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New Mechanical Inventions.

A new form of Rock Drill, of the reciprocating type, has been designed by Mr. C. H. Chandler, of Foxcroft, Me. The drill point is cruciform in transverse section, having three of the wings or blades sharpened on the lower edges, and one wing squared and a little shorter than the others, the object being to crush the drill chips, keep the bottom of the hole free, and prevent the drill from entering too deeply into soft rock.

Mr. E. O. Leermo, of Gold Hill, Nev., proposes to make the Suction Pipes of mining pumps terminate in perforated nozzles attached by a ball and socket joint, so as to be readily removed out of the way of the workmen in sinking the shaft, and to be used in shallower water than a straight and rigid suction pipe can be.

A new Screw Propeller, which is claimed by the inventor, Mr. J. C. Capern, of New York city, to be unusually economical of power, has its blades formed in the section of a hollow semi-cone, having the flaring sides astern.

A machine for Cleaning and Condensing Lint Cotton as it comes from the gin has been invented by Mr. A. T. Hunt, of Arkadelphia, Ark. It consists of an inclined stationary or adjustable screen, made in sections, with parallel fingers, in connection with an endless belt having lateral combs or rakes.

Mr. W. F. Eyster, of Chambersburg, Pa., has invented an improved Water Motor for driving light machinery. The class of motors to which this invention belongs is that which employs a wheel having buckets upon its periphery, against which the stream of water is made to impinge. The improvements consist in the peculiar construction of the wheel, which is made of two convex disks with a trough-shaped periphery, carrying two rows of buckets; in the construction of the case, which is divided horizontally and arranged so as to be readily taken apart, and in the devices for preventing leakage at the joints.

Mr. Caspar Hübner, of Newark, N. J., has invented an improved Motor, applicable for purposes of locomotion,

such as propelling a hand car, and arranged so as to give out for a long time power which is stored up in heavy fly wheels. Motion is communicated to the fly wheels by means of cranks oppositely arranged and operated by hand levers.

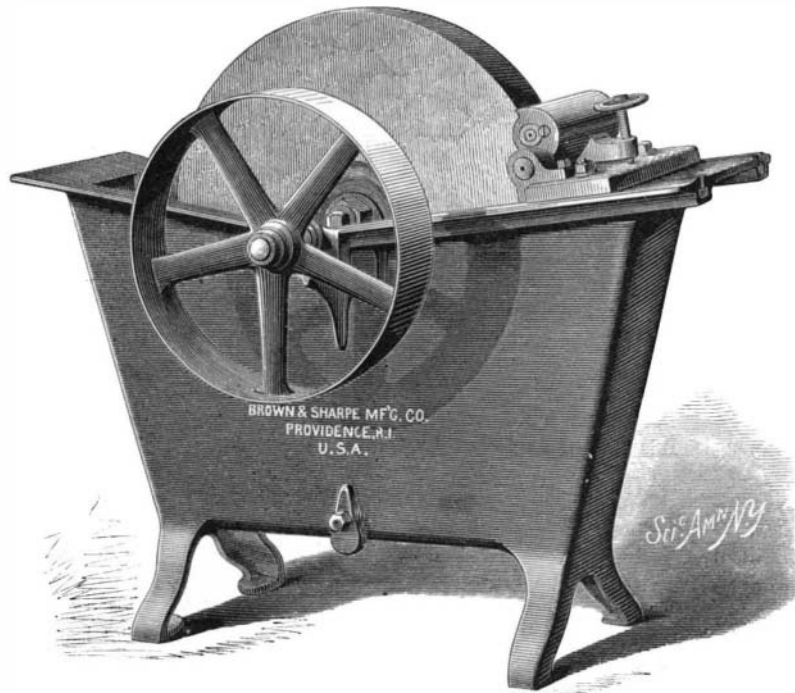


Fig. 1.—IMPROVED GRINDSTONE TROUGH.

