaint of one of our correspondents, in our issue of Dec. 15th, that his grate bars bent and sagged to a great extent, R. J. S., of Ohio, remarks that it is customary to rest the ends of the bars on a support having a face at right angles to the bearings, so that if the grate bars should expand in length the ends would thrust against the face and tend to push out the furnace front or push in the bridge wall. Generally, however, the heated bars sag and remain bent. This face against the ends of the bars affords a lodgment for ashes in cleaning out the furnace when cold, which becomes compressed as the bars expand by heat, and offers a fulcrum for them to act against, although their ends may not reach the face of the cross bar. Our correspondent thinks the thrust faces of the supporting bars should be discarded.

California Silk Culture.

A California letter-writer ("Mark Train") asserts that "the dry, sunny, mild and balmy atmosphere of California, and especially of San Jose Valley, is unsurpassed in all the world for the production of raw silk. The mulberry tree springs up in a shorter time, flourishes more luxuriantly, and is blessed with a greater freedom from disease or blemish of any kind, in this State, than in almost any other country. Its trunk attains a circumference of two or three feet in six or seven years, and slips will grow to the hight of ten or twelve feet in a single year. When a climate can be found which insures the mulberry tree against disease, no occupation is so free from risk and so surely profitable as the silk culture; and California furnishes that climate. Therefore, there is little question that she will one day become a great silk-growing State. The State legislature has instituted very fair premiums for the encouragement of the silk interest. There were about 200,000 cocoons produced in California this year, half of them by Mr. Prevost, of San Jose. A silk manufacturing company has been formed at San Jose, machinery has been purchased, and the buildings are now in process of erection. Silk can be manufactured in San Jose, with Chinese labor, cheaper than it can be imported.

"Mr. Prevost raises his cocoons in a garret about 40 by 12, which has no ventilation, and where the thermometer gets up to 107 sometimes—a state of things which no silk worm would put up with in any other country—yet the beasts eat ravenously, live happily, and curl up in July or August and die with unalloyed satisfaction. They weave a silken winding-sheet for themselves, and always take a pride in getting it up the best they know how. If these shrouds are to be sent to the factory, the life of the imprisoned worm must be destroyed. If not, that worm turns into a very imbecile-looking and inferior quality of butterfly, and bites a hole in the end of the cocoon and climbs out. And as long as it lives, it never takes any interest in any thing but laying eggs. It lays them by the thousand, and they turn to worms and fall to eating mulberry leaves with an avidity that shows that they mean business. A hundred thousand silk worms at dinner at once make a noise with their teeth something like the racket of a steam printing press. A cocoon averages 800 yards of fiber, or 200 to 250 yards of thread—about one spool, I should say. Woven into cloth, it will make a strip of silk goods a yard long, and an inch wide."

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VOL. XVI., No. 3....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, JANUARY 19, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

Subscriptions to our new Volume are pouring in from every direction far beyond our expectations, and we desire to thank our host of friends for their very generous co-operation in promoting our circulation, which is now much larger than at any time since the SCIENTIFIC AMERICAN began its existence. We shall endeavor not to disappoint the expectation of our readers. Five Editors are constantly employed on the Scientific, Mechanical and Literary departments of the paper, and are prepared to discuss all questions that belong to the character of the paper, in a plain practical manner.

Owing to the great number of claims of patents—covering about six pages—we are compelled to issue with the present number a four-page supplement. We would have gladly avoided the trouble and expense attending the supplement, but we did not feel willing to deprive our readers of the amount of excellent matter which will be found in this issue. The list of claims embraces the issues of two weeks; something that is not likely to occur again this year.

HANDLES---THEIR VARIETY AND ADAPTABILITY.

Does any one who uses some of the multifarious tools which pertain to the manipulation of the mechanic arts—to labor in all its branches—ever note the almost infinite variety of the appendages adapted to them to fit them for effective use? The handles differ as widely as the tools themselves. Without noticing the different manner in which the tools are attached to the handles, the variety in form and structure of the handles themselves, is surprising. Many of these appendages show plainly the object of their peculiarities. For instance, the scythe snath has a very crooked appearance viewed as a piece of timber, but every curve has its object. Where the handles proper are attached, it approaches a horizontal, when in use. Below the lower handle it descends at an angle, with a curvature intended to present the blade to the grass near the ground and to swing clear of the body in using. A straighter snath would compel the mower to stoop uncomfortably and add greatly to his labor.

Some handles are long, as that of the hand rake and hoe; others short, as the ax, the hammer, the mallet. But each one has its peculiarities. The handle of the carpenter's hammer is very different from that of the machinist's hammer. Those not acquainted practically with the details of the business of the carpenter and joiner and of the machinist, might not be able to distinguish, at first sight, in what that difference consisted. The carpenter's hammer is used for driving nails into a readily yielding substance. The handle is rigid; it gives a dead blow. The machinist's hammer is used on comparatively unyielding substances. If rigid it would jar and partially paralyze the muscles of the arm. For "chipping"—cutting iron by means of a cold chisel—the blow is received on the end of a steel chisel and transmitted through it to the rigid surface of wrought or cast iron. It may be called a spring blow. Soon as the hammer face strikes the chisel head it rebounds. All good chippers understand the necessity of having the hammer handle elastic. To produce this proper elasticity and graduate it exactly to the work to be performed, the workman will sometimes spend hours in rasping, scraping and sand-papering the wood. The blacksmith's hammer, on the contrary, has a stiff, unyielding handle, although used on the same material as that of the machinist. But in this case the material is soft and malleable.