An ingenious Hoisting Clamp for Barrels has been invented by Mr. W. Bulkeley, of Ballston Spa, N. Y. Two pairs of pivoted levers are connected at their lower ends by semicircular cross bars, and at their upper ends to a straight cross bar by links, the strain of the hoisting rope having the effect of tightening the hold upon the barrel in proportion to the weight of the latter.

IMPROVED MACHINE TOOLS.

In the annexed engravings we illustrate some new machine tools manufactured by the Brown & Sharpe Manufacturing Company, of Providence, R. I., all of which are noteworthy for excellence of design, finish, durability, and general efficiency. In Fig. 1 is shown a grindstone trough combining a number of very desirable qualities. In addition to the ordinary arrangement of trough, spindle, and pulley, it is provided with self-oiling journal boxes and an adjustable device for truing the grindstone. This device, shown in Fig. 4, page 274, can be instantly applied to the face of the stone, working automatically and without dust, keeping the stone always in good shape and condition without interfering with its constant use. The stone should be revolved so as to have the device upon the face which moves upward. The main stand or bottom piece of the device is securely clamped upon the trough close to the face of the grindstone, then by turning the hand wheel the threaded roll is brought into contact with the face of the stone and allowed to remain so as long as is requisite to produce the desired result. The water is left in the trough as usual, so that the device, while always at hand and in position, does not for an instant stop the continuous use of the stone. When the hardened steel threaded roll becomes worn it may be readily and repeatedly cut from time to time as occasion may require.

In Fig. 2 is shown a special automatic bevel and spur gear cutting machine, in which there are two separate heads upon one bed or frame. One of them is designed for cutting bevel, and the other spur gear, teeth. They are specially intended for cutting the small gears used upon sewing machines and other light machinery. Both machines are automatic in their movements to the extent of revolving, the wheels being cut from tooth to tooth, the cutter passing through for each tooth, and stopping when the wheels are completed.

Upon the machine for bevel wheels the movement of a lever places the wheel in position for the second cut, after

[Continued on page 274.]

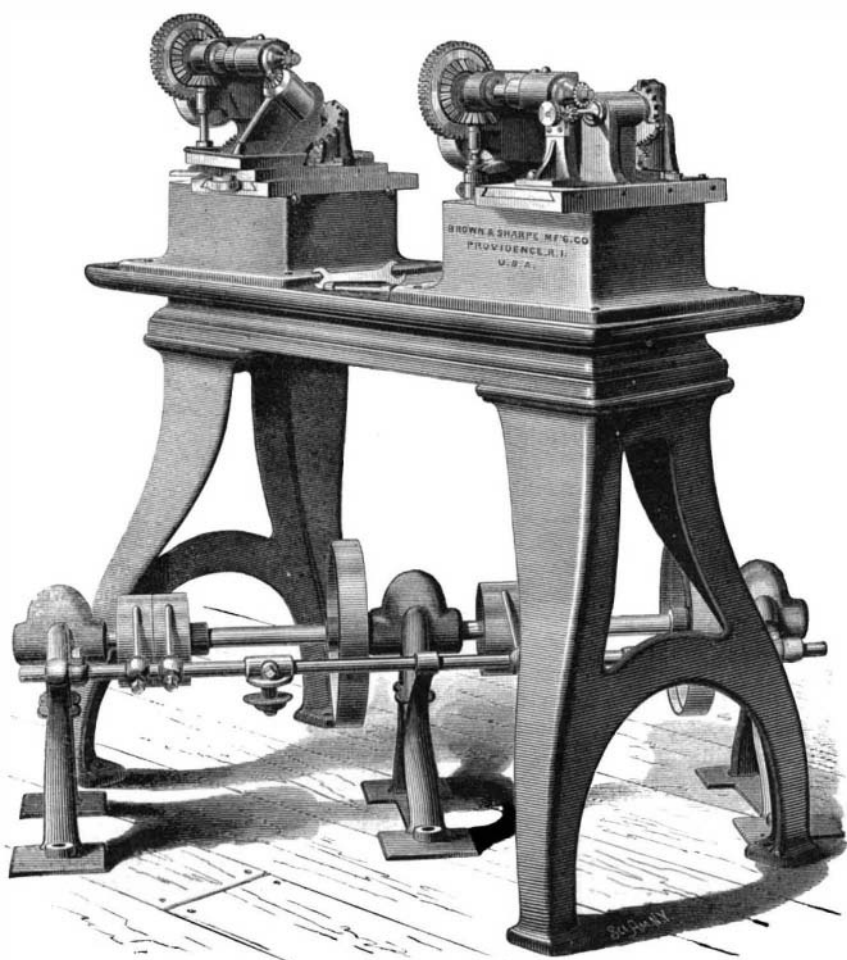


Fig. 2.—BEVEL AND SPUR GEAR CUTTING MACHINE.

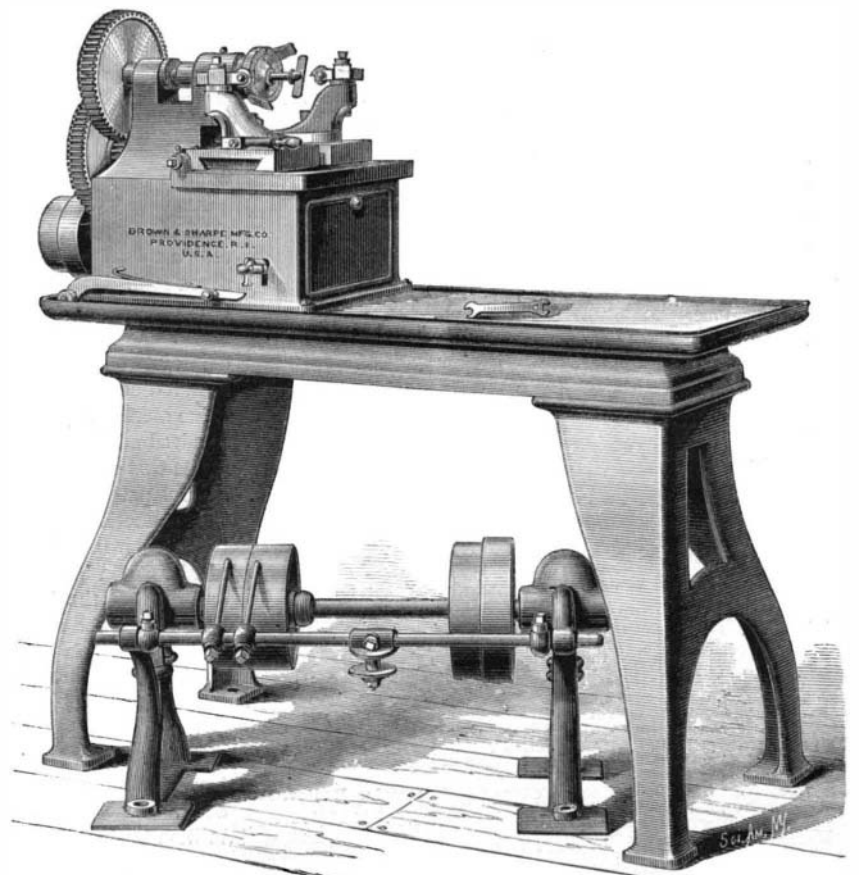


Fig. 3.—AUTOMATIC BALANCE WHEEL TURNING MACHINE.

New Inventions.

Mr. L. P. Taylor, of South Orange, N. J., has invented an improved Type Holder for Hand Stamps in which regularly recurring changes are made. The type box, having one or more compartments, is provided with lifters and followers which raise the type in turn, as desired, in a simple manner.

Mr. Jonathan Miller, of Hinrad's, N. Y., has improved upon the Apparatus for Making Tea or Coffee, previously patented by him, by modifying its form so as to adapt it to be made of stone ware.