Why do the handles of the sledge and the ax so widely differ in form? The ax may be nearly as heavy as a light sledge hammer and the handles of about the same length, but in no other respect have they any similarity. The sledge handle is straight and the ax handle curved. But the sledge and ax are not only used on different substances, but in a different manner. The striker grasps his sledge, one hand at the end of the handle and the other advanced, holding each to its place while the blow is delivered. He does not change the relative positions of his hands in striking. Even in delivering a swinging blow both hands remain together at the end of the handle. But see how the wood chopper handles his ax. With one hand at the end and the other in advance he swings his ax, bringing the advanced hand, with a quick, sliding movement, back to the end hand as the ax descends. Only women, unaccustomed to the ax, use it as the striker does the sledge. Now we see the reason of the downward, inward curve of the ax handle. The curve facilitates the downward movement of the hand by making the position of that portion of the handle more perpendicular as the blow is given. It is notorious among blacksmiths that the country lad, accustomed to the use of the ax, requires long practice and repeated instructions before he becomes a good striker. We recollect a laughable incident, that was nearly a serious accident, in illustration. A farmer's boy in a smith's shop was requested to aid in "upsetting" a bar at the end, the bar being laid across the anvil and held by the forger. He gave a blow ax fashion in this unusual, horizontal manner, and missing the bar, struck the stooping blacksmith full in the forehead, instantly "upsetting" him.

The advantage of a handle adapted to the work to be performed is exemplified in the difference between that of the modern shovel and spade, and that of the ancient mattock, or a spade of fifty years ago. This last was perfectly straight with a cross piece at the end. Being straight, the labor of pressing the blade into the soil was greater than it is with a curved handle, as the hand and foot were compelled to act in the same line. Besides, to retain the load on the spade or shovel, or to carry it, required a very strong grasp to prevent tilting. The downward curve of the shovel handle raises the point of suspension of the load, so that the center of gravity falls below the lifting force. The wooden grain shovel with its spoon-like scoop is a case in point. The advantage of this position of the load beneath the point of suspension can be easily tested by attempting to carry a shallow pan full of water by grasping the rim and a pail filled by using the bail.

Real science is shown as much in the form and adaptability of handles as in any mechanical device; and science is necessary: for if we examine the simple tools of savage peoples we shall see that it is not often the handles are well adapted to the work for which the tool is designed.

REMEDY FOR SMOKY AND DANGEROUS FLUES.

We are under obligation to Dr. Alex. H. Stevens of Huntington, L. I., for valuable suggestions relative to the construction of chimneys and fire flues in buildings. Most fires originating in flues, may be referred directly to the unphilosophical shape in which they have been constructed from the first, in deference to the rectangular form of bricks, and with the object of flattening them into thin walls. A given area for draft is obtained, by this form, with an excessive inner surface of masonry to abstract the heat of the ascending draft and thus diminish its force. At the same time, the corners, detaining warm air by their frictional resistance, invite counter currents of fresh air down the chimney, which not only diminish the draft proper, but increase the danger from the detention of fire, and materially assist combustion within the flue whenever a heated beam is ready to receive oxygen and burst into flame. Worst of all, the broad flat flues cannot well be avoided far enough by the timber ends set in the wall, to prevent frequent fires from their close proximity to the hot draft.

Dr. Stevens has constructed the fire flues of a number of dwellings with reference to these considerations, and as he informs us, with remarkable success. His flues were made in the form affording a given draft area with the least inner surface to abstract heat and oppose frictional resistance to the draft; leaving no corners as channels for counter currents; from each of these causes giving better draft with flues of less size; and by the size and shape of the flues permitting the floor timbers to be inserted in the wall at a safe distance from their inner surface. This form, it is unnecessary to state, is cylindrical. His experience indicates that eight inches would be sufficient diameter for the largest flues, while six-inch and even four-inch flues of this form, for ordinary dwellings, will give better drafts than those generally in use. An arrangement of three six-inch flues for one chimney, allowing four-inch timbers with the corners bevelled off to be set four inches into the wall between them, at a distance of six inches from each flue, would require an enlargement of the wall to twelve or fourteen inches in thickness, for a breadth of not more than three and a half feet. The expense of constructing a cylindrical flue need be no greater than that of a rectangular one: the mason needs nothing more than an old joint of stove-pipe to work around.

A simple contrivance for at once strengthening the draft of a smoky chimney, and so applying abundant fresh air as neither to exhaust that in the room nor reduce its temperature, was observed by Dr. Stevens in Paris when a medical student there, as long ago as 1812. It is called a *ventose*, and is nothing more than a tube of properly adjusted diameter, let down the chimney from a hole in its side near the roof, and opening directly under the fire. The descending current of cool fresh air supports a vigorous combustion, and leaves the atmosphere of the room undisturbed by currents, for the use of the occupants.