An improved Latch, for barn doors and similar positions, has been patented by Mr. B. Hollingsworth, of Sigourney, Iowa. It consists of a pendent bolt dropping into blocks on the door casing and locking the latch proper, which is opened by a string from the outside, as usual. The bolt is raised or lowered by means of a cord, which is carried by pulleys to a convenient and concealed terminus.

Mr. H. L. St. Clair, of Vineland, N. J., has invented an improvement in hand Washboards. The bed, or friction surface of the board, is formed of rollers, which are square or polygonal in cross section. The labor of rubbing clothes on such a surface is obviously less than on a fixed surface. One of the side bars of the washboard is provided with a hinged section, which permits the rollers to be easily put in or removed as required.

A new Fire Escape has been invented by Mr. Sylvester Root, of Kentland, Ind. A drum, having two separated grooves, in which ropes are attached so as to wind in opposite directions, is mounted in a frame which is hinged at the side of the window casing, so that it will swing into and out of the window. The free end of the swinging frame is provided with hooks to catch on a bar which spans the window casing transversely, and serves to support the frame when the drum and ropes are in use.

Mr. E. F. Gordon, of Concord, N. H., has invented a strong and simple Clamp for general use. At the lower end of the standard a beveled head is formed, which fits into a dovetail slot in an iron strip let into the bench. The sliding arm of the jaw is operated by an eccentric lever, which is shaped so as to prevent it from turning when the jaw is under pressure.

A new process and apparatus for Extracting Glycerin from Fats has been invented by Mr. Frederick Sahlfeld, of New York city, who employs steam for the purpose of mixing the fatty matter and chemicals; not by direct action, but indirectly by the use of revolving steam-heated stirrers, the mechanical action and the contact of the surfaces of the stirrers with the fatty material expediting the separation of the glycerin.

An improved Chimney Cowl consists of a pipe closed at its upper end, and having lateral discharge openings near the top, and surrounded by a thimble, between which and the pipe are formed vertical passages for the discharge of smoke and movement of wind. This device has been patented by Mr. J. W. Androvatt, of Prince's Bay, N. Y.

Mr. Moritz Leiner, of New York city, has patented an improved Brush, for bathing and other purposes, composed of a series of round brushes made of bristles retained in twisted wire strands, the brushes being attached to flexible bindings at the ends, and provided with a suitable handle.

A convenient Device for Sizing Rings, intended for the use of jewelers, has been patented by Mr. Edward Davies, of Brooklyn, N. Y. It consists of a die plate having a number of tapering holes of different sizes, in connection with a corresponding number of tapering punches having annular recesses at the ends, fitting the different sizes of rings, and either contracting or expanding them by driving them into the die holes.

Influenza.

Dr. D. H. Beckwith, in a paper published in the Cincinnati *Medical Advance*, says: "That theory which commends itself to my acceptance is that a deficiency of ozone in the atmosphere will cause influenza, catarrh, hay fever, cholera, scarlatina, and diphtheria, while an increase of ozone in the air will increase bronchial and pulmonary diseases.

"Ozone is defined to be 'oxygen in an active or highly negative state.' Ozone is a constituent in the air, and is remarkable in its properties. It has an odor similar to a spot that has been struck by lightning. In quantities—that is, an excess in the atmosphere—it will attack the mucous membrane of the throat, nose, mouth, and bronchia," so says Hartly. Short says, in his 'Chronological History of the Weather': 'Thick ill smelling fogs are preceded by attacks of epidemic catarrh.'"

IMPROVED MACHINE TOOLS.

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which the same automatic movements are repeated, completing the wheel. The spindles run in anti-friction boxes

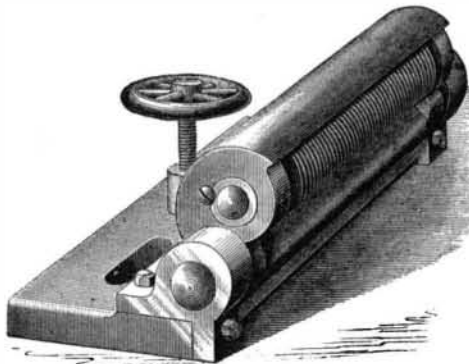


Fig. 4.—GRINDSTONE TRUING DEVICE.

provided with means of compensation for wear. The machine is of neat design and carefully constructed, and is accompanied with complete self-oiling overhead works. Special fixtures for wheels of any given form and size can be readily attached, while, on the other hand, one machine only can be supplied if required. With the two machines upon the one bed the weight, including the overhead works, is about 1,000 lbs. The heads, having what is technically known as a box frame, are very strong and rigid in proportion to their weight, while their interiors can be used as closet room for the cutters.

Fig. 3, page 271, shows an automatic balance wheel turning

spindle of the machine and the tool posts automatically cease revolving. The centers around which the tool posts revolve are adjustable, and allow a variation in the size of the wheel to be turned of from 6 inches to 7 inches in diameter, this adjustment being made by simply turning a screw.

The feed works or motion are all inclosed in the base of the machine, and are readily accessible for oiling. The spindle of the machine is of steel, made with large bearings working in boxes, which are provided with means of compensation for wear, and is strongly geared. The cone has two speeds, and is driven by a belt 1 1/4 inch wide. With the countershaft, self-oiling hangers, etc., the machine weighs nearly 1,000 pounds.

Driving Piles in Sand.

The contractors who had charge of preparing the sheet piling which was to protect the hospital at Berck-sur-Mer, in France, were much troubled in driving the piles by the compactness of the wet sand, and finally made use of tubes which were driven at the same time with the pile, their lower ends being a few inches below the points of the piles; through these tubes water was forced by small hand engines, and so loosened the sand that the advance of the pile was easy and rapid. In the case of the panels of sheet piling, the benefit was even more marked. Careful observations showed that by the ordinary process it took, on an average, 185 strokes to drive a ten inch pile ten feet, while 900 blows were needed to drive the panels. The hammer weighed 1,320 pounds, and had a fall of six and one half feet. The average time required to drive a pile and panel was eight hours and a half. After the device of loosening the sand by the pressure of water was adopted it was found that the average time required to accomplish this was one hour and nine minutes, while to drive a pile and a panel more than fifty blows were never required, and often the mere weight of the hammer was enough to sink the pile.