ANOTHER GREAT WORK PROJECTED.

Damming the St. Lawrence, is the topic of the day with the citizens of Montreal. Monstrous as the undertaking seems, engineers have laid it out, and capitalists are about to apply to parliament for a charter incorporating a capital of two millions of dollars for the purpose. It is needless to remark that the waterpower to be obtained by a successful accomplishment of this work would be many times greater than any other in the world, and could not fail to build up a mighty manufacturing metropolis around the present nucleus called Montreal. At the same time, the city would acquire what it must soon have by some means, a head of water and a pumping power adequate to its own supply.

The arrangements of nature to facilitate the giganticwork, are quite interesting. The Lachine rapids, just above the city, are said to afford a fall of twenty-five feet in about a mile. They are divided longitudinally by a series of islands running their entire length, and forming with the northern bank of the river a natural enclosure, lacking only the proposed dam at its lower end to make an enormous basin and to convert the rapids into a smooth mill-pond or rather lake, with a semi-Niagara at its outlet, and a hydraulic power estimated as two millions of horses. There is also another natural channel running between the islands, which admits of being made into a mill-stream of seventy-five thousand horse power. To complete the work of nature in this way, requires a dam two thousand eight hundred feet in length, leaving the southern and only navigable channel open for commerce, and the shoal rocky bed of the river below the dam, besides the shore, for the accommodation of a city of mills and factories. A great canal is also to be led inland from the new lake, to supply other factories and conduct an abundance of water to the city.

EXPLOSIONS FROM OVERHEATING BOILERS.

We have a communication from an able correspondent relative to the causes of steam boiler explosions, in which he reckons the following as a prolific cause: "The sudden formation of steam caused by a change in the position of the boiler, the sudden starting or stopping of a locomotive, the rolling of a steamer, or any sudden shock given the boiler. This formation of steam is caused by the water in the boiler being thrown suddenly on the sides of the boiler not before covered by water. An immense volume of super-heated steam is thus formed, as it were in an instant, exerting a greater pressure than that which the boiler is calculated to withstand."

We do not entirely agree with our correspondent in his views. If they were correct, explosions of the boilers of sea-going steamers should be much more frequent than they are. An article in the London *Mechanics' Magazine* puts the subject in a more reasonable light, we think. This article says:—

A great number of boiler explosions are attributed to overheating: in fact some theorists go so far as to assume this as the general cause of such catastrophes. Now this theory, taken in a broad sense, is a false one, although it is possible that a boiler may be exploded by the formation of a great quantity of steam from water thrown upon red-hot plates. But a consideration of some of the phenomena of heat places this possibility at the farthest limit, and the occurrence of an explosion from such a cause only just within its bounds. We quench the heat of a railway tire in a cistern, and why may we not as safely fill a red-hot boiler with cold water? It is surprising to see how small a quantity of steam is disengaged when a large body of wrought iron is plunged into twice or thrice its weight of cold water. Now if we reverse the operation and dispose the same weight of metal in the form of a boiler, heat it to the same degree, and throw the same quantity of cold water into it, is it not reasonable to expect that exactly the same amount of steam will be produced? If so, where would be the harm done to the boiler beyond the damage inflicted upon the iron by burning?

If we look into the matter a little more closely, we shall find that the metallic plates of a steam boiler are not capable of containing sufficient heat to change a very large quantity of water into steam. The total quantity of heat which would raise the temperature of 1 cwt. of iron through one deg. would, according to the best authorities, impart the same additional temperature to 12 1-2 lbs. only of water. And this makes it clear that overheating is not the sole cause of an explosion, although it may lead to a rupture by weakening the plates.

The writer fortifies his position by the following account of an experiment:—

An empty boiler 25 feet long and 6 feet diameter, and with the safety valve loaded to 60 lbs. per square inch, was made red hot. While in this condition the feed was suddenly let on and the boiler filled up. The experimenters expected a mighty explosion, for which they were fully prepared, but no such event occurred, the result being simply a sudden contraction of the overheated iron, which allowed the free escape of the water at every seam and rivet as high as the fire mark extended. Although we were not witnesses of the occurrence, yet arguing upon the hypothesis regarding the action of heat already referred to, we cannot hesitate to accept the fact; the more so in that we have heard of other experiments of a similar character having been made, and which were attended with similar results.

Charles Wye Williams maintained that steam in a boiler under pressure is as much in the water itself as in the steam space. He contended that in the case of an explosion the globules of steam contained in the water and confined by pressure in a medium over eight hundred times denser than the steam alone, fly into the steam space when the pressure is removed, and expand in volume in proportion to the density of the two mediums, or over eight hundred times. The *Mechanics' Magazine*, however, adopts the theory of Mr. Zerah Colburn, and says:—

In all boiler explosions, the pressure of steam is instantaneously liberated from the surface of the hot water present