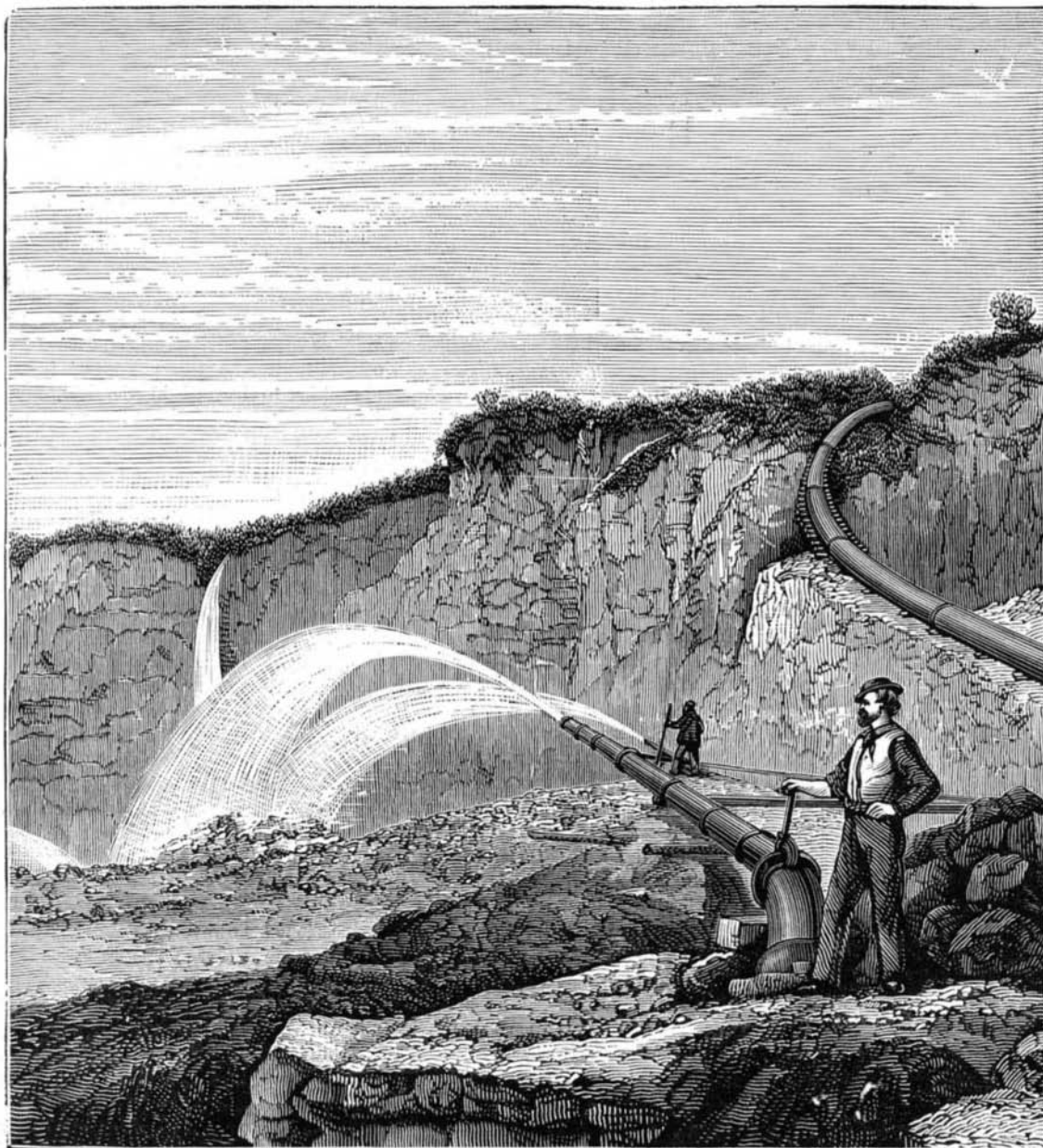
HYDRAULIC MINING IN CALIFORNIA.

The rich gold placers of California, where for a brief period fortunes were made by the use of the most primitive appliances, such as the pan, the rocker, and the "long tom," soon became exhausted, and it became necessary to turn to the original sources of gold in the quartz veins, or to work,

by combined and systematic effort and the aid of modern mechanical improvements, the masses of auriferous gravel which contained too small a proportion of the precious metal to be profitably treated by the early crude processes. Our engravings give a good idea of how the latter is accomplished.

In place of the pick and shovel, the disintegrating power of water is employed to break up the gravel, often cemented together and containing huge boulders, and convey it to the flumes, where the gold particles are separated by riffles, blankets, and other devices depending upon the action of gravity or the attraction of amalgamated plates. The success of operations depends rather upon the cheapness and amount of the water supply than upon the richness of the gravel; so low a proportion as 15 to 20 cents' worth of gold to the cubic yard of gravel being at times profitably extracted; while much richer gravel, in places where water is not abundant or has not the requisite fall, often fails to pay.

The water is conveyed from the upper reservoirs by wrought iron pipes capable of withstanding the pressure of a head of water many hundreds of feet high. The limit of strength of the best canvas hose of the necessary diameter is only about 50 feet perpendicular, and 180 feet when braced by "crinoline" of iron or rope netting; and hence it was soon displaced by the stronger material in all permanent workings. The

**HYDRAULIC MINING IN CALIFORNIA.**

usual dimensions of the iron feed pipes are from 22 inches to 40 inches in diameter, and 0.06 inch to 0.2 inch in thickness, or from No. 16 to No. 7. The water is led to a cast iron distributing box, permanently fixed, and from thence by short pipes to the nozzles. A great deal of ingenuity has been expended upon the construction of these nozzles, and the forms now in use are very effective and easily directed. The stream discharged from them has frequently